

PORT HEDLAND AREA TARGETED PRIORITY FLORA SURVEY

Prepared for

SINCLAIR KNIGHT MERZ PTY LIMITED



Job 09.028

Report RP003



Australia

PORT HEDLAND AREA TARGETED PRIORITY FLORA SURVEY

Prepared for

SINCLAIR KNIGHT MERZ PTY LIMITED

Prepared by

ENV Australia Pty Ltd
Level 7, 182 St Georges Terrace
PERTH WA 6000
Phone: (08) 9289 8360
Fax: (08) 9322 4251
Email: env@env.net.au

Prepared by:	<i>Emma Carroll</i>
Status:	<i>Final</i>
QA Review:	<i>Kerryn McCann</i>
Technical Review:	<i>Teresa Gepp</i>
Content Review:	<i>Teresa Gepp</i>
Date:	<i>11 September 2009</i>

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1 INTRODUCTION	1
1.1 BACKGROUND AND OBJECTIVES.....	1
1.2 LOCATION.....	1
2 METHODOLOGY	3
2.1 BACKGROUND TO SURVEY METHODOLOGY.....	3
2.2 PROTECTED FLORA	3
2.3 SURVEY METHODOLOGY	4
2.4 PERMITS	5
3 SURVEY LIMITATIONS AND CONSTRAINTS	6
4 RESULTS.....	8
4.1 DESKTOP REVIEW	8
4.2 FIELD SURVEY	9
4.2.1 Protected Flora.....	9
5 DISCUSSION	14
6 REFERENCES	18

FIGURES

FIGURE 1	LOCATION OF BHP BILLITON IRON ORE GROWTH PROJECTS IN PORT HEDLAND
FIGURE 2	SURVEY AREAS FOR PRIORITY FLORA
FIGURE 3	LOCATIONS OF PRIORITY FLORA RECORDED IN THE TARGETED SURVEY
FIGURE 4	PRIORITY FLORA RECORDED BY ENV IN PORT HEDLAND TO DATE
FIGURE 5	PRIORITY FLORA SPECIES RECORDED IN THE PORT HEDLAND AREA DURING OTHER SURVEYS

TABLES

TABLE 1	LIMITATIONS AND CONSTRAINTS ASSOCIATED WITH THE PORT HEDLAND PRIORITY FLORA SURVEY
TABLE 2	PRIORITY FLORA SPECIES POTENTIALLY OCCURRING IN THE PORT HEDLAND AREA
TABLE 3	SUMMARY OF PRIORITY FLORA SPECIES RECORDED IN THE TARGETED SURVEY
TABLE 4	VEGETATION COMMUNITIES IN WHICH <i>HELIOTROPIUM MUTICUM</i> WAS RECORDED
TABLE 5	VEGETATION COMMUNITIES IN WHICH <i>TEPHROSIA ROSEA</i> VAR. <i>VENULOSA</i> WAS RECORDED
TABLE 6	VEGETATION COMMUNITIES IN WHICH <i>GOODENIA NUDA</i> WAS RECORDED

APPENDICES

APPENDIX A	DEFINITIONS OF DECLARED RARE / PRIORITY AND THREATENED FLORA SPECIES
APPENDIX B	LOCATIONS OF PRIORITY FLORA SPECIES
APPENDIX C	NUMBERS OF INDIVIDUALS RECORDED DURING THE TARGETED PRIORITY FLORA SURVEY

EXECUTIVE SUMMARY

ENV.Australia Pty Ltd was commissioned in March 2009 by Sinclair Knight Merz Pty Limited to undertake a targeted survey for Priority Flora in the Port Hedland area for BHP Billiton Iron Ore's Growth Projects.

The aim of the targeted survey was to provide additional information on the occurrence of Priority Flora to that collected by baseline flora and vegetation surveys for Dredge Material Management Area H, the Outer Harbour Development and the Goldsworthy Rail Duplication. These baseline surveys were undertaken in 2008 following less than ideal summer rainfall (less than 71.8 mm between December 2007 and February 2008) or outside of the summer period when Priority Flora may not be present.

The targeted Priority Flora survey of the Outer Harbour Development, Goldsworthy Rail Duplication and Dredge Material Management Area H was undertaken from the 18 – 22 March 2009 with 20 person-days invested in the survey.

No Threatened species under the *Environment Protection and Biodiversity Conservation Act 1999* or Declared Rare Flora species under the *Wildlife Conservation Act 1950* were recorded during any of the surveys.

Four Priority Flora species, *Heliotropium muticum* (Priority 1), *Tephrosia rosea* var. *venulosa* (Priority 1), *Pterocaulon* sp. A Kimberley Flora (B.J. Carter 599) (Priority 2) and *Goodenia nuda* (Priority 3) were recorded within the Port Hedland area during the targeted survey.

1 INTRODUCTION

1.1 BACKGROUND AND OBJECTIVES

ENV.Australia Pty Ltd was commissioned in March 2009 by Sinclair Knight Merz Pty Limited to undertake a targeted survey for Priority Flora in the Port Hedland area for BHP Billiton Iron Ore's Growth Projects, namely Dredge Material Management Area H (DMMA H) (ENV 2009a), the Outer Harbour Development (ENV 2009b) and the Goldsworthy Rail Duplication (ENV 2009c). Figure 1 shows the location of these project areas.

The aim of the targeted survey was to provide additional information on the occurrence of Priority Flora to that collected by baseline flora and vegetation surveys undertaken in the Port Hedland area. Baseline flora and vegetation surveys for DMMA H and the Goldsworthy Rail Duplication were undertaken in October 2008 with only 0.4 mm of rainfall in the three months preceding these surveys. The Outer Harbour Development flora and vegetation survey was undertaken in winter 2007 and summer 2008, with only 71.8 mm of rainfall preceding the summer survey. The low levels of rainfall preceding these baseline surveys suggested that some Priority Flora species may not have been identified as they require a higher rainfall level to stimulate germination.

The Port Hedland area received a relatively large amount of rainfall in the 2008/2009 summer season, with the area having received 235.6 mm (December – February) (Bureau of Meteorology (BoM) 2009). On average the area usually receives 171.8 mm over the December to February period (BoM 2009). The completion of a targeted Priority Flora survey following this high rainfall was considered ideal to further document the occurrence of Priority Flora within proposed impact areas.

The specific objectives of the targeted Priority Flora survey were to:

- document all Priority Flora species in the survey area;
- map the location of all Priority Flora species in the survey area; and
- discuss potential impacts of the project on Priority Flora.

1.2 LOCATION

The targeted Priority Flora Survey focussed on three areas located west and south-west of the towns of Port Hedland and South Hedland (Figure 1):

- DMMA H: A 266 ha area to the north of Wedgefield Industrial consisting of mangroves, samphire flats, *Triodia* grasslands and low sandy islands.

