

# Flora and Vegetation Environmental Management Plan Mt Keith Satellite Project

August 2018

Version 0

## CONTENTS

| Summ           | nary   | 4 |
|----------------|--|---|
| 1.             | Context, Scope and Rationale   | 4 |
| 1.1.           | Proposal   | 4 |
| 1.2.           | Condition requirements   | 7 |
| 1.3.           | Rationale and approach   | 8 |
| 1.3.1.         | Overall objective, purpose and scope of this FVEMP                                     | 8 |
| 1.3.2.         | Surveys and study findings   | 8 |
| 1.3.3.         | Key assumptions and uncertainties  | 9 |
| 1.3.4.         | Management Approach – General  | 9 |
| 1.3.5.         | Value specific rationale and approach1   | 0 |
| 2.             | EMP provisions   | 0 |
| 3.             | Adaptive Management and review of the EMP1   | 0 |
| 3.1.           | Review and update of this FVEMP1   | 1 |
| 4.             | Stakeholder consultation1  | 1 |
| 5.             | References1  | 2 |
| Apper          | ndices1  | 3 |
| Apper          | ndix A – Summary of Botanical Surveys, 1990 - 20171                                    | 3 |
| Apper          | ndix B – Rationale and Context1  | 5 |
| Sched          | lule 1: MS <mark>XXXX</mark> Mt Keith Satellite (MKS) Project – Priority Flora2        | 3 |
| Sched          | dule 2: MS <mark>XXXX</mark> Mt Keith Satellite (MKS) Project – Violet Range PEC.3     | 3 |
| Sched<br>Reser | dule 3: MS <mark>XXXX</mark> Mt Keith Satellite (MKS) Project – Wanjarri Nature<br>ve3 | 9 |

## **Table of Figures**

| Figure 1: MKS Proposal Development Envelope and Disturbance Footprint | :5 |
|---|----|
| Figure 2: MKS Proposal Indicative General Layout                      | 6  |
| Figure 3: BHP's adaptive management approach                          | 10 |

## **Table of Tables**

| Table 1: Key environmental factor, | values and impacts7 |  |
|------------------------------------|---------------------|--|
| Table 2: Stakeholder Consultation  |                     |  |

### Note to Reader:

The obligations to meet the requirements of Ministerial Statement conditions are addressed in the Schedules of this Flora and Vegetation Environmental Management Plan. All other information is considered supporting information, and is not subject to Department of Water and Environmental Regulation (DWER) compliance auditing, nor does it require DWER endorsement to be amended.

### **Document Amendment Record**

| Version | Page<br>Number | Version description   | Key changes       | Date of<br>Change |
|---------|----------------|---|-------------------|-------------------|
| A       | ALL            | Draft submitted for review to EPA to meet the requirements of EPA Scoping document item 9 | New document.     | April 2018        |
| В       | ALL            | Draft submitted for review to EPA to meet the requirements of EPA Scoping document item 9 | Revised document. | July 2018         |
| 0       | ALL            | Final Issued for Use  | Revised document  | August 2018       |

## Summary

| Summary of the Proposal                     | Summary of the Proposal   |  |  |  |  |
|---|---|--|--|--|--|
| Proposal title                              | Mt Keith Satellite Project  |  |  |  |  |
| Proponent name                              | BHP Billiton Nickel West Pty Ltd  |  |  |  |  |
| Purpose of the EMP                          | To satisfy EPA Scoping document item 9, and to outline the key flora and vegetation values associated with the MKS Project, the potential impacts and the proposed management provisions to mitigate these impacts. |  |  |  |  |
| Key Environmental Factors<br>and Objectives | Land - Flora and Vegetation - To protect flora and vegetation so that biological diversity and ecological integrity are maintained  |  |  |  |  |
| Key provisions in the EMP                   | Site based adaptive management actions (including pre-disturbance approvals, weed management, progressive rehabilitation)   |  |  |  |  |
|   | Monitoring of significant flora (indicator species) and vegetation communities within Violet Range PEC and Wanjarri Nature Reserve  |  |  |  |  |
|   | Monitoring of areas of land disturbance and rehabilitation  |  |  |  |  |
|   | Monitoring and control of weeds   |  |  |  |  |
|   | Annual reporting (including results of monitoring)  |  |  |  |  |

## 1. Context, Scope and Rationale

This Flora and Vegetation Environmental Management Plan (FVEMP) has been compiled by BHP Billiton Nickel West Pty Ltd (NiW) to meet Environmental Protection Authority (EPA)) requirements. Those requirements are to develop and submit an 'Environment Management Plan (EMP)' and relevant 'Schedules' in accordance with the *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (EPA, 2018) (the '*Instructions*').

The provisions of the Instructions permit a Proponent to:

- cover one or more key environmental factors for a particular proposal, and
- cover one or more operations or Ministerial Statements (EPA, 2018, p. i).

In accordance with the Instructions (EPA, 2018), the following sub-sections outline the Proposal that this FVEMP addresses (Section 1.1), the relevant key environmental factors (Table 1), the condition requirements applicable to the Proposal (Section 1.2) and the rationale and approach underlying this FVEMP (Section 1.3).

## 1.1. Proposal

Mt Keith Satellite (MKS) Project (the Proposal) is currently under assessment by the Environmental Protection Authority (EPA, assessment number 2122). The Proposal has a Disturbance Footprint of 878 hectares (ha) that lies within a Development Envelope of 1,259 ha (Figure 1). The Proposal involves the development of two satellite mine pits (Six Mile Well and Goliath), a waste rock landform (WRL), associated support infrastructure and a 20 kilometre (km) transport corridor north to the existing Mt Keith Mine (Figure 2).



Figure 1: MKS Proposal Development Envelope and Disturbance Footprint





Figure 2: MKS Proposal Indicative General Layout

#### Key environmental factors

The key environmental factor relevant to this EMP is flora and vegetation for which Table 1 describes the activities, values and actual or potential impacts on Flora and Vegetation.

Table 1: Key environmental factor, values and impacts

| Key<br>environmental<br>factor | Activities  | Values   | Impacts  |
|--------------------------------|---|--|--|
| Flora and<br>vegetation        | Clearing of<br>native<br>vegetation<br>Mining<br>activities | <ul> <li>Priority flora, with<br/>indicator species of<br/>concern:         <ul> <li><i>Eremophila</i> sp.<br/>long pedicels (P2)</li> <li><i>Hibbertia</i> sp.<br/>Sherwood<br/>Breakaways (P2)</li> <li><i>Hybanthus</i><br/>floribundus<br/>subsp.<br/>chloroxanthus<br/>(P3)</li> <li><i>Verticordia</i><br/>jamiesonii (P3)</li> </ul> </li> <li>Violet Range<br/>Priority Ecological<br/>Community (PEC)</li> <li>Wanjarri Nature<br/>Reserve (WNR)</li> </ul> | <ul> <li>Direct Impacts</li> <li>Clearing of up to 878 ha of native vegetation within a Development Envelope of 1,259 ha.</li> <li>Indirect Impacts <ul> <li>Potential increased spread or introduction of weeds.</li> <li>Habitat fragmentation</li> <li>Altered fire regime</li> <li>Dust</li> <li>Alteration to surface water flow</li> </ul> </li> </ul> |

## **1.2. Condition requirements**

The Proposal is currently being assessed by the EPA (Assessment 2122) and a Ministerial Statement and associated Proposal Implementation conditions are yet to be issued.

This EMP addresses the requirements of the EPA Scoping document item 9 and details:

- Monitoring of significant flora and vegetation communities;
- Monitoring and control of weeds; and
- Adaptive management actions to be implemented in response to environmental criteria (triggers and thresholds) being reached.

Rehabilitation requirements will be addressed within Mount Keith Satellite Project Mine Closure Plan.

## **1.3.** Rationale and approach

This section provides a concise description of the rationale and approach for this FVEMP and discusses the environmental objectives for the identified biodiversity regional assets to which implementation conditions (and Schedules) apply.

The following sections summarise:

- survey findings;
- key assumptions and uncertainties;
- the management approach; and
- the rationale for choice of provisions,

as is required by the Instructions (EPA, 2018, p. ii).

## 1.3.1. Overall objective, purpose and scope of this FVEMP

As previously mentioned, this FVEMP has been compiled by NiW to meet EPA requirements to develop and submit an EMP and relevant Schedules to demonstrate how NiW meets the intent of various biodiversity-related implementation conditions.

The biodiversity-related assets, within the Development Envelope, which have been identified as requiring a 'Schedule' to be developed are:

- Indicator Priority flora species (*Eremophila* sp. long pedicels (P2), *Hibbertia* sp. Sherwood Breakaways (P2), *Hybanthus floribundus* subsp. *chloroxanthus* (P3), *Verticordia jamiesonii* (P3))
- Violet Range Priority Ecological Community (PEC) (Schedule 1)
- Wanjarri Nature Reserve (WNR) (Schedule 2)

For these above-listed biodiversity-related assets, management actions, targets and proposed monitoring parameters have been developed in this FVEMP and specifically included in the relevant Schedules for the endorsement of the CEO. The Schedules are intended to be stand-alone documents.

## **1.3.2.** Surveys and study findings

Ordinarily, baseline surveys are conducted at a tenement scale. This ensures a regional understanding of flora and vegetation and fauna communities which enables informed management in a regional context and an assessment at a Proposal level of impact and area of influence beyond its direct footprint. Baseline surveys are reviewed on a five-yearly basis to ensure they remain current and applicable for management. In these reviews, survey timing, methodology and extent are considered against contemporary standards. The results of the survey are considered against taxonomic and conservation significance changes over the past five years and the potential for future operational activity in the area.

Targeted surveys may be undertaken to update baseline information or to resolve particular survey or study gaps. Targeted surveys may also be undertaken prior to approved land clearing if there is an identified risk of Declared Rare Flora or Priority 1 species occurring in a proposed impact area.

The Study Area for the Proposal has been subject to extensive field surveying since 1990, including desktop, reconnaissance and detailed surveys, and targeted work for *Acacia* species (Appendix A). The most recent survey, undertaken by Western Botanical in 2017 (Western Botanical, 2017), covered approximately 5,422 ha within the Study Area, and encompassed the Disturbance Footprint (878 ha) and the Development Envelope (1,259 ha). The survey by Western Botanical (2017) was prepared to meet the requirements for environmental impact assessment (EIA) in accordance with EPA (2016) Technical Guidance

– Flora and Vegetation Surveys for Environmental Impact Assessment. Survey effort included a desktop assessment, three EIA field surveys in November 2016 and December 2016, and three field surveys during July 2017, August 2017 and September 2017 to target *Hibbertia* and *Acacia* taxa.

## **1.3.3.** Key assumptions and uncertainties

The findings of the flora and vegetation surveys completed to date have formed the basis for the rationale and management approach adopted for the FVMP. It is assumed that the surveys undertaken have accurately identified and mapped vegetation associations, and identified Priority flora and populations within the Proposal area and surrounds. It is also assumed that the previous assessment of impacts on flora and vegetation associated with the Proposal are correct, and are typically considered to be minor on a local and regional scale

In order to establish measureable environmental criteria (targets, triggers, thresholds) and appropriate adaptive management measures, baseline surveys and ground-truthing of potential monitoring locations is required. The findings of the baseline surveys will provide a greater understanding of the natural variability and range of vegetation condition and plant condition and reproductive capcity that can be expected during monitoring.

