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BGC Construction Pty Ltd

Report for Great Northern Highway - Lay Down Areas

Preliminary Environmental Impact Assessment Turkey Creek Lay Down Areas

May 2009

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

Contents

Table Index

Figure Index

Appendices

1. Introduction

1.1 Background

BGC Contracting Pty Ltd (BGC) has been contracted by Main Roads Western Australia (Main Roads WA) to undertake a shoulder reconstruction on sections of the Great Northern Highway.

BGC propose to create two lay down areas approximately 20 km north of Turkey Creek (the Project Areas). The location of the proposed lay down areas is shown in Figures 1 and 2.

The first lay down area will be situated within the existing road reserve, adjacent to Great Northern Highway, at SLK 3003.8.

The second lay down area will be situated in the road reserve somewhere between SLK 3005.2 and 3006.2 along Great Northern Highway. The exact location of the lay down area will be confirmed after a site inspection is conducted to find a suitable flat area, away from the beds of the numerous intermittent creeks in the area.

Both lay down areas will be used from July to October 2009 to store locally carted gravel during road works. A clearing area of approximately 150 m by 75 m will be required at each of the Project Areas.

1.2 Purpose of this Report

BGC has commissioned GHD Pty Ltd (GHD) to undertake a Preliminary Environmental Impact Assessment (PEIA) for the proposed Project.

This report details the findings of the PEIA undertaken for the Project Area, and

- describes the significant aspects of the existing environment;
- details the primary environmental and social impacts of the proposed works;
- identifies any matters likely to warrant referral to the Environmental Protection Authority and/or the Commonwealth Department of the Environment, Water, Heritage and the Arts; and
- provides recommendations for additional investigations that may be required to clarify the expected environmental impacts of the proposed works.

2. Environmental Aspects

The key environmental aspects considered for the proposed Project are listed in Table 1. The potential impacts for the relevant environmental aspects are examined in more detail in Sections 4 and 5.

Note: Where issues were not considered relevant to the Project a justification for their exclusion has been included in Table 1.

Table 1 Environmental Aspects Considered for the Project

Environmental Aspect	Yes	No	Comments
Adjacent Land-uses	√		Addressed in Section 3.2
Surface waters / drainage (watercourses, stormwater disposal, water quality, proclaimed waterways)	√		Addressed in Section 3.4.1 and 3.4.2
Groundwater	√		Addressed in Section 3.4.3
Wetlands	√		Addressed in Section 3.4.1
Salinity		√	No salinity issues are known to occur within the Project Area.
Reserves and conservation areas; including Environmentally Sensitive Areas	√		Addressed in Section 3.5
Vegetation – clearing	√		Addressed in Section 4
Vegetation – associations, representativeness and clearing	√		Addressed in Section 3.7
Vegetation – threatened species and communities	√		Addressed in Section 3.8 and 3.9
Vegetation – dieback and other diseases or pathogens		√	No known dieback exists within the Kimberley Region. No other diseases or pathogens are considered relevant to the Project Area.
Vegetation – weeds	√		Addressed in Section 3.10
Fauna	√		Addressed in Section 3.11
Heritage (non-indigenous)	√		Addressed in Section 3.12
Aboriginal heritage	√		Addressed in Section 3.13

Environmental Aspect	Yes	No	Comments
Noise and Vibration	√		Addressed in Section 3.14
Air Quality		√	The Project is not expected to impact upon regional air quality.
Dust	√		Addressed in Section 3.15
Visual Amenity	√		Addressed in Section 3.16
Public safety and risk	√		Addressed in Section 3.17
Contaminated sites		√	No known contaminated sites are located within the Study Area. Due to the historical and present land-use (cattle grazing), the risk of contaminated sites occurring within the Study Area is considered extremely low. A search of the Contaminated Site database (Department of Environment and Conservation, 2009a) did not identify any known sites within the vicinity of the project area.
Acid Sulphate Soils		√	The probability of Acid Sulphate Soils occurring within the Study Area is extremely low (Commonwealth Scientific and Industrial Research Organisation, 2006).

3. Existing Environment

3.1 Climate

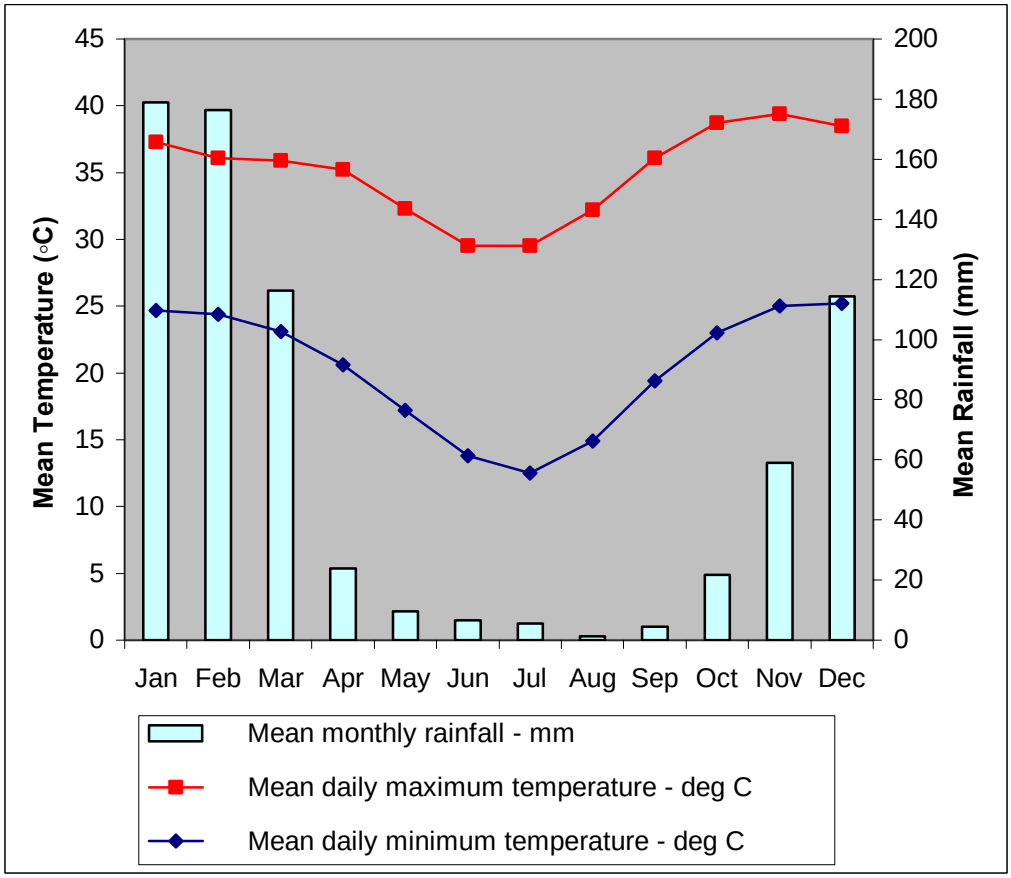
The Kimberley Region has a tropical monsoon climate dominated by two seasons, referred to as the 'wet' and the 'dry', separated by short transitional periods. Hot, humid and high rainfall conditions characterise a wet season, extending over the months from November to April. The region receives around 90% of its rainfall during this season; mainly from thunderstorms, monsoonal rain and occasionally, tropical cyclones. The dry season occurs from May to October as high pressure systems dominate the weather patterns with south easterly air flows from the interior bringing sunny days and cooler nights (Kimberley Development Commission, 2009).

Extreme weather events are a significant component of the Kimberley climate. Tropical cyclones and tropical storms can bring heavy and sustained rainfall, particularly in the months leading up to and during the wet season. It is common for a large proportion of the Regions' rainfall to be recorded in one single event, leading to extensive flooding of rivers, creeks and roadways.

The closest Bureau of Meteorology weather station to the Project Area is at Warmun, located approximately 21 km to the south. Recorded climatic data for this weather station is presented in Graph 1 and summarised as follows:

- Mean Daily Maximum Temperature: 39.4°C (November) to 29.5°C (June/July)
- Mean Daily Minimum Temperature: 25.2°C (December) to 12.5°C (July)
- Mean Annual Rainfall: 724.1 mm

Source: Bureau of Meteorology (2009)



Graph 1 Warmun Temperature and Rainfall

3.2 Landuse

The Study Sites are situated within the Shire of Wyndham-East Kimberley. The Lissadell Pastoral Lease runs along both sides of the Great Northern Highway at the proposed Project Areas.

3.3 Topography and Soils

The Project Areas are located within the Carr-Boyd Ranges Zone (Tille, 2006). This zone is characterised by hills, ranges and plateaux with some undulating plains on volcanic and granitic rocks. The area comprises of stony soils with some yellow loamy earths and deep yellow sands.

The Western Australian Geological Survey mapped soils in the region surrounding the Project Areas. Soil types likely to be found in the Project Areas are presented in Table 2.

Table 2 Soil Types

Project SLK	Likely Soil Types in Project Areas*
3003.8	Colluvium and rubble – sand, gravel, conglomerate and

Project SLK	Likely Soil Types in Project Areas*
	sedimentary breccia forming sheetwash fans and scree deposits Violet Valley Tonalite: fine to medium grained, weakly porphyritic biotite granodiorite and biotite-horblende tonalite; weakly to moderately foliated. Colluvium and alluvium – partly consolidated clay, silt, sand and gravel adjacent to drainage.
3005.2 - 3006.2	Quartz-K-feldspar-plagioclase-muscovite-biotite-cordierite-andalusite hornfels and hornfelsic (raft) migmatite

*Source (Thorne *et. al*., 1998)

3.4 Hydrology

3.4.1 Surface Waters

The Kimberley Region contains some very large fresh surface water resources. Waterways and wetland areas within the Kimberley Region are ephemeral, and typically flow or fill during seasonal rainfall events. The Great Northern Highway crosses many natural waterways, the majority of which are ephemeral. Bow River intersects the Great Northern Highway approximately 3 km north of the northern Project Area (SLK 3005.2 – 3006.2); and numerous intermittent streams are present in the region surrounding both Project sites (Figure 2).

3.4.2 Drainage

Numerous ephemeral drainage channels are present in the region surrounding the project areas. These channels drain either directly into Bow River, or indirectly though its tributary, Turkey Creek.

3.4.3 Groundwater Management Areas

A search of the Department of Water (DoW) Geographic Data Atlas indicated that the Project Area is not located within any Gazetted Public Drinking Water Source Areas, but is within the Canning-Kimberley Groundwater Area. The Canning-Kimberley Groundwater Area covers the entire Kimberley sub-region. This area was proclaimed in 1997 under the *Rights in Water and Irrigation Act* (1914) to ensure groundwater is abstracted sustainably (Department of Water, 2009).