- Outer Harbour Development: A 1884.2 ha area extending from Finucane Island to the decommissioned Boodarie Iron Plant and south-east to the existing Newman to Port Hedland Railway. The area consists of mangroves and samphire flats in the northern coastal areas, and sandplains with scattered major (riverine) drainage lines in the remaining area.
- Goldsworthy Rail Duplication: A 63.8 ha area 30 m either side of the existing Goldsworthy Railway extending east from the decommissioned Boodarie Iron Plant to the intersection of this railway with the existing Newman to Port Hedland Railway.

2 METHODOLOGY

2.1 BACKGROUND TO SURVEY METHODOLOGY

All surveys undertaken by ENV are designed to meet the requirements of the following State and Federal legislation:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) ('*EPBC Act 1999*');
- *Wildlife Conservation Act 1950* (WA) ('*WC Act 1950*'); and
- *Environmental Protection Act 1986* (WA) ('*EP Act 1986*').

The survey was carried out in a manner designed to be compliant with the EPA requirements for the environmental surveying and reporting for flora and vegetation in Western Australia, as set out in the following documents:

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

EPA Guidance Statement No. 51 (EPA 2004) outlines the expectations of the EPA and details the extent, design and intensity of field surveys for environmental assessments. Two formal levels of flora survey are defined by the EPA Guidance Statement No. 51:

- Level One: a 'desktop' study to collate historical knowledge conducted in conjunction with a reconnaissance survey (site inspection).
- Level Two: an intensive survey that incorporates a detailed and comprehensive survey to characterise the flora present, combined with a Level One survey.

2.2 PROTECTED FLORA

Flora species are protected formally and informally by various legislative and non-legislative measures, which are as follows:

Legislative Protection

EPBC Act 1999:

- Threatened Flora Species.

WC Act 1950:

- Declared Rare Flora species.

EP Act 1986:

- offers protection to Declared Rare Flora species.

Non-Legislative Protection

Department of Environment and Conservation (DEC) Priority lists:

- Priority Flora species.

Informal recognition by the DEC of locally significant populations:

- endemic species;
- range extensions; and
- previously undescribed taxa.

Conservation categories and definitions are presented in Appendix A for threatened, Declared Rare and Priority Flora species.

2.3 SURVEY METHODOLOGY

Desktop Review

The purpose of the desktop review was to gather background information on the project area and the Priority Flora species and vegetation it may support. This involved reviewing previous reports conducted in the area, DEC database search results (20° 17' 6"S, 118° 27' 13"E to 20° 33' 26"S, 118° 39' 40"E) and NatureMap searches to compile a list of Declared Rare or Priority species that could potentially occur within the survey areas.

Field Survey

The Priority Flora survey was conducted from the 18 – 22 March 2009 with a total of 20 person-days invested in the survey.

For DMMA H survey area, a series of closely walked transects were undertaken, approximately 50 m apart, searching for Priority Flora species.

The Outer Harbour Development and Goldsworthy Rail Duplication targeted survey areas were searched for Priority Flora species using two methods:

- for linear sections of the survey area, two transects approximately 20 m apart were walked in parallel; and
- for the area surrounding the decommissioned Boodarie Iron Plant, a series of transects approximately 200 m apart were walked. Targeted searches were also conducted in locations at which Priority Flora had been previously recorded during the baseline survey (ENV 2009b) and in known preferred habitats.

Taxonomic Identification

Where field identification of plant taxa was not possible, specimens were collected systematically for later identification by expert taxonomists utilising the resources of the Western Australian Herbarium (WAH). Species were identified through comparison with the reference collection and the use of identification keys.

The project species list was checked against FloraBase (WAH 2009) to determine whether any of the species identified were listed as Rare or Priority species. Species were also checked against the *EPBC Act* 1999 listing of Threatened species to determine if any were federally listed (Department of Environment, Water, Heritage and the Arts [DEWHA] 2008).

2.4 PERMITS

Specimens collected during the survey were taken by permit of and subject to the conditions of the following licences issued under sections 23C and 23F of the *WC Act* 1950:

- SL008483 to Emma Carroll;
- SL008487 to Todd Edwards;
- SL008481 to Ciaran Sgherza; and
- SL008485 to Michael Brown.

3 SURVEY LIMITATIONS AND CONSTRAINTS

It is important to note the specific constraints imposed on individual surveys. Constraints are often difficult to predict, as is the extent to which they influence survey outcomes. Survey constraints of the Priority Flora targeted surveys are detailed in Table 1.

Table 1: Limitations and Constraints Associated with the Port Hedland Priority Flora Survey

Variable	Impact on Survey Outcomes
Access Problems	The majority of the project area was accessible and adequately surveyed during the current survey. Areas within the decommissioned Boodarie Iron Plant on the eastern side of the conveyor could not be accessed along with areas within the recently cleared DMMA A area, on the western side of the conveyor. Priority Flora are considered unlikely to occur in these areas as none of the potentially occurring species occur in these habitats and the areas are highly disturbed.
Experience levels	The biologists who executed these surveys were practitioners suitably qualified in their respective fields. <ul style="list-style-type: none"> • Mr Todd Edwards – Botanist; • Ms Emma Carroll – Biologist; • Ms Ciaran Sgherza – Biologist; • Mr Michael Brown – Biologist; and • Mr Malcolm Trudgen – Taxonomist.
Timing ¹ , weather, season.	The survey was undertaken from 18 – 22 March 2009. During the three months preceding the survey (December - February) the area received 235.6 mm of rainfall, and a total of 452.6 mm for the year to the commencement of the survey (BoM 2009). The conditions were conducive to Priority Flora species being located and identified more readily. Flora composition changes over time, with flora species having specific growing periods, especially annuals and ephemerals (some plants lasting for a markedly brief time, some only a day or two). Therefore the results of future botanical surveys in this location may differ from the results of this

¹ EPA Guidance Statement 51 (2004) stipulates that flora and vegetation surveys should be undertaken following the season that contributes the greatest rainfall in the region. In the Northern Province, this is after summer. Short-term variations in normal weather patterns (e.g. drought) may necessitate supplementary survey work at other times of year or in later years to take into account temporal changes in diversity.

Variable	Impact on Survey Outcomes
	survey.
Completeness	All accessible areas of the project area were traversed during the current survey. Annual species were present and a number of species were in flower due to the summer rainfall. The survey effort consisted of spaced transects and targeted searches of preferred habitat.
Sources of information	<p>At the bioregion level, the Pilbara has been relatively well studied. Numerous flora and vegetation assessment surveys have been undertaken in the area as part of the environmental impact assessment processes. Previous studies completed in the Port Hedland area include the baseline flora and vegetation surveys conducted for DMMA H (ENV 200a), the Goldsworthy Rail duplication (ENV 2009c) and the Outer Harbour Development (ENV 2009b).</p> <p>Previous studies completed in the vicinity of the project area include those completed for the Hope Downs rail line, Fortescue Metals Group Rail Line, Utah Point Berth, DMMA A and H and the Boodarie Iron Plant (Hope Downs 2002, Biota 2004, Biota 2007, Biota 2008, Biota 2007 and Matiske Consulting 1994).</p> <p>A supplementary assessment has also being undertaken focusing on the mangroves of the Outer Harbour Development area (SKM 2008).</p>
Determination	The taxonomy and conservation status of the Western Australian flora are dynamic. This report was prepared in reliance on taxonomy and conservation current at the time of preparation, but it should be noted this may change.

