Public Transport Authority

Thornlie Extension

Environmental Assessment

September 2013

Executive summary

The Public Transport Authority (PTA) is currently planning the extension of the Thornlie spur line to Cockburn Central (the Project). The proposed extension will provide approximately 13 km of rail linking the Armadale and Mandurah rail lines, following the existing freight alignment between Albany Highway and the Kwinana Freeway.

Two new stations are under construction along the spur line extension at Nicholson Road and Ranford Road/South Street. The design and development footprints for these stations will be determined at a later date. The Project will require duplication of the existing rail bridge over the Canning River, immediately south of the existing rail bridge.

Drainage infrastructure (e.g. an interceptor) is also proposed as part of the Project within the easternmost corner of Tom Bateman Reserve.

The purpose of this report is to provide an assessment of potential environmental constraints associated with the Project based on desktop information and the results from Level 1 flora and fauna surveys. Based on the assessment, there does not appear to be any significant environmental constraints which may prevent the Project from proceeding. However, a range of additional studies have been identified which are recommended in order to confirm whether certain environmental features may pose a constraint to development.

Through this assessment, the following key elements of the Project were identified as requiring further consideration:

- The exact location of the Ranford Road Station which is proposed within or within close proximity to a Bush Forever site, Environmentally Sensitive Area and Conservation Category wetland; and
- Design of the Canning River bridge duplication to minimise impacts on the foreshore and aquatic environment.

A more detailed assessment of potential environmental impacts associated with the Project would need to be undertaken once detailed design is completed in order to quantify impacts and confirm any requirements for environmental approvals.

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1. Introduction

1.1 Project Background and Location

The Public Transport Authority (PTA) is currently planning the extension of the Thornlie spur line to Cockburn Central (the Project). The Project area is located approximately 18 km south-east of Perth's central business district within the City of Cockburn, City of Fremantle, City of Melville and City of Gosnells.

The proposed extension of the Thornlie spur line will provide approximately 13 km of rail linking the Armadale and Mandurah rail lines, following the existing freight alignment between Albany Highway and the Kwinana Freeway (Figure 1). The rail line will extend the existing Thornlie spur line and connect with the Mandurah railway line in the centre of the Kwinana Freeway via a previously constructed tunnel. The spur line will generally be located within an existing corridor, zoned as railway reserve under the Metropolitan Regional Scheme (MRS). It is proposed the spur line extension will be constructed on the southern side of the existing freight alignment.

Two new stations are planned along the spur line extension. One station is proposed to the south-west of the railway's intersection with Nicholson Road (hereinafter referred to as Nicholson Road Station), and a second station is proposed to the south-west of the railway's intersection with Ranford Road/South Street (hereinafter referred to as Ranford Road Station). Indicative locations for the two proposed stations are shown on Figure 2; however the design and development footprints for these stations will be determined at a later date.

The Project will require duplication of the existing rail bridge over the Canning River. It is anticipated the bridge duplication would be located outside of the current railway reserve, immediately south of the existing rail bridge.

Drainage infrastructure (e.g. an interceptor) is also proposed as part of the Project within the easternmost corner of Tom Bateman Reserve.

1.2 Purpose of this Report

The scope and purpose of this report is to provide an assessment of potential environmental constraints associated with the proposed extension of the Thornlie spur line including the construction of two new train stations, drainage infrastructure and duplication of the existing bridge over the Canning River.

This environmental assessment has been based on a review of available desktop information, including published literature, government databases and other publicly available data sources, in addition to the findings of Level 1 flora and fauna surveys of five targeted investigation areas within the Project area.

This document also aims to assist the PTA identify any State and/or Commonwealth regulatory approvals required, as part of the proposed works. The recommendations outlined in this environmental assessment are limited by Project information provided by the PTA as at September 2013.

1.3 Limitations

This report has been prepared by GHD for the Public Transport Authority and may only be used and relied on by Public Transport Authority for the purpose agreed between GHD and the Public Transport Authority as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Public Transport Authority arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section 1.4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Public Transport Authority and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.4 Assumptions

At the time of preparing this report, footprints for the proposed rail alignment, stations, bridge duplication and drainage infrastructure were not available. As such, the following assumptions have been made:

- The rail alignment will be located within the existing railway reserve zoned under the Metropolitan Regional Scheme;
- Duplication of the Canning Bridge is proposed to the south of the existing rail bridge and may be located outside of the existing railway reserve;
- Drainage infrastructure within Tom Bateman Park will be located in the eastern corner of the reserve and will be located outside of the existing railway reserve;
- The proposed Nicholson Road and Ranford Road Stations will be located within, or immediately adjacent to the railway reserve; and
- No works are proposed to the north-east of the intersection of the Armadale line and freight line (e.g. in the vicinity of the Brixton Street wetlands).

380,000 390,000 400,000 410,000

6,460,000

6,450,000

INDIAN OCEAN

PERTH

KINGS PARK

MT CLAREMONT

KARRAKATTA

WATTLE GROVE

ORANGE GROVE

SOUTHERN RIVER

Locality Map

KALBARRI

Indian Ocean

NANNUP

1:100,000 (at A3)

0 0.5 1 2 3 4 5

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 50

N

LEGEND

Project Area

Investigation Area

GHD

Public Transport Authority

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Public Transport Authority
Thornlie Extension
Environmental Assessment

Locality

Job Number	61-28662
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Date	12 Sep 2013

Figure 1

G:\61\28662\GIS\Maps\MXD\6128662_G001_Fig1_Rev1.mxd

Data source: GHD: Study boundary - 20120919, Investigation Area - 20121030; Landgate: Street Smart Mosaic 2012 - 20130912; GA: 250K Australian Topographic Series - 2006 Created by: cagilbert, erice

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2. Desktop Review of Environmental Constraints

2.1 Methodology

A number of desktop sources were identified and consulted to inform the desktop environmental constraints assessment for this Project, as outlined in Table 1.