The Study Area is also located within the Ord River and Tributaries Surface Water Management Area, proclaimed under the *Rights in Water and Irrigation Act* (1914).

The Act gives the DoW the power to manage ground and surface areas and use of land that may impact upon these water sources. Permits are required to allow abstraction or interference with the bed or banks of a watercourse to which there is access by a public

road or reserve, or to build or alter a dam on a proclaimed or prescribed watercourse or wetland.

BGC will need relevant approvals where dewatering, abstraction of groundwater or modification of stream banks, or the taking of surface water is required. The DoW will need to be consulted and the following approvals will be required.

- For dewatering – 'Application for a 5C Licence to take Groundwater' (Form A); and
- For modifying beds and banks – 'Application for a 5C licence to take surface water / Application for a 11/17/21 A permit to modify bed and banks / Application to amend a 11/17/21A permit to modify bed and banks' (Form C).

3.4.4 Wetlands

Australia is a Contracting Party to the Convention on Wetlands, signed in Ramsar, Iran in 1971 (the Ramsar Convention). This intergovernmental treated is dedicated to the conservation and wise use of wetlands.

Sites containing representative, rare or unique wetland types, or that are important for conserving biological diversity are contained within a List of Wetlands of International Importance (Ramsar sites).

Lake Argyle, Lake Kununurra and the Ord River Floodplain are Ramsar sites.

Creeks and rivers in the vicinity of the project site flow approximately 50 km along Bow River before it flows into the Ord River just upstream from Lake Argyle. Given the small area of clearing required at each of the Project Areas (~1.1ha) and low impact nature of the proposed works it is considered unlikely that the Project will have significant impacts upon any Ramsar sites.

3.5 Reserves and Conservation Areas

No conservation reserves or areas occur within the immediate vicinity of the Project Area. The nearest reserve to the Project Areas is Purnululu Conservation Reserve, which is situated approximately 37 km to the south east (Figure 1).

3.6 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are subject to definition under Section 51B of the *Environmental Protection Act* (1986). The Department of Environment and Conservation (2009b) does not identify any Environmentally Sensitive Area (ESA) within or adjacent to the Project Areas.

3.7 Vegetation

3.7.1 Vegetation Types

The vegetation of the Study Area is identified by Beard (1979) as likely to contain the following vegetation associations:

- Vegetation Association 825: Grasslands, high grass savanna woodland; cabbage gum & *Eucalyptus foelscheana** over upland tall grass & curly spinifex on basalt;
- Vegetation Association 833: Grasslands, short bunch grass savanna sparse low tree; scattered snappy gum over arid short grass on plains; and
- Vegetation Association 808: Grasslands, curly spinifex, low tree savanna; snappy gum over curly Spinifex.

* *Eucalyptus foelscheana* has been reclassified to *Corymbia foelscheana* since the naming of this vegetation association.

3.7.2 Vegetation in a Regional Context

A vegetation type is considered under represented if there is less than 30% of its original distribution remaining. From a purely biodiversity perspective, and not taking into account any other land degradation issues, there are several key criteria now being applied to vegetation in States where clearing is still occurring (Environmental Protection Authority, 2000), namely:

- The "threshold level" below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at 30% of the pre-European / pre-1750 extent for the vegetation type;
- A level of 10% of the original extent is regarded as being a level representing *Endangered*; and
- Clearing which would put the threat level into the class below should be avoided.

Such status can be delineated into five classes (Table 3).

Table 3 Vegetation Extent and Status

Class	Classification
Presumed Extinct	Probably no longer present in the bioregion
*Endangered**	< 10% of pre-European extent remains
*Vulnerable**	10-30% of pre-European extent exists
*Depleted**	< 30% and up to 50% of pre-European extent exists
Least Concern	< 50% pre-European extent exists and subject to little or no degradation over a majority of this area.

Note: * or a combination of depletion, loss of quality, current threats and rarity gives a comparable status

The extent of the vegetation in the Project Area is considered to be of *Least Concern*, with 100% of the pre-European extents considered to be remaining in both the Ord Ord Victoria Plain Biogeographic Regionalisation for Australia (IBRA) region (Table 4) and the Central Kimberley IBRA region (Table 5) (Shepherd, 2005).

Table 4 Regional Assessment of Vegetation Extent (Shepherd, 2005) Ord Victoria Plain IBRA Region

Vegetation Association Number	Association Description	Pre-European Extent (Ha) in Ord Victoria Plain IBRA region	Current Extent (Ha) in Ord Victoria Plain IBRA region	% Remaining	% Current Extent in IUCN Class I-IV Reserves	Occurrence in Project Area
825	Grasslands, high grass savanna woodland; cabbage gum & *Eucalyptus foelscheana* over upland tall grass & curly spinifex on basalt	22590.303	22590.303	100.0	0.0	◗ ~2.3 km North West of SLK3005.2-3006.2; ◗ ~4 km West of SLK3003.8.
833	Grasslands, short bunch grass savanna sparse low tree; scattered snappy gum over arid short grass on plains	38497.637	38497.637	100.0	0.0	◗ Entire project site at SLK3005.2-3006.2; ◗ North Western side of project site at SLK3003.78

Table 5 Regional Assessment of Vegetation Extent (Shepherd, 2005) Central Kimberley IBRA Region

Vegetation Association Number	Association Description	Pre-European Extent (Ha) in Central Kimberley IBRA region	Current Extent (Ha) in Central Kimberley IBRA region	% Remaining	% Current Extent in IUCN Class I-IV Reserves	Occurrence in Project Area
808	Grasslands, curly spinifex, low tree savanna; snappy gum over curly Spinifex	1128243.754	1128243.754	100.0	0.9	◗ South Eastern side of project site at SLK3003.78

3.8 Threatened Ecological Communities

No Threatened Ecological Communities (TEC) protected under the *Environment Protection and Biodiversity Conservation Act 1999* are known to be present within the Study Area (Department of Environment, Water, Heritage and the Arts, 2009a).

A search of the DEC's TEC Database was undertaken for the Project Areas. No TEC's are known to be located within the Project Areas.

3.9 Flora

3.9.1 Threatened Flora

Flora species considered to be threatened are listed under the *Wildlife Conservation Act* (1950) and the *Environment Protection and Biodiversity Conservation Act 1999.* The DEC also keeps a list of Priority Flora species that are not listed under legislation but for which the DEC feels there is cause for concern, or for which not enough information is known (Table 9 and Table 10, Appendix A).

An *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) Protected Matters Search was undertaken for the Study Area. No flora species of conservation significance are known to occur, or considered to have habitat, in the search area.

A search was also undertaken through the DECs threatened flora databases (ref #: 35-0409) and NatureMap (Department of Environment and Conservation, 2009c) for species of Declared Rare and Priority Flora located within the vicinity of the Project Areas. Descriptions of those species recorded from these searches are presented in Table 11, Appendix A. No Declared Rare Flora (DRF) species were identified from the search area. Three Priority Flora species were identified from the search area.

The DECs threatened flora database search results and the Protected Matters Search results are presented in Appendix C.

The recorded locations of these species are presented in Figure 2. None of these identified species are located within the boundaries of the Project Areas.

3.9.2 Previous Surveys

A vegetation and flora survey was undertaken by GHD (2007) along Great Northern Highway starting immediately north of the northern Project Area (SLK 3005.2-3006.2) and extending north along the highway for approximately 15 km.

No DRF or Priority species were recorded during the field surveys.

A known location of the Priority 2 species *Eucalyptus ordiana* was examined, however no plants were recorded within the vicinity of this location.

A number of Boab trees (*Adansonia gregorii*) were observed in the region during field surveys, particularly along creeklines and in flats at the base of some outcrops. This species is traditionally of great importance to indigenous peoples of the West Kimberley and individual plants should not be disturbed where possible.

Vegetation near the northern Project Area was noted to be in *Pristine* condition and was described as:

- Riparian Vegetation: Vegetation along Bow River and creeklines, *Lophostemon grandiflorus*, *Eucalyptus camaldulensis*, *Adansonia gregorii*, *Terminalia platyphylla*, *Terminalia canescens*, *Melaleuca argentea* over mixed grass and herb species; and
- Mixed Open Woodlands and Grasslands: *Eucalyptus pruinosa*, *Eucalyptus brevifolia*, *Bauhinia cunninghamii* and scattered *Corymbia confertiflora* over shrubs and herbs, such as *Carissa lanceolata*, *Crotalaria novaehollandiae*, mixed hummock grasses, particularly *Chrysopogon fallax*, *Heteropogon contortus*, *Eriachne* spp. and *Triodia pungens*.

3.10 Weeds

The margins of roads are often excellent habitat for weed species as they respond well to disturbance and quickly colonise exposed areas. Runoff from the exposed road surface often pools in depressions adjacent to the road, aiding the growth of weeds.

Roads can also act as transport corridors for weeds, with vegetative parts and seeds of weeds “hitching rides” on vehicles. Other pests also can spread into an area in the same way.

A framework was endorsed by the Australian Government in 1998 under which Weeds of National Significance (WONS) are identified. Weeds considered as being significant within an agricultural, forestry or environmental context are included in a database of WONS. These species were determined through an assessment of the invasiveness, impacts, potential for spread and socio-economic and environmental values of each species (Australian Government, 2009).

In Western Australia invasive plants may also be declared under the *Agriculture and Related Resources Protection Act 1976*. The Act may stipulate specific control measures that must be undertaken for Declared Plant species (Department of Agriculture and Food Western Australia 2008).

The *Draft Kimberley Natural Resource Management Plan* (Rangelands NRM Coordinating Group, 2004) identified a number of weeds of significance in the Kimberley Region (Table 6).

The Department of Agriculture and Food (2009) have recorded 84 Declared Plants as occurring within the Shire of Wyndham-East Kimberley.

Table 6 Weeds Of National Significance (WONS), Declared Plants and Regionally significant weed species that may occur in the Project Areas

Weed Species	WONS	Declared Plant	Regionally Significant
Mesquite – *Prosopis pallida*	X	X	
Parkinsonia – *Parkinsonia aculeata*	X	X	
Prickly Acacia – *Acacia nilotica*	X		
Rubber Vine – *Cryptostegia grandiflora* and *C. madagascariensis*	X	X	
Salvinia – *Salvinia molesta*	X	X	
Bellyache Bush – *Jatropha gossypifolia*		X	X
Noogoora Burr – *Xanthium strumaruim*		X	X
Lead Tree – *Leucaena leucocephala*			X
Calotrope – *Calotropis procera*			X

3.10.1 Previous Surveys

A vegetation and flora survey was undertaken by GHD (2007) along Great Northern Highway starting immediately north of the northern Project Area (SLK 3005.2-3006.2) and extending north along the highway for approximately 15 km.