The Schedules developed for this FVMP identify proposed environmental criteria and corresponding adaptive management actions based on the limitations of current knowledge. Upon completion of pre-disturbance baseline surveys to establish appropriate monitoring locations, the environmental criterial and management provisions within the Schedules of this FVMP will be reviewed and revised as required.

## **1.3.4.** Management Approach – General

NiW mining operations are managed under Asset Wide and site specific plans and procedures, inductions and training. The Proposal will operate under Mt Keith environmental plans and procedures where relevant, with Project specific procedures developed as required (such as procedures required to ensure the implementation of this FVMP).

NiW has an Asset wide Environment and Heritage Impact Approval (EHIA) permit process to manage the implementation of its environmental, Aboriginal heritage, land tenure and legal obligations prior to and during land disturbance activities. All ground disturbance activities will be required to meet the requirements of the EHIA process, as well as relevant legislative and regulatory requirements. Additionally, the EHIA process provides a mechanism whereby technical and professional advice can be provided to the business regarding environmental aspects, land access and Aboriginal heritage planning and management issues. The EHIA system consists of an electronic workflow process linked to a geographical information system. The objectives of the EHIA process are to:

- identify the significant environmental\*, Aboriginal heritage and legal aspects of proposed activities;
- ensure that, through appropriate environmental Aboriginal heritage and land access planning and management, BHP activities comply with all legal and other obligations;
- avoid, minimise and mitigate the number and nature of environmental\*, Aboriginal heritage and land tenure impacts and ensure adequate environmental performance of BHP operations; and
- provide a mechanism for continuous improvement.

\*In relation to this FVEMP, environmental aspects particularly consider conservation significant flora species and communities.

Mine closure objectives, criteria and activities (including rehabilitation requirements) will be addressed within Mount Keith Satellite Project Mine Closure Plan.

## **1.3.5.** Value specific rationale and approach

The Instructions (EPA, 2018) require a "concise" description of the rationale and approach for the EMP against the environmental objective for each value. Appendix B outlines the survey and study findings, key assumptions and uncertainties, management approach and rationale for choice of provisions regarding each value.

## 2. EMP provisions

Please refer to the Schedule sections.

## 3. Adaptive Management and review of the EMP

Adaptive management shall be achieved through ongoing training, supervision and monitoring of operational performance. Area inspections, audits and task observations may be used to assess performance and identify procedural or technical variance in operational practices that can then be remediated.

Through an annual review and reporting process the following will occur:

- Define operational issues and proposed changes to the plan.
- Implement management and mitigation measures.
- Monitor and evaluate performance against amended environmental provisions.
- Adjust management and mitigation measures and monitoring where required to meet the outcome or objective.

BHP applies an adaptive management framework for implementing management measures identified in this FVEMP. Adaptive management is a structured, iterative process to decision making. An integral component is the application of the mitigation hierarchy (avoid, minimise and rehabilitate environmental impacts, prior to applying offsets as a last resort).

The framework embeds a cycle of monitoring, reporting and implementing change where required. It allows an evaluation of the management controls so that they are progressively improved and refined, or alternative solutions adopted, to ensure the outcome-based objectives are achieved. The key steps of the adaptive management approach are outlined in Figure 3.



Figure 3: BHP's adaptive management approach

## 3.1. Review and update of this FVEMP

This FVEMP will be reviewed and updated to ensure it addresses the relevant conditions and is being implemented effectively. Changes may arise from, but not limited to, a change of scope, request by proponent or regulator for a change to Ministerial Conditions or this FVEMP, stakeholder consultation comments or from opportunities for improvement.

New and/or revised Schedules will be provided for review and endorsement by the CEO as per the requirements of the respective Ministerial Statement implementation conditions.

## 4. Stakeholder consultation

NiW undertakes regular and ongoing stakeholder engagement as part of its core business activities. NiW aims to facilitate regular, open and honest dialogue to understand expectations, concerns and interests of stakeholders and incorporate them into business planning to help build strong, mutually beneficial relationships. The main objectives of the consultation programme are to:

- provide information and the opportunity to comment to relevant government agencies, local authorities and to other groups or individuals who may potentially be interested in a Proposal; and
- where relevant, discuss and allow stakeholder comments on this FVEMP.

NiW will continue to engage with Traditional Owners through targeted consultation and via administration of Native Title heritage agreements where applicable.

This plan is submitted as a preliminary draft for consultation. Stakeholder consultation shall be monitored and reported through revision of this EMP for its finalisation and implementation.

Ongoing consultation has been undertaken EPA. A summary of this consultation is included in Table 2.

| Date        | Proponent                   | Stakeholder | Discussion  | Outcomes  |
|-------------|-----------------------------|-------------|---|---|
| March, 2018 | BHP Billiton<br>Nickel West | EPA         | Comments on Mt Keith<br>Satellite Project<br>Environmental Review<br>Document | Requested significant<br>revision of Flora and<br>Vegetation Management Plan  |
| April, 2018 | BHP Billiton<br>Nickel West | EPA         | Focus required on revisions to Flora and Vegetation EMP                       | <ul><li>EMP to focus on:</li><li>EPA Factors</li><li>Cumulative and residual impacts</li></ul>  |
| July, 2018  | BHP Billiton<br>Nickel West | EPA         | Document review comments specific to FVEMP (Item 2)                           | FVEMP to be revised to<br>measure indirect impacts to<br>significant flora and<br>vegetation and take action to<br>address any impacts. |

#### Table 2: Stakeholder Consultation

Flora and Vegetation Environmental Management Plan

## 5. References

Beard, J. S., Beeston, G.R., Harvey, J.M., Hopkins, A. J. M. and Shepherd, D. P. (2013) The *Vegetation of Western Australia at the 1:3,000,000 scale. Explanatory memoir.* Second edition. Conservation Science Western Australia 9: 1-152.

BHP Billiton Nickel West Pty Ltd (2018) *Mt Keith Satellite Project Environmental Review (Assessment No 2122)*, Draft, April 2018

CALM (1996) *Wanjarri Nature Reserve Management Plan 1996-2006. Management Plan No 35.* Department of Conservation and Land Management for the National Parks and Conservation Authority Perth, Western Australia.

Environmental Protection Authority (EPA) (2004). Guidance statement 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessments in Western Australia.

Environmental Protection Agency (2016) *Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment*, EPA, Western Australia. December 2016.

Environmental Protection Agency (2018) *Instructions on how to prepare Environmental Protection Act* 1986 Part IV Environmental Management Plans, EPA, Western Australia. April 2018.

Keighery, B.J. (1994) *Bushland Plant Survey. A Guide to Plant Community Surveys for the Community.* Western Australia: Wildflower Society (Inc).

Mattheck, C and Breloer, H. (1994). The Body Language of Trees: A Handbook for Failure Analysis. The Stationary Office, Great Britain.

Western Botanical (2017) *Flora and Vegetation Assessment of the Mt Keith Satellite Proposal Study Area* October 2017. Consultant report to BHP Billiton, Nickel West Pty Ltd. Report reference: WB867.

## Appendices

## Appendix A – Summary of Botanical Surveys, 1990 - 2017

## Table A-1: Summary of botanical surveys completed throughout the Study Area between 1990 and 2017.

| Author                         | Title   | Date              | Scope  |
|--------------------------------|---|-------------------|--|
| Western Botanical              | Flora and Vegetation<br>Assessment of the Mt Keith<br>Satellite Operations Study<br>Area.   | October<br>2017   | Review and update of the previous baseline flora and vegetation report (2012) following a revision of the area surveyed including supplementary field works conducted during November-December 2016. Area survey covers 5,422 ha. The initial March 2017 report updated to include the results of further targeted surveys, undertaken in August to October 2017, and revised Proposal footprint.                    |
| Western Botanical              | Flora and Vegetation<br>Assessment, Yakabindie<br>Nickel Proposal.  | September<br>2016 | A review and update of all data relating to flora and vegetation, including review of previous reports relating to the Mount Keith Satellite Operations Study Area inclusive of the Six Mile and Goliath pits and related infrastructure and produce an updated report meeting the requirements of EPA Guidance Statement 51 and Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment. |
| Western Botanical              | Baseline review and<br>statistical analysis of the flora<br>and vegetation of the<br>(previously proposed) NDS1<br>mine and corridor Study<br>Area.                   | 2012              | A review and synthesis of previous works and<br>addition of quadrat-based vegetation assessment<br>and analysis, to meet the criteria of a Level 2 Survey.<br>Includes Six-mile and Goliath orebody areas, waste<br>rock storage area, and associated transport corridor<br>based on additional field works implemented in 2011.   |
| Mattiske<br>Consulting Pty Ltd | Summary of <i>Hybanthus</i><br><i>floribundus</i> subsp.<br><i>chloroxanthus</i> E.M. Benn.<br>(P3) Populations,<br>Yakabindie.                                       | September<br>2011 | Confirmation of the identification of populations<br>previously recorded in the Proposal area and<br>abundance of the populations of <i>Hybanthus</i><br><i>floribundus</i> subsp. <i>chloroxanthus</i> (P3) outside<br>immediate impact areas.  |
| Western Botanical              | Assessment of flora and vegetation, Yakabindie Proposal (draft report).   | 2009              | Level 1 assessment commissioned for the purposes<br>of applying for a Native Vegetation Clearing Permit<br>(NVCP) for the (previously proposed) YNP.   |
| Western Botanical              | Flora, vegetation and habitats<br>of the Yakabindie tenements<br>2004-2005.   | 2006a             | Level 1 assessment inclusive of the initial review of<br>flora, vegetation, and conservation values of<br>Yakabindie tenements and surrounding local areas.<br>This represents the most comprehensive and<br>extensive works conducted at the Mt Keith Study<br>Area inclusive of vegetation mapping, habitat<br>descriptions and species profiles.  |
| Western Botanical              | Review of flora, vegetation,<br>landscapes and conservation<br>values of the Six-mile and Sir<br>Samuel blocks, Wanjarri<br>Nature Reserve and<br>Yakabindie Station. | 2006b             | Level 1 assessment of a section of Wanjarri Nature<br>Reserve and a section of Sir Samuel Block, in<br>preparation for a land swap to facilitate mining at<br>Yakabindie Nickel Proposal.  |
| Landcare<br>Services           | Review of <i>Hemigenia exilis</i> (S. Moore).   | 2001              | Combined all data including WMC, Anaconda Nickel<br>and CALM sources to review the status of <i>Hemigenia</i><br><i>exilis</i> Declared Rare Flora (DRF) resulting total of<br>46,005 plants from 66 populations and reduction to<br>P4 status.  |

