Ministers North and Yandi
Vegetation Association and Condition Mapping

Prepared for BHP Billiton Iron Ore
June 2020

MINISTERS NORTH AND YANDI
VEGETATION ASSOCIATION AND CONDITION MAPPING

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CONTENTS

1.0 INTRODUCTION

BHP Billiton Iron Ore (BHP) maintain a consolidated database of vegetation association and condition mapping across their Pilbara tenure. This consolidated database was developed in 2014 by Onshore Environmental Consultants Pty Ltd (Onshore Environmental), and merged and collated vegetation association and condition mapping from 162 historical baseline surveys (Onshore Environmental 2014). In 2016, Onshore Environmental completed a review of the database to incorporate new survey data. The update to the database also involved a review of the vegetation codes, to allow for the delineation of a wider suite of species.

In order to support future environmental approvals and management, BHP has commissioned Onshore Environment to complete a detailed review of all existing vegetation association and condition mapping across their Ministers North and Yandi tenements and associated infrastructure corridors (the project area).

The aim of this review was to consolidate mapping across the project area, aligning the vegetation association mapping with BHP's regional consolidated database, and aligning vegetation condition mapping with the condition rating scale for the Eremaean Botanical Province detailed the Environmental Protection Authority (EPA) *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a).

2.0 METHODOLOGY

2.1 Legislation and Guidance Statement

The consolidation of vegetation mapping within the project area was carried out with consideration given to requirements in the EPA's guidance for the environmental surveying and reporting of flora and vegetation in Western Australia:

- Statement of Environmental Principles, Factors and Objectives (EPA 2016b);
- Environmental Factor Guideline Flora and Vegetation (EPA 2016c); and
- Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016a).

The recent flora and vegetation surveys undertaken across the project area, which informed the review of the vegetation mapping, were carried out in accordance with the EPA Technical Guidance (EPA 2016a). Additionally, the surveys were conducted in accordance with BHP's *Vegetation and Flora Survey Procedure* (BHP 2018).

The review and update of vegetation mapping across the project area was undertaken in accordance with BHP's *Vegetation and Flora Survey Procedure* (BHP 2018) and *Biological Survey Spatial Data Requirements* (BHP 2020).

2.2 Data Input

Since the latest update of BHP's regional consolidated database (in 2016), there have been four flora and vegetation surveys undertaken within the project area (Table 1). Survey data from these recent surveys were used to update the vegetation association and condition mapping across the project area.

Table 1: Recent Flora and Vegetation Surveys

Survey Title	Survey Date	Survey Type
Area C West to Yandi Flora and Vegetation Assessment (Astron 2019)	Nov 2018	Single-season Reconnaissance vegetation survey along creek lines near Area C, Yandi and South Flank, comprising Marillana Creek, Pebble Mouse Creek, Yandicoogina Creek, Lamb Creek and Area C North Creek.
Yandicoogina Creek Reconnaissance Vegetation Survey (Onshore Environmental 2018a)	Jun 2018	Single-season Reconnaissance vegetation survey along Yandicoogina Creek, focusing on the identification of groundwater dependent and riparian vegetation.
Ministers North to Yandi Corridor Flora and Vegetation Survey (Onshore Environmental 2018b)	Oct 2017 May 2018	Single-season Detailed flora and vegetation survey of the Ministers North to Yandi infrastructure corridor, with an additional follow-up targeted flora survey.
Ministers North Detailed Flora and Vegetation Survey (Biota 2017)	Sep 2016 May and Jul 2017	Two-season Detailed flora and vegetation survey of the Ministers North project area.

2.3 Vegetation Associations

Onshore Environmental worked with BHP's geospatial team to compile a project database for the project area that incorporated vegetation association mapping from the consolidated database and from the recent flora and vegetation surveys (Table 1), with the most recent survey data used for any given area.

The vegetation associations delineated and mapped during the recent flora and vegetation surveys were reviewed and updated accordingly in the project database. Each vegetation association from recent surveys was aligned to an existing regional consolidated vegetation association (and vegetation code), where relevant. In instances where the vegetation association was new and did not align to an existing vegetation association from the regional consolidated database, Onshore Environmental added the vegetation association to the database along with a unique vegetation code[1].