4 RESULTS

4.1 DESKTOP REVIEW

A database search and desktop review of the area indicates that no *EPBC Act* 1999 listed species, no Declared Rare Flora species and 11 Priority Flora species potentially occur in the project area (Table 2). Definitions of DRF and Priority Flora species ratings are presented in Appendix A.

Table 2: Priority Flora Species Potentially Occurring in the Port Hedland Area

Species	Code	Description (WAH 2009)	Distribution (Atkins 2008)
<i>Heliotropium muticum</i>	P1	Ascending to spreading perennial herb to 0.3 m high.	Port Hedland. Outer Harbour Development survey (ENV 2009b).
<i>Mimulus clementii</i>	P1	Annual herb, 0.1–0.2 m high.	Between Ashburton and De Grey Rivers
<i>Ptilotus appendiculatus</i> var. <i>minor</i>	P1	Prostrate or ascending perennial, herb or shrub.	Port Hedland, Boodarie.
<i>Tephrosia rosea</i> var. <i>venulosa</i>	P1	Erect shrub to 1.7 m. Red sands near creeks.	Port Hedland, Finucane Island. Outer Harbour Development, DMMA H surveys (ENV 2009a, b).
<i>Gomphrena pusilla</i>	P2	Slender branching annual herb, to 0.2 m high. Fine beach sand, behind foredune, on limestone.	Dampier Peninsula, Port Hedland.
<i>Euphorbia clementii</i>	P2	Erect herb, to 0.6 m high. Gravelly hillsides, stony grounds.	Port Hedland area, Yarric.
<i>Pterocaulon</i> sp. A Kimberley Flora (B.J. Carter 599)	P2	Compact shrub to 0.5 m high. Found in sandy coastal areas and saline sandy flats.	Broome, Anna Plains. Outer Harbour Development and DMMA H surveys (ENV 2009a, b).
<i>Acacia glaucocaesia</i>	P3	Dense shrub or tree, 1.8–6 m high. Floodplains with red loam, sandy loam or clay.	Port Hedland, Mardie, Roebourne, De Grey.

Species	Code	Description (WAH 2009)	Distribution (Atkins 2008)
<i>Bulbostylis burbidgeae</i>	P3	Tufted annual herb, 0.03–0.25 m high. Granite outcrops and cliff bases.	Mount Edgar, Gorge Creek, Abydos-Woodstock Recorded by Biota (2007) at Utah Point and within FMG rail line (Biota 2004).
<i>Gymnanthera cunninghamii</i>	P3	Erect shrub, 1–2 m high. Sandy soils.	Dampier Archipelago, Boodarie, 80 Mile Beach Recorded within both the FMG and Hope Downs rail lines (Biota 2004; Hope Downs Management Services 2002) and the Outer Harbour Development survey (ENV 2009b).
<i>Goodenia nuda</i>	P3	Erect to ascending herb to 0.3 m high.	Weeli Wolli, Roy Hill, Mt Stuart, Outer Harbour Development survey (ENV 2009b).

4.2 FIELD SURVEY

4.2.1 Protected Flora

No Threatened species pursuant to the *EPBC Act* 1999 were located during the surveys.

No plant taxa gazetted as Declared Rare pursuant to the *WC Act* 1950 were located in the survey areas.

Four Priority Flora species, *Heliotropium muticum* (Priority 1), *Tephrosia rosea* var. *venulosa* (Priority 1), *Pterocaulon* sp. A Kimberley Flora (B.J. Carter 599) (Priority 2) and *Goodenia nuda* (Priority 3) were recorded from 161 GPS-recorded sites within the Port Hedland area during the targeted survey (Appendix B). The number of locations of Priority Flora has been determined by grouping individuals recorded in close proximity to each other. A summary of the numbers of GPS points, locations and individuals recorded for each Priority Flora species is included in Table 3. The locations of recorded Priority Flora species are illustrated in Figure 3.

Tephrosia rosea var. *venulosa* was recorded in the highest numbers and at the greatest number of locations, followed by *Goodenia nuda*, *Heliotropium muticum* and *Pterocaulon* sp. A Kimberley Flora (Appendix C).

Table 3: Summary of Priority Flora Species Recorded in the Targeted Survey

Species	Sites (GPS Points)	Locations	Individuals (Approx.)
<i>Heliotropium muticum</i>	2	2	11
<i>Tephrosia rosea</i> var. <i>venulosa</i>	124	9	1890
<i>Pterocaulon</i> sp. A Kimberley Flora (B.J. Carter 599)	1	1	2
<i>Goodenia nuda</i>	34	2	220

***Heliotropium muticum* – Priority 1**

Heliotropium muticum, a small perennial herb which grows to approximately 0.3 m in height (Plate 1), was recorded at two locations within the Outer Harbour Development survey area (Figure 3). This species was recorded in two vegetation communities within the Sandplain landform (Table 4).



Plate 1: *Heliotropium muticum*

Table 4: Vegetation Communities in which *Heliotropium muticum* was Recorded.

Landform Type	Vegetation
Sandplain	A low <i>Acacia stellaticeps</i> and <i>Corchorus incanus</i> subsp. <i>incanus</i> shrubland over a <i>Triodia schinzii</i> hummock grassland.
	Scattered low <i>Corymbia flavescens</i> trees over an open <i>Acacia ancistrocarpa</i> and <i>A. bivenosa</i> shrubland over scattered low <i>A. stellaticeps</i> shrubs over a <i>Triodia epactia</i> and <i>T. lanigera</i> hummock grassland.

***Tephrosia rosea* var. *venulosa* – Priority 1**

Tephrosia rosea var. *venulosa*, an erect shrub which grows to 1.7 m in height (Plate 2), was recorded at eight locations within the Outer Harbour Development and Goldsworthy Duplication survey areas, and one location within the DMMA H survey area (Figure 3). This species was recorded within two landforms and six vegetation communities (Table 5).



Plate 2: *Tephrosia rosea* var. *venulosa*

Table 5: Vegetation Communities in which *Tephrosia rosea* var. *venulosa* was Recorded.