## Flora & Vegetation Environmental Management Plan

| Author                                | Title  | Date          | Scope   |
|---------------------------------------|--|---------------|---|
| Landcare<br>Services                  | A review of <i>Hemigenia exilis</i><br>(S. Moore) populations at The<br>Mt Keith Operation and within<br>the north-eastern Goldfields. | 1996          | Targeted survey and review of Hemigenia exilis local<br>and regional populations, incorporating data supplied<br>by Anaconda Nickel.                                    |
| Ecologia                              | Yakabindie Nickel Proposal:<br><i>Hemigenia exilis</i> survey and<br>management plan.  | 1996          | Targeted survey and management of <i>Hemigenia exilis</i> , previously ranked as Declared Rare Flora, at the Yakabindie Nickel Proposal.                                |
| Ecologia                              | Yakabindie nickel mine<br>Proposal, Six Mile Well – Mt<br>Pasco blocks: environmental<br>assessment.                                   | 1995          | Unknown.  |
| Ecologia<br>Ecological<br>Consultants | Yakabindie Nickel Mine<br>Proposal Consultative<br>Environmental Review: Flora<br>and Fauna Survey.                                    | March<br>1990 | Documentation of existing biota, delineation of the main ecological units, map the area and integration of previously published and unpublished vegetation information. |

## **Appendix B – Rationale and Context**

| Schedule   | Value          | Surveys and Studies  | Survey and Study Findings  | Key assumptions and uncertainties  |
|------------|----------------|--|--|--|
| Schedule 1 | Priority flora | Western Botanical (2017) Flora and Vegetation<br>Assessment of the Mt Keith Satellite Operations<br>Study Area<br>Western Botanical (2012) Baseline review and<br>statistical analysis of the flora and vegetation of<br>the (previously proposed) NDS1 mine and<br>corridor Study Area.<br>Western Botanical (2006) Flora, vegetation and<br>habitats of the Yakabindie tenements 2004-<br>2005 | The Study Area is known to support 393 endemic flora taxa<br>from 140 genera and 51 families, ranging from six to 36<br>taxa per vegetation associations (Table B-1). No listed<br>Threatened Flora are known to occur within, or adjacent to,<br>the Study Area.<br>Thirteen Priority Flora species were initially known within<br>the Study Area. Following the Western Botanical (2017)<br>survey, the species, <i>Eremophila</i> sp. long pedicels G.<br>Cockerton 1975, has since been listed by DBCA as a<br>Priority 2 species . This takes the total known Priority Flora<br>within the Study Area to 14, which includes one Priority 1,<br>two priority 2, eight Priority 3, and three Priority 4 listed<br>species (Table B-2). Of these 14 species, five are not<br>directly impacted by the Proposal.<br>Of the nine remaining Priority species , four taxa have been<br>selected as "indicator species of concern" for use in<br>monitoring; <i>Eremophila</i> sp. long pedicels (P2), <i>Hibbertia</i> sp.<br>Sherwood Breakaways (P2) and <i>Hybanthus floribundus</i><br>subsp. <i>chloroxanthus</i> (P3), <i>Verticordia jamiesonii</i> (P3) A<br>description of these taxa of concern is provided in Table B-<br>3.<br>There is the potential for the viability of Priority flora taxa and<br>vegetation communities, remaining after land clearing, to be<br>reduced by fragmentation, particularly within the Violet<br>Range PEC. This may result in changes in genetic flow,<br>colonisation and recruitment that may impede the<br>functionality of a species population or community,<br>particularly for populations at the limits of their distribution.<br>The flora of breakaway landscapes is naturally sparse with<br>large gaps between individual plants and plant communities.<br>Species tend to flower rapidly after sufficient rainfall, often<br>following thunderstorm or cyclonic rainfall events. A number<br>of taxa found with the breakaway landscape of the Violet<br>Range PEC are insect pollinated, with gaps between<br>disjunct populations of insect-pollinated species potentially<br>already resulting in barriers to gene flow. | <ul> <li>With the exception of <i>Hibbertia</i> sp. Sherwood</li> <li>Breakaways (R.J. Cranfield 6771) and Hybanthus</li> <li>floribundus subsp. chloroxanthus, all of the priority</li> <li>flora recorded have wider distributions outside of the sub-region or bioregion and in some cases occur outside of the State.</li> <li>Indirect impacts considered in the impact assessment and the development of Schedule 1 are: <ul> <li>Habitat fragmentation - The potential for habitat fragmentation is most likely to occur where plants exist immediately adjacent to areas of disturbance associated with the Proposal.</li> </ul> </li> <li>Alteration of surface water flows – Some of the species are found within drainage lines. These may be impacted by interception by the haul road or impacted or reduction in catchment flow due to the construction of mining landforms.</li> <li>Potential to spread or introduce weeds – The impact of weeds on these species is unknown. The impacts to these species are not considered significant</li> </ul> |

#### Rationale for choice of provisions

The Priority indicator species have been selected due to proximity to either haul road or mine landforms (pits, waste rock dump) and therefore risk of indirect impacts:

- *Eremophila* sp. long pedicels (G. Cockerton 1975) (P2) is a species that was first discovered at the Mt Keith Nickel Operation (NMK) in 1996 by Geoff Cockerton & Kirsty Stratford. It is locally abundant to dominant in drainage lines downstream of the NMK tailings facility (CDTSF). The northern extent of the proposed haul road intercepts a small population (estimated at 20 plants) on the south-western perimeter of the CDTSF.
- Hibbertia sp. Sherwood Breakaways (P2) is a newly recognised species that is currently known only from the Yakabindie station and Wanjarri Nature Reserve. A population occurring in the western end of the Wanjarri Nature Reserve will be fragmented from populations to the east of the Development Envelope by construction of the haul road.
- Hybanthus floribundus subsp. is typically found in rocky areas, creek banks and along drainage lines. The sub-population to be disturbed by clearing is largely located within the Six Mile Well pit boundary. A large portion of this sub-population that exists outside the proposed pit within an ephemeral drainage line will remain undisturbed and will be intact. Here, the species occupies a small niche on the margins of narrowly incised Mulga dominated ephemeral drainage line (DRMS Community) which drains southward. It receives run-on from the adjacent granitoid landscape to the west and from the Six Mile orebody area on the eastern side of the drainage line. Development of the MKS proposal will unavoidably reduce the overall catchment area (by 12.25%) and therefore overall volume of surface water run-on into this minor creekline. It is assumed that the Hybanthus floribundus subsp. chloroxanthus plants here derive their moisture from within the fractured rocks on the margins of the drainage line and that this moisture is replenished during surface flow events, particularly when free water is resident in the ephemeral drainage line for extended periods. This would normally be following heavy rainfall events.
- A population of 63 plants of *Verticordia* jamiesonii (5.26% of the overall enumerated population) lies within the proposed MKS haul road alignment over a breakaway and will be impacted by the development of the MKS project.

|            |   |   | Flora & Vegetation Environmental Manag  | gement Plan  |   |
|------------|---|---|---|--|---|
| Schedule 2 | Value<br>Violet<br>Range PEC<br>and<br>associated<br>Priority Flora | Surveys and Studies<br>Western Botanical (2017) Flora and Vegetation<br>Assessment of the Mt Keith Satellite Operations<br>Study Area<br>Western Botanical (2012) Baseline review and<br>statistical analysis of the flora and vegetation of<br>the (previously proposed) NDS1 mine and<br>corridor Study Area.<br>Western Botanical (2006) Flora, vegetation and<br>habitats of the Yakabindie tenements 2004-<br>2005 | Survey and Study Findings<br>The Violet Range PEC comprises a number of vegetation<br>associations that occur within limonitic landforms, basalt<br>geology of the Perseverance fault line, carbonate soils<br>derived from weathered basalt and some colluvial slopes<br>associated with these. Western Botanical (2017) have<br>mapped other occurrences of these vegetation<br>associations and landforms and suggest that the<br>boundaries of the PEC could be expanded to include a<br>further 18,288 ha.<br>Historical impacts to the PEC comprise clearing for<br>pastoralism and mining (including the abandoned Bellevue<br>site).<br>There is the potential for the viability of flora taxa and<br>vegetation communities, remaining after land clearing, to be<br>reduced by fragmentation, particularly within the Violet<br>Range PEC. This may result in changes in genetic flow,<br>colonisation and recruitment that may impede the<br>functionality of a species population or community,<br>particularly for populations at the limits of their distribution.<br>The flora of breakaway landscapes is naturally sparse with<br>large gaps between individual plants and plant communities.<br>Species tend to flower rapidly after sufficient rainfall, often<br>following thunderstorm or cyclonic rainfall events. A number<br>of taxa found with the breakaway landscape of the Violet<br>Range PEC are insect pollinated, with gaps between<br>disjunct populations of insect-pollinated species potentially<br>already resulting in barriers to gene flow.<br>Six weed species documented from the Study Area are<br>found in small, isolated populations with low numbers of<br>individuals present (Table B-4). Three of these species<br>have the potential to be highly invasive and, excluding<br>intentional introduction through pastoral activities, the<br>nearest significant sources are the Goldfields Highway and<br>NMK. In addition, a number of other weed species are<br>documented at NMK - the two sites will be linked by a haul<br>road, with frequent vehicle movements between the two | <ul> <li>Key assumptions and uncertainties</li> <li>Detailed flora surveys have been undertaken across the Development Envelope and surrounding areas over multiple years and seasons and the species list is considered to be highly representative of the communities present within the study area (Western Botanical, 2017).</li> <li>Clearing will directly impact less than 4% of the PEC; however it is possible that the PEC extends further than the extent currently mapped based on the survey effort to date.</li> <li>Indirect impacts considered in the impact assessment and the development of Schedule 1 are:</li> <li>Habitat fragmentation - The potential for habitat fragmentation is most likely to occur where plants exist immediately adjacent to areas of disturbance associated with the Proposal.</li> <li>Potential to spread or introduce weeds - Weeds can compete for resources with native flora and disrupt ecological function. When intact populations of native plants are fragmented, or adjacent areas are disturbed, the risk of weed incursion increases.</li> <li>Altered Fire Regime – the likelihood of fire in the Proposal area is low due to arid climate and low natural fire frequency. The introduction of mining activities, including clearing is unlikely to increase or alter the existing fire regime. Effective management of weeds will ensure the fire potential is not exacerbated</li> </ul> | F T s a n c r F u E F s tr r T tt tt tr n v S |
| Schedule 3 | Wanjarri<br>Nature<br>Reserve                                       | Western Botanical (2006) <i>Review of flora,</i><br>vegetation, landscapes and conservation values<br>of the Six-mile and Sir Samuel blocks, Wanjarri<br>Nature Reserve and Yakabindie Station<br>Plus also refer to:<br>CALM (1996) Wanjarri Nature Reserve<br>Management Plan 1996-2006.  | areas, providing risk of weed ingress.<br>Level 1 assessment of a section of Wanjarri Nature<br>Reserve and a section of Sir Samuel Block, in preparation<br>for a land swap to facilitate mining at Yakabindie Nickel<br>Proposal.   | <ul> <li>Indirect impacts considered in the impact assessment<br/>and the development of Schedule 1 are: <ul> <li>Dust impacts - Based on a depositional<br/>trigger value of 0.3 g/m2/day, the predicted<br/>impacts to vegetation within the Wanjarri<br/>Nature Reserve from activity along the<br/>transport corridor with no controls applied is<br/>likely to be low (NiW, 2018).</li> <li>Habitat fragmentation - The potential for<br/>habitat fragmentation is most likely to occur<br/>where plants with limited populations exist<br/>immediately adjacent to areas of disturbance<br/>associated with the Proposal.</li> <li>Potential to spread or introduce weeds -<br/>Weeds can compete for resources with native<br/>flora and disrupt ecological function. When<br/>intact populations of native plants are<br/>fragmented, or adjacent areas are disturbed,<br/>the risk of weed incursion increases.</li> </ul> </li> <li>Altered fire regime - The risk of fire in non-<br/>grassy habitats is naturally low due to low<br/>fuel loads, however, fires within the Spinifex<br/>and perennial grass dominated communities<br/>(SAMW, SAWS, SAMA, MUWA) are naturally</li> </ul>  | Triv<br>v n w p gri ri a V d ti v O ti ii     |

#### Rationale for choice of provisions

The PEC occurs within areas that are currently subjected to cattle grazing and previous exploration activities. The impacts from these activities are minimal, suggesting that the vegetation communities that comprise the PEC are relatively resilient to these processes. The key risks to the PEC arising from the Proposal are considered to be unauthorised clearing outside the Development Envelope and weed incursion.