A total of 15 weed species were recorded within the GHD survey area, comprising approximately 7% of the total number of plant species. Dominant weed families include Poaceae (grasses) and Euphorbiaceae (spurges). Generally, weed invasion was noted to be restricted to the edges of the highway, in disturbed areas such as old borrow pits and along creeklines.

Two noxious weeds declared under the *Agriculture and Related Resources Protection Act 1976* (*ARRP Act*) were recorded in the survey area: Parkinsonia (*Parkinsonia aculeata*) and Bellyache Bush (*Jatropha gossypifolia*). Under the *ARRP Act* these plants are 'Priority 1' weeds for the whole of state, which means that the movement of plants and their seeds is prohibited, and 'Priority 4' weeds in the area surveyed, which means that the spread of infestations from properties must be prevented. Additionally, Parkinsonia is listed as one of the twenty 'Weeds of National Significance' (WONS), meaning it has been identified as a weed that is causing significant environmental damage. Parkinsonia and Bellyache Bush were recorded along the Bow River and in the borrow pits adjacent to the river.

3.11 Fauna

3.11.1 Fauna Habitat

The dominant habitat types located around the Project Areas are likely to be:

- Grasslands; and
- Open Woodlands.

Patches of denser vegetation and larger trees are also likely to be found along the paths of the numerous ephemeral creak lines running though the area.

These vegetation types are likely to provide shelter for a wide range of fauna species.

The dominant vegetation types located within the Project Area are common and widespread within the Ord Victoria Plains and Central Kimberley Interim Biogeographic Regionalisation for Australia (IBRA) bioregions. It has been estimated that each vegetation type in the project area has close to 100% of its pre-European settlement extent remaining (refer to Table 3). Given the small area of clearing required it is considered unlikely that the proposed works will significantly impact upon fauna within the region.

3.11.2 Threatened Fauna

The conservation of fauna species and their significance status is currently assessed under both State and Commonwealth Acts. The Acts include the *Western Australian Wildlife Conservation Act 1950*; *Wildlife Conservation (Specially Protected Fauna) Notice 2008,* and the *Environment Protection and Biodiversity Conservation Act 1999*. The DEC also produces a supplementary list of Priority Fauna, being species that are not considered "threatened" under the Western Australian *Wildlife Conservation Act 1950* but for which the Department feels there is a cause for concern. These species have no special protection, but their presence would normally be considered to determine any potential impacts on these species.

The classification schedules are provided in Table 12 and Table 13, Appendix B.

The DEC's Threatened and Priority Fauna Database and the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Database (Department of the Environment, Water, Heritage and the Arts, 2009a) was conducted for the Project Area. The threatened fauna species listed from these searches and a comment on their likelihood of occurrence in the Study Area are presented in Table 14, Appendix B.

The DEC's Threatened and Priority Fauna Database search results and the Protected Matters Search results are presented in Appendix C.

It should be noted that some species that appear in the *EPBC Act* Protected Matters Search Tool are often not likely to occur within the specified area, as the search provides an approximate guidance to matters of national significance that require further investigation. The records from the DEC searches of threatened fauna provide more accurate information for the general area; however some records of sightings or

trappings can be dated and often misrepresent the current range of threatened species.

3.11.3 Migratory Species

The *EPBC Act* also protects migratory species that are listed under the following International Agreements:

- Appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals) for which Australia is a range state under the Convention;
- The Agreement between the Government of Australia and the Government of the Peoples Republic of China for the Protection of Migratory Birds and their Environment (CAMBA);
- The Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA);
- The Bilateral Agreement between the Republic of Korea and Government of Australia to protect migratory shorebirds and their habitat (ROKAMBA); and
- Listed migratory species also include species identified in other international agreements approved by the Commonwealth Environment Minister.

The Act also protects marine species on Commonwealth lands and waters.

The Protected Matters Search Tool lists 13 Migratory species, protected under the *EPBC Act,* which may occur in the Project Areas. Most migratory species, if occurring in the area, will be present as foraging species during the wet season. Many of these migratory species are considered common in Western Australia and do not have special protection under the Western Australian *Wildlife Conservation Act 1950*. The likelihood of these species being impacted by the proposed Project is considered minimal. The Protected Matters Search results are presented in Appendix C.

3.11.4 Introduced Species

The following introduced species are known to occur in the Central Kimberley and Ord Victoria Plains IBRA regions:

- *Canis lupus* (Dingo);
- *Felis catus* (Cat);
- *Equus caballus* (Brumby, Horse);
- *Equus asinus* (Donkey);
- *Sus scrofa* (Pig);
- *Camelus dromedarius* (Dromedary, Camel);
- *Bubalis bubalis* (Water Buffalo); and
- *Bos taurus* (European Cattle).

Source: Australian Government (2007a, 2007b).

3.12 Heritage (non-Indigenous)

A search of the Australian Heritage Database, the Australian Heritage Inventory and the Heritage Council of Western Australia databases did not indicate any heritage sites within the immediate vicinity of the survey area however it did list the two Ramsar listed wetlands, Lake Argyle and Lake Kununurra and the Ord River floodplain, as being in the vicinity of the survey site.

3.13 Aboriginal Heritage

The Aboriginal Site Register is held under Section 38 of the *Aboriginal Heritage Act* (1972). It protects places and objects customarily used by, or traditional to, the original inhabitants of Australia.

Where an activity disturbs an Aboriginal site or object an application for permission to disturb will need to be submitted under Section 18 of the *Aboriginal Heritage Act 1972.* Where a site of previously unknown Aboriginal Heritage is to be disturbed, it is advised that a detailed anthropological and archaeological heritage survey is undertaken to find if there are any sites or objects of significance in that area, as it is an offence to disturb all Aboriginal Heritage sites, even those not contained on the Aboriginal Heritage Site Register. In the event that Aboriginal archaeological or ethnographic sites are discovered during construction, there will be a need to meet the requirements of the *Aboriginal Heritage Act (1972).*

A search of the Department of Indigenous Affairs (DIA) Aboriginal Heritage Inquiry System identified a total of 6 registered Aboriginal Heritage sites within the vicinity of the Project Areas. The search results from the Aboriginal Heritage Inquiry System are provided in Appendix D (Department of Indigenous Affairs, 2009).

The approximate location of the registered sites has been presented in Figure 2.

It should be noted that a search under the DIA database is not a valid full assessment under the *Aboriginal Heritage Act WA* 1972. This would require consultation with Aboriginal people with knowledge of the area (usually, but not necessarily Native Title Claimants), and an archaeological survey.

3.14 Noise and Vibration

There are no residents in close proximity of the proposed works who will be impacted by any noise or vibration.

3.15 Dust

There are no residents in close proximity of the proposed works who will be impacted by any dust.

3.16 Visual Amenity

Due to the undulating hilly terrain in the region it is unlikely that the proposed lay down areas will be visible from great distances.

3.17 Public Safety and Risk

The construction of the lay down areas may create some public safety and risk issues. Applying traffic management and signage to Main Roads standards will be necessary to manage these risks throughout the implementation of the Project.

4. Vegetation Clearing

Any clearing of native vegetation requires a permit under Part V of the *Environmental Protection Act (1986)* except where exemptions apply under Schedule 6 of the Act or are prescribed in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004. These exemptions do not apply in Environmentally Sensitive Areas (ESAs).

Main Roads have been granted a Purpose Clearing Permit (CPS 818/4) under the provisions of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004.* This permit provides for Main Roads to conduct such clearing associated with roadworks projects where that clearing is:

- The clearing is not at variance with the Ten Clearing Principles; and
- Not within an Environmentally Sensitive Area.

4.1 DEC's Ten Clearing Principles

The clearing required for the proposed Project has been assessed against the Ten Clearing Principles (Appendix E).

Based on the findings of the desktop survey, the clearing is not considered likely to be at variance with the Ten Clearing Principles.

4.2 Clearing in Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are subject to definition under Section 51B of the *Environmental Protection Act (1986)* and may include areas such those requiring special management attention to protect important scenic values, fish and wildlife resources, historical and cultural values, and other natural systems or processes.

The Department of Environment and Conservation (2009b) does not identify any Environmentally Sensitive Area (ESA) within any of the Project Areas.

5. Potential Impacts

Table 7 identifies the potential impacts for those aspects considered relevant to the Project. This section includes references to recommendations where applicable.

Table 7 Assessment of Environmental and Social Aspects and Impacts

Aspect	Evaluation of Potential Impact
Land Use and acquisition	The lay down areas will be restricted to existing Main Roads WA road reserve and land acquisition is not an issue for this part of the Project.
Surface waters/ drainage	No permanent wetlands occur within the Project Area. Some minor ephemeral rivers /creek lines traverse the Great Northern Highway within the vicinity of both Project Areas. However, these are only likely to flow following major rainfall events. While some sedimentation risk / erosion may occur, the impact on surface waters and drainage lines is expected to be minimal. Refer to Section 6, Recommendation 2.
Groundwater	Proposed works are not expected to impact on groundwater resources. Refer to Section 6, Recommendation 3.
Reserves and conservation areas	There were no National Parks or Conservation Reserves identified within or in close proximity to the Study Area.
Vegetation Clearing	The extent of clearing required for this Project is relatively minor (~1.1 ha at each site) compared to the large areas of native vegetation adjacent to the Project Area and within the Central Kimberley and Ord Victoria Plains IBRA region. Following assessment against the DEC's Ten Clearing Principles (refer to Appendix E) it is considered that clearing of native vegetation for the proposed Project is unlikely to be at variance with the Ten Clearing Principles. Rehabilitation of the lay down areas will be required after Project completion. Refer to Section 6, Recommendations 4 and 5.