Landform Type	Vegetation
Dunes	Scattered <i>Acacia bivenosa</i> shrubs over a low open <i>Crotalaria cunninghamii</i> shrubland over a * <i>Cenchrus ciliaris</i> tussock grassland over scattered * <i>Aerva javanica</i> herbs.
	An <i>Atalaya hemiglauca</i> , <i>Santalum lanceolatum</i> and <i>Acacia bivenosa</i> shrubland over a * <i>Cenchrus ciliaris</i> tussock grassland.
Sandplain	Low <i>Acacia stellaticeps</i> shrublands over <i>Triodia epactia</i> and <i>T. secunda</i> hummock grasslands/ <i>T. epactia</i> and <i>T. secunda</i> hummock grasslands mosaic.
	A low <i>Acacia stellaticeps</i> and <i>Corchorus incanus</i> subsp. <i>incanus</i> shrubland over <i>Triodia schinzii</i> hummock grassland.
	Scattered <i>Acacia ampliceps</i> shrubs over scattered <i>Tecticornia indica</i> subsp. <i>leiostachya</i> and <i>T. halocnemoides</i> subsp. <i>tenuis</i> low shrubs over scattered <i>Sporobolus virginicus</i> grasses.
	<i>Acacia colei</i> var <i>colei</i> (<i>A. trachycarpa</i>) scattered tall shrubs over <i>A. stellaticeps</i> (<i>Myoporum montanum</i>) low open shrubland over <i>Triodia epactia</i> hummock grassland over <i>Eriachne obtusa</i> , <i>Panicum decompositum</i> var. <i>decompositum</i> very open tussock grassland over an open herbland of mixed species.

***Pterocaulon* sp. A Kimberley Flora (B.J. Carter 599) – Priority 2**

Pterocaulon sp. A Kimberley Flora (B.J. Carter 599), a compact shrub growing to 0.5 m in height (Plate 3), was recorded at one location during the DMMA H survey (Figure 3). This species was recorded from the Sandplain landform within the following vegetation community:

- *Acacia colei* var. *colei* (*A. trachycarpa*) scattered tall shrubs over *A. stellaticeps* (*Myoporum montanum*) low open shrubland over *Triodia epactia* hummock grassland over *Eriachne obtusa*, *Panicum decompositum* var. *decompositum* very open tussock grassland over an open herbland of mixed species.



Plate 3: *Pterocaulon* sp. A Kimberley Flora (B.J. Carter 599)

***Goodenia nuda* – Priority 3**

Goodenia nuda, a herb which grows to 0.5 m in height (Plate 4), was recorded at three locations within the Outer Harbour Development survey (Figure 3). This species was recorded from three vegetation communities in one landform type (Table 6).



Plate 4: *Goodenia nuda*

Table 6: Vegetation Communities in which *Goodenia nuda* was Recorded

Landform Type	Vegetation
Sandplain	Low <i>Acacia stellaticeps</i> shrublands over <i>Triodia epactia</i> and <i>T. secunda</i> hummock grasslands/ <i>T. epactia</i> and <i>T. secunda</i> hummock grasslands mosaic.
	A low open <i>Eucalyptus victrix</i> , <i>Corymbia hamersleyana</i> and <i>C. flavescens</i> woodland over an open <i>Acacia colei</i> var. <i>colei</i> shrubland over a low open <i>A. stellaticeps</i> and <i>Pluchea tetranthera</i> shrubland over a <i>Triodia epactia</i> hummock grassland.
	Scattered low <i>Corymbia flavescens</i> trees over an open <i>Acacia ancistrocarpa</i> and <i>A. bivenosa</i> shrubland over scattered low <i>A. stellaticeps</i> shrubs over a <i>Triodia epactia</i> and <i>T. lanigera</i> hummock grassland.

5 DISCUSSION

No Threatened species under the *EPBC Act* 1999 or Declared Rare Flora species under the *WC Act* 1950 were recorded within the Port Hedland area Priority Flora targeted survey. This was expected as none have been previously recorded according to DEC database search results or have been previously recorded in surveys undertaken in the area.

Four Priority Flora species, *Heliotropium muticum* (Priority 1), *Tephrosia rosea* var. *venulosa* (Priority 1), *Pterocaulon* sp. A Kimberley Flora (B.J. Carter 599) (Priority 2) and *Goodenia nuda* (Priority 3) were recorded during the targeted Priority Flora survey. All four Priority Flora species were recorded in the Outer Harbour Development survey area. Only one Priority Flora species, *T. rosea* var. *venulosa*, was recorded within the Goldsworthy Rail Duplication survey area. Two Priority Flora species, *T. rosea* var. *venulosa* and *P. sp. A Kimberley Flora* (B.J. Carter 599), were recorded within the DMMA H survey area.

Heliotropium muticum

Heliotropium muticum was recently added to the Priority Flora list (December 2008) and has only three records on FloraBase (WAH 2009), all from the Port Hedland area. An estimate of the total quantity of existing plants is not known.

Heliotropium muticum was previously recorded in the Port Hedland area during the winter phase of the flora and vegetation baseline survey for the Outer Harbour Development (ENV 2009b). Including the results of the current targeted survey, approximately 16 individuals of *H. muticum* have been recorded across eight locations in the Port Hedland area (Figure 4). Three records of this species have been lodged with the WAH, all of these located within the Port Hedland area.

Tephrosia rosea* var. *venulosa

This species was recently added to the Priority Flora list (December 2008) and is considered to have a restricted distribution within the Pilbara region, known only from the Port Hedland area. *Tephrosia rosea* var. *venulosa* is known from herbarium specimens collected from Finucane Island (2 collections) and the Peawah River (3 collections) (WAH 2009).

Tephrosia rosea var. *venulosa* was previously recorded in the Port Hedland area during the baseline surveys for DMMA H (ENV 2009a), the Outer Harbour Development (ENV 2009b) and the Goldsworthy Rail Duplication (ENV 2009c). Including the results of the current targeted survey, a total of approximately 1898 plants of *T. rosea* var. *venulosa* have been recorded across 18 locations in Port Hedland during surveys conducted by ENV for BHPBIO growth projects. The

extent of plants recorded during ENV surveys in the Port Hedland area is illustrated in Figure 4.

In surveys conducted by ENV, *Tephrosia rosea* var. *venulosa* has been recorded predominantly from along the existing Goldsworthy Railway and on Finucane Island. The majority of individuals were found within previously disturbed areas with few individuals recorded from the surrounding undisturbed vegetation. On Finucane Island individuals were recorded from disturbed areas with a high cover of Buffel Grass (**Cenchrus ciliaris*) and from along the road side.

Based on field observations by ENV staff, the distribution of plants suggests that the species is a disturbance specialist, a pioneer species and/or a post-fire germinant. The additional survey effort in the Port Hedland area from targeted Priority Flora surveys has resulted in a significant number of *Tephrosia rosea* var. *venulosa* plants being recorded. Ongoing survey effort may demonstrate that the species is more broadly distributed in the Port Hedland area than is currently documented.