Four Priority species within the PEC have been selected for ongoing monitoring due to proximity to either haul road or mine landforms (pits, waste rock dump) and therefore risk of indirect impacts. These assessments will also record condition of the associated vegetation. In addition to these, the condition of key vegetation associations typical of the PEC will monitored. Monitoring and management actions for these species and vegetation associations are provided in Schedule 1.

The Wanjarri Nature Reserve is an A class nature reserve covering approximately 53,000 ha. The key regetation component is spinifex grasslands with nulga complexes that occur primarily in the western third of the reserve, adjacent to the MKS proposals. It is acknowledged by the State povernment that due to the small size of the eserve that a regional approach to management is equired, and therefore potential indirect impacts arising from weed incursion need to be managed. Nater based dust suppression will be utilised during both construction and operational phases of he Proposal to minimise dust impacts on adjacent regetation on either side of the transport corridor. Given the low likely impacts to the vegetation within he Nature Reserve, dust suppression is not ncluded in this management plan.

|          |       |                     | Flora & Vegetation Environmental Management Plan         |   |  |  |
|----------|-------|---------------------|--|---|--|--|
| Schedule | Value | Surveys and Studies | Flora & Vegetation Environr<br>Survey and Study Findings | Nental Management Plan         Key assumptions and uncertainties         R           more frequent following lightning strike.<br>Mining should not increase the incidence of<br>fire occurrences.         Nining should not increase the incidence of<br>fire occurrences.         Nining should not increase the incidence of<br>fire occurrences.           -         The presence of existing weed species in<br>small, isolated patches does not alter or<br>enhance the existing fire regime. However |  |  |
|          |       |                     |  | the introduction of grass weeds such as<br>Buffel Grass and Birdwood Grass may alter<br>and increase the fuel load in those areas.<br>Infestations along water courses and<br>disturbed areas introduce a risk of altered fire<br>regime. Effective management of weeds will<br>ensure the fire potential is not exacerbated.   |  |  |

## BHP

Rationale for choice of provisions

| Veg Code                                     | Vegetation Association Name  |        | % of MKS<br>Proposal<br>Study Area | Area (ha) within<br>MKS<br>Development<br>Envelope | % within<br>MKS<br>Development<br>Envelope |
|--|--|--------|------------------------------------|--|--|
| Basalt Geology Landform<br>(Fresh Rock)      |  |        |                                    |  |  |
| BaMAS Complex                                | Basalt, mixed Acacia species Shrubland Complex   | 182.9  | 3.37                               | 0.33   | 0.03                                       |
| BaAdS  | Basalt, Acacia doreta long phyllode form Shrubland                                     | 19.4   | 0.36                               | 0.86   | 0.07                                       |
| BaAxS  | Basalt, Acacia aff. xanthocarpa Shrubland  | 83.2   | 1.54                               | 9.73   | 0.77                                       |
| BaAbS  | Basalt, Acacia burkittii Shrubland   | 11.9   | 0.22                               | 0.00   | 0.00                                       |
| BaCdS  | Basalt, Calytrix desolata low Shrubland  | 22.7   | 0.42                               | 0.00   | 0.00                                       |
| Weathered Basalt Landforms (Carbonate Soils) |  |        |                                    |  |  |
| GHPS   | Weathered Basalt, Hakea leucoptera subsp. sericipes - Eremophila pantonii<br>Shrubland | 233.19 | 4.32                               | 107.44   | 8.53                                       |
| SSS  | Stony Senna Shrubland  |        | 2.37                               | 54.64  | 4.34                                       |
| EGPW   | Weathered Basalt, Eucalyptus gypsophila - Eremophila pantonii Woodland                 | 11.92  | 0.22                               | 5.16   | 0.41                                       |
| Limonitic Landforms                          |  |        |                                    |  |  |
| SILS   | Stony Ironstone Low Shrubland  | 27.17  | 0.50                               | 2.37   | 0.19                                       |
| SIMS   | Stony Ironstone Mulga Shrubland  | 412.28 | 7.60                               | 254.86   | 20.24                                      |
| USBS   | Upland Small Bluebush Shrubland  | 92.93  | 1.71                               | 32.67  | 2.59                                       |
| Archaean Granite Landforms                   |  |        |                                    |  |  |
| BrCP Complex                                 | Breakaway Chenopod Plain Complex   | 12.23  | 0.23                               | 0.41   | 0.03                                       |
| BrCP – TectS                                 | Breakaway Chenopod Plain Complex - Tecticornia Shrubland                               | 0.58   | 0.01                               | 0.00   | 0.00                                       |
| BrCP-FRAN                                    | Breakaway Chenopod Plain Complex - Frankenia Shrubland                                 | 8.46   | 0.16                               | 0.00   | 0.00                                       |
| BrGP   | Breakaway Grassy Plain   | 18.70  | 0.35                               | 0.00   | 0.00                                       |
| BrX-FOL                                      | Archaean Granite Breakaway Footslope   | 15.71  | 0.29                               | 0.00   | 0.00                                       |
| BrX  | Archaean Granite Breakaway   | 7.08   | 0.130                              | 0.00   | 0.00                                       |
| BrX-P  | Archaean Granite geology   | 30.79  | 0.57                               | 2.85   | 0.23                                       |
| GrEx   | Granite, Exfoliating granite outcrops  | 62.4   | 1.15                               | 0.00   | 0.00                                       |
| GrMS   | Granitic Mulga Shrubland   | 990.0  | 18.26                              | 35.19  | 2.80                                       |
| GrMS - BRX Complex                           | Granite Mulga Shrubland - Granite Breakaway Plateaux Complex                           | 48.3   | 0.89                               | 0.00   | 0.00                                       |
| SAES   | Stony Acacia Eremophila Shrubland  | 484.25 | 8.93                               | 80.76  | 6.41                                       |

### Table B-1: Vegetation Associations of the Study Area

| Veg Code                                  | Vegetation Association Name   |        | % of MKS<br>Proposal<br>Study Area | Area (ha) within<br>MKS<br>Development<br>Envelope | % within<br>MKS<br>Development<br>Envelope |
|---|---|--------|------------------------------------|--|--|
| SGRS                                      | Sandy Granitic Mulga Shrubland  | 5.37   | 0.10                               | 0.00   | 0.000                                      |
| Sandplain Landforms                       |   |        |                                    |  |  |
| MUWA                                      | Mulga - Wanderrie Grassland 2   |        | 0.05                               | 0.00   | 0.00                                       |
| SAMU                                      | Sandplain Mulga Spinifex Shrubland  | 172.04 | 3.17                               | 16.16  | 1.28                                       |
| SAWS                                      | Sandplain, Acacia species Spinifex Shrubland                                  | 11.92  | 0.22                               | 0.00   | 0.00                                       |
| SAMA                                      | Sandplain, Mallee, Acacia species Spinifex Shrubland                          | 13.27  | 0.24                               | 0.00   | 0.00                                       |
| WABS                                      | Wanderrie Bank Grassy Shrublands  | 182.23 | 3.36                               | 36.22  | 2.88                                       |
| WABS – SAMU Complex                       | Wanderrie Bank Grassy Shrublands / Sandplain Mulga Spinifex Shrubland Complex | 153.89 | 2.84                               | 20.57  | 1.63                                       |
| Colluvial and Alluvial Drainage Landforms |   |        |                                    |  |  |
| DRES                                      | Drainage Line Eucalypt Woodland   | 50.46  | 0.93                               | 3.79   | 0.30                                       |
| DRMS                                      | Drainage Line Mulga Shrubland   | 381.54 | 7.04                               | 37.67  | 2.99                                       |
| GRMU                                      | Groved Mulga Woodland   | 65.21  | 1.21                               | 5.51   | 0.44                                       |
| HMCS                                      | Mulga Shrubland with scattered low Chenopod Shrubs                            | 24.00  | 0.44                               | 0.00   | 0.00                                       |
| HPMS                                      | Hardpan Mulga Shrubland   | 323.35 | 5.96                               | 102.73   | 8.16                                       |
| HPMS THOMA                                | Hardpan Mulga Shrubland with Acacia thoma co-dominant                         | 3.02   | 0.06                               | 3.02   | 0.24                                       |
| MMS                                       | Mulga over Maireana triptera Shrubland  | 329.99 | 6.09                               | 259.82   | 20.64                                      |
| MPS                                       | Maireana pyramidata Shrubland   | 6.83   | 0.13                               | 0.00   | 0.00                                       |
| SMS                                       | Stony Mulga Shrubland   | 763.84 | 14.16                              | 186.25   | 14.79                                      |

 Table B-2
 Priority taxa recorded from the Proposal Study Area (orange cells are indicator taxa of concern).