Table 1 Information Sources

Aspect	Information Source
Matters of National Environmental Significance	Protected Matters Search Tool: http://www.environment.gov.au/epbc/pmst/index.html
Reserves	Department of Parks and Wildlife (DPaW) (formerly known as the Department of Environment and Conservation (DEC)) Estate spatial dataset Bush Forever
Environmentally Sensitive Areas	DPaW Native Vegetation Viewer: http://maps.dec.wa.gov.au/idelve/nv/index.jsp
Vegetation	Protected Matters Search Tool: http://www.environment.gov.au/epbc/pmst/index.html DPaW NatureMap: http://naturemap.dec.wa.gov.au/default.aspx Heddle (1980) 1:250,000 vegetation mapping for the Swan Coastal Plain.
Threatened and Priority Ecological Communities	DPaW Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) spatial datasets. Protected Matters Search Tool: http://www.environment.gov.au/epbc/pmst/index.html
Conservation Significant Flora and Fauna	DPaW NatureMap database: http://naturemap.dec.wa.gov.au/default.aspx DPaW Declared Rare Flora and Priority Flora datasets
Acid Sulphate Soils	Department of Environment Regulation (DER) (formerly known as DEC) Acid Sulphate Soils Risk Mapping: https://www2.landgate.wa.gov.au/bmvf/app/waatlas/
Surface water and Groundwater	Hydrological features (SLIP) Department of Water (DoW) Geographic Data Atlas DPaW Geomorphic Wetlands dataset *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (EPP Lakes) dataset
Heritage	Department of Aboriginal Affairs (DAA) (formerly known as DIA) Heritage Inquiry Search Tool: http://www.dia.wa.gov.au/AHIS/ Protected Matters Search Tool: http://www.environment.gov.au/epbc/pmst/index.html Heritage Council of Western Australia: http://register.heritage.wa.gov.au/

The results of these desktop searches are discussed below and presented in Figure 2 and Figure 3. The discussion for many of the environmental aspects is broken into the following headings to aid the assessment:

- Rail corridor;
- Canning River bridge;
- Proposed stations; and
- Proposed drainage area within the Tom Bateman Park.

2.2 Geology

A search of the GeoView WA search tool showed the study corridor is located on the Coolyena Group which includes the Osbourne and Lancelin Formations. The geology of this area consists of chalk, greensand, glauconitic sandstone and siltstone. Soils in the area include alluvial, shoreline, and eolian deposits.

2.3 Acid Sulphate Soils

Acid Sulphate Soils (ASS) are naturally occurring soils containing iron sulphides. These soils are typically benign within an anaerobic environment, however they can become oxidised when exposed, resulting in the formation of acidic soil and groundwater. The resulting sulphuric acid can also lead to the leaching of heavy metals and result in groundwater contamination.

Rail Corridor

A search of the DER's acid sulphate soils (ASS) risk mapping shows the rail corridor to be generally located within areas mapped as having 'moderate to low' risk of ASS within 3 m of the surface (Figure 3).

A small number of areas of 'high to moderate' ASS risk occur along the rail corridor between Ranford Road and Nicholson Road which are likely to be associated with wetland features.