Aspect	Evaluation of Potential Impact
Flora	The search of DECs databases indicated no known populations of Declared Rare Flora (DRF) or Priority Flora within the Project Areas. However three Priority species have been recorded in the surrounding region, within the vicinity of the Project Areas. Given the small amount of clearing required at each of the Project Areas (~1.1 ha), large areas of similar vegetation in the surrounding region (~100% of vegetation types remaining within the IBRA bioregions) and the absence of DRF found in flora surveys within the surrounding region, the Project is unlikely to have a significant impact upon any DRF.
Weeds	A number of noxious species have been recorded within the vicinity of the Project Areas, particularly in roadside areas. Weed spread will be an issue that will require management during the clearing and construction phase. It is necessary to reduce the risk of weed spread from disturbed areas to less disturbed areas via vehicles, machinery and soil movement. Weed control should be included in the CEMP for the Project. Refer to Section 6, Recommendation 6
Fauna	The area required for this Project is small relative to the area of good quality habitat surrounding the Study Area and the impacts on fauna species are expected to be minimal. Although the clearing of vegetation has the potential to have a direct impact on fauna, the Project is unlikely to have a significant impact on the biodiversity value at the species and ecosystem levels in the region. Refer to Section 6, Recommendation 7.
Heritage (non-Indigenous)	No World Heritage Properties or European heritage sites of significance are present in the Project Areas.
Aboriginal Heritage	The Project will not impact upon any known Aboriginal Heritage sites. It is considered that potential impacts upon unrecorded Indigenous Heritage sites can be adequately managed under a project specific Construction Environmental Management Plan (CEMP) (refer to Section 6, Recommendation 6).
Construction phase impacts – fire management, fuel and chemical storage, and waste disposal.	During the construction phase of the proposed works, activities have the potential to cause adverse environmental/social impacts. It is considered that these can be adequately managed under a project specific Construction Environmental Management Plan (CEMP) (refer to Section 6, Recommendation 6).
Noise and Vibration	Given the remote location of the Project Areas the potential for construction noise and vibration to cause significant impacts is considered minimal.

Aspect	Evaluation of Potential Impact
Dust	Dust will be generated during the roadworks. BGC will control dust during constriction via the implementation of a standard CEMP and areas that no longer require construction will be rehabilitated (refer to Section 6, Recommendations 5 and 6).
Visual Amenity	Whilst proposed works and clearing of vegetation will impact upon the visual amenity, this aspect is not considered to be significant given that much of the Project Area is unpopulated and the impact will be temporary. Rehabilitation after construction works will reduce the impacts on visual amenity. Refer to Section 6, Recommendation 5).
Public safety and risk	The construction phase of the Project may create some public safety and risk issues. Applying traffic management and signage to Main Roads standards will be necessary to manage these risks throughout the implementation of the Project.

6. Recommendations and Approvals Required

Table 8 indicates that it is unlikely that approvals from government agencies are required unless clearing occurs on or near to one of the many intermittent creeks running through the region.

Table 8 Recommendations and Approvals required for the Project

Recommendation	Agency Required / Referral	Relevant Agency
1. BGC will need to liaise with the pastoral lease holders if works are to be undertaken on Lissadel Pastoral Lease	No	Pastoral Lease Holders
2. BGC will need to apply for a Section 17 Permit to Interfere with Bed and Banks under the *Rights in Water Irrigation Act 1914* if the project impact on the Bed and Banks of the perennial streams running through the Project Area.	Yes	Department of Water (DoW)
3. If groundwater is required, BGC will need to apply for a 26D Licence under the *Rights in Water and Irrigation Act 1914* to construct bores in this area and/or apply for a 5C Licence for abstraction of water.	Yes	DoW
4. It is recommended that works be undertaken for this Project in the dry season, reducing the chance for weather to adversely impact construction activities.	No	N/A
5. Rehabilitation of the Project Areas as well as any access tracks will be required after Project works. It is suggested that rehabilitation be undertaken at the end of the dry season to ensure that native flora can take advantage of wet season rainfall.	No	N/A
6. Development of a Construction Environmental Management Plan.	No	Main Roads WA
7. BGC should protect fauna and fauna habitat during construction works in accordance with a Construction Environmental Management Plan.	No	DEC
8. Damage to any Boab Trees present in the Project Areas should be avoided where possible.	No	N/A

7. Report Limitations

This report presents the results of a Preliminary Environmental Impact Assessment prepared for the purpose of this commission. The data and advice provided herein relate only to the project and structures described herein and must be reviewed by a competent scientist/botanist before being used for any other purpose. GHD accepts no responsibility for other use of the data.

Where previous reports, flora surveys and similar work have been preformed and recorded by others the data is included and used in the form provided by others. The responsibility for the accuracy of such data remains with the issuing authority, not with GHD.

An understanding of site conditions depends on the integration of many pieces of information, some regional, some site specific, some structure specific and some experience based. Hence, this report should not be altered, amended or abbreviated, issued in part or incomplete in any way without prior checking and approval by GHD. GHD accepts no responsibility for any circumstances that arise from the issue of the report that has been modified in any way as outlined above.

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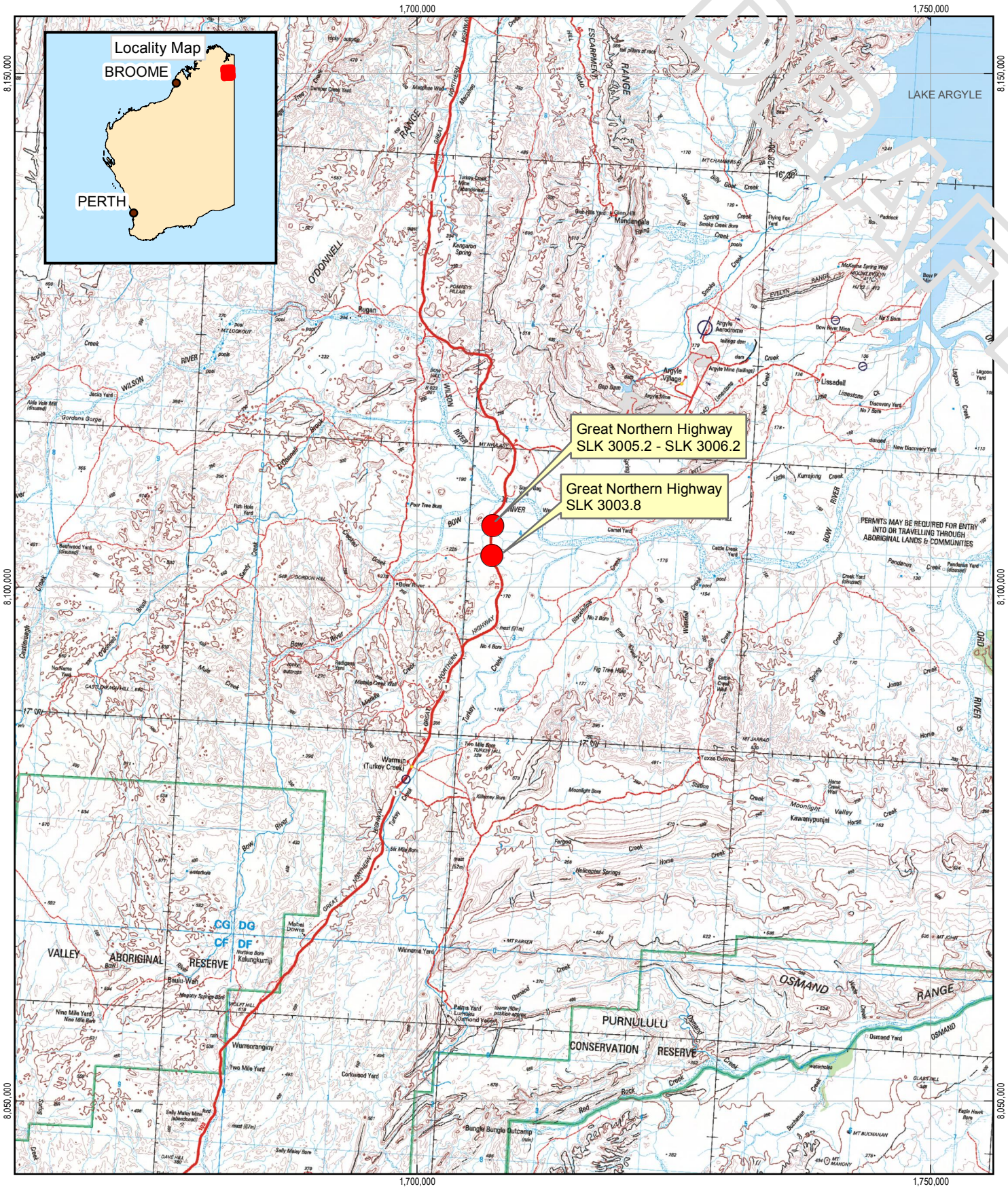
Figures



LEGEND

Study Areas - GHD - 20090418

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0 2,500 5,000 10,000 15,000 20,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 52

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CLIENTS | PEOPLE | PERFORMANCE

BGC
Great Northern Highway Shoulder Upgrade

Job Number 61-23982
Revision A
Date 20 MAY 2009

Locality Map

Figure 1

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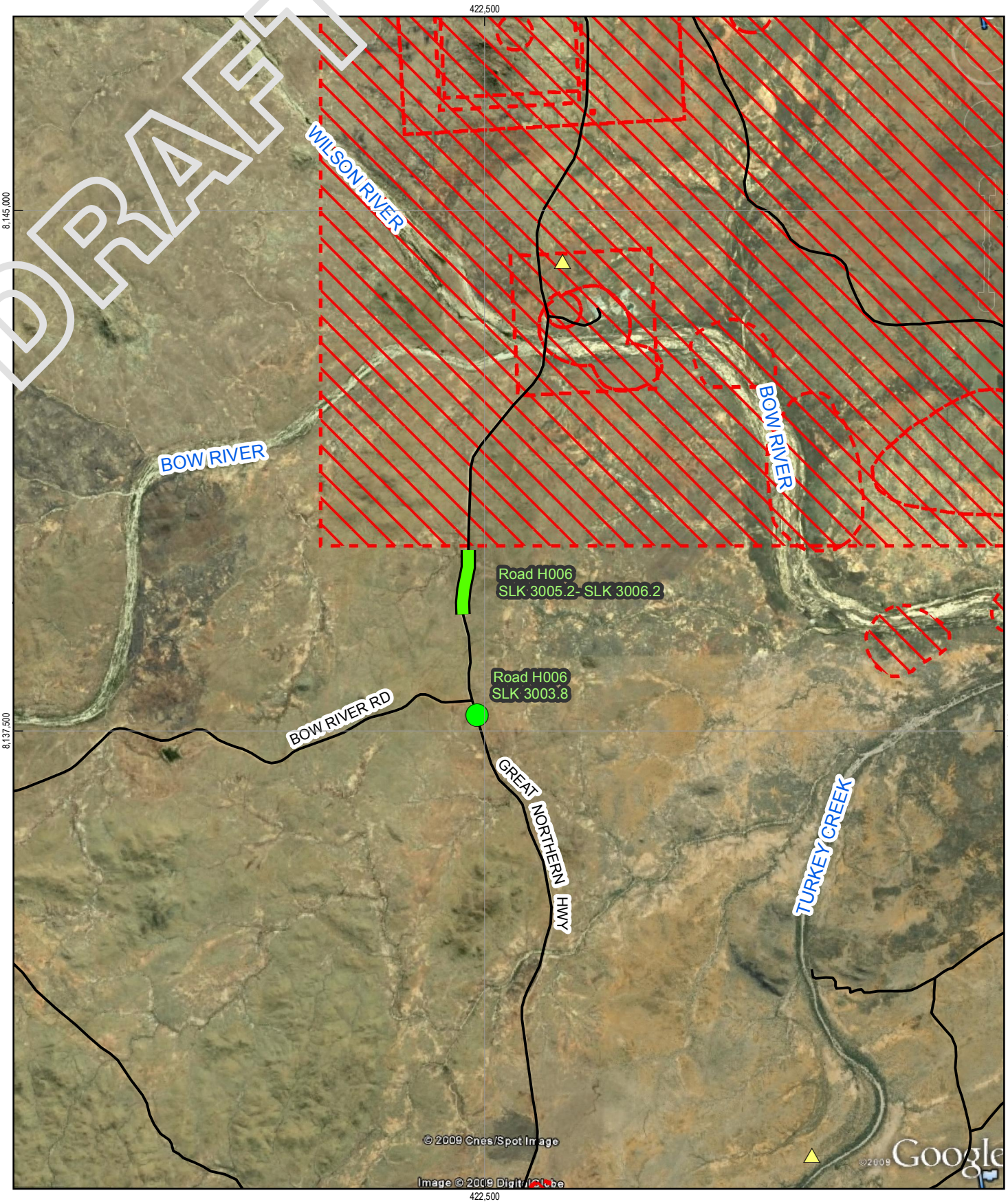
76 Forrest Street Geraldton WA 6530 T 61 8 9964 3677 F 61 8 9921 7997 E getmail@ghd.com.au W www.ghd.com.au