| Priority taxa   | Priority | Distribution   |
|---|----------|--|
| Aizoaceae   |          |  |
| Gunniopsis propinqua  | P3       | Several records in the Development Envelope and Study Area, saline areas downslope of granitoid breakaways, recorded in the Study Area for the first time in 2016.         |
| Anacampserotaceae   |          |  |
| Anacampseros sp. Eremaean<br>(F. Hort, J. Hort & J. Shanks 3248)                                    | P1       | Granitoid domains.   |
| Dilleniaceae  |          |  |
| Hibbertia sp. Sherwood Breakaways (R.J. Cranfield 6771)   | P2       | Development Envelope (transport corridor) and Study Area, associated with granitoid breakaways and laterite capped hills.  |
| Lamiaceae   |          |  |
| Hemigenia exilis  | P4       | Low numbers, widespread in the Development Envelope and Study Area, associated with creeklines and volcaniclastic sediments.   |
| Malvaceae   |          |  |
| Hibiscus krichauffianus   | P3       | Three records within the Development Envelope and Study Area, recorded in the Study Area for the first time in 2016, stony landscapes.                                     |
| Sida picklesiana  | P3       | Development Envelope and Study Area, granitoid breakaways.   |
| Myrtaceae   |          |  |
| Thryptomene sp. Leinster<br>(B.J. Lepschi & L.A. Craven 4362)                                       | P3       | Development Envelope and Study Area, granitoid breakaways, SIMS and SILS communities.  |
| Verticordia jamiesonii  | P3       | Development Envelope and Study Area, granitoid breakaways.   |
| Poaceae   |          |  |
| Aristida ?jerichoensis var. subspinulifera  | P3       | One specimen was recorded from Jones Creek.  |
| Proteaceae  |          |  |
| Grevillea inconspicua   | P4       | Low numbers, widespread in the Development Envelope and Study Area, associated with outcropping basalt.  |
| Scrophulariaceae  |          |  |
| <i>Eremophila pungens</i> complex inclusive of <i>Eremophila</i> sp. Leinster (R.J. Cranfield 6767) | P4       | Low numbers, widespread in the Development Envelope and Study Area, granitoid breakaways and limonitic landforms.  |
| <i>Eremophila</i> sp. long pedicels<br>(G. Cockerton 1975)  | P2       | ~20 individuals known within the north of the proposed haul road towards NMK, located on the south-western margin of the NMK TSF on hardpan plains and adjacent sandplain. |
| Violaceae   |          |  |
| Hybanthus floribundus subsp. chloroxanthus  | P3       | Scattered populations in the Development Envelope and Study Area, mostly in drainage areas.  |
| Zygophyllaceae  |          |  |
| Tribulus adelacanthus   | P3       | One specimen was recorded within the Development Envelope on colluvial slopes.   |

| Таха   | Description  | Habitat   | Populations   |
|--|--|---|---|
| <i>Eremophila</i> sp. long<br>pedicels (G. Cockerton<br>1975)<br>(P2)        | Domed shrub, up to 0.7 m by 1-1.5 m<br>diameter. Glabrous dark green, glossy<br>filiform leaves with prominent dorsal<br>groove. Purple (rarely white) flowers held<br>on sinusoidal pedicles to 20 mm long,<br>fruits containing up to 4 seeds in a woody<br>capsule up to 8 mm diameter with long<br>prominent simple hairs on the papery<br>pericarp. | Associated with sheetflow<br>habitats with Mulga and/or<br>Spinifex. Locally abundant<br>to dominant in drainage<br>lines downstream of the<br>CDTSF, within extending<br>eastwards from the NMK<br>CDTSF, towards sandplains<br>to the east. | A regional estimate of 50,000 plants in 4 sub-populations made. Within the vicinity of MKS, an estimated 37,533 plants occur, with a further 12,467 plants estimated in three other sub-populations at Mt Keith, Lake Way and Barwidgee Stations, north of MKS. The population at Barwidgee Station, within the Lake Maitland catchment, is considered substantial and at Lake Way a small population is known in a narrow drainage line on the northern shore of the eastern part of the lake. A small number of plants are known to exist within Wanjarri Nature Reserve, south-east of the NMK CDTSF within a drainage line, however, this population has not been assessed. |
| <i>Hibbertia</i> sp. Sherwood<br>Breakaways (R.J.<br>Cranfield 6771)<br>(P2) | Hibbertia sp. Sherwood Breakaways is a<br>single stemmed perennial shrub up to 1m<br>high x 1.5 m wide, with dark green<br>glabrous, glossy pungent need-like leaves<br>to 15 mm long. It produces large yellow<br>flowers following adequate rainfall and<br>copious amounts of light brown seeds to<br>2 mm diameter in good seasons.                  | Grows in cracks in<br>Archaean granite plateaux<br>and on adjacent shallow<br>lateritic caps of low rounded<br>hills and associated<br>drainage lines.  | Two populations have been identified between Wanjarri NR and Yakabindie Station, with the total population estimated to be 13,715 plants. The majority (12,287 plants) occur at Yakabindie, in six sub-populations. The population within Wanjarri NR is estimated at 1,428 plants, growing east of a drainage divide east of the MKS Study Area.   |
| Hybanthus floribundus<br>subsp. chloroxanthus<br>(P3)                        | Multi-stemmed shrub growing to 0.7 m tall<br>with blue-green foliage in the cooler,<br>wetter months turning yellow-green in<br>summer. It has pale blue flowers from<br>August to October following adequate<br>rainfall and produces copious amounts of<br>round black seeds to 3 mm diameter.   | Occurs in drainage foci in<br>rocky areas, creek banks<br>and along ephemeral<br>drainage lines growing in<br>fractures in the surface rock   | Five populations have been identified in Western Australia, with an estimated 241 plants in four subpopulations between MKS and NMK. Locally, plants occur in a north-south alignment on the western margin of the Perseverance fault line. A further 220 plants have been recorded 5km north of the study area. Regionally, the population is estimated at 1,679 plants with populations also identified from Yakabindie Station, Weebo Station and nearby Murrin nickel mine and Leinster.  |
| Verticordia jamiesonii<br>(P3)   | Perennial shrub growing 0.2-0.6 m tall.<br>Produces pink to white flowers during<br>September to October following adequate<br>rainfall with potentially one seed per fruit,<br>though seed fill within fruits is usually low<br>for this genus.   | Grows in rock cracks on granite breakaways  | Distributed through the Gibson Desert, Murchison and Yalgoo Biogeographic regions at three disjunct foci. At NMK there is a large population (500 plants) on low breakaways within the south east portion of the study area and a small population (63 plants) at the propose haul road. Outside the area a population of 326 plants have been enumerated.  |

Table B-3: Description of the four Priority indicator taxa of concern (based on Florabase 2018; and Western Botanical, 2017).

| Table B-4 | Weeds identified | within the | Proposal | Study Area. |
|-----------|------------------|------------|----------|-------------|
|           |                  |            |          |             |

| Weed Species                                      | Description   |
|---|---|
| Rumex vesicarius<br>(Ruby Dock)                   | An aggressive coloniser species that responds rapidly to rainfall, producing seeds that are readily distributed by wind and water. It is well established at NMK and elsewhere in the north-eastern Goldfields on mine sites and disturbed lands.                         |
| <i>Cenchrus ciliaris</i><br>(Buffel Grass)        | An aggressive coloniser that is well established in the Pilbara region but is only recently becoming a problem in the north-eastern Goldfields. It is allelopathic, meaning it supresses other plants growing near it and can be a major management risk to the Proposal. |
| Cenchrus setiger<br>(Birdwood Grass)              | Is similar to Buffel Grass and is an aggressive, allopathic coloniser that is well established in the Pilbara region but is only recently becoming a problem in the north-eastern Goldfields.   |
| <i>Bidens bipinnata</i><br>(Bipinnate Beggartick) | Recorded within the bed of Jones Creek, downstream from the existing main crossing, and lies within the Study Area. It is a nuisance plant with spiny fruit that cling to clothing and is also readily transmitted via stock.   |
| Lysimachia arvensis<br>(Pimpernel)                | Recorded at one site within Jones Creek and is a small annual species, which has seeds that are readily transported by wind and water.  |
| Mesembryanthemum nodiflorum (Slender Iceplant)    | Recorded at one site in the north-west of the Study Area, associated with a low granite breakaway. It is a small annual species with seeds which are readily transported by wind.   |

## Schedule 1: MSXXXX Mt Keith Satellite (MKS) Project – Priority Flora

To meet the requirements of Condition(s) X of Ministerial Statement XXXX

| EPA Factor and objective:   | Flora and Vegetation –   | <ul> <li>to protect flora and vegetation so that biological diversion</li> </ul>  | ty and ecological integrity are maintained.  |  |  |
|---|--|---|--|--|--|
| Values:   | Wanjarri Nature Reserve (WNR) – A Class Nature Reserve.  |   |  |  |  |
| Objective:  | <ul> <li>X: The proponent shall of</li> <li>Eremophila sp. long</li> <li>Hibbertia sp. Sherwo</li> <li>Hybanthus floribung</li> <li>Verticordia jamiesor</li> </ul>  | ensure that the implementation of the Mt Keith Satellite<br>pedicels (P2)<br>bood Breakaways (P2)<br><i>lus</i> subsp. <i>chloroxanthus</i> (P3)<br><i>nii</i> (P3)   | (MKS) Project proposal does not affect the viability of local populations of   | Priority flora species:  |  |
| Outcome:  | No decline in condition of   | lition of local populations of Priority taxa as a result of activities associated with the Proposal.  |  |  |  |
| Key impacts and risks:  | Risk to biological diversi introduce weeds).   | ty and/or ecological integrity indicator Priority taxa popu   | lations, due direct impacts (clearing) and indirect impacts (habitat fragme  | ntation, alteration of su  |  |
| Management and Outcome  | Based Provisions   |   |  |  |  |
| Management Actions  |  | Management Targets  | Monitoring   | Reporting  |  |
| X The Plan shall specify Mana<br>Management Targets, Monito<br>demonstrate that the objective<br>met.<br>Drainage measures designed<br>minimise changes to natural s<br>including diversion drains, roc<br>contouring as required.<br>Rehabilitation of waste rock la<br>disturbance areas upon comp  | agement Actions,<br>ring and Reporting to<br>e in condition X will be<br>and constructed to<br>surface water flow,<br>ek cladding and<br>andform and general<br>eletion of mining.   | X The Plan shall specify Management Actions,<br>Management Targets, Monitoring and Reporting to<br>demonstrate that the objective in condition X will be<br>met.  | X The Plan shall specify Management Actions, Management Targets,<br>Monitoring and Reporting to demonstrate that the objective in<br>condition X will be met.  | <ul> <li>X The proponent sha<br/>compliance within set<br/>known.</li> <li>X The proponent sha<br/>Assessment Report<br/>Statement and then set<br/>XX thereafter or as of<br/>The Compliance Asset<br/>(1) be endorsed<br/>person dele<br/>behalf;</li> <li>(2) include a sta<br/>complied wiiist<br/>(3) identify all p<br/>corrective ai<br/>(4) be made put<br/>Compliance<br/>(5) indicate any<br/>Assessmen</li> <li>X The Plan shall spect<br/>Monitoring and Report</li> </ul> |  |
| <ul> <li>Management actions -</li> <li>Implement the Environme<br/>Assessment process prior</li> <li>Conduct weed hygiene inse<br/>engaging equipment prior</li> <li>Implement targeted bienr<br/>spraying regime post rain</li> <li>Drainage measures desig<br/>minimise changes to natu<br/>including diversion drains<br/>contouring as required.</li> <li>Trigger Level Action – plant</li> </ul> | ental Heritage Impact<br>r to land disturbance.<br>spections on ground-<br>to arriving at site.<br>nial weed inspection and<br>ifall periods.<br>Ined and constructed to<br>ral surface water flow,<br>, rock cladding and | TargetNo measurable decrease in vegetation conditionand plant phenology values at impact sites,validated by statistically significant trends over time.Trigger criteria – plant conditionA decrease in plant condition scale or deviation fromnormal phenology of one or more of the indicatorPriority flora species in the impact populationscompared to analogue populations.Reduced plant condition or deviation in phenology inimpact populations of one or more indicator Priorityspecies compared to analogues.Trigger criteria – weeds | <ul> <li>Implementation of Before, After, Control, Impact (BACI) design comprising:</li> <li>Baseline survey to assess condition and reproductive phenology of Priority taxa, pre-disturbance and establish analogue and potential impact sites based on indicative monitoring locations (Figures 1-1 to 1-4).</li> <li>Installation of permanent photo monitoring points at impact and analogue sites.</li> <li>Baseline weed survey within the Development Envelope to define weed populations pre-disturbance and establish analogue and potential impact sites. (Current weed species population shown in Figure 1-5).</li> <li>Annual monitoring program to assess condition of Priority taxa and extent of weed populations</li> </ul> | Notification of potenti<br>compliance will be pr<br>days of that potential<br>any corrective actions<br>DBCA following the con-<br>non-compliance.<br>An annual compliance<br>the Annual Compliance<br>to the DWER by XX<br>The Compliance Ass<br>(1) be endorsed<br>delegated to<br>(2) include a sta<br>complied wi<br>(3) identify all p<br>corrective an   |  |



all advise the CEO of any potential noneven (7) days of a potential non-compliance being