BHP maintain a spatial layer that documents all existing clearing or disturbance undertaken on BHP's tenure. This disturbance layer was added to the project database to delineate areas that have been cleared of vegetation.

To ensure there were no overlaps or errors in line work in the database, Onshore Environmental reviewed the line work for each association across the project area. This review focused on boundaries between adjoining surveys, tenement boundaries, and on specific landform features (such as drainage lines and gorges). In some areas, there was a requirement to re-map or extend the vegetation association polygons, particularly across boundaries where the level of detail in the survey data differed.

The line work was reviewed against high resolution aerial photography and landform contours at a detailed scale (generally 1:5,000), along with attribute data from sample sites (quadrats). Any changes in line work were detailed on hard copy maps or captured digitally and provided to BHP's geospatial team to amend the line work, and associated vegetation association and vegetation code, within the project database.

Once the line work review and amendment was completed, BHP's geospatial team 'merged' any adjoining polygons attributed as the same vegetation association. This resulted in one consolidated database for the project area.

Some portions of the project area (i.e. extensions to the infrastructure corridor) had not previously been mapped, and due to recent on-ground survey limitations, desktop mapping of these areas was completed. Vegetation polygons were inferred using a combination of shading patterns and colours evident from high-resolution aerial photography, inference of landform (relief and slope), position in landscape and drainage patterns. Quadrat and vegetation association information of adjacent areas was used to assign a vegetation association and code to each inferred polygon. This information was provided to BHP's geospatial team for inclusion in the project database.

2.4 Vegetation Condition

Onshore Environmental reviewed the vegetation condition described and mapped during recent flora and vegetation surveys within the project area to determine if the vegetation condition rating used aligned with the EPA's guidance (EPA 2016a). When it was determined that an incorrect condition rating scale had been used, the descriptions for each condition rating provided within the survey report was reviewed against the descriptions in the EPA guidance and alignment of the condition ratings was made.

Once the alignment between the condition rating scales had been determined, Onshore Environmental assigned to relevant condition rating to each vegetation association polygon. Specific areas where the vegetation condition differed within a single vegetation association were assessed based on survey data and reporting to ensure the correct condition rating was assigned to the area. This information was then provided to BHP's geospatial team to update the project database.

[1] A vegetation association code is a unique code for each vegetation association, comprising a two letter code to indicate the landform from which the association occurs, followed by a sequence of two or three letter codes reflecting the dominant plant taxa.

3.0 RESULTS

3.1 Vegetation Associations

The consolidated vegetation association mapping for the project area resulted in the delineation of 40 vegetation associations, classified under 21 broad floristic formations on the basis of the dominant vegetation stratum (Table 2).