Canning River Bridge

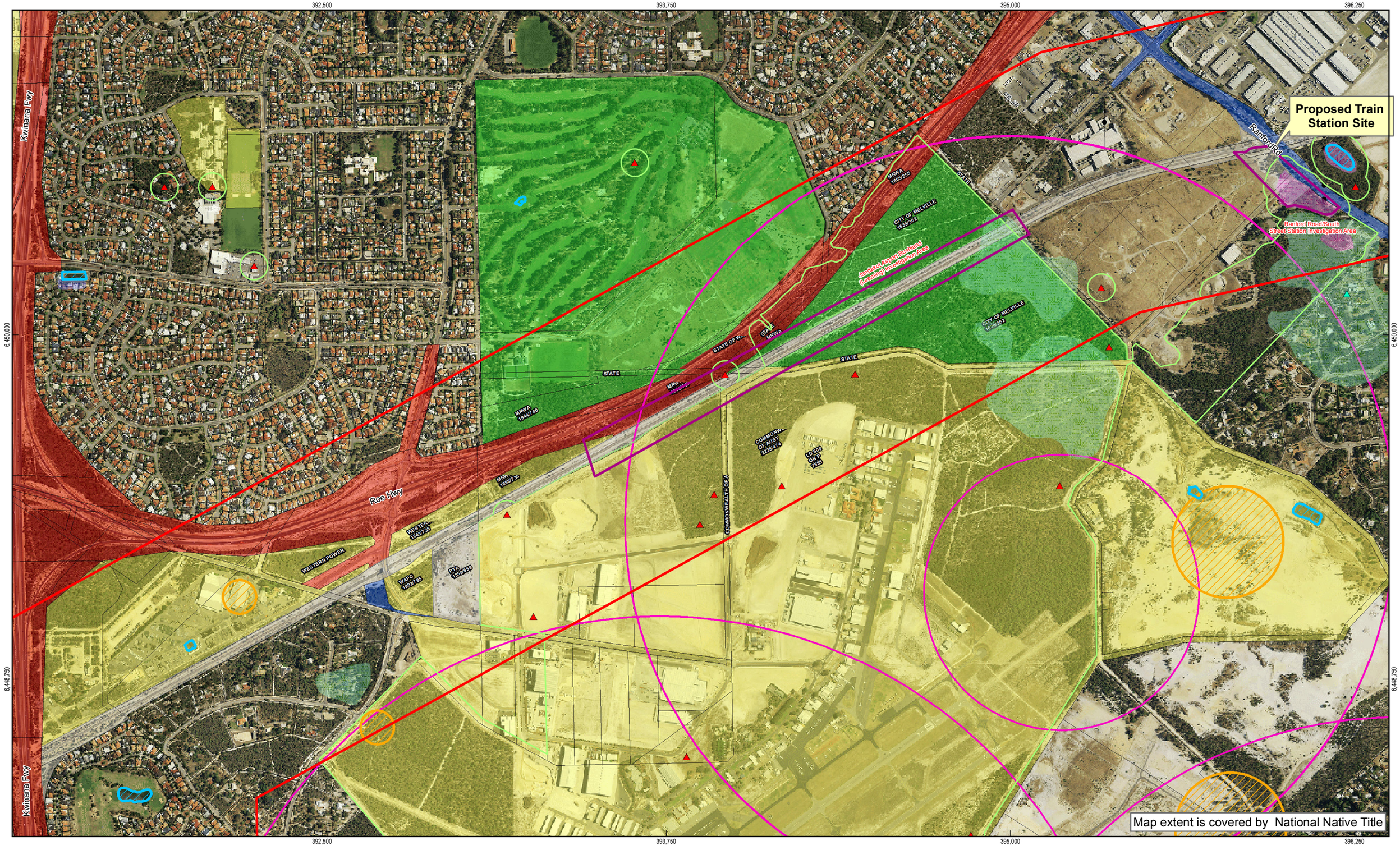
The Canning River and adjacent land is mapped as having 'high to moderate' ASS risk.

Proposed Stations

The two proposed train station sites are mapped as having 'moderate to low' risk of ASS within 3 m of the surface (Figure 3).

Proposed Drainage Area within Tom Bateman Park

The potential drainage area identified within Tom Bateman Park is mapped as having 'moderate to low' risk of ASS within 3 m of the surface (Figure 3).



1:12,500 (at A3)

0 0.125 0.25 0.375 0.5 0.625

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 50

N

LEGEND

Threatened and Priority Species
- (T) Threatened Flora - Extant Taxa
- Priority 1 - Poorly Known Taxa
- Priority 2 - Poorly Known Taxa
- Priority 3 - Poorly Known Taxa
- Priority 4 - Rare Taxa
- Priority 5 - Conservation Dependent Taxa

- Project Area
- Investigation Area
- Railway Reserve (MRS)
- Cadastre
- Hydrology
- Environmentally Sensitive Area
- Aboriginal Heritage Sites

Geomorphic Wetlands
- Conservation
- Resource Enhancement
- Multiple Use
- Priority Ecological Communities

Metropolitan Region Scheme
- REGIONAL ROADS (2)
- PARKS & RECREATION (3)
- PUBLIC PURPOSES (8)
- PRIMARY REGIONAL ROADS (1)
- RAILWAYS (2)

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Environmental Constraints

Figure 2

G:\61\28662\GIS\Maps\MXD\6128662_G004_Fig2_Rev2.mxd

Data source: Landgate: 2012 Virtual Mosaic - 20120919, Hydrology - 20120919; DOP: Metropolitan Regional Scheme - 20120928; DEC: Environmentally Sensitive Areas - 20120919, Swan River Trust Act Management Area - 20120920; DEC Estate - 20120919, Geomorphic Wetlands - 20120919, Threatened Ecological Communities - 20121004, Priority Ecological Communites - 20121004; DIA: Aboriginal Heritage Sites - 20120920; DOP: Bush Forever - 20120919, Railway Reserve (MRS) - 20210928; EPA: EPP Lakes - 20121119; GHD: Project Area - 20120919, Areas of Investigation - 20121030; PTA: Cadastre - 20130911. Created by: cagilbert, erice

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396,250 397,500 398,750 400,000

6,452,500

6,451,250

Tom Bateman Reserve Drainage Investigation Area

Indicative Drainage Infrastructure Area

Nicholson Road Station Investigation Area

Proposed Train Station Site

Roe Hwy

Proposed Train Station Site

Ranford Rd

Ranford Road South

Gardens

Map extent is covered by National Native Title

396,250 397,500 398,750 400,000

1:12,500 (at A3)

0 0.125 0.25 0.375 0.5 0.625

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 50

N

LEGEND

Threatened and Priority Species
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- Priority 1 - Poorly Known Taxa
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- Project Area
- Investigation Area
- Railway Reserve (MRS)
- Cadastre
- Hydrology
- Environmentally Sensitive Area
- Aboriginal Heritage Sites

Geomorphic Wetlands
- Conservation
- Resource Enhancement
- Multiple Use
- Threatened Ecological Communities
- Priority Ecological Communities

Metropolitan Region Scheme
- REGIONAL ROADS (2)
- PARKS & RECREATION (4)
- PRIMARY REGIONAL ROADS (1)
- RAILWAYS (2)