- all submit to the CEO the first Compliance on **XX** following the date of issue of this subsequent Compliance Assessment Reports on otherwise agreed in writing by the CEO.
- sessment Report shall:
- ed by the proponent's Chief Executive Officer or a egated to sign on the Chief Executive Officer's
- tatement as to whether the proponent has vith the conditions;
- potential non-compliances and describe
- and preventative actions taken;
- ublicly available in accordance with the approved Assessment Plan; and
- proposed changes to the Compliance nt Plan required by condition X;
- cify Management Actions, Management Targets, orting to demonstrate that the objective in
- tial management target or objective nonrovided to the DWER and the DBCA within 7 I non-compliance being known. A report including ns identified will be provided to the DWER and the completion of an investigation into the potential
- ce assessment report will be submitted as part of nce Assessment Report, which will be submitted each year.
- sessment Report shall:
- d by NiW's Asset President or a person
- o sign on the Asset President's behalf;
- tatement as to whether the proponent has ith the conditions;
- potential non-compliances and describe and preventative actions taken;

| Ondertake investigation into the source of decline inAn increase of 10% in area of existing weed- Priority taxa assessment to include an appropriate condition(4) be made puthe indicator Priority species condition.populations compared to baseline weed survey, with<br>no new weed species recorded within the<br>Development Envelope Priority taxa assessment to include an appropriate condition(4) be made puTrigger level action – weeds<br>Implement targeted spraying program Priority taxa assessment to include an appropriate condition(5) indicate any<br>AssessmentThreshold Action – plant condition and<br>reproductive phenology<br>Increase the extent and frequency of indicator Priority<br>species condition and reproductive phenology- Priority taxa assessment to include an appropriate condition(4) be made pu(4) be made pu(4) be made pu(5) indicate any<br>Assessment(5) indicate any<br>A decrease in the plant condition scale or phenology<br>in the impact populations compared to analogues Priority taxa assessment to include an appropriate condition(4) be made pu(4) be made pu(5) indicate any<br>Assessment(5) indicate any<br>A decrease in the plant condition scale or phenology<br>in the impact populations compared to analogues Priority taxa assessment to include an appropriate condition(5) indicate any<br>Compliance |
|--|
| The indicator PhoneScaleComplianceTrigger level action – weedsno new weed species recorded within the<br>Development Envelope.Rehabilitation monitoring undertaken in accordance with the Mine<br>Closure Plan and BHP Rehabilitation monitoring standard.(5) indicate any<br>AssessmentThreshold Action – plant condition and<br>reproductive phenology<br>Increase the extent and frequency of indicator Priority<br>species condition and reproductive phenologyThe plant condition scale or phenology<br>of one or more of the indicator Priority flora species<br>in the impact populations compared to analogues.Compliance<br>scale(5)  |
| Trigger level action – weeds       no new weed species recorded within the       (5) indicate any         Implement targeted spraying program.       Development Envelope.       Rehabilitation monitoring undertaken in accordance with the Mine       Assessment         Threshold Action – plant condition and reproductive phenology       no new weed species recorded within the       Rehabilitation monitoring undertaken in accordance with the Mine       Assessment         Increase the extent and frequency of indicator Priority species condition and reproductive phenology       A decrease in the plant condition scale or phenology       A decrease in the indicator Priority flora species in the indicator Priority flora species in the impact populations compared to analogues.       Intervent of the indicator Priority flora species in the impact populations compared to analogues.       Intervent of the indicator Priority flora species in the impact populations compared to analogues.   |
| Trigger level action – weeds       Development Envelope.       Rehabilitation monitoring undertaken in accordance with the Mine       Assessment         Implement targeted spraying program.       Threshold criteria – plant condition and       Threshold criteria – plant condition and       Closure Plan and BHP Rehabilitation monitoring standard.       Assessment         Threshold Action – plant condition and       phenology       A decrease in the plant condition scale or phenology       A decrease in the plant condition scale or phenology       A decrease in the indicator Priority flora species in the impact populations compared to analogues.   |
| Implement targeted spraying program.       Threshold criteria – plant condition and phenology       Closure Plan and BHP Rehabilitation monitoring standard.         Threshold Action – plant condition and reproductive phenology       A decrease in the plant condition scale or phenology       A decrease in the plant condition scale or phenology         Increase the extent and frequency of indicator Priority species condition and reproductive phenology       of one or more of the indicator Priority flora species in the impact populations compared to analogues.       Closure Plan and BHP Rehabilitation monitoring standard.   |
| Threshold Action – plant condition and<br>reproductive phenology       Threshold criteria – plant condition and<br>phenology         Increase the extent and frequency of indicator Priority<br>species condition and reproductive phenology       A decrease in the plant condition scale or phenology<br>of one or more of the indicator Priority flora species<br>in the impact populations compared to analogues.  |
| Threshold Action - plant condition and<br>reproductive phenologyphenologyIncrease the extent and frequency of indicator Priority<br>species condition and reproductive phenologyA decrease in the plant condition scale or phenology<br>of one or more of the indicator Priority flora species<br>in the impact populations compared to analogues.   |
| reproductive phenologyA decrease in the plant condition scale or phenologyIncrease the extent and frequency of indicator Priorityof one or more of the indicator Priority flora speciesspecies condition and reproductive phenologyin the impact populations compared to analogues.  |
| Increase the extent and frequency of indicator Priority of one or more of the indicator Priority flora species condition and reproductive phenology in the impact populations compared to analogues.   |
| species condition and reproductive phenology in the impact populations compared to analogues.  |
|  |
| monitoring to determine extent of overall decline of   |
| condition and reproductive phenology in wider Threshold criteria – weeds   |
| populations of the effected species. Develop An increase of 20% in area of existing weed   |
| mitigation action plan in consultation with EPA. populations compared to baseline weed survey, with  |
| no new weed species recorded within the  |
| Threshold action – weeds Development Epivelopment  |
| Review and implement revised weed monitoring and   |
| control froguest and mathematic word populations. New wood appeals recorded within existing areas of   |
| control requericy and methods until weed populations in the weed species recorded within existing areas of   |
| are measured to be below trigger criteria. Weed intestation within the Development Envelope.   |
|  |

#### Vegetation Condition Monitoring Program

Establish series of analogue and impact monitoring plots at indicative locations which include:

- Demarcated quadrats, with corners marked and GPS coordinates recorded for each corner. •
- Photographic point marked at the northwest corner of each plot.
- For Priority species, establish subset of at least 25 permanently marked individuals of each species in each population.
- Individual plants tagged with unique identification number and GPS coordinates recorded.

#### Information to be recorded at each monitoring plot, at each repeat measure:

- Date and time of monitoring
- Weather conditions at time of monitoring •
- Photograph from the northwest corner
- Any maintenance required for the site
- Any presence of weeds, and if present, estimate percentage weed cover
- Dust observations
- Vegetation condition observations ٠
  - Estimated % of live canopy with the appropriate score as per Table 1
- Individual plant observations for tagged plants:
  - Plant condition score as per Table 1
  - Photographic record of each tagged plant
  - Percentage of Priority species population within each condition category as per Table 1
- Additional comments (including evidence of grazing on monitoring plants within the plot).

#### Assessment of Monitoring data to include:

- Preceding and current weather records reflecting seasonal conditions. •
- Likely expression of impacts on vegetation in response to potential risks, as per Table 2.
- Consideration of each indicator Priority species' preferred habitat and phenology in response to seasonal conditions, as per Table 3.
- Use of remote sensing data to assess whole of site vs regional assessment of vegetation condition, described below.

#### Use of Remote Sensing

It is intended to use the Normalised Difference Vegetation Index (NDVI) tool, which is developed through the interpretation of satellite imagery. NDVI is calculated from the visible and near-infrared light reflected by vegetation. The chlorophyll in plant leaves strongly absorbs visible light for use in photosynthesis. The cell structure of the leaves however strongly reflects near-infrared. Healthy vegetation absorbs most of the visible light that hits it and reflects a large portion of the near infrared light. Unhealthy or sparse vegetation reflects more visible light and less near-infrared.

NDVI imagery will be obtained for dry seasonal conditions and wet seasonal conditions existing prior to the project commencement. This will provide baseline imagery for the Project. This tool provides standardised, high resolution imagery that can identify areas of change in vegetation vigour outside the small point focussed monitoring plots.

#### **Monitoring Schedule**

Baseline monitoring to be undertaken for the first two years following implementation of the clearing program as per schedule provided in Table 4. The frequency of monitoring will then be reassessed following the winter 2020 monitoring cycle with a view to reduction to an annual monitoring program. Collection of baseline data will commence prior to clearing occurring, in Spring 2018. For Priority species, this will include assessment of plant condition every 2 to 3 months for the first two years following implementation of the clearing program, to gauge plant condition. This frequency will provide a relatively fine-scale record of the annual cycle of aestivation in dry seasons and response to rainfall demonstrated by each species.

blicly available in accordance with the approved Assessment Plan; and proposed changes to the Compliance Plan required by condition X.