Table 2: Vegetation Associations within the Project Area

Broad Floristic Formation	Consolidated Vegetation Code	Vegetation Association Description
Acacia High Shrubland	MA AtpApypAse Ecr ThmbTtCyp	High Shrubland of *Acacia tumida* var. *pilbarensis*, *Acacia pyrifolia* var. *pyrifolia* and *Acacia sericophylla* with Scattered Trees of *Eucalyptus camaldulensis* subsp. *refulgens* over Open Tussock Grassland of *Themeda* sp. Mt Barricade (M.E. Trudgen 2471), *Themeda triandra* and *Cymbopogon procerus* on brown loam and gravels on major drainage channels
Acacia Low Open Forest	SA Aa TpTwTb CcChf	Low Open Forest of *Acacia aptaneura* over Open Hummock Grassland of *Triodia pungens*, *Triodia wiseana* and *Triodia basedowii* over Open Tussock Grassland of **Cenchrus ciliaris* and *Chrysopogon fallax* on red brown sandy loam on sandy plains and undulating low hills
	SP AaApr TmTwTp TtChfAri	Low Open Forest of *Acacia aptaneura* and *Acacia pruinocarpa* over Open Hummock Grassland of *Triodia melvillei*, *Triodia wiseana* and *Triodia pungens* over Tussock Grassland of *Themeda triandra*, *Chrysopogon fallax* and *Aristida inaequiglumis* on red brown loam on stony plains
Acacia Low Woodland	FP AcaoAaEx Erff Tp	Low Woodland of *Acacia catenulata* subsp. *occidentalis*, *Acacia aptaneura* and *Eucalyptus xerothermica* over Open Shrubland of *Eremophila forrestii* subsp. *forrestii* over Open Hummock Grassland of *Triodia pungens* on red sandy loam on floodplains
	MA AciAcpAthe Tp EteEnl	Low Woodland of *Acacia citrinoviridis*, *Acacia coriacea* subsp. *pendens* and *Atalaya hemiglauca* with Open Hummock Grassland of *Triodia pungens* and Open Tussock Grassland of *Eriachne tenuiculmis* and *Enneapogon lindleyanus* on brown loam on raised levee banks of major drainage line
Acacia Open Scrub	MI AtpPlAm TpTs ChEll	Open Scrub of *Acacia tumida* var. *pilbarensis*, *Petalostylis labicheoides* and *Acacia monticola* over Open Hummock Grassland of *Triodia pungens* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Woodland of *Corymbia hamerselyana* and *Eucalyptus leucophloia* subsp. *leucophloia* on red brown sandy loam on minor drainage lines
Acacia Shrubland	MI AbAdAma Tp TtPamuEua	Shrubland of *Acacia bivenosa*, *Acacia dictyophleba* and *Acacia maitlandii* over Open Hummock Grassland of *Triodia pungens* over Open Tussock Grassland of *Themeda triandra*, *Paraneurachne muelleri* and *Eulalia aurea* on brown sandy loam on minor drainage lines
Callitris Low Open Forest	GG CcolCfEll ErmuThmbCya	Low Open Forest of *Callitris columellaris*, *Corymbia ferriticola* and *Eucalyptus leucophloia* subsp. *leucophloia* over Open Tussock Grassland of *Eriachne mucronata*, *Themeda* sp. Mt Barricade (M.E. Trudgen 2471) and *Cymbopogon ambiguus* and Very Open Hummock Grassland of *Triodia pungens* on orange brown loam on upper gorges
Cenchrus Closed Tussock Grassland	MA CcCs Aci EcrEv	Closed Tussock Grassland of **Cenchrus ciliaris* and **Cenchrus setiger* with Low Open Forest of *Acacia citrinoviridis* and Scattered Low Trees of *Eucalyptus camaldulensis* and *Eucalyptus victrix* on banks and floodplains of major drainage line with brown sandy loam
Cenchrus Tussock Grassland	MA CcCs EvAciAthe	Tussock Grassland **Cenchrus ciliaris* and **Cenchrus setiger* with Low Woodland of *Eucalyptus victrix*, *Acacia citrinoviridis* and *Atalaya hemiglauca* on brown sandy loam on major drainage lines and adjacent flood plains