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Environmental Constraints

Figure 2

G:\61\28662\GIS\Maps\MXD\6128662_G004_Fig2_Rev2.mxd

Data source: Landgate: 2012 Virtual Mosaic - 20120919, Hydrology - 20120919; DOP: Metropolitan Regional Scheme - 20120928; DEC: Environmentally Sensitive Areas - 20120919, Swan River Trust Act Management Area - 20120920; DEC Estate - 20120919, Geomorphic Wetlands - 20120919, Threatened Ecological Communities - 20121004, Priority Ecological Communites - 20121004; DIA: Aboriginal Heritage Sites - 20120920; DOP: Bush Forever - 20120919, Railway Reserve (MRS) - 20210928; EPA: EPP Lakes - 20121119; GHD: Project Area - 20120919, Areas of Investigation - 20121030; PTA: Cadastre - 20130911. Created by: cagilbert, erice

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400,000 401,250 402,500 403,750

6,455,000

6,453,750

Albany Hwy

Spencer Rd

Canning River Bridge Investigation Area

Roe Hwy

Spencer Rd

Tom Bateman Reserve Drainage Investigation Area

Indicative Drainage Infrastructure Area

Map extent is covered by National Native Title

400,000 401,250 402,500 403,750

1:12,500 (at A3)

0 0.125 0.25 0.375 0.5 0.625

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 50

N

LEGEND

Threatened and Priority Species
- (T) Threatened Flora - Extant Taxa
- Priority 1 - Poorly Known Taxa
- Priority 2 - Poorly Known Taxa
- Priority 3 - Poorly Known Taxa
- Priority 4 - Rare Taxa
- Priority 5 - Conservation Dependent Taxa

- Project Area
- Investigation Area
- Railway Reserve (MRS)
- Swan River Trust Act Management Area
- Cadastre
- Hydrology
- Environmentally Sensitive Area
- EPP Lakes
- DEC Estate
- Aboriginal Heritage Sites

Geomorphic Wetlands
- Conservation
- Resource Enhancement
- Multiple Use
- Not Assessed
- Threatened Ecological Communities

Metropolitan Region Scheme
- REGIONAL ROADS (4)
- PARKS & RECREATION (13)
- PRIMARY REGIONAL ROADS (1)
- RAILWAYS (5)
- WATERWAYS (3)

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Environmental Constraints

Figure 2

G:\61\28662\GIS\Maps\MXD\6128662_G004_Fig2_Rev2.mxd

Data source: Landgate: 2012 Virtual Mosaic - 20120919, Hydrology - 20120919; DOP: Metropolitan Regional Scheme - 20120928; DEC: Environmentally Sensitive Areas - 20120919, Swan River Trust Act Management Area - 20120920; DEC Estate - 20120919, Geomorphic Wetlands - 20120919, Threatened Ecological Communities - 20121004, Priority Ecological Communites - 20121004; DIA: Aboriginal Heritage Sites - 20120920; DOP: Bush Forever - 20120919, Railway Reserve (MRS) - 20210928; EPA: EPP Lakes - 20121119; GHD: Project Area - 20120919, Areas of Investigation - 20121030; PTA: Cadastre - 20130911. Created by: cagilbert, erice

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385,000 392,500 400,000 407,500

6,457,500

6,450,000

STIRLING HIGHWAY
Swan River
CANNING HIGHWAY
STOCK ROAD
NORTH LAKE ROAD
HIGH STREET
SOUTH STREET
ROCKINGHAM ROAD
FORREST ROAD
COCKBURN ROAD
KWINANA FREEWAY
LEACH HIGHWAY
ALBANY HIGHWAY
TONKIN HIGHWAY
ROE HIGHWAY
RANFORD ROAD
ARMADALE ROAD

385,000 392,500 400,000 407,500

1:75,000 (at A3)

0 0.75 1.5 2.25 3 3.75

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 50

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LEGEND

Roads (Major)
Project Area

Acid Sulphate Soil

High to moderate ASS disturbance risk (<3m from surface)
Moderate to low ASS disturbance risk (<3m from surface)

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Acid Sulphate Soils

Figure 3

G:\61\28662\GIS\Maps\MXD\6128662_G003_Fig3_Rev1.mxd

Data source: GA: Roads (Major) - 2006; PTA: Study Alignment - 20120918; Landgate: 2012 Virtual Mosaic - 20120919, DEC: Acid Sulphate Soil - 20120927; GHD Project Area - 20120927 Created by: cagilbert, erice

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2.4 Contaminated Sites

Contaminated sites in Western Australia are covered under the *Contaminated Sites Act 2003*. Under this Act, contaminated sites must be reported to DER, investigated and, if necessary, remediated. The Contaminated Sites Database records information on sites classified as:

- Contaminated - remediation required;
- Contaminated - restricted use; and
- Remediated for restricted use.

The Contaminated Sites Reported Sites Register holds information on all sites reported to DER, including sites awaiting classification.

Rail Corridor

A search of the Contaminated Sites Database identified five contaminated sites within 500 m either side of the proposed rail corridor. These sites are listed in Table 2. None of the registered sites identified are situated within the rail reserve itself and therefore it is not anticipated that there will be any disturbance of these sites due to construction of the spur line.