Data Source: Landgate: Travellers Atlas - 2004. Created by: mlogue



LEGEND

- Proposed Laydown Areas - GHD - 20090418
- Roads - Landgate - 20090423
- Indigenous Heritage Sites - DIA - 20081112

Rare and Priority Flora* - DEC - 20090428

- Rare
- P1
- P2
- P3
- P4

*Threatened Flora Database and WA Herbarium database Information Reference Number 35-0409

(at A4)

0 375 750 1,500 2,250 3,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 52

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BGC
Great Northern Highway Shoulder Upgrade

Job Number 61-23982
Revision A
Date 20 MAY 2009

Environmental Constraints

Figure 2

76 Forrest Street Geraldton WA 6530 T 61 8 9964 3677 F 61 8 9921 7997 E getmail@ghd.com.au W www.ghd.com.au

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Data Source: Landgate: WA AGO 02 724enhLc - ????; Cnes/Spot Image 2009 & DigitalGlobe 2009: Aerial Photography - 2008. Created by: mlogue

Appendix A

Flora

Conservation Codes and Threatened Species

Table 9 Conservation Categories and Definitions for *EPBC Act* Listed Flora and Fauna Species.

Conservation Category	Definition
Extinct	Taxa not definitely located in the wild during the past 50 years
Extinct in the Wild	Taxa known to survive only in captivity
Critically Endangered	Taxa facing an extremely high risk of extinction in the wild in the immediate future
Endangered	Taxa facing a very high risk of extinction in the wild in the near future
Vulnerable	Taxa facing a high risk of extinction in the wild in the medium-term
Near Threatened	Taxa that risk becoming Vulnerable in the wild
Conservation Dependent	Taxa whose survival depends upon ongoing conservation measures. Without these measures, a conservation dependent taxon would be classified as Vulnerable or more severely threatened.
Data Deficient (Insufficiently Known)	Taxa suspected of being Rare, Vulnerable or Endangered, but whose true status cannot be determined without more information.
Least Concern	Taxa that are not considered Threatened

Table 10 Conservation Codes and Descriptions for DEC Declared Rare and Priority Flora Species.

Conservation Code	Description
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.
X: Declared Rare Flora – Presumed Extinct Taxa	Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.
P1: Priority One – Poorly Known Taxa	Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2: Priority Two – Poorly Known Taxa	Taxa which are known from one or a few (generally<5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P3: Priority Three – Poorly Known Taxa	Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.
P4: Priority Four – Rare Taxa	Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5 – 10 years.

Table 11 Significant Flora Species identified in the Threatened Flora Database Search Results

****Refer to Appendix C for full details of the database search results****

Species	Conservation Code	Description[1]	Flowering Time [1]	Preferred Habitat [1]	Distribution [1]	Data Source
Eucalyptus ordiana	Priority 2	Mallee or tree, 2–5.5 m high, bark smooth, powdery. Fl. white	Apr–May	Skeletal soils over sandstone or quartzite. Steep rocky outcrops	Northern Botanical Province: Central Kimberley, Ord-Victoria Plains, Victoria Bonaparte.	WAHERB
Grevillea miniata	Priority 4	Spreading to erect shrub or tree, 1.8–5 m high. Fl. yellow, orange	Apr–Aug	Skeletal sandy soils or sandy loam over quartzite or sandstone. Cliffs or rocky slopes, sometimes along watercourses	Northern Botanical Province: Central Kimberley, Ord-Victoria Plains.	WAHERB
Triodia bunglensis	Priority 2	Tussock-forming perennial, grass-like or herb, ca 1.5 m high, foliage resinous, panicle spiciform.	Nov–Dec/Apr–Jul	Sandstone. Cliffs, gorges & domes, often in fissures & cracks.	Northern Botanical Province: Ord-Victoria Plains.	WAHERB

[1]Data Source Department of Environment and Conservation (2009d) FloraBase accessed online at http://florabase.calm.wa.gov.au/ on 12/05/2009

Appendix B

Fauna

Fauna Conservation Codes and Threatened Fauna Species

EPBC Act Fauna Conservation Categories

Listed threatened species and ecological communities

An action will require approval from the Environment Minister if the action has, will have, or is likely to have a significant impact on a species listed in any of the following categories:

- Extinct in the wild,
- Critically Endangered,
- Endangered, or
- Vulnerable.

See Table 9.

Critically endangered and endangered species

An action has, will have, or is likely to have a significant impact on a critically endangered or endangered species if it does, will, or is likely to:

- lead to a long-term decrease in the size of a population, or
- reduce the area of occupancy of the species, or
- fragment an existing population into two or more populations, or
- adversely affect habitat critical to the survival of a species, or
- disrupt the breeding cycle of a population, or
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat*, or
- interfere with the recovery of the species.

**Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a critically endangered or endangered species by direct competition, modification of habitat, or predation.*

Vulnerable species

An action has, will have, or is likely to have a significant impact on a vulnerable species if it does, will, or is likely to:

- lead to a long-term decrease in the size of an important population of a species, or
- reduce the area of occupancy of an important population, or
- fragment an existing important population into two or more populations, or
- adversely affect habitat critical to the survival of a species, or
- disrupt the breeding cycle of an important population, or
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or

- result in invasive species that are harmful a vulnerable species becoming established in the vulnerable species' habitat*, or
- interferes substantially with the recovery of the species.

An important population is one that is necessary for a species' long-term survival and recovery. This may include populations that are:

- key source populations either for breeding or dispersal,
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

*Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a vulnerable species by direct competition, modification of habitat, or predation.

Listed Migratory species

An action will require approval from the Environment Minister if the action has, will have, or is likely to have a significant impact on a listed migratory species. Note that some migratory species are also listed as threatened species. The criteria below are relevant to migratory species that are not threatened.

An action has, will have, or is likely to have a significant impact on a migratory species if it does, will, or is likely to:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species, or
- result in invasive species that is harmful to the migratory species becoming established* in an area of important habitat of the migratory species, or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species.

An area of important habitat is:

1. habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, or
2. habitat utilised by a migratory species which is at the limit of the species range, or
3. habitat within an area where the species is declining.

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an ecologically significant proportion of the population varies with the species (each circumstance will need to be evaluated).

*Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a migratory species by direct competition, modification of habitat, or predation.

Table 12 *Western Australia Wildlife Conservation Act* (1950) Conservation Codes

Conservation Code	Description
Schedule 1	"…fauna that is rare or likely to become extinct, are declared to be fauna that is in need of special protection."
Schedule 2	"…fauna that is presumed to be extinct, are declared to be fauna that is in need of special protection."
Schedule 3	"…birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is in need of special protection."
Schedule 4	"…fauna that is in need of special protection, otherwise than for the reasons mentioned [in Schedule 1 – 3]"

Table 13 DEC Priority Fauna Codes

(Species not listed under the *Wildlife Conservation Act (*1950), but for which there is some concern).

Conservation Code	Description
Priority 1	Taxa with few, poorly known populations on threatened lands.
Priority 2	Taxa with few, poorly known populations on conservation lands. Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown Land, water reserves, etc.
Priority 3	Taxa which are known from few specimens or sight records, some of which are on lands not under immediate threat of habitat destruction or degradation.
Priority 4	Rare taxa. Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5 – 10 years.
Priority 5	Taxa in need of monitoring. Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

Table 14 Threatened fauna occurring, or likely to occur, in the Study Area as indicated by the EPBC Act Protected Matters Search Tool and the DEC's Threatened Fauna Database search

Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Birds					
Accipitridae	*Haliaeetus leucogaster* (White-bellied Sea-Eagle)	Migratory Marine			This species is recorded as occurring in coastal regions all the way around Australia (Department of Environment, Water, Heritage and the Arts 2009b). It may occur in the Project Areas as a transient visitor.
Anatidae	*Tadorna radjah rufitergum* (Burdekin Duck)	Migratory	Schedule 4	Other Specially Protected Fauna	The Burdekin Duck is found in the coastal tropics of northern Australia from Fitzroy River in Western Australia to Northern Queensland (Honolulu Zoo 2009). This species may be found in the Project Areas.
Anatidae	*Anseranas semipalmata* (Magpie Goose)	Migratory Marine			The Magpie Goose is distributed along the northern coast of Australia from Broome in Western Australia around to northern New South Wales, also along the Western Coast of Victoria (Department of Environment, Water, Heritage and the Arts 2009b). This species may occur in the Project Areas.
Apodidae	*Apus pacificus* (Fork-tailed Swift)	Migratory Marine Listed – overfly marine area			This species has a wide distribution across Australia, excluding the arid interior. It is highly migratory with a widespread global population. Global population trends have not been quantified however it has recently been elevated to Least Concern on the IUCN Red List due to evidence that the population is increasing (Birdlife International 2009). This species may occur in the Project Areas.

Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Ardeidae	*Ardea alba* (Great Egret, White Egret)	Migratory Listed – overfly marine area			Also known as *Ardea modesta* (Eastern Great Egret) this species is widely distributed across southern and eastern Asia and Australasia. The main threats to the species are thought to be alteration of wetland habitat and bioaccumulation of persistent environmental contaminants (Department of Environment, Water, Heritage and the Arts 2009b). This species may occur in the Project Areas as a transient visitor; however it is unlikely to use the area for extended periods as it favours a wetland habitat.
Ardeidae	*Ardea ibis* (Cattle Egret)	Migratory Listed – overfly marine area			The distribution of this species is considered to be Australia wide, excluding the arid interior regions (Department of Environment, Water, Heritage and the Arts 2009b). This species may occur in the Project Areas as a transient visitor.
Ardeidae	*Ixobrychus minutus* (Little Bittern)			Priority 4	The global Extent of Occurrence of the Little Bittern is estimated at 10,000,000 km^2. It is estimated to have a large global population, however population trends have not been well quantified (Birdlife International 2008a). This species may be found in the Project Areas.
Charadriidae	*Charadrius veredus* (Oriental Plover, Oriental Dotterel)	Migratory Listed – overfly marine area			This migratory waterbird breeds at scattered sites in Mongolia, Manchuria and south-eastern Siberia. Its migratory route includes visiting Australia where it usually spends a few weeks in coastal habitats along the North of Australia before dispersing inland. Thereafter they usually inhabit flat open arid or semi-arid grasslands, they can also be found in lightly wooded grasslands during the wet seasons (Department of Environment, Water, Heritage and the Arts 2009b). This species may occur in the Project Areas.
Passeridae	*Heteromunia pectoralis* (Pictorella Mannikin)			Priority 4	This species is found across northern Australia between Fitzroy River in Western Australia and the central western Cape York Peninsula in Queensland. The species was downlisted from Near Threatened to Least Concern in the IUCN Red List in 2007 as it was found to be abundant at Mornington Station in the Central Kimberley and large flocks were observed in Nathan River National Park (Birdlife International 2008b). This species may be found in the Project Areas.

Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Falconidae	*Falco peregrinus* (Peregrine Falcon)		Schedule 4		The Peregrine Falcon has a large range, with an estimated global Extent of Occurrence of 10,000,000 km^2. Global population are thought to be stable and the species is considered to be of Least Concern in the ICUN Red List (Birdlife International 2008c). This species may occur in the Project Areas.
Glareolidae	*Glareola maldivarum* (Oriental Pratincole)	Migratory Listed – overfly marine area			The Oriental Pranticole breeds in southern, south-eastern and eastern Asia. A majority of the population migrates to Australia for the non-breeding season. While in Australia the species usually inhibits open plains, floodplains or short grasslands, often near wetlands. Their distribution is widespread in northern areas especially in the Pilbara and Kimberley (Department of Environment, Water, Heritage and the Arts 2009b). This species may occur in the Project Areas.
Maluridae	*Malurus coronatus conronatus* (Purple-crowned Fairy-wren (western))	Vulnerable		Priority 4	This species occurs along waterways within the Kimberley and east to the Victoria River downs in the Northern Territory. It is estimated to occur in 13 locations including the Ord River system and Bow River (Department of Environment, Water, Heritage and the Arts 2009b). Its habitat is restricted to dense, riparian vegetation and as such is unlikely to be disturbed by the project.
Meropidae	*Merops ornatus* (Rainbow Bee-eater)	Migratory Listed – overfly marine area			The rage of the Rainbow Bee-eater extends throughout Australia in all regions except Tasmania. There are no published estimates of the global population size however it is estimated to be quite large due to its wide distribution (Department of Environment, Water, Heritage and the Arts 2009b). This species may occur in the Project Areas.

Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Otididae	*Ardeotis australis* (Australian Bustard)			Priority 4	The Australian Bustard has been recorded across continental Australia with a majority of specimens having been recorded in the north. It inhabits grasslands and generally nests on the boundary between grasslands and shrubland or woodland. The primary threat to the species is predation by foxes however it will also desert nests when disturbed by humans, sheep or cattle (Birdlife International 2008d). This species has been recorded from the Project Area (GHD, 2007).
Pachycephalidae	*Falcunculus frontatus whitei* Crested Shrike-tit (northern subsp)	Vulnerable Migratory	Schedule 1		The northern subspecies of the Crested Shrike-tit is endemic to northewestern Australia where it occurs in the Kimberley and across the north of the Northern Territory. Its main habitat is open Eucalypt woodlands (Department of Environment, Water, Heritage and the Arts 2009b). The species was found in DEC database searches for the region however it was not recorded in the EPBCA Protected Maters Search for the area. The DEWHA database records the distribution of the species as being further north than the Project Areas. The species is unlikely to be found in the Project Areas do to lack of suitable habitat.
Passeridae	*Erythrura gouldiae* (Gouldian Finch)	Endangered Migratory	Schedule 1		This species is sparsely distributed across northern Australia from the Kimberley to north-central Queensland. It inhabits open woodlands that are dominated by *Eucalyptus* sp. and support a ground cover of *Sorghum* and other species (Department of Environment, Water, Heritage and the Arts 2009b). This species may occur in the Project Areas as a transient visitor. The species is unlikely to sustain populations in the immediate area of the project due to lack of suitable habitat. The species has been recorded from Bow River, to the north of the Project Areas (GHD, 2007).
Passeridae	*Neochima ruficauda subclarescens* (Star Finch (western)			Priority 4	This species is considered in need of monitoring. It may be found in the Project Areas.

Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Rostratulidae	*Rostratula australis* (Australian Painted Snipe) *Rostratula benghalensis s. lat.* (Painted Snipe)	Vulnerable Migratory Listed – overfly marine area	Schedule 1		This taxon is currently under revision. This species is recorded around the northern and eastern half of Australia including the Kimberley, Queensland, New South Wales, Australian Capital Territory and Victoria. Its predominant habitat is in shallow inland wetlands (Department of Environment, Water, Heritage and the Arts 2009b). The species is unlikely to occur in Project Areas due to lack of suitable habitat.
Scolopacidae	*Numenius minutus* (Little Curlew, Little Whimbrel)	Migratory Listed – overfly marine area			This migratory marine species has a recorded distribution covering much of Northern Australia (Department of Environment, Water, Heritage and the Arts 2009b). The species breeds in Siberia and migrates south to non-breeding areas in northern Australia and southern New Guinea. The species disperse across a broad area after arriving in Australia during September, then leave again in April. They feed on coastal and inland grasslands and black soil plains near swamps and flooded areas (Australian Museum 2009). This species may occur in the Project Areas.
Mammals					
Muridae	*Leggadina lakedownensis* (Lakeland Downs Mouse, Kerakenga)			Priority 4	Populations of this rodent are recorded in Queensland, Kimberley and the Pilbara. These populations are suspected to represent separate subspecies as they appear to be morphologically distinct. It is listed as least concern on the IUCN Red List due to its wide distribution, presumed large population and lack of major threats. It is nocturnal and found in areas of open tussock and hummock grassland (Birdlife International 2008e). The species may occur in the Project Areas.

Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Fish					
Pristidae	*Pristis microdon* (Freshwater Sawfish)	Vulnerable			The Freshwater Sawfish is actually a marine/estuarine species that is thought to occur in all large rivers of Northern Australia from the Fitzroy River to the western side of the Cape York Peninsular. In the Ord River Catchment it is thought to be confined to the Main Ord Channel below Kununurra Dam and in the Pentecost River. It is unlikely this species will occur within the vicinity of the Project Area the closest river, the Bow River is approximately 5 km away from the proposed project site and is unlikely to represent a suitable habitat for the species due to the distance from the coast.
Reptiles					
Crocodylidae	*Crocodylus johnstoni* (Freshwater Crocodile)	Marine	Schedule 4		This species is disturbed along the north of Australia from the Kimberley to northern Queensland (Department of Environment, Water, Heritage and the Arts 2009b). It is unlikely to occur within the vicinity of the Project, however may be found in nearby lakes and river systems.
Crocodylidae	*Crocodylus porosus* (Estuarine Crocodile, Salt-water Crocodile)	Migratory Marine	Schedule 4		This species is distributed along the northern coastal regions of Australia from Broome in Western Australia to Rockhampton in Queensland. It can be found in brackish water up to 200 km from the coast and freshwater up to 100 km from the coast (Britton 2009). It is unlikely to occur in the Project Areas due to lack of suitable habitat.

Appendix C

Search Results

Environment Protection and Biodiversity Conservation Act 1999 Protected Matters Search Tool

DEC Database Search Results

Australian Government
Department of the Environment, Water, Heritage and the Arts

Protected Matters Search Tool

You are here: Environment Home > EPBC Act > Search

11 May 2009 16:35

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

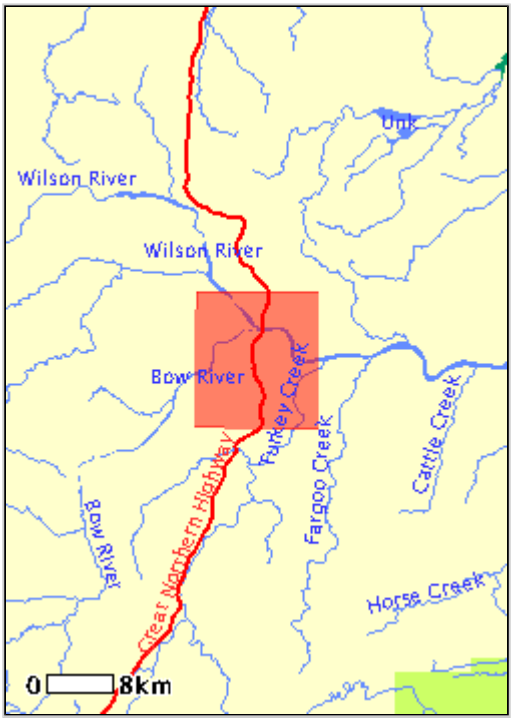
The Australian Natural Resources Atlas at http://www.environment.gov.au/atlas may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.environment.gov.au/epbc/assessmentsapprovals/index.html

---

Search Type: Area

Buffer: 20 km

Coordinates: -16.7525,128.2072, -16.75319,128.341, -16.90547,128.3404, -16.90278,128.2065



This map may contain data which are
© Commonwealth of Australia
(Geoscience Australia)
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Report Contents:

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail

part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance: (Ramsar Sites)	2
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None
Threatened Species:	4
Migratory Species:	13

Other Matters Protected by the EPBC Act

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

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

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.au/epbc/permits/index.html.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Places on the RNE:	1
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