Broad Floristic Formation	Consolidated Vegetation Code	Vegetation Association Description
Corchorus Low Open Heath	MA CocrTerfc EcrEv EteCcEpd	Low Open Heath of *Corchorus crozophorifolius* and *Tephrosia rosea* var. Fortescue creeks (M.I.H. Brooker 2186) with Scattered Trees of *Eucalyptus camaldulensis* and *Eucalyptus victrix* and Scattered Tussock Grasses of *Eriachne tenuiculmis*, **Cenchrus ciliaris* and *Eriachne pulchella* subsp. *dominii* on creekbed of major drainage line with brown clay loam
Corymbia Low Woodland	GG CfEllFib AhDovmAsha CyaErmuThmb	Low Woodland of *Corymbia ferriticola*, *Eucalyptus leucophloia* subsp. *leucophloia* and *Ficus brachypoda* over Open Shrubland of *Acacia hamersleyensis*, *Dodonaea viscosa* subsp. *mucronata* and *Astrotricha hamptonii* over Open Tussock Grassland of *Cymbopogon ambiguus*, *Eriachne mucronata* and *Themeda* sp. Mt Barricade on red brown loam along clifflines and gorge walls
Dysphania Herbs	SP DyrTrhPta	Herbs of *Dysphania rhadinostachya*, *Tribulus hirsutus* and *Ptilotus aervoides* on brown clay on undulating stony plains
Eucalyptus Low Open Forest	MA EcrEvEx ApypAtpGoro TtEuaCyp	Low Open Forest of *Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix* and *Eucalyptus xerothemica* over High Shrubland of *Acacia pyrifolia* var. *pyrifolia*, *Acacia tumida* var. *pilbarensis* and *Gossypium robinsonii* over Open Tussock Grassland of *Themeda triandra*, *Eulalia aurea* and *Cymbopogon procerus* on red brown clay loam on major drainage lines
Eucalyptus Open Forest	MA EcrEvMa AcpAamAthe TydCyv	Open Forest of *Eucalyptus camaldulensis* var. *refulgens*, *Eucalyptus victrix* and *Melaleuca argentea* over Low Open Forest of *Acacia coriacea* subsp. *pendens*, *Acacia ampliceps* and *Atalaya hemiglauca* over Open Sedges of *Typha domingensis* and *Cyperus vaginatus* on brown sandy clay loam along major rivers with permanent water
Eucalyptus Open Woodland	MA EcrEv AciAcp Mg	Open Woodland of *Eucalyptus camaldulensis* and *Eucalyptus victrix* over Low Open Woodland of *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* over High Open Shrubland of *Melaleuca glomerata* on river bed with brown sand
Eucalyptus Woodland	MA EcrEv AciApypMg CcEuaTt	Woodland of *Eucalyptus camaldulensis* subsp. *refulgens* and *Eucalyptus victrix* over High Open Shrubland of *Acacia citrinoviridis*, *Acacia pyrifolia* var. *pyrifolia* and *Melaleuca glomerata* over Tussock Grassland of **Cenchrus ciliaris*, *Eulalia aurea* and *Themeda triandra* on brown clay loam on banks of major drainage lines
	MA EcrEv AcpAtheEv TpTl	Woodland to Open Woodland of *Eucalyptus camaldulensis* and *Eucalyptus victrix* over Low Woodland of *Acacia coriacea* subsp. *pendens*, *Atalaya hemiglauca* and *Eucalyptus victrix* over Open Hummock Grassland of *Triodia pungens* and *Triodia longiceps* on brown sandy loam on levees and channel islands of major drainage lines
	MA EvAciEcr TercCocrApyp CcEuaTt	Woodland of *Eucalyptus victrix*, *Acacia citrinoviridis* and *Eucalyptus camaldulensis* subsp. *refulgens* over Low Open Shrubland of *Tephrosia rosea* var. *clementii*, *Corchorus crozophorifolius* and *Acacia pyrifolia* var. *pyrifolia* over Very Open Tussock Grassland of **Cenchrus ciliaris*, *Eulalia aurea* and *Themeda triandra* on brown loamy sand on channels of major drainage lines
Melaleuca High Open Forest	MA MaEcrEv MgAcpAtr Cyv	High Open Forest of *Melaleuca argentea*, *Eucalyptus camaldulensis* var. *refulgens* and *Eucalyptus victrix* over High Open Shrubland of *Melaleuca glomerata*, *Acacia coriacea* subsp. *pendens* and *Acacia trachycarpa* over Very Open Sedges of *Cyperus vaginatus* on alluvial gravelly soils on major drainage channels with seasonal pools
Potamogeton Open Herbs	MA Pt Ecr TdScsuCyv	Open Herbs of *Potamogeton tricarinatus* with Open Woodland of *Eucalyptus camaldulensis* and Very Open Sedges of *Typha domingensis*, *Schoenoplectus subulatus* and *Cyperus vaginatus* on brown light clay on dolerite platforms of major drainage lines