Table 2 Registered Contaminated Sites within the Vicinity of the Project Area

ID	Address	Summary of Contamination and Restrictions on Use	Status
43016	Lot 1000 On Plan 13682, Leeming	Asbestos containing material (ACM) and asbestos fibre (AF) are present in soil at the site. Due to the presence of asbestos in soil, a site-specific health and safety plan should be developed and implemented to address the risks to the health of any workers undertaking intrusive works until further notice.	Contaminated – remediation required
17487	1A Eagle Drive, Jandakot	This site is associated with the airport and contamination consists of two separate hydrocarbon plumes in the groundwater to the northern and central areas of the site. Groundwater abstraction is not permitted.	Contaminated – remediation required
27530	85 Bannister Road, Canning Vale	Dioxins and hydrocarbons (such as from diesel or oil) were detected in soak wells. Hydrocarbons, heavy metals and ammonia are present in groundwater. The land use of the site is restricted to	Remediated for Restricted Use

ID	Address	Summary of Contamination and Restrictions on Use	Status
		commercial/industrial use. Additional investigations will be required if the site is to be developed for a more sensitive land use.	
14570	60 Bannister Rd, Canning Vale	Hydrocarbons (such as from petrol/diesel) and lead are present in groundwater in a plume located in the vicinity of the underground storage tanks and migrating off-site in a north east direction. Groundwater abstraction is not permitted.	Contaminated – remediation required
33884	Road Reserve at the corner of Bannister Road and Canvale Road	Dissolved phase hydrocarbons (such as from petrol/diesel) and lead are present in groundwater as a plume beneath the site coming from the adjacent service station, to the south west. Groundwater abstraction is not permitted.	Contaminated – remediation required

Canning River Bridge

There are no registered contaminated sites within the vicinity of the proposed Canning River bridge duplication.

Proposed Stations

The proposed Ranford Road Station is located partially (or wholly depending on the final design footprint) within the former Bannister Road landfill site. The proposed location for this station is located in close proximity to the registered contaminated site at 85 Bannister Road (ID 27530), which is situated to the north of the existing freight line.

There are no registered contaminated sites within the vicinity of the Nicholson Road Station.

Proposed Drainage Area within Tom Bateman Park

There are no registered contaminated sites within the vicinity of the proposed drainage area within Tom Bateman Park.

2.5 Surface Water

The main surface water body within the Project area is the Canning River. The extension of the Thornlie spur line will require construction of a duplicate bridge immediately south of the existing rail bridge.

The Project area is predominantly located within the Canning River surface water allocation area. The western extent of the rail corridor also traverses the Cockburn/Kwinana Coast and Swan River and Tributaries allocation areas.

The Project area is not located within a Surface Water Area or Public Drinking Water Source Area proclaimed under the *Rights in Water and Irrigation Act 1914*.

2.6 Wetlands

The Ramsar Convention on Wetlands of International Importance, is an international treaty designed to ensure international cooperation for the conservation of wetlands.

Certain lakes within the Swan Coastal Plain have been classified as Environmental Protection Policy (EPP) lakes under the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992*, developed under Part III of the *Environmental Protection Act 1986* (EP Act) in order to protect the environmental values of the selected lakes. The policy makes it an offence to fill, drain excavate, pollute or clear the listed lake areas.

In addition, DPaW maintains a database of geomorphic wetlands on the Swan Coastal Plain, which are categorised as follows:

- Conservation wetlands – which support high levels of environmental attributes and functions;
- Resource Enhancement wetlands – which have been partly modified but still support substantial environmental functions and attributes; and
- Multiple Use wetlands – which have few attributes but still provide important wetland functions.

The nearest Ramsar site to the Project area is Forrestdale and Thomsons lakes, which are located approximately 5 km south.

A number of surface water features including numerous wetlands have been identified within the vicinity of the Project area as identified in Figure 2 and listed in Table 3

Table 3 Geomorphic Wetlands within the Vicinity of the Project Area

Wetland ID Number	Wetland Name	Wetland Category
13620	Unnamed	Resource Enhancement
7746	Brixton Street Swamp	Multiple Use
7733	Unnamed	Resource Enhancement
14901	Canning River Palusplain	Conservation
14900	Canning River Palusplain	Conservation
14899	Canning River Palusplain	Conservation
15300	Unnamed	Multiple Use
7744	Unnamed	Multiple Use
7066	Canning Vale Dampland	Multiple Use
7065	Unnamed	Multiple Use
14456	Canning River Palusplain	Conservation
14455	Canning River Palusplain	Resource Enhancement

Wetland ID Number	Wetland Name	Wetland Category
14454	Canning River Palusplain	Resource Enhancement
13764	Canning River Palusplain	Multiple Use
6912	Unnamed	Conservation
6911	Unnamed	Conservation
6910	Unnamed	Conservation
6776	Unnamed	Resource Enhancement
15299	Unnamed	Resource Enhancement
15254	Unnamed	Multiple Use
13621	Unnamed	Multiple Use
13537	Unnamed	Resource Enhancement
6650	Unnamed	Resource Enhancement
7499	Unnamed	Resource Enhancement
7748	Brixton Street Swamp	Conservation
7446	unknown	Conservation
14452	Canning River Palusplain	Multiple Use
14453	Canning River Palusplain	Multiple Use
7156	Unnamed	Resource Enhancement
7155	Unnamed	Multiple Use
13365	Brixton Street Swamp	Conservation
15716	Unnamed	Multiple Use
13332	Unnamed	Resource Enhancement
14451	Canning River Palusplain	Not Applicable
14450	Canning River Palusplain	Multiple Use
7447	Hester Park Canning River	Resource Enhancement
6777	Unnamed	Resource Enhancement

Rail Corridor

The rail corridor is located within close proximity to numerous Conservation Category wetlands mapped by DPaW. Of particular note include:

- A Conservation Category wetland which abuts the rail corridor within Tom Bateman Park (ID 7446); and
- A Conservation Category wetland located within bushland on the southern side of the rail reserve, immediately east of Ranford Road (ID 6910).