***Pterocaulon* sp. A Kimberley Flora (B.J. Carter 599)**

Pterocaulon sp. A Kimberley Flora (B.J. Carter 599) is typically recorded in the Kimberley region of Western Australia, and is known from records along the Kimberley coast and from Broome and Anna Plains (WAH 2009). This species was previously recorded during the winter phase of the baseline flora and vegetation survey for the Outer Harbour Development (ENV 2009b) and was also recorded in the baseline flora and vegetation survey for DMMA H (ENV 2009a). Prior to these baseline surveys, *Pterocaulon* sp. A Kimberley Flora had not previously been recorded in the Port Hedland area. The presence of this species in these baseline surveys and in the current targeted Priority Flora survey is therefore considered a range extension (WAH 2009).

The identification of *Pterocaulon* sp. A Kimberley Flora (B.J.Carter 599) within the Port Hedland area has been confirmed by the WAH. Of the thirteen records of this species which have been vouchered, only two are located in the Pilbara region. These collections were made and vouchered as part of the flora and vegetation baseline survey for the Outer Harbour Development. Including the results of the current targeted survey, approximately four individuals of *P. sp. A Kimberley Flora* (B.J.Carter 599) have been recorded across three locations in the Port Hedland area (Figure 4)

Goodenia nuda

Goodenia nuda was previously recorded during the winter phase of the baseline flora and vegetation survey for the Outer Harbour Development (ENV 2009b). Prior to this baseline survey, *G. nuda* had not previously been recorded in the Port Hedland area, with most historical records for this species located further

inland. The presence of this species in these surveys is therefore considered a range extension (WAH 2009).

Including the results of the current targeted survey, approximately 221 individuals of *Goodenia nuda* have been recorded across four locations in the Port Hedland area (Figure 4).

Priority Flora Species Previously Recorded within the Survey Areas

Two species, *Bulbostylis burbidgeae* and *Gymnanthera cunninghamii* were not recorded in the targeted survey, although these species were previously recorded from other surveys in Port Hedland.

Bulbostylis burbidgeae was recorded adjacent to the existing Goldsworthy Railway during the Utah Point survey (Biota 2007) and was also recorded during the Fortescue Metals Group (FMG) rail line survey (Biota 2004) (Figure 5). This species is an annual grass, and may not have been recorded in the subsequent surveys conducted due to a lack of rainfall. The Utah Point survey in which it was recorded was completed in April 2007, after the area had received 390 mm during the cyclone season (Biota 2007). The Priority Flora survey did not receive this level of rainfall preceding the survey.

Five individuals of *Gymnanthera cunninghamii*, a shrub 1-2 m high, were recorded within drainage line habitats as part of the baseline flora and vegetation surveys for the Outer Harbour Development (ENV 2009b). This species has also previously been recorded in the area during the survey for the FMG rail corridor (Biota 2004) and Hope Downs rail corridor (Hope Downs Management Services 2002) and from two other locations in the vicinity of the project area (Figure 4).

Other Potentially Occurring Priority Flora Species

Five species potentially occur within the survey area based on habitat preference that have been recorded in other surveys further afield from Port Hedland. These include *Mimulus clementii* (Priority 1), *Ptilotus appendiculatus* var. *minor* (Priority 1), *Gomphrena pusilla* (Priority 2), *Euphorbia clementii* (Priority 2) and *Acacia glaucocaesia* (Priority 3) (Figure 5). Records of these species are mapped on Figure 5 where co-ordinates have been available.

Euphorbia clementii has previously been recorded in the area as part of the Hope Downs (Hope Downs Management Services 2002) and FMG rail corridor studies (Biota 2004). This species is found on gravely hillsides and stony grounds.

Mimulus clementii has been recorded between the Ashburton and De Grey Rivers and no information is available on its preferred habitat. *Gomphrena pusilla* has been recorded on Finucane Island and near Port Hedland, both within existing BHP infrastructure areas. This species is found behind the foredune on

limestone or fine beach sand and may occur within the survey areas on Finucane Island. *Ptilotus appendiculatus* var. *minor* has been recorded near Boodarie Station and is a prostrate herb.

Acacia glaucocaesia has been recorded nearby at Port Hedland, Mardie, Roebourne and the De Grey river. It is often found on floodplains with red loam, sandy loam or clay soils, which do occur within the survey area.

The targeted survey is considered to have been thorough with all accessible areas surveyed. The survey was conducted after significant rainfall with a number of annuals present and many species in flower. It is considered that if any of these five potentially occurring Priority Flora species were present within the project area they would have been recorded during the targeted survey.

6 REFERENCES

Atkins, KJ (2008). *Declared Rare and Priority Flora List for Western Australia, 30 June 2006*. Department of Environment and Conservation, Perth.

Biota (2004). *Vegetation and Flora Survey of the Proposed FMG Stage A Rail Corridor*. Report for Fortescue Metals Groups.

Biota (2007). *Utah Point Berth Project, Port Hedland Port Authority*, Unpublished report for Sinclair Knight Merz and the Port Hedland Port Authority.

Biota (2008). *A Flora and Fauna Assessment of RGP5 Spoil Areas A and H, Port Hedland Harbour*, Unpublished report for Sinclair Knight Merz.

Bureau of Meteorology (2009). *Daily Weather Observations*, Commonwealth of Australia. Available: www.bom.gov.au/climate [August 2009].

Department of Environment, Water, Heritage and the Arts (2008). *Environmental Protection and Biodiversity Conservation Act 1999*. Available: <http://www.environment.gov.au/epbc/index.html> [July 2009]

ENV.Australia (2009a). *Port Hedland Nelson Point Dredging Approvals Flora and Vegetation Assessment of DMMA H*. Unpublished report for Sinclair Knight Merz Pty Limited.

ENV.Australia (2009b). *Outer Harbour Development Flora and Vegetation Assessment*. Unpublished report for Sinclair Knight Merz Pty Limited.

ENV.Australia (2009c). *Outer Harbour Development Goldsworthy Rail Option Flora and Vegetation Assessment*. Unpublished report for Sinclair Knight Merz Pty Limited.

ENV.Australia (2009d). *Port Hedland Nelson Point Dredging Approvals Targeted Species Assessment of DMMA H*. Unpublished report for Sinclair Knight Merz Pty Limited.

ENV.Australia (2009e). *Port Hedland Nelson Point Dredging Approvals Flora and Vegetation Assessment of an area located within DMMA A*. Unpublished report for Sinclair Knight Merz Pty Limited.

Environmental Protection Authority (2000). *Environmental Protection of Native Vegetation in Western Australia: Clearing of Native Vegetation with Particular Reference to Agricultural Areas. Position Statement No. 2*, EPA, Perth, Western Australia.

Environmental Protection Authority (2002). *Terrestrial Biological Surveys as an Element of Biodiversity Protection. Position Statement No. 3*, EPA, Perth, Western Australia.

Environmental Protection Authority (2004). *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia, No. 51*, EPA, Perth, Western Australia.

Hope Downs Management Services Pty Ltd (2002). *Hope Downs Iron Ore Project Rail and Port Public Environmental Review*.