Broad Floristic Formation	Consolidated Vegetation Code	Vegetation Association Description
Themeda Open Tussock Grassland	ME TtAriCya ChEll AmPlAnl	Open Tussock Grassland of *Themeda triandra*, *Aristida inaequiglumis* and *Cymbopogon ambiguus* with Low Open Woodland of *Corymbia hamerselyana* and *Eucalyptus leucophloia* subsp. *leucophloia* over Open Shrubland of *Acacia monticola*, *Petalostylis labicheoides* and *Androcalva luteiflora* on red brown alluvium on minor and medium drainage lines
Themeda Tussock Grassland	FP TtEuaAri EvCa GoroErloAthe	Tussock Grassland of *Themeda triandra*, *Eulalia aurea* and *Aristida inaequiglumis* with Open Woodland of *Eucalyptus victrix* and *Corymbia aspera* and High Open Shrubland of *Gossypium robinsonii*, *Eremophila longifolia* and *Atalaya hemiglauca* on brown sandy loam on plains
	GG TtErmuThmb EllChCf AtpGoroPl	Tussock Grassland of *Themeda triandra*, *Eriachne mucronata* and *Themeda* sp. Mt Barricade with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia*, *Corymbia hamersleyana* and *Corymbia ferriticola* over High Shrubland of *Acacia tumida* var. *pilbarensis*, *Gossypium robinsonii* and *Petalostylis labicheoides* on red brown sandy loam on narrowly incised rocky drainage lines
	ME TtEuaEte ApypAtpPl EvCh	Tussock Grassland of *Themeda triandra*, *Eulalia aurea* and *Eriachne tenuiculmis* with High Shrubland of *Acacia pyrifolia* var. *pyrifolia*, *Acacia tumida* var. *pilbarensis* and *Petalostylis labicheoides* and Open Woodland of *Eucalyptus victrix* and *Corymbia hamersleyana* on red brown silty loam on medium drainage lines and flood plains
Triodia Closed Hummock Grassland	HC TbTw Erfr AbAk	Closed Hummock Grassland of *Triodia brizoides* and *Triodia wiseana* with Shrubland of *Eremophila fraseri* and High Open Shrubland of *Acacia bivenosa* and *Acacia kempeana* on brown silty loam on high dolerite hills
Triodia Hummock Grassland	CP TwTa Ese AbPlApyp	Hummock Grassland of *Triodia wiseana* and *Triodia angusta* with Open Mallee of *Eucalyptus socialis* subsp. *eucentrica* and Open Shrubland of *Acacia bivenosa*, *Petalostylis labicheoides* and *Acacia pyrifolia* var. *pyrifolia* on light brown clay loam on calcrete plains and rises
	FP Tp ChApr GrwhApypAb	Hummock Grassland of *Triodia pungens* with Scattered Low Trees of *Corymbia hamersleyana* and *Acacia pruinocarpa* over Open Shrubland of *Grevillea wickhamii* subsp. *hispidula*, *Acacia pyrifolia* var. *pyrifolia* and *Acacia bivenosa* on brown loamy sand on floodplains
	FS Ts CdHc AancAiGrwh	Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of *Corymbia deserticola* subsp. *deserticola* and *Hakea chordophylla* over Open Shrubland of *Acacia ancistrocarpa*, *Acacia inaequilatera* and *Grevillea wickhamii* subsp. *hispidula* on red brown sandy loam on footslopes and stony plains
	FS TsTpTw Ell AbApaAanc	Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835), *Triodia pungens* and *Triodia wiseana* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and Open Shrubland of *Acacia bivenosa*, *Acacia pachyachra* and *Acacia ancistrocarpa* on red brown loam on footslopes, low undulating hills and stony plains
	FS Tw Ell	Hummock Grassland of *Triodia wiseana* with Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* on red silty clay on hill slopes and footslopes
	HC Tw Ah EkkEgCh	Hummock Grassland of *Triodia wiseana* with Shrubland of *Acacia hamersleyensis* and Open Mallee of *Eucalyptus kingsmillii* subsp. *kingsmillii*, *Eucalyptus gamophylla* and *Corymbia hamersleyana* (mallee form) on red brown loam and silty loam on hill crests
	HC Tw AiAb InrSeao	Hummock Grassland of *Triodia wiseana* with High Open Shrubland of *Acacia inaequilatera* and *Acacia bivenosa* over Low Open Shrubland of *Indigofera rugosa* and *Senna artemisioides* subsp. *oligophylla* on red silty loam on dolerite hill crests