There are a number of additional Resource Enhancement and Multiple Use wetlands located within the vicinity of the Project area as shown in Figure 2 and listed in Table 3

There are no EPP lakes within or adjacent to the railway reserve or surrounding areas.

Canning River Bridge

The Canning River is recognised as a Conservation Category wetland (ID 14899 and ID 14900). The area immediately south of the Canning River is also mapped as a Resource Enhancement wetland (ID 7447) while the northern side of the river is classified as a Multiple Use wetland (ID 14450).

Proposed Stations

The proposed Ranford Road Station site is located partially within a Conservation Category wetland (ID 6911), which is situated within the southern portion of the Project area. It is understood that various options are being considered for the configuration of this station and subsequently direct impacts to this wetland may be avoided.

The proposed Nicholson Road Station is located within an area mapped as a Multiple Use wetland (ID 13621).

There are no EPP lakes within or adjacent to the proposed station sites.

Proposed Drainage Area within Tom Bateman Park

The proposed drainage area within the eastern corner of Tom Bateman Park is mapped as forming part of a large Multiple Use wetland (ID 13621). Based on a review of aerial photography, the wetland feature within the vicinity of the proposed drainage infrastructure area appears to be a highly modified (e.g. possibly man made). This wetland appears to receive flows from an open drain which runs parallel to the existing freight line. There is potential for the proposed drainage infrastructure to improve the quality of water discharged to the wetland at this point.

2.7 Groundwater

The proposed rail alignment traverses three groundwater sub-catchments including the Airport sub-catchment of the Jandakot catchment area and the Canning and Gosnells sub-catchments of the Perth catchment area. All three sub-catchments are located within the Perth groundwater area proclaimed under the *Rights in Water and Irrigation Act 1914*.

2.8 Flora and Vegetation

Broad Vegetation Types

Regional vegetation has been mapped by Heddle *et al*. (1980) at a scale of 1:250,000 based on major geomorphic units on the Swan Coastal Plain. The Project is located in three vegetation types, the Swan Complex, Southern River Complex and the Bassendean Complex.

Vegetation Extent and Status

A vegetation type is considered under-represented if there is less than 30 percent 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 clearing proposals (EPA 2000):

- The “threshold level” below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30% of the pre-European/pre-1750 extent of 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, where:

- *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; and
- *Least Concern:* >50% pre-European extent exists and subject to little or no degradation over a majority of this area.

* or a combination of depletion, loss of quality, current threats and rarity give a comparable status.

Native vegetation types represented in the survey areas, their regional extent and reservation status are drawn from EPA Guidance Statement 10 (EPA 2006). These are shown in Table 4.

Table 4 Vegetation Extent and Status

Vegetation Complex	Vegetation Complex No.	Total pre-1750 extent (ha)	Present extent (1997/1998) in the System 6/part System 1 area (ha)	% of each remaining (1997/98) in the System 6/part System 1 area	Area in secure tenure (2002) (ha)	% of each remaining of pre-1750 extent in secure tenure (2002)
Swan Complex	33	15,783	2,454	15.6	0	0
Southern River Complex	42	57,979	11,501	19.8	882	1.5
Bassendean Complex	44	87,477	23,624	27.0	572	0.7

The majority of the Project is located in the Bassendean Complex and Southern River Complex. All three vegetation types occurring within the Project area are categorized as *Vulnerable* with less than 30% of pre-1750 extent remaining on the Swan Coastal Plain.

Native Vegetation within the Project Area

The following assessment of native vegetation within the Project area is made based on a review of aerial photography. This desktop assessment should be considered in conjunction with the findings of the field survey (Section 3.3.1) undertaken within the Project area.

Rail Corridor

The majority of vegetation within the rail reserve appears to have been cleared. Small area of regrowth, revegetation and/or remnant vegetation remain within the corridor.

Canning River Bridge

Remnant riparian vegetation occurs along the Canning River which may be impacted by the Project, however the extent of potential impacts cannot be quantified without a detailed design footprint.

Proposed Stations

The proposed Nicholson Road Station site appears to have been predominantly cleared with only scattered remnant vegetation remaining.

Much of the Ranford Road Station site appears to remain in a vegetated state, part of which forms part of a Bush Forever site.

Proposed Drainage Area within Tom Bateman Park

The area proposed for drainage infrastructure within Tom Bateman Park appears to support a highly modified environment which supports only limited scattered remnant trees.

Threatened and Priority Ecological Communities

Ecological communities are defined as "naturally occurring biological assemblages that occur in a particular type of habitat" (English and Blythe 1997). Threatened Ecological Communities (TECs) are ecological communities that have been assessed and assigned to one of four categories related to the status of the threat to the community, i.e. Presumed Totally Destroyed, Critically Endangered, Endangered, and Vulnerable. TECs are not formally protected under the *Wildlife Conservation Act 1950* (WC Act). However the loss of, or disturbance to, listed TECs triggers the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and would be a consideration in determining the need to assess under the EP Act.

Possible TECs that do not meet the stringent survey criteria for the assessment of TECs are placed on DPaW's Priority Ecological Communities (PEC) List under Priorities 1, 2 and 3. These are ecological communities that are inadequately known, are rare but not threatened, or meet criteria for Near Threatened. They would also be a consideration in determining the need to assess under the EP Act.

PECs that have been recently removed from the threatened list are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

A search of DPaW's TEC and PEC database identified 7 TECs and 2 PECs within the vicinity of the Project area (Table 5). Five of the TECs are protected under the EPBC Act.