Mattiske Consulting (1994). *Hedland HBI Project – Boodarie Site Flora, Vegetation and Vertebrate Fauna*. Report prepared for BHP Minerals.

SKM (2008). *Port Hedland Outer Harbour Development Benthic Primary Producer Management Plan: Mangroves*. Unpublished Report for BHPBIO.

Western Australian Herbarium (2009). *Florabase - Information on the Western Australian Flora*. Department of Environment and Conservation, Perth. Online: <http://florabase.calm.wa.gov.au/>. [March 2009].

STATEMENT OF LIMITATIONS

Scope of Services

This environmental site assessment report ('the report') has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and ENV.Australia Pty Ltd (ENV) ('scope of services'). In some circumstances the scope of services may have been limited by factors such as time, budget, access and/or site disturbance constraints.

Reliance on Data

In preparing the report, ENV has relied on data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ('the data'). Except as otherwise stated in the report, ENV has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or in part on the data, those conclusions are contingent upon the accuracy and completeness of the data. ENV will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, unavailable, misrepresented or otherwise not fully disclosed to ENV.

Environmental Conclusions

In accordance with the scope of services, ENV has relied on the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

Within the limitations imposed by the scope of services, the monitoring, testing, sampling and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, express or implied, is made.

Report for Benefit of Client

The report has been prepared for the benefit of the Client and for no other party. ENV assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including, without limitation, matters arising from any negligent act or omission of ENV or for any loss or damage suffered by any other party relying on the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions, and should make their own enquiries and obtain independent advice in relation to such matters.




Other Limitations


ENV will not be liable to update or revise the report to take into account any events or circumstances occurring or facts becoming apparent after the date of the report.

The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in the report, nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

FIGURES



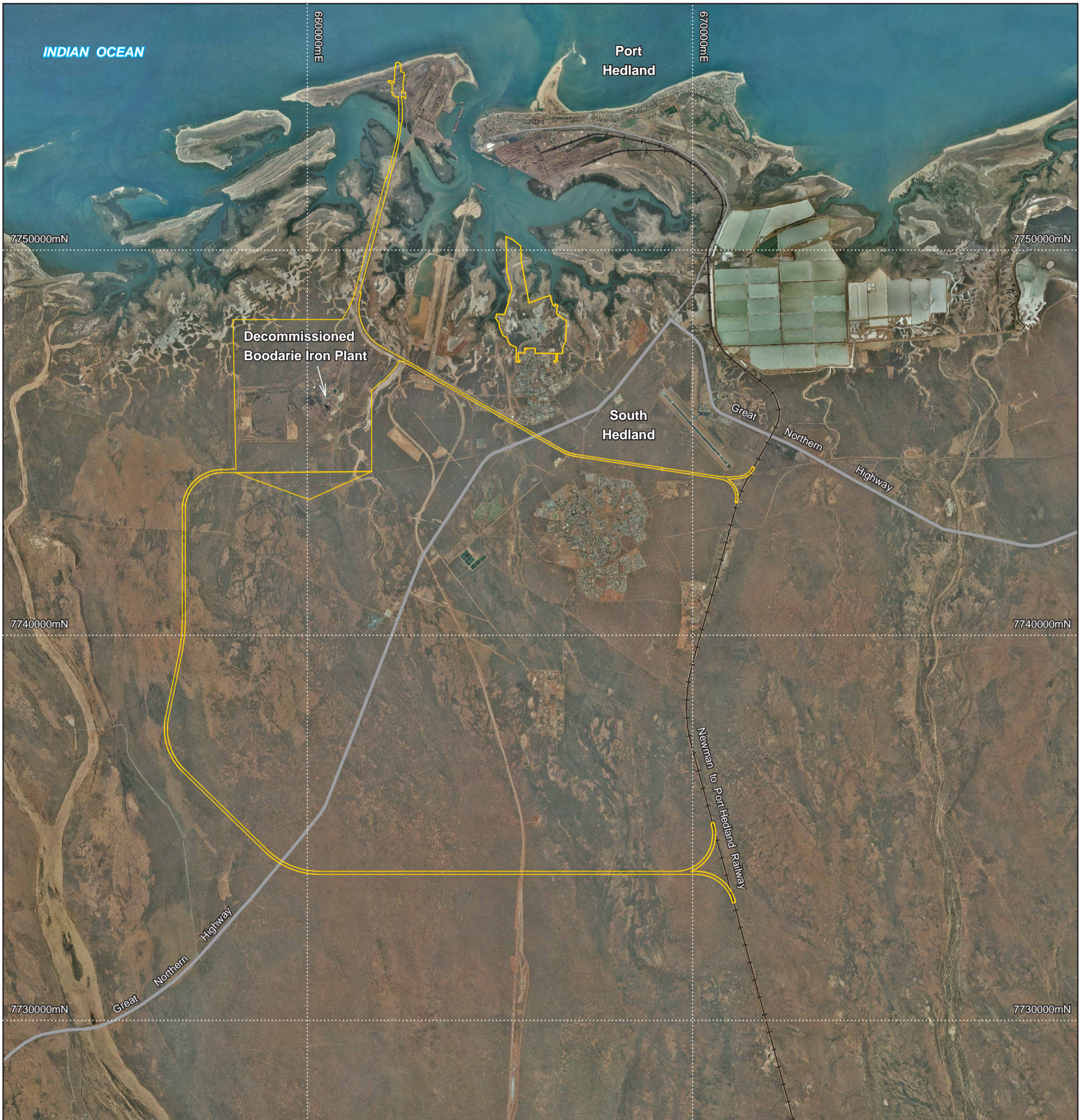
Legend	
Growth Project Areas	
	DMMA Area H
	Goldsworthy Rail Duplication
	Outer Harbour Development

	Author: E.Carroll
	Drawn: S.Coleman
	Status:
	Job Number: 09.028

Client:	BHP BILLITON PTY LTD
Project:	PORT HEDLAND AREA PRIORITY FLORA SURVEY

**LOCATION OF BHP BILLITON IRON ORE'S
GROWTH PROJECTS IN PORT HEDLAND**

Date:	18 August 2009
Scale:	1:100 000
Figure No.	1
Plan No.	QM-025



SCALE 1 : 100 000



Kilometres
 MAP GRID OF AUSTRALIA
 Grid based on Transverse Mercator Projection
 GDA 1994 MGA Zone 50