### Table 1 Observable Plant Condition Scale

| Score | Descriptor                                 | Prevailing conditions  | Observations   |
|-------|--|--|--|
| 1 a-d | Plants<br>vegetative                       | Normal, dry season   | Foliage healthy and normal for prevailing seasonal<br>conditions. Foliage may be (a) actively growing, (b)<br>static or (c) reduced and/or (d) may demonstrate<br>variable levels of auxiliary pigments (anthocyanins).<br>No flower buds initiated, no flowers present, no<br>fruits attached to plant. |
| 2     | Plants pre-<br>reproductive                | Normal, soon after rainfall  | Foliage healthy and normal for prevailing seasonal conditions. Flower buds initiated but no flowers open, no fruits attached to plant.   |
| 3     | Plants reproductive                        | Normal, following sufficient rainfall  | Foliage healthy and normal for prevailing seasonal conditions. Flowers open, developing fruits may be attached to plant.   |
| 4     | Plants post-<br>reproductive               | Normal, drying season,<br>following sufficient rainfall  | Foliage healthy and normal for prevailing seasonal conditions. No flowers present. Current season fruits containing viable seeds may be attached to plant and/or the plant may have recently dehisced viable seeds.  |
| 5     | Plants<br>exhibiting<br>reduced<br>foliage | Either<br>(a) Reflecting extended dry<br>seasonal conditions; or<br>(b) Abnormal, localised<br>impacts possible, requires<br>investigation | Foliage observably reduced and not normal for<br>prevailing seasonal conditions. Plants exhibiting<br>discoloured-yellowed leaves, increased leaf fall.  |
| 6     | Plants with<br>partial dead<br>canopies    | Abnormal, localised impacts possible, requires investigation   | Foliage observably reduced and not normal for<br>prevailing seasonal conditions. A portion (estimate<br>% of plant canopy is alive) of the plant canopy is<br>alive while a proportion is dead (dried leaves<br>attached or dead stems held within plant canopy).  |
| 7     | Plant<br>completely<br>dead                | Abnormal, localised impacts possible, requires investigation   | No live foliage held on plant, no live bark observable, irreversible death of plant.   |

### Table 2. Potential Risks and Expression in Vegetation

| Risk                     | Expression in Vegetation  |
|--------------------------|---|
| Dust deposition          | Observable and recordable dust on foliage causing reduced photosynthetic and            |
|                          | transpirational efficiencies. Gradual decline in vegetation vigour, reduced canopies,   |
|                          | reduced growth rates, reduced flowering and fruiting success, deaths of some            |
|                          | individuals.  |
| Salt water over-spray    | Immediate death of susceptible plants.  |
| Salt water migration in  | Immediate death of susceptible plants affected and a progressive expansion of the       |
| surface runoff           | impact area.  |
| Salt water migration in  | Immediate death of susceptible plants affected and a progressive expansion of the       |
| sub soil through-profile | impact area. Salt migrates slowly in soils with a high silt or clay content but resides |
| drainage                 | within that soil for long periods. Salt migrates through sandy soils rapidly and can    |
|                          | leach away leaving non-saline soils in a short time frame.                              |
| Interruptions to sheet   | Gradual decline in vegetation vigour, reduced canopies, reduced growth rates,           |
| flow causing             | reduced flowering and fruiting success; deaths of areas of vegetation noted rapidly     |
| decreased infiltration   | after infrastructure development, particularly after extended dry periods and then a    |
|                          | stabilisation of the impact zone with limited successful recruitment.                   |
| Concentrated surface     | Obvious new areas of channelised flow, erosion and potential waterlogging, decline      |
| runoff exacerbating      | in condition and deaths of vegetation.  |
| erosion                  |   |

| Species  | Preferred habitat  | Normal response to Dry<br>Seasonal Conditions                     | Recovery following Dry<br>Conditions   |
|--|--|---|--|
| <i>Hibbertia</i> sp. Sherwood<br>Breakaways P2   | Growing on the granitoid<br>breakaway system<br>traversed by the<br>proposed MKS haul road   | Aestivates, minimal foliage retained, anthocyanins elevated       | New growth produced,<br>flowers produced, fruits<br>and seeds produced   |
| <i>Eremophila</i> sp. long pedicels P3           | Found in a small<br>population at the<br>northern end of the haul<br>road growing in<br>sandplains on the<br>margins of drainage lines<br>which are subject to<br>sheet flow | Aestivates, minimal<br>foliage retained,<br>anthocyanins elevated | New growth produced,<br>flowers produced, fruits<br>and seeds produced   |
| Hybanthus floribundus<br>subsp. chloroxanthus P3 | is found growing on the<br>banks of rocky<br>ephemeral creek lines on<br>the western side of the<br>Six Mile orebody area  | Aestivates, foliage<br>retained but turns yellow                  | Retained foliage turns<br>green rapidly after<br>rainfall, new growth<br>produced, flowers<br>produced, fruits and<br>seeds produced |
| Verticordia jamiesonii P3                        | Growing on the granitoid<br>breakaway system<br>traversed by the<br>proposed MKS haul road   | Aestivates, minimal foliage retained, anthocyanins elevated       | New growth produced,<br>flowers produced, fruits<br>and seeds produced   |

Table 3. Summary Phenology of Indicator Priority Florg Species

These species, as is the case for the majority of flora in the Eremaean region of W.A., which are reliant on incident rainfall and short term soil moisture availability, reduce their physiological activity in response to dry conditions and increase their new leaf growth, flowering and fruiting in response to highly variable rainfall. It is important to understand the normal response of each species in relation to changing seasonal conditions so that erroneous records of abnormal plant condition indicating negative impacts are not mistakenly recorded. And similarly, if negative impacts are responsible for declines in plant condition, one needs to recognise this early so that reasons for, and measures addressing, plant condition decline can be implemented in a timely fashion.

#### Glossary:

Anthocyanins are water-soluble scarlet, magenta, purple and blue pigments that colour the fruit and flowers of many plants. They also provide the red colours of many autumn leaves. They are flavonoids, formed by phenylpropanoid metabolism from phenylalanine. In addition to colouring specific plant organs, often to attract pollinators and dispersers, they may serve to protect photosynthetic tissues from oxidative stress induced by light under stressful conditions. They are synthesised by gymnosperms and most angiosperms except the Caryophyllales (beets, cacti, Bougainvillia, Amaranthus), which synthesise the unrelated betalain pigments from tyrosine instead. (Current Biology).

Phenology is the study of the timing of life cycle events at the population level, most often focusing on how they respond to (prevailing weather conditions) climate change. It often makes use of long-term records and includes events such as flowering, leaf fall, hatching and annual migration. (Nature.com)

#### **References:**

Current Biology

https://www.cell.com/current-biology/abstract/S0960-9822(12)00022-X accessed 7 August 2018. Nature.com

https://www.nature.com/subjects/phenology accessed 7 August 2018.

### Table 4. Monitoring program schedule

| Monitoring                        | Spring 2018 | Summer<br>2018-19 | Autumn<br>2019 | Winter<br>2019 | Spring<br>2019 | Summer<br>2019-20 | Autumn<br>2020 | Winter<br>2020 | Spring<br>2020 and<br>annually<br>thereafter |
|-----------------------------------|-------------|-------------------|----------------|----------------|----------------|-------------------|----------------|----------------|--|
| Vegetation Condition (annually)   | Baseline    |                   |                |                | Baseline       |                   |                |                | Condition<br>monitoring                      |
| Priority Flora (every 2-3 months) | Baseline    | Baseline          | Baseline       | Baseline       | Baseline       | Baseline          | Baseline       | Baseline       | Condition<br>monitoring                      |



Figure 1-1: Indicative monitoring locations for Eremophila sp. long pedicels (G. Cockerton 1975).



Figure 1-2 Indicative Monitoring Sites for Hibbertia sp. Sherwood Breakaways (R.J.Cranfield 6771)



Figure 1-3: Indicative monitoring locations for Hybanthus floribundus subsp. chloroxanthus.



Figure 1-4: Indicative monitoring locations for Verticordia jamiesonii



Figure 1-5 Current weed species populations

## Schedule 2: MSXXXX Mt Keith Satellite (MKS) Project – Violet Range PEC

## To meet the requirements of Condition(s) X of Ministerial Statement XXXX

| EPA Factor and objective:  | Flora and Vegetation – to protect flora and vegetation so that biological diversity and ecological integrity are maintained.  |   |  |  |  |  |  |  |
|--|---|---|--|--|--|--|--|--|
| Values:  | Violet Range – Priority E   | cological Community   |  |  |  |  |  |  |
| Objective:   | X: The proponent shall e  | nsure that the implementation of the Mt Keith Satellite (   | MKS) Project proposal does not affect the viability of Violet Range PEC.   |  |  |  |  |  |
| Outcome  | No decline in condition o   | f Violet Range PEC as a result of impacts from the prop   | oosal.   |  |  |  |  |  |
| Key impacts and risks:   | Risk to biological diversit   | y and/or ecological integrity of Violet Range PEC due to  | o direct impacts (clearing) and potential indirect impact (habitat fragmenta   | tion, altered fire regime  |  |  |  |  |
| Management-based provision   | าร  |   |  |  |  |  |  |  |
| Management Actions   |   | Management Targets  | Monitoring   | Reporting  |  |  |  |  |
| X The Plan shall specify Management Targets, Monitori<br>demonstrate that the objective<br>met.  | gement Actions,<br>ng and Reporting to<br>in condition X will be  | X The Plan shall specify Management Actions,<br>Management Targets, Monitoring and Reporting to<br>demonstrate that the objective in condition X will be<br>met.  | X The Plan shall specify Management Actions, Management Targets,<br>Monitoring and Reporting to demonstrate that the objective in<br>condition X will be met.  | <ul> <li>X The proponent shawithin seven (7) days</li> <li>X The proponent shawithin seven (7) days</li> <li>X The proponent shawithin seven (7) days</li> <li>X The proponent shawith seven (7) days</li> <li>X The proponent shawith the subsequent thereafter or as other thereafte</li></ul> |  |  |  |  |
| <ul> <li>Management actions:         <ul> <li>Implement the Environmer<br/>Assessment process prior</li> <li>Drainage measures designinity including diversion drain contouring as required.</li> <li>Conduct weed hygiene instengaging equipment prior</li> <li>Implement targeted bient spraying regime post rainfat</li> </ul> </li> <li>Trigger Level Action - vegetar reproductive phenology Undertake investigation into the indicator PEC vegetation condi phenology.</li> <li>Trigger level action - vegetation Increase the extent and frequet condition and reproductive phenology in wide mitigation action plan in consultation action plan in consultation action plan in consultation action plan in consultation action plan in consultation</li> </ul> | ntal Heritage Impact<br>to land disturbance.<br>uned and constructed to<br>ural surface water flow,<br>is, rock cladding, and<br>pections on ground-<br>to arriving at site.<br>ial weed inspection and<br>all periods<br><b>tion condition and</b><br>e source of decline in the<br>tion and reproductive<br>rogram<br><b>n condition</b><br>nology monitoring to<br>line in condition or<br>ir populations. Develop<br>tation with EPA. | <ul> <li>Targets:<br/>No unauthorised disturbance beyond the<br/>Development Envelope.</li> <li>No measurable decrease in vegetation condition<br/>and plant condition values at impact sites only,<br/>validated by statistically significant trends over time.</li> <li>Achieve rehabilitation areas where weed presence<br/>and density is comparable to pre-mining analogue<br/>sites.</li> <li>Trigger criteria – vegetation condition<br/>A decrease in 1 value of the approved vegetation<br/>condition scale rating in the PEC impact populations<br/>only.</li> <li>Trigger criteria – weeds<br/>An increase of 10% in area of existing weed<br/>populations compared to baseline weed survey, with<br/>no new weed species recorded within the<br/>Development Envelope.</li> <li>Threshold criteria – vegetation condition<br/>A decrease in 2 values of the approved vegetation<br/>condition and reproductive phenology scale rating in<br/>the PEC impact populations only.</li> <li>Threshold criteria – weeds<br/>An increase of 20% in area of existing weed<br/>populations compared to baseline weed survey, with</li> </ul> | <ul> <li>Annual land disturbance reconciliation (hectares and spatial footprint).</li> <li>Implementation of Before, After, Control, Impact (BACI) design comprising: <ul> <li>Baseline survey to assess condition of PEC vegetation associations pre-disturbance and establish analogue and potential impact sites based on indicative monitoring locations (Figure 2-1).</li> <li>Installation of permanent photo monitoring points at impact and analogue sites.</li> <li>Baseline weed survey within the Development Envelope to define weed populations pre-disturbance and establish analogue and potential impact sites. (Current weed species population shown in Figure 2-2).</li> <li>Annual (spring) monitoring program to assess condition of PEC vegetation associations and to survey weed populations during operation.</li> <li>PEC vegetation condition to be assessed using photographic monitoring and the vegetation scale and with consideration to the likely expression of impacts on vegetation in response to indirect risks .</li> </ul> </li> <li>Rehabilitation monitoring undertaken in accordance with the Mine Closure Plan.</li> </ul> | Notification of potent<br>will be provided to the<br>potential non-complia<br>actions identified will<br>the completion of an<br>An annual compliance<br>the Annual Compliance<br>the DWER by XX eau<br>The Compliance Ass<br>(1) be endorsed<br>to sign on th<br>(2) include a sta<br>with the com<br>(3) identify all p<br>and prevent<br>(4) be made pu<br>Compliance<br>(5) indicate any<br>Plan require   |  |  |  |  |