State and Territory Reserves:	None
Other Commonwealth Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Wetlands of International Significance [Dataset Information] (Ramsar Sites)	
LAKE ARGYLE AND LAKE KUNUNURRA	Within 10 km of Ramsar site
ORD RIVER FLOODPLAIN	Within same catchment as Ramsar site

Threatened Species [Dataset Information]	Status	Type of Presence
Birds		
Erythrura gouldiae Gouldian Finch	Endangered	Species or species habitat may occur within area
Malurus coronatus coronatus Purple-crowned Fairy-wren (western)	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
Sharks		
Pristis microdon Freshwater Sawfish	Vulnerable	Species or species habitat likely to occur within area

Migratory Species [Dataset Information]	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Erythrura gouldiae Gouldian Finch	Migratory	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
Migratory Wetland Species		
Birds		
Ardea alba Great Egret, White Egret	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Migratory	Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel	Migratory	Species or species habitat may occur within area
Glareola maldivarum	Migratory	Species or species habitat may

Oriental Pratincole		occur within area
Numenius minutus Little Curlew, Little Whimbrel	Migratory	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Migratory	Species or species habitat may occur within area
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift	Migratory	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Migratory	Species or species habitat may occur within area
Migratory Marine Species		
Reptiles		
Crocodylus porosus Estuarine Crocodile, Salt-water Crocodile	Migratory	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
Anseranas semipalmata Magpie Goose	Listed - overfly marine area	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift	Listed - overfly marine area	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Listed - overfly marine area	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Listed - overfly marine area	Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel	Listed - overfly marine area	Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole	Listed - overfly marine area	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater	Listed - overfly marine area	Species or species habitat may occur within area

Numenius minutus Little Curlew, Little Whimbrel	Listed - overfly marine area	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Reptiles		
Crocodylus johnstoni Freshwater Crocodile	Listed	Species or species habitat may occur within area
Crocodylus porosus Estuarine Crocodile, Salt-water Crocodile	Listed	Species or species habitat likely to occur within area

Places on the RNE [Dataset Information]
Note that not all Indigenous sites may be listed.

Natural

Middle Ord Region (Purnululu) WA

Caveat

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

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

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

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

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the migratory and marine provisions of the Act have been mapped.

The following species and ecological communities have not been mapped and do not appear in

reports produced from this database:

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

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

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

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

Acknowledgments

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

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

ANUCliM Version 1.8, Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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Last updated: Thursday, 20-Nov-2008 14:17:56 EST

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DECLARED RARE AND PRIORITY FLORA LIST
6 October 2008

SPECIES / TAXON	CONS CODE	DEC REGION	DISTRIBUTION	FLOWER PERIOD
Acacia richardsii	3	K,*	Kununurra, Keep River N.P., Northern Carr Boyd Ranges, Gardner Plateau, N.T.	Mar-Aug
Aphyllodium parvifolium	1	K	Broome, McLarty Hills	
Brachychiton tuberculatus	3	K	Ord River, Kununurra	Aug-Nov
Corymbia paratia	1	K	Broome, Cable Beach, Cape Boileau	April-May, Oct-Dec
Desmodium flagellare	1	K	Kununurra, Ord River Basin	
Echinochloa kimberleyensis	1	K	Ord River, NT, Qld	Apr
Eriochloa decumbens	3	P,K	Cooyapooya, Derby, Wyndham	
Eucalyptus ceracea	R	K	NW of Wyndham, King George River	Aug-Nov
Eucalyptus ordiana	2	K	Kununurra	Jan,Jun,Jul
Euphorbia stevenii	3	P,K	Karijini N.P., Kununurra	
Ficus lilliputiana	4	K,*	Ord River, Lake Argyle, Hidden Valley, Kununurra, Northern Territory	Apr-Oct
Fuirena nudiflora	1	GLD,K,*	Rawlinson Range, Kununurra, NT, Qld	Jun
Glycine pindanica	1	K	Broome, Beagle Bay	Feb-Apr
Goodenia brachypoda	1	K	Carlton Hill, Wyndham, Augustus Is	Sep
Goodenia durackiana	1	K	Ord River, Kununurra	Mar
Goodenia strangfordii	1	K	Kununurra, Sturt Creek	Sep
Jacquemontia sp. Keep River (J.L. Egan 5051)	1	K	Kununurra	-
Keraudrenia exastia	R	K	Broome	
Keraudrenia katatona	3	K	Broome, Edgar Range, Wallal Downs, Canning Stock Route	Mar-Aug
Lepidium scandens	3	MW	Sanford River, Murgoo Stn, Jingemarra Stn, Bush Bay, Wooramel	Aug,Sep
Nicotiana heterantha	1	K,P	Broome, Dampier Peninsula, Roy Hill, Mandora, Anna Plains	May-Jun
Pandanus spiralis var. flammeus	R	K	SE of Broome	Nov
Pittosporum moluccanum	4	K,P	Dampier Peninsula, N of Broome, Berthier Is., Maret Is., Northern Territory, SE Asia	Feb-Aug
Platysace saxatilis	2	K*	Hidden Valley, Kununurra, NT	Mar-May,Sep
Pterocaulon sp. A Kimberley Flora (B.J. Carter 599)	2	K	Broome, Anna Plains	Aug-Oct
Schoenus punctatus	3	P,K	Nurrup Peninsula, Broome, Mt Barnett Stn	Aug

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DECLARED RARE AND PRIORITY FLORA LIST
6 October 2008

SPECIES / TAXON	CONS CODE	DEC REGION	DISTRIBUTION	FLOWER PERIOD
Stylidium prophyllum	3	K	Mt Hart Stn, Beverley Springs Stn, Kununurra	May-Jun
Tephrosia andrewii	1	P,K	Port Hedland-Broome	Apr,Oct
Trachymene oleracea subsp. sedimenta	1	K	Napier Range, Wyndham	May
Triumfetta rubiginosa	2	K	Prince Regent River Reserve, Wyndham	Aug
Typhonium sp. Kununurra (AN Start 1467)	1	K	Kununurra	
Vigna sp.Silver leaf (T.E.H. Aplin 6300)	3	P,K	Meentheena Stn, Yarraloola Stn, Kununurra	Aug-Sep
Whiteochloa capillipes	3	P,K	Kununurra, Madora Stn, Hamersley Stn, Lacrosse Island	

Warmun Project Area
Threatened and Priority Fauna Database Search Results

40km Buffer

COMMON	SCIENTIFIC	DECLIST	RANKING	YEAR	CERTAINTY	NUMSEEN	LOCNAME	METHOD
Australian Bustard	Ardeotis australis	PRIORITY FAUNA	P4	2003	1	0	Argyle Diamond Mine	
Gouldian Finch	Erythrura gouldiae	DECLARED THREATENED FAUNA	EN	2000	1	2	Argyle Diamond Mine	Day sighting
Gouldian Finch	Erythrura gouldiae	DECLARED THREATENED FAUNA	EN	2001	1	3	Argyle Diamond Mine	
Gouldian Finch	Erythrura gouldiae	DECLARED THREATENED FAUNA	EN	2001	1	4	Argyle Diamond Mine	
Peregrine Falcon	Falco peregrinus	OTHER SPECIALLY PROTECTED FAUNA		2000	1	2	Argyle Diamond Mine	
Peregrine Falcon	Falco peregrinus	OTHER SPECIALLY PROTECTED FAUNA		2000	1	4	Argyle Diamond Mine	
Peregrine Falcon	Falco peregrinus	OTHER SPECIALLY PROTECTED FAUNA		2001	1	1	Argyle Diamond Mine	
Peregrine Falcon	Falco peregrinus	OTHER SPECIALLY PROTECTED FAUNA		2003	1	1	Argyle Diamond Mine	
Crested Shrike-tit (northern subsp)	Falcunculus frontatus whitei	DECLARED THREATENED FAUNA	EN	1955	1	0	Ord River	
Pictorella Mannikin	Heteromunia pectoralis	PRIORITY FAUNA	P4	2003	1	10	Argyle Diamond Mine	
Pictorella Mannikin	Heteromunia pectoralis	PRIORITY FAUNA	P4	2003	1	11	Argyle Diamond Mine	
Little Bittern	Ixobrychus minutus	PRIORITY FAUNA	P4	2000	1	1	Lake Argyle	Day sighting
Lakeland Downs Mouse, Kerakenga	Leggadina lakedownensis	PRIORITY FAUNA	P4	2000	1	6	Argyle Diamond Mine	Caught or trapped
Lakeland Downs Mouse, Kerakenga	Leggadina lakedownensis	PRIORITY FAUNA	P4	2000	1	12	Argyle Diamond Mine	Caught or trapped
Lakeland Downs Mouse, Kerakenga	Leggadina lakedownensis	PRIORITY FAUNA	P4	2000	2	1	Argyle Diamond Mine	Caught or trapped
Lakeland Downs Mouse, Kerakenga	Leggadina lakedownensis	PRIORITY FAUNA	P4	2000	1	1	Argyle Diamond Mine	Caught or trapped
Lakeland Downs Mouse, Kerakenga	Leggadina lakedownensis	PRIORITY FAUNA	P4	2000	1	2	Argyle Diamond Mine	Caught or trapped
Lakeland Downs Mouse, Kerakenga	Leggadina lakedownensis	PRIORITY FAUNA	P4	2000	1	1	Argyle Diamond Mine	Caught or trapped
Lakeland Downs Mouse, Kerakenga	Leggadina lakedownensis	PRIORITY FAUNA	P4	2003	1	9	Argyle Diamond Mine	
Lakeland Downs Mouse, Kerakenga	Leggadina lakedownensis	PRIORITY FAUNA	P4	2003	1	2	Argyle Diamond Mine	
Lakeland Downs Mouse, Kerakenga	Leggadina lakedownensis	PRIORITY FAUNA	P4	2003	1	3	Argyle Diamond Mine	
Lakeland Downs Mouse, Kerakenga	Leggadina lakedownensis	PRIORITY FAUNA	P4	2003	1	1	Argyle Diamond Mine	
Star Finch (western)	Neochima ruficauda subclarescens	PRIORITY FAUNA	P4	2001	1	6	Argyle Diamond Mine	
Star Finch (western)	Neochima ruficauda subclarescens	PRIORITY FAUNA	P4	2003	1	2	Argyle Diamond Mine	
Burdekin Duck	Tadorna radjah rufitergum	OTHER SPECIALLY PROTECTED FAUNA		1998	1	1	Argyle Diamond Mine	Day sighting

Threatened and Priority Fauna Database Explanations

DECList	Ranking	StatusExpand
DECLARED THREATENED FAUNA	CR	Schedule 1 - Fauna that is rare or is likely to become extinct
DECLARED THREATENED FAUNA	EN	Schedule 1 - Fauna that is rare or is likely to become extinct
DECLARED THREATENED FAUNA	EX	Schedule 2 - Presumed extinct
DECLARED THREATENED FAUNA	VU	Schedule 1 - Fauna that is rare or is likely to become extinct
OTHER SPECIALLY PROTECTED FAUNA		Schedule 4 - Other specially protected fauna
PRIORITY FAUNA	P1	Priority One: Taxa with few, poorly known populations on threatened lands
PRIORITY FAUNA	P2	Priority Two: Taxa with few, poorly known populations on conservation lands
PRIORITY FAUNA	P3	Priority Three: Taxa with several, poorly known populations, some on conservation lands
PRIORITY FAUNA	P4	Priority Four: Taxa in need of monitoring
PRIORITY FAUNA	P5	Priority Five: Taxa in need of monitoring (conservation dependent)

Certainty Code	Certainty
0	Not defined
1	Very certain
2	Moderately certain
3	Not sure

Appendix D

Aboriginal Heritage

DIA Database Search Results

Search Criteria

6 sites in a search polygon. The polygon is formed by these points (in order):

MGA Zone 52	
Northing	Easting
8145205	417524
8145312	426740
8132561	426918
8132668	417810

Disclaimer

Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist. Consultation with Aboriginal communities is on-going to identify additional sites. The AHA protects all Aboriginal sites in Western Australia whether or not they are registered.