Legend

Priority Flora Survey Area



Author: E.Carroll
 Drawn: S.Coleman
 Status:
 Job Number: 09.028

Client: **BHP BILLITON PTY LTD**
 Project: **PORT HEDLAND AREA
 PRIORITY FLORA SURVEY**

**TARGETED
 PRIORITY FLORA SURVEY**

Date: 18 August 2009
 Scale: 1:100 000
 Figure No. **2**
 Plan No. **QM-026**

A3



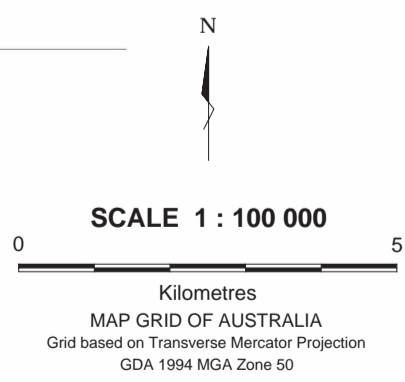
Legend

Priority Flora

- *Heliotropium muticum* (P1)
- *Tephrosia rosea* var. *venulosa* (P1)
- *Pterocaulon* sp. A Kimberley Flora (P2)
- *Goodenia nuda* (P3)

120 Number of Individual Plants

Priority Flora Survey Area



7720000mN 660000mE 670000mE 7720000mN

Author: E.Carroll
 Drawn: S.Coleman
 Status:
 Job Number: 09.028

Client: **BHP BILLITON PTY LTD**

Project: **PORT HEDLAND AREA PRIORITY FLORA SURVEY**

**PRIORITY FLORA SPECIES RECORDED
 DURING THE TARGETED PRIORITY FLORA SURVEY**

Date: 19 August 2009
 Scale: 1:100 000
 Figure No. **3**
 Plan No. **QM-029**



Legend

Priority Flora

- *Heliotropium muticum* (P1)
- *Tephrosia rosea* var. *venulosa* (P1)
- Tephrosia rosea* var. *venulosa* (P1) Location Boundary
- *Pterocaulon* sp. A Kimberley Flora (P2)
- *Gymnanthera cunninghamii* (P3)
- *Goodenia nuda* (P3)
- Goodenia nuda* (P3) Location Boundary
- 120 Number of Individual Plants

N

SCALE 1 : 100 000



Kilometres

MAP GRID OF AUSTRALIA
Grid based on Transverse Mercator Projection
GDA 1994 MGA Zone 50



Author: E.Carroll
Drawn: S.Coleman
Status:
Job Number: 09.028

Client: **BHP BILLITON PTY LTD**
Project: **PORT HEDLAND AREA
PRIORITY FLORA SURVEY**

**PRIORITY FLORA SPECIES
RECORDED BY ENV AUSTRALIA
IN THE PORT HEDLAND AREA TO DATE**

Date: 19 August 2009
Scale: 1:100 000
Figure No. **4**
Plan No. **QM-027**

A3



SCALE 1 : 100 000



Kilometres
MAP GRID OF AUSTRALIA
Grid based on Transverse Mercator Projection
GDA 1994 MGA Zone 50

Legend

- Priority Flora Site



Author: E.Carroll
Drawn: S.Coleman
Status:
Job Number: 09.028

Client: **BHP BILLITON PTY LTD**
Project: **PORT HEDLAND AREA
PRIORITY FLORA SURVEY**

**PRIORITY FLORA SPECIES
RECORDED IN THE PORT HEDLAND AREA
DURING OTHER SURVEYS**

Date: 18 August 2009
Scale: 1:100 000
Figure No. **5**
Plan No. **QM-028**

APPENDIX A

**DEFINITIONS OF DECLARED
RARE / PRIORITY AND
THREATENED FLORA SPECIES**

APPENDIX A

DEFINITIONS OF DECLARED RARE / PRIORITY AND THREATENED FLORA

A1: Categories of Declared Rare and Priority Flora Species

Conservation Code	Category
X	<p>Declared Rare Flora - Presumed Extinct Taxa</p> <p>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.</p>
R	<p>Declared Rare Flora - Extant Taxa</p> <p>“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”</p>
P1	<p>Priority One - Poorly Known Taxa</p> <p>“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 urgently need further survey.”</p>
P2	<p>Priority Two - Poorly Known Taxa</p> <p>“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 urgently need further survey.”</p>
P3	<p>Priority Three - Poorly Known Taxa</p> <p>“Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as ‘rare flora’ but need further survey.”</p>
P4	<p>Priority Four - Rare Taxa</p> <p>“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.”</p>

Source: Department of Environment and Conservation (2009). Western Australian Flora Conservation Codes.

Department of Environment and Conservation, Perth, Western Australia. Online:

<http://florabase.calm.wa.gov.au>.

A2: Categories of Threatened Flora Species

Category Code	Category
Ex	Extinct Taxa which at a particular time if, at the time, there is no reasonable doubt that the last member of the species has died.
ExW	Extinct in the Wild Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	Critically Endangered Taxa which at a particular time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	Endangered Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
V	Vulnerable Taxa which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	Conservation Dependent Taxa which at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

Source: Environment Protection and Biodiversity Conservation Act 1999

APPENDIX B

LOCATIONS OF PRIORITY FLORA SPECIES

APPENDIX B

LOCATIONS OF PRIORITY FLORA SPECIES

Taxa	Project	Site Number	No. of Individuals	# Easting	# Northing
<i>Tephrosia rosea</i> var. <i>venulosa</i> (P1)	Outer Harbour Development Flora and Vegetation Assessment (ENV 2009b)	QR002	2	662575	7754784
		QT003	1	662281	7754469
		QT004	1	662134	7754698
		QT005	9	661938	7754476
		QR007	1	661708	7754401
		QR009	1	661343	7754341
		QR010	2	660982	7754227
		QT023	2	662180	7747426
		QT050	1	654497	7746751
		QR054	1	659462	7744955
		QT055	2	654692	7745578
	QR094	1	662918	7740138	
	Goldsworthy Rail Duplication Flora and Vegetation Assessment (ENV 2009c)	GR07	1	670752	7742100
		GR08	1	671028	7743096
		GR13	1	666693	7744720
		GR14	1	665795	7745205
		GR21	1	665528	7745418
		GR22	1	666342	7744952
		GR24	1	668417	7744459
		GR26	1	670437	7744148
GR35		1	670068	7739413	
GR39	1	670463	7735374		
Outer Harbour Development Priority Flora Survey	OHE04	3	670583	7744091	
	OHE06	2	670440	7744115	

Taxa	Project	Site Number	No. of Individuals	# Easting	# Northing
		OHE08	8	669728	7744216
		OHE09	10	669669	7744235
		OHE10	5	669601	7744239
		OHE14	5	668232	7744459
		OHE15	1	668015	7744497
		OHE16	1	667927	7744507
		OHE17	2	668123	7744499
		OHE18	16	668170	7744493
		OHE19	14	668236	7744485
		OHE20	18	668319	7744471
		OHE21	1	668384	7744462
		OHE22	1	668418	7744458
		OHE23	1	668504	7744444
		OHE24	6	668566	7744436
		OHE25	25	668615	7744424
		OHE26	5	668674	7744413
		OHE27	9	668724	7744407
		OHE28	9	668780	7744399
		OHE29	5	668832	7744391
		OHE30	5	668870	7744383
		OHE31	10	668934	7744373
		OHE32	18	669004	7744365
		OHE33	4	669073	7744352
		OHE34	2	669570	7744273
		OHE35	4	670406	7744150
		OHE36	7	670533	7744130
		OHE37	3	666650	7744774