Broad Floristic Formation	Consolidated Vegetation Code	Vegetation Association Description
	HC TwTbrTp EllCh AmaGrwhAb	Hummock Grassland of *Triodia wiseana*, *Triodia brizoides* and *Triodia pungens* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* over High Open Shrubland of *Acacia maitlandii*, *Grevilllea wickhamii* subsp. *hispidula* and *Acacia bivenosa* on red brown sandy loam on hill crests and upper hill slopes
	HC TwTsTp EllCh Ah	Hummock Grassland of *Triodia wiseana*, *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia pungens* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamerselyana* over Open Shrubland of *Acacia hamersleyensis* on red brown clay loam on hill crests and upper hill slopes
	HS TsTwTp EllCh AhiAaa	Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835), *Triodia wiseana* and *Triodia pungens* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* over Low Open Shrubland of *Acacia hilliana* and *Acacia adoxa* var. *adoxa* on red brown sandy loam on hill slopes
	HS TwTbrTs EllExCh PtcPtasAhi	Hummock Grassland of *Triodia wiseana*, *Triodia brizoides* and *Triodia* sp. Shovelanna Hill with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia*, *Eucalyptus xerothermica* and *Corymbia hamersleyana* over Low Open Shrubland of *Ptilotus calostachyus*, *Ptilotus astrolasius* and *Acacia hilliana* on brown loam on hill crests and upper hill slopes
	HS TwTpTs Ell AprAaAanc	Hummock Grassland of *Triodia wiseana*, *Triodia pungens* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* over Open Shrubland of *Acacia pruinocarpa*, *Acacia aptaneura* and *Acacia ancistrocarpa* on red brown loam on plains and low hills
	ME TpTlo ExAciCh PlApypGoro	Hummock Grassland of *Triodia pungens* and *Triodia longiceps* with Low Woodland of *Eucalyptus xerothermica*, *Acacia citrinoviridis* and *Corymbia hamersleyana* over High Shrubland of *Petalostylis labicheoides*, *Acacia pyrifolia* var. *pyrifolia* and *Gossypium robinsonii* on red brown clay loam on medium drainage lines and surrounding floodplains
	SP TbTp HlAancAi Ch	Hummock Grassland of *Triodia basedowii* and *Triodia pungens* with High Open Shrubland of *Hakea lorea* subsp. *lorea*, *Acacia ancistrocarpa* and *Acacia inaequilatera* and Scattered Low Trees of *Corymbia hamersleyana* on red brown loamy sand on stony plains

None of the vegetation associations mapped from within the project area align to formally recognised Threatened Ecological Communities or Priority Ecological Communities (PECs).

Vegetation association MA EcrEvMa AcpAamAthe TydCyv has been identified as occurring within Yandicoogina Creek and a small portion of Marillana Creek. A feature of this association is the occurrence of semi-permanent and/or permanent water bodies. A portion of this association occurring within Yandicoogina Creek also contains the Priority 3 species, *Fimbristylis sieberiana*. This species is an indicator understorey species, along with the presence of permanent water bodies, of the Priority 2 ecological community '*Riparian flora and plant communities of springs and river pools with high water permanence of the Pilbara Region*'. Vegetation association MA EcrEvMa AcpAamAthe TydCyv occurring within this portion of Yandicoogina Creek may be affiliated with this PEC.

This vegetation association, along with association MA MaEcrEv MgAcpAtr Cyv, have been identified as potentially significant as they contain the obligate phreatophytic tree species, *Melaleuca argentea*. This species is reliant on groundwater and therefore is susceptible to any changes in groundwater.

One vegetation association was identified as supporting fire sensitive species (i.e. *Callitris columellaris*), GG CcolCfEll ErmuThmbCya. This association occurs in a gorge habitat and provides refuge for such species.

Vegetation association SA Aa TpTwTb CcChf was identified as potentially significant, as it aligns to the Department of Biodiversity, Conservation and Attractions' ecosystem at risk 'Valley Floor Mulga'. The importance of the 'Valley Floor Mulga' ecosystem, within the northern extent of the Hamersley subregion, is in relation to large occurrences of vegetation dominated by Mulga occurring on valley floors or broad plains; therefore, this unit would only be considered significant where it occurs over large area.

3.2 Vegetation Condition

Vegetation condition across the project area ranged from 'completely degraded' (i.e. cleared) to 'excellent' with the majority of the area rated as 'very good' or 'excellent'. The clearing within the project area is associated with the existing Yandi mining operation, the Mainline rail or access tracks.

4.0 STUDY TEAM

The vegetation mapping review was planned, co-ordinated and executed by the following personnel, with support from BHP's geospatial team:

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