Copyright

Legend

Restriction

N	No restriction
M	Male access only
F	Female access

Access

C	Closed
O	Open
V	Vulnerable

Coordinate Accuracy

Accuracy is shown as a code in brackets following the site coordinates.

[Reliable]	The spatial information recorded in the site file is deemed to be reliable, due to methods of capture.
[Unreliable	The spatial information recorded in the site file is deemed to be unreliable due to errors of spatial data capture and/or quality of spatial information reported.

Status

L	Lodged	IR	Insufficient Information (as assessed by Site Assessment Group)
I	Insufficient Information	PR	Permanent register (as assessed by Site Assessment Group)
P	Permanent register	SR	Stored data (as assessed by Site Assessment Group)
S	Stored data		

Site Assessment Group (SAG)

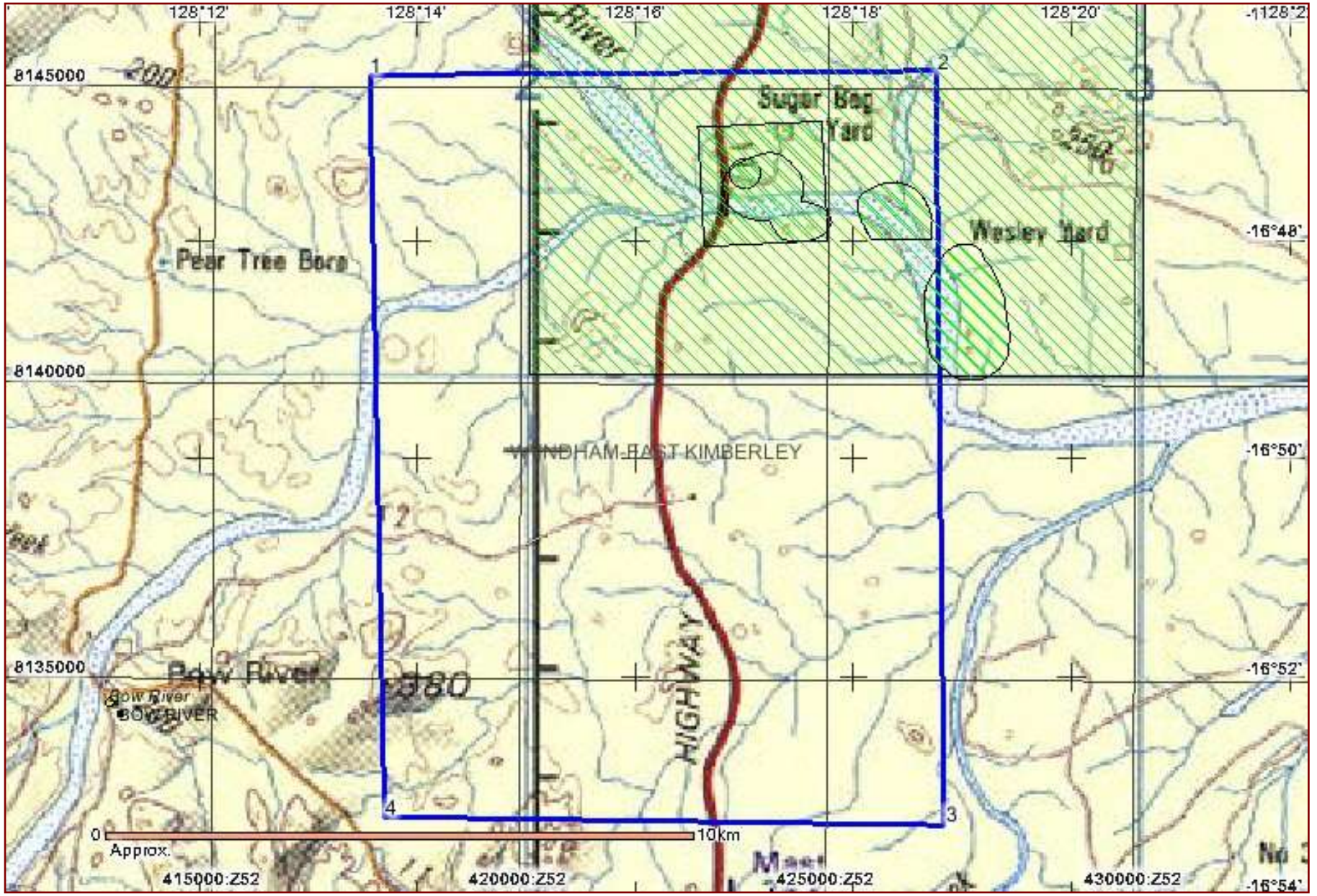
Sites lodged with the Department are assessed under the direction of the Registrar of Aboriginal Sites. These are not to be considered the final assessment.

Final assessment will be determined by the Aboriginal Cultural Material Committee (ACMC).

Spatial Accuracy

Index coordinates are indicative locations and may not necessarily represent the centre of sites, especially for sites with an access code “closed” or “vulnerable”. Map coordinates (Lat/Long) and (Easting/Northing) are based on the GDA 94 datum. The Easting / Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. '5000000:Z50' means Easting=5000000, Zone=50.

Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
12453	P	O	N	Wilson River Quarry	Quarry, Artefacts / Scatter			423634mE 8143565mN Zone 52 [Reliable]	K02757
13083	P	C	M	Margumbarren	Mythological			Not available for closed sites	K02117
14012	P	C	N	Sugar Bag Yard Hole.	Mythological	Water Source		Not available for closed sites	K01110
17800	I	O	N	Waringarri / Yulilij Complex			*Registered Informant names available from DIA.	424167mE 8143164mN Zone 52 [Reliable]	
17801	I	O	N	Gelinaban			*Registered Informant names available from DIA.	426080mE 8142937mN Zone 52 [Reliable]	
17802	I	O	N	Waringarri 01			*Registered Informant names available from DIA.	427259mE 8141236mN Zone 52 [Reliable]	



Legend

- Highlighted Area
- Town
- Map Area
- Search Area

Appendix E

DEC's Ten Clearing Principles

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments This Project is not considered to be at variance with this clearing principle given the desktop information to hand, particularly given the extent of the vegetation in the IBRA region (refer to Table 3).

Methodology Desktop assessment of available information

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Comments This Project is not considered to be potentially at variance with this clearing principle given the desktop information to hand.

Although the vegetation in the Project Areas is likely to provide shelter for a large variety of fauna species, the dominant vegetation type located within the Project Areas, is a common and widespread vegetation type, with an estimated 100% remaining (refer to Table 3).

The clearing area required for the project is very low and this area is in proximity to large areas of similar vegetation, as such it is unlikely to be necessary for the maintenance of a significant habitat for indigenous fauna, including several threatened and priority fauna species known to exist in the general vicinity. It is considered that the proposed works will not significantly impact the resident individual species and species distributions levels.

Methodology Desktop assessment of available information

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Comments This Project is not considered to be potentially at variance with this clearing principle given the desktop information to hand.

The desktop assessment did not indicate the presence of any DRF within the project area. Given the low area of required it is unlikely that the project will impact upon any DRF.

Methodology Desktop assessment of available information including the *EBPC Act 1999* Protected Matters Search Tool and DEC database search within the vicinity of the Project Area.

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Comments This Project is not considered to be at variance with this clearing principle given the desktop information to hand, including the remaining extent of the regional vegetation associations.

The results of a search of the DEC's Threatened Ecological Community (TEC) database, and the *EPBC Act* Protected Matters Search Tool, concluded that no TECs have been previously recorded in the Project Area.

Methodology Desktop assessment of available information, including DEC database search within the vicinity of the Study Area.

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments This Project is not considered to be potentially at variance with this clearing principle, given the remaining extent of the regional vegetation associations.

Shepherd (2005) identifies that none of the vegetation associations located within the Project Area are lower than the EPA's threshold level of 30% and in fact all are recorded at 100% of the Pre-European vegetation extent.

Methodology Desktop assessment of available information, including review of Shepherd (2005) vegetation extents.

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments This Project is unlikely to be at significant variance with this clearing principle.

The nearest river to the Project Areas is Bow River, which runs approximately 3 km north of the northernmost Project Area. A dense network of minor ephemeral creeks runs though the area surrounding the project site due to the undulating hilly terrain.

Given the minimal clearing required for the project the impact upon the riparian vegetation is considered to be minimal.

Methodology Desktop assessment of available information

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments This Project is not considered to be potentially at variance with this clearing principle.

Only a nominal amount of vegetation clearing will be undertaken as part of the proposed Project and is unlikely to be of sufficient scale to result in significant land degradation.

Methodology Desktop assessment and review of available information

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Comments This Project is not considered to be potentially at variance with this clearing principle.

No conservation areas or reserves are located in the Project Area.

Methodology Desktop assessment of available information.

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Comments This Project is not considered to be potentially at variance with this clearing principle.

Vegetation clearing is unlikely to be of sufficient scale to cause the deterioration in the quality of surface or underground water.

Methodology Desktop assessment of available information

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Comments This Project is not considered to be potentially at variance with this clearing principle.

The minimal clearing of native vegetation required for the Project is not considered likely to cause any alternation to the incidence or intensity of flooding within the region.

Methodology Desktop assessment of available information.

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