Taxa	Project	Site Number	No. of Individuals	# Easting	# Northing
		OHE38	3	666604	7744798
		OHE39	20	666578	7744813
		OHE40	21	666536	7744838
		OHE41	18	666493	7744860
		OHE42	13	666455	7744883
		OHE43	2	666370	7744931
		OHE44	22	666306	7744969
		OHE45	10	666244	7745003
		OHE46	45-50	666213	7745020
		OHE47	5	666147	7745059
		OHE48	2	666351	7744958
		OHE49	8	666474	7744860
		OHE50	30	666448	7744862
		OHE51	15	666424	7744877
		OHE52	4	666413	7744883
		OHE53	30	666384	7744902
		OHE54	41	666344	7744923
		OHE55	8	666318	7744936
		OHE90	18	662484	7754545
		OHE91	3	662477	7754602
		OHE92	7	662455	7754619
		OHE93	11	662406	7754636
		OHE94	3	662403	7754673
		OHE96	12	662372	7754695
		OHE97	6	662372	7754655
		OHE98	2	662368	7754610
		OHE99	15	662380	7754588

Taxa	Project	Site Number	No. of Individuals	# Easting	# Northing
		OHE100	3	662407	7754525
		OHE101	5	662424	7754494
		OHE102	8	662485	7754523
		OH102	8	662468	7754486
		OHE103	29	662453	7754471
		OHE104	8	662426	7754460
		OHE105	12	662111	7754364
		TER01	50	666445	7747476
		GWN01	21	665849	7745198
		GWN02	4	665690	7745300
		GWN03	3	665620	7745336
		GWN04	16	665539	7745381
		GWM05	9	665749	7745290
		QTE04	1	665425	7745445
		QTE04	1	665398	7745467
		QTE04	2	668943	7744335
		QTE04	1	668779	7744365
		QTE04	4	668667	7744390
		QTE04	2	668633	7744386
		QTE04	1	667816	7744547
		QTE04	9	667961	7744543
		QTE04	26	668006	77445330
		QTE04	20	668040	7744514
		QTE04	5	668081	7744506
		QTE04	1	668093	7744506
		QTE04	5	670843	7744102
		QTE04	5	666246	7744974

Taxa	Project	Site Number	No. of Individuals	# Easting	# Northing
		QTE04	31	666199	7745001
		QTE04	3	666162	775017
		QTE04	5	666141	7745031
		QTE04	6	666070	7745061
		QTE04	10	666595	7745141
		QTE04	80	665663	7745348
		QTE04	7	665623	7745370
		QTE04	15	665594	7745389
		QTE04	5	665513	7745437
		QTE04	40	665231	7745598
		QTE04	50	665169	7745623
		QTE04	5	665073	7745677
		QTE04	2	664826	7745823
		QTE04	5	664812	7745873
		QTE04	1	663688	7746488
		QTE04	6	663655	7746502
		QTE04	3	663611	7746523
		QTE04	25	663580	7746537
		QTE04	23	663529	7746567
		QTE04	10	663498	7746585
		QTE04	30	663457	7746608
		QTE04	1	663382	7746653
		QTE04	1	661332	7748461
		QTE04	4	661349	7748371
		QTE04	5	661361	7748267
		QTE04	50	661706	7747655
		QTE04	70	661964	7747447

Taxa	Project	Site Number	No. of Individuals	# Easting	# Northing
		QTE04	10	662645	7747061
		OHCS17	20	662283	7754443
		OHCS19	10	662348	7754685
		OHCS20	5	662349	7754661
		OHCS21	10	662346	7754623
		OHCS22	10	662350	7754576
		OHCS23	15	662375	7754521
		OHCS24	20	662393	7754458
		OHCS25	20	662287	7754406
		OHCS28	30	662117	7754386
	DMMA H Flora and Vegetation Assessment (ENV 2009a)	OP04	1	666147	7747631
		OP05	1	666304	7747557
	DMMA H Priority Flora Survey (ENV 2009d)	OP1	50	666445	7747476
		OP2	2	666332	7747677
		OP3	200	666235	7747662
		OP4	100	666304	7747560
<i>Heliotropium muticum</i> (P1)	Outer Harbour Development Priority Flora Survey	OHCS10	1	670513	7734694
		OHCS14	10	670566	7733739
	Outer Harbour Development Flora and Vegetation Assessment (ENV 2009b)	QR126	1	666239	7731941
<i>Pterocaulon</i> sp. A Kimberley Flora (B.J. Carter 599)	DMMA H Flora and Vegetation Assessment (ENV 2009a)	OP1	2	666309	7747612
	Outer Harbour Development Flora and Vegetation Assessment (ENV 2009b)	QR26	1	661379	7747365
		QR33	1	658167	7747044
<i>Goodenia nuda</i> (P3)	Outer Harbour Development Flora and	QR61	1	656268	7744988

Taxa	Project	Site Number	No. of Individuals	# Easting	# Northing
	Vegetation Assessment (ENV 2009b)				
	Outer Harbour Development Priority Flora Survey	OHCS30	3	660425	7747784
		OHCS31	15	660601	7747490
		OHCS32	2	660648	7747481
		OHCS33	10	659621	7747374
		OHCS34	2	659465	7747349
		OHCS36	3	659162	7749455
		OHE73	1	668562	7733828
		OHE74	3	668653	7733816
		OHE75	4	668905	7733815
		OHE110	1	660205	7746876
		OHE111	4	660230	7746887
		OHE112	2	660138	7746993
		OHE114	2	660093	7747002
		OHE115	2	660389	7747337
		OHE116	1	659347	7747618
		BIM01	2	658274	77456725
		BIM02	3	661171	7747491
		BIM03	2	661599	7747058
		OHT04b	20	668205	7733862
		OHT04b	40	668357	7733846
		OHT07	20	668564	7733847
		OHT07	40	668618	7733852
		OHT08	40	668776	7733837
		OHT15	3	658932	7747045
	OHT15	2	659764	7746955	

Taxa	Project	Site Number	No. of Individuals	# Easting	# Northing
		OHT15	2	659501	7746901
		OHT15	2	659336	7746879
		OHT15	1	659155	7746872
		OHT15	1	658524	7746946
		OHT15	1	658386	7746957
		OHT15	1	658344	7746960
		OHT15	1	658291	7746955
		OHT15	1	661699	7746934
		OHT15	1	661603	7746935
<i>Gymnanthera cunninghamii</i>	Outer Harbour Development Flora and Vegetation Assessment (ENV 2009b)	QR74	4	661712	7744111
		QT087	1	662031	7741025

Australian Geocentric 1994 (GDA94), Zone 50K.