Rail Corridor

The rail corridor intersects the buffers of a number of TECs within the vicinity of Brixton Street wetlands at the northern end of the alignment, as well as the buffer of one PEC in the vicinity of Jandakot Airport.

Canning River Bridge

There are no known TECs or PECs within the vicinity of the Canning River bridge.

Proposed Stations

The proposed Ranford Road Station site is located within close proximity to the buffer of a large PEC which appears to be associated with vegetation adjacent to the Jandakot Airport.

There are no PECs or TECs within the vicinity of the proposed Nicholson Road Station.

Proposed Drainage Area within Tom Bateman Park

There are no known TECs or PECs within the vicinity of the proposed drainage area.

Table 5 Threatened and Priority Ecological Communities within vicinity of the Project Area

Community ID	Status		Community Name
	Commonwealth	State	
SCP3a	Endangered	Critically Endangered	*Eucalyptus calophylla* - *Kingia australis* woodlands on heavy soils, Swan Coastal Plain
SCP3b		Vulnerable	*Eucalyptus calophylla* - *Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain
SCP7	Critically Endangered	Vulnerable	Herb rich saline shrublands in clay pans
SCP8	Critically Endangered	Vulnerable	Herb rich shrublands in clay pans
SCP10a	Critically Endangered	Endangered	Shrublands on dry clay flats
Muchea Limestone	Endangered	Endangered	Shrublands and woodlands on Muchea Limestone
SCP20a		Endangered	*Banksia attenuata* woodland over species rich dense shrublands
SCP21c		Priority 3	Low lying *Banksia attenuata* woodlands or shrublands
SCP22		Priority 2	*Banksia ilicifolia* woodlands

Conservation Significant Flora Potentially Occurring within the Project Area

Significant flora species are protected under both State and Commonwealth legislation. Any activities that are deemed to have a substantial impact on flora species that are recognised by the EPBC Act or the WC Act can trigger referral to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) and/or the EPA.

Significant flora in Western Australia that are protected under the WC Act are listed as Threatened (Declared Rare) flora. DPaW also produces a supplementary list of Priority Flora, these being species that are not considered Threatened under the WC Act but for which DPaW feels there is a cause for concern. Such taxa need further survey and evaluation of conservation status before consideration can be given to declaration as threatened flora. As such these species have no special legislative protection, but their presence would normally be considered relevant to an assessment of the conservation status of an area.

A search of the EPBC Act Protected Matters Search Tool and DPaW's Naturemap search tool (September 2012) identified 42 species protected under the EPBC Act and/or WC Act within the vicinity of the Project area (Table 6).

Database records from DPaW and the WA Herbarium are mapped in Figure 2 and are also included in Table 6. Data restrictions enforced by DPaW prevent GHD from being able to identify flora species associated with threatened flora points shown on Figure 2.

Rail Corridor

Locations of previously recorded threatened and priority flora within the vicinity of the rail reserve, as recorded on DPaW's database, include:

- Numerous recorded locations of threatened flora close proximity to the proposed rail alignment in the vicinity of the Jandakot Airport. Of particular note is one record which is located to the north of the existing freight alignment, which appears to be on the boundary of the rail reserve; and

- A number of threatened, Priority 3 and Priority 4 species at the eastern extent of the Project area, to the east of Albany Highway.

Canning River Bridge

There are no known records of threatened or priority flora within the vicinity of the proposed Canning River bridge.

Proposed Stations

One recorded location of threatened flora is known within bushland to the east of Ranford Road, opposite the proposed Ranford Road train station site.

No threatened or priority flora are known from within the vicinity of the proposed Nicholson Road Station.

Proposed Drainage Area within Tom Bateman Park

There are no known records of threatened or priority flora within the vicinity of the proposed drainage area.

Table 6 Conservation Significant Flora Species Potentially Present in Project Area

Common Name	Scientific Species Name	Status		Database Records within the Vicinity of the Project Area	
		Commonwealth	State	EPBC Act Protected Matters Search Tool	DPaW / NatureMap Databses
Slender Andersonia	*Andersonia gracilis*	Endangered	Threatened	X	X
King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid	*Caladenia huegelii*	Endangered	Threatened	X	X
Swamp Starflower	*Calytrix breviseta* subsp. *breviseta*	Endangered		X	X
	Centrolepis caespitosa	Endangered		X	
Muchea Bell	*Darwinia foetida*	Critically Endangered		X	
Glossy-leaved Hammer-orchid, Praying Virgin	*Drakaea elastica*	Endangered	Threatened	X	X
Cadda Road Mallee, Cadda Mallee	*Eucalyptus balanites*	Endangered		X	
Narrow curved-leaf Grevillea	*Grevillea curviloba* subsp. *incurva*	Endangered		X	
Beaked Lepidosperma	*Lepidosperma rostratum*	Endangered	Threatened	X	X
	Macarthuria keigheryi	Endangered	Threatened		X

Common Name	Scientific Species Name	Status		Database Records within the Vicinity of the Project Area	
		Commonwealth	State	EPBC Act Protected Matters Search Tool	DPaW / NatureMap Databses
Selena's Synaphea	*Synaphea sp. Fairbridge Farm* (D.Papenfus 696)	Critically Endangered	Threatened	X	
Dwellingup Synaphea	*Synaphea stenoloba*	Endangered		X	
	Thelymitra manginii K.Dixon & Batty ms.	Endangered		X	
Mountain Villarsia	*Villarsia calthifolia*	Endangered		X	
	Baeckea sp. Perth Region (R.J. Cranfield 444)		Priority 3		X
Rainbow Plant	*Byblis gigantea*		Priority 3		X
Slender-fruited Comesperma	*Comesperma rhadinocarpum*		Priority 2		X
	Drosera occidentalis subsp. occidentalis		Priority 4		X
	Eremophila glabra subsp. chlorella		Threatened		X
	Eryngium pinnatifidum subsp. palustre		Priority 3		X
	Eryngium subdecumbens		Priority 3		X
Spider Net Grevillea	*Grevillea thelemanniana subsp. thelemanniana*		Priority 4		X

Common Name	Scientific Species Name	Status		Database Records within the Vicinity of the Project Area	
		Commonwealth	State	EPBC Act Protected Matters Search Tool	DPaW / NatureMap Databses
Aquatic Pennywort	*Hydrocotyle lemnoides*		Priority 4		X
	Ornduffia submersa		Priority 4		X
Jumping Jacks	*Stylidium longitubum*		Priority 3		X
Pantaloon Triggerplant	*Stylidium periscelianthum*		Priority 3		X
	Tripterococcus paniculatus		Priority 4		X
	Verticordia lindleyi subsp. lindleyi		Priority 4		X
Stalked Water Ribbons	*Aponogeton hexatepalus*		Priority 4		X
Blue Tinsel Lily	*Calectasia cyanea*		Threatened		X
	Carex tereticaulis		Priority 1		X
	Chamaescilla gibsonii		Priority 3		X
Purdie's Donkey Orchid	*Diuris purdiei*		Threatened		X
	Dodonaea hackettiana		Priority 4		X
	Drakaea micrantha		Threatened		X
	Eleocharis keigheryi		Threatened		X

Common Name	Scientific Species Name	Status		Database Records within the Vicinity of the Project Area	
		Commonwealth	State	EPBC Act Protected Matters Search Tool	DPaW / NatureMap Databses
	Haemodorum loratum		Priority 3		X
	Phlebocarya pilosissima subsp. pilosissima		Priority 3		X
	Schoenus benthamii		Priority 3		X
	Schoenus capillifolius		Priority 3		X
Floating Bog-rush	*Schoenus natans*		Priority 4		X
	Schoenus pennisetis		Priority 1		X
	Schoenus sp. *Waroona* (G.J. Keighery 12235)		Priority 3		X
	Tetraria australiensis		Threatened		X

2.9 Fauna

This fauna desktop assessment should be considered in conjunction with the findings of the field survey (Section 3.3.2) undertaken within the Project area.

Conservation Significant Fauna Potentially Occurring within the Project Area

The Federal conservation level of fauna species and their significance status is currently assessed under the EPBC Act. The significance levels for fauna used in the EPBC Act are those recommended by the International Union for the Conservation of Nature and Natural Resources (IUCN) and reviewed by Mace and Stuart (1994).

The State conservation level of fauna species and their significance status is currently assessed under the WC Act (*Wildlife Conservation (Specially Protected Fauna) Notice 2010(2)*). The WC Act uses a set of Schedules but also classifies species using some of the IUCN categories. Schedule 3 fauna species are those which are subject to agreements between the government of Australia and the governments of Japan, China and the Republic of Korea relating to the protection of migratory birds and are declared to be fauna that is in need of special protection.

DPaW produces a supplementary list of Priority Fauna, these being species that are not considered Threatened under the WC Act but for which the Department feels there is a cause for concern. Such taxa need further survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna. These species have no special legislative protection, but their presence would normally be considered relevant to an assessment of the conservation status of an area.

A search of the EPBC Act Protected Matters Search Tool and DPaW Naturemap search tool (September 2012) showed the potential presence of 23 species protected under the EPBC Act and/or WC Act within the Project footprint.

A summary of the conservation significant species potentially occurring within the vicinity of the Project is included in Table 7.

Migratory Species

The EPBC Act legislates protective status to species that migrate to Australia (and/or its territories), and/or fly over/travel through Australia's marine waters. Specifically, any species listed under international agreements and conventions pertaining to migratory species are protected under the EPBC Act. Such agreements include:

- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention);
- Japan-Australia Migratory Bird Agreement (JAMBA);
- China-Australia Migratory Bird Agreement (CAMBA); and
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

A search of the EPBC Act Protected Matters Search Tool identified seven migratory bird species potentially present within the vicinity of the Project area (Table 7).

Table 7 Conservation Significant Fauna Species Potentially Occurring in the Project Area

Common Name	Scientific Name	Status	
		Commonwealth	State
Birds			
Australasian Bittern	*Botaurus poiciloptilus*	Endangered	
Forest Red-tailed Black-Cockatoo	*Calyptorhynchus banksii naso*	Vulnerable	Threatened
Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo	*Calyptorhynchus latirostris*	Endangered	Threatened
Malleefowl	*Leipoa ocellata*	Vulnerable	
Australian Painted Snipe	*Rostratula australis*	Vulnerable	
Fairy Tern (Australian)	*Sternula nereis nereis*	Vulnerable	
Curlew Sandpiper	*Calidris ferruginea*	Listed Marine, Migratory	
Black-tailed Godwit	*Limosa limosa*	Listed Marine, Migratory	
Rainbow Bee-eater	*Merops ornatus*	Listed Marine, Migratory	
Common Greenshank	*Tringa nebularia*	Listed Marine, Migratory	
Insects			
Graceful Sun Moth	*Synemon gratiosa*		Priority 4
Bee	*Leioproctus douglasiellus*		Threatened
Carter's Freshwater Mussel	*Westralunio carteri*		Priority 4