| , weeds).   |
|---|
|   |
|   |
| Il advise the CEO of any potential non-compliance<br>of a potential non-compliance being known.<br>Il submit to the CEO the first Compliance<br>on XX following the date of issue of this Statement<br>Compliance Assessment Reports on XX<br>wise agreed in writing by the CEO.<br>essment <b>Report</b> shall:<br>by the proponent's Chief Executive Officer or a<br>ated to sign on the Chief Executive Officer's behalf;<br>ement as to whether the proponent has complied<br>itions;<br>tential non-compliances and describe corrective<br>tive actions taken;<br>icly available in accordance with the approved<br>assessment Plan: and |
| by condition $\frac{X}{X}$ ;  |
| cify Management Actions, Management Targets, <b>rting</b> to demonstrate that the objective in condition  |
| al management target or objective non-compliance<br>e DWER and the DBCA within 7 days of that<br>ince being known. A report including any corrective<br>be provided to the DWER and the DBCA following<br>investigation into the potential non-compliance.<br>e assessment report will be submitted as part of<br>ce Assessment Report, which will be submitted to<br>ch year.<br>essment Report shall:   |
| I by NiW's Asset President or a person delegated<br>e Asset President's behalf;<br>atement as to whether the proponent has complied<br>ditions;   |
| otential non-compliances and describe corrective<br>ative actions taken;<br>blicly available in accordance with the approved<br>Assessment Plan; and  |
| proposed changes to the Compliance Assessment<br>d by condition <mark>X</mark> .  |

| Threshold action – weeds       no new weed species recorded within the Development Envelope.         Review and implement revised weed monitoring and control frequency and methods until weed populations are reduced to below trigger criteria.       no new weed species recorded within the Development Envelope. |  |  |
|---|--|--|
|---|--|--|

#### Vegetation Condition Monitoring Program

Establish series of analogue and impact monitoring plots at indicative locations which include:

- Demarcated quadrats, with corners marked and GPS coordinates recorded for each corner.
- Photographic point marked at the northwest corner of each plot.

#### Information to be recorded at each monitoring plot, at each repeat measure:

- Date and time of monitoring
- Weather conditions at time of monitoring
- Photograph from the northwest corner
- Any maintenance required for the site
- Any presence of weeds, and if present, estimate percentage weed cover
- Dust observations
- Vegetation condition observations
  - Estimated % of live canopy with the appropriate score as per Table 1
- Additional comments (including evidence of grazing on monitoring plants within the plot).

#### Assessment of Monitoring data to include:

- Preceding and current weather records reflecting seasonal conditions
- Likely expression of impacts on vegetation in response to potential risks, as per Table 2.
- Use of remote sensing data to assess whole of site vs regional assessment of vegetation condition, described below.

#### Use of Remote Sensing

It is intended to use the Normalised Difference Vegetation Index (NDVI) tool, which is developed through the interpretation of satellite imagery. NDVI is calculated from the visible and near-infrared light reflected by vegetation. The chlorophyll in plant leaves strongly absorbs visible light for use in photosynthesis. The cell structure of the leaves however strongly reflects near-infrared. Healthy vegetation absorbs most of the visible light that hits it and reflects a large portion of the near infrared light. Unhealthy or sparse vegetation reflects more visible light and less near-infrared.

NDVI imagery will be obtained for dry seasonal conditions and wet seasonal conditions existing prior to the project commencement. This will provide baseline imagery for the Project. This tool provides standardised, high resolution imagery that can identify areas of change in vegetation vigour outside the small point focussed monitoring plots.

#### **Monitoring Schedule**

Collection of baseline data will commence prior to clearing, in Spring 2018 and will be undertaken for the first two years following implementation of the clearing program as per schedule provided in Table 3.

### Table 1. Observable Plant Condition Scale

| Score | Descriptor                                 | Prevailing conditions  | Observations   |
|-------|--|--|--|
| 1 a-d | Plants<br>vegetative                       | Normal, dry season   | Foliage healthy and normal for prevailing seasonal<br>conditions. Foliage may be (a) actively growing, (b)<br>static or (c) reduced and/or (d) may demonstrate<br>variable levels of auxiliary pigments (anthocyanins).<br>No flower buds initiated, no flowers present, no<br>fruits attached to plant. |
| 2     | Plants pre-<br>reproductive                | Normal, soon after rainfall  | Foliage healthy and normal for prevailing seasonal conditions. Flower buds initiated but no flowers open, no fruits attached to plant.   |
| 3     | Plants<br>reproductive                     | Normal, following sufficient rainfall  | Foliage healthy and normal for prevailing seasonal conditions. Flowers open, developing fruits may be attached to plant.   |
| 4     | Plants post-<br>reproductive               | Normal, drying season,<br>following sufficient rainfall  | Foliage healthy and normal for prevailing seasonal conditions. No flowers present. Current season fruits containing viable seeds may be attached to plant and/or the plant may have recently dehisced viable seeds.  |
| 5     | Plants<br>exhibiting<br>reduced<br>foliage | Either<br>(a) Reflecting extended dry<br>seasonal conditions; or<br>(b) Abnormal, localised<br>impacts possible, requires<br>investigation | Foliage observably reduced and not normal for<br>prevailing seasonal conditions. Plants exhibiting<br>discoloured-yellowed leaves, increased leaf fall.  |
| 6     | Plants with<br>partial dead<br>canopies    | Abnormal, localised impacts possible, requires investigation   | Foliage observably reduced and not normal for<br>prevailing seasonal conditions. A portion (estimate<br>% of plant canopy is alive) of the plant canopy is<br>alive while a proportion is dead (dried leaves<br>attached or dead stems held within plant canopy).  |
| 7     | Plant<br>completely<br>dead                | Abnormal, localised impacts possible, requires investigation   | No live foliage held on plant, no live bark<br>observable, irreversible death of plant.  |

### Table 2. Potential Risks and Expression in Vegetation

| Risk                     | Expression in Vegetation  |
|--------------------------|---|
| Dust deposition          | Observable and recordable dust on foliage causing reduced photosynthetic and            |
|                          | transpirational efficiencies. Gradual decline in vegetation vigour, reduced canopies,   |
|                          | reduced growth rates, reduced flowering and fruiting success, deaths of some            |
|                          | individuals.  |
| Salt water over-spray    | Immediate death of susceptible plants.  |
| Salt water migration in  | Immediate death of susceptible plants affected and a progressive expansion of the       |
| surface runoff           | impact area.  |
| Salt water migration in  | Immediate death of susceptible plants affected and a progressive expansion of the       |
| sub soil through-profile | impact area. Salt migrates slowly in soils with a high silt or clay content but resides |
| drainage                 | within that soil for long periods. Salt migrates through sandy soils rapidly and can    |
|                          | leach away leaving non-saline soils in a short time frame.                              |
| Interruptions to sheet   | Gradual decline in vegetation vigour, reduced canopies, reduced growth rates,           |
| flow causing             | reduced flowering and fruiting success; deaths of areas of vegetation noted rapidly     |
| decreased infiltration   | after infrastructure development, particularly after extended dry periods and then a    |
|                          | stabilisation of the impact zone with limited successful recruitment.                   |
| Concentrated surface     | Obvious new areas of channelised flow, erosion and potential waterlogging, decline      |
| runoff exacerbating      | in condition and deaths of vegetation.  |
| erosion                  |   |

## Table 3. Monitoring program schedule

| Monitoring                      | Spring 2018 | Summer<br>2018-19 | Autumn<br>2019 | Winter<br>2019 | Spring<br>2019 | Summer<br>2019-20 | Autumn<br>2020 | Winter<br>2020 | Spring<br>2020 and<br>annually<br>thereafter  |
|---------------------------------|-------------|-------------------|----------------|----------------|----------------|-------------------|----------------|----------------|---|
| Vegetation Condition (annually) | Baseline    |                   |                |                | Baseline       |                   |                |                | Monitoring<br>for<br>assessment<br>of impacts |



Figure 2-1 Indicative Monitoring Locations for Violet Range PEC



Figure 2-2 Current weed species populations

## Schedule 3: MSXXXX Mt Keith Satellite (MKS) Project – Wanjarri Nature Reserve

To meet the requirements of Condition(s)  $\frac{X}{X}$  of Ministerial Statement  $\frac{XXXX}{X}$ 

| EPA Factor and objective   | : Flora and Vegetation -  | Flora and Vegetation – to protect flora and vegetation so that biological diversity and ecological integrity are maintained.  |   |   |  |  |  |  |  |  |
|--|---|---|---|---|--|--|--|--|--|--|
| Values:  | Wanjarri Nature Reserv  | e (WNR) – A Class Nature Reserve.   |   |   |  |  |  |  |  |  |
| Objective:   | X: The proponent shall  | ensure that the implementation of the Mt Keith Satellite (  | MKS) Project proposal does not affect the viability of Wanjarri Nature Res  | erve.   |  |  |  |  |  |  |
| Outcome  | No decline in the condit  | ion of vegetation of the Wanjarri Nature Reserve as a res   | sult of impacts from the proposal.  |   |  |  |  |  |  |  |
| Key impacts and risks:   | Risk to biological divers avoided through project   | ity and/or ecological integrity of Wanjarri Nature Reserve<br>design.   | , due to potential indirect impact (habitat fragmentation, altered fire regime  | , weeds). Direct impac  |  |  |  |  |  |  |
| Management-based provisions  |   |   |   |   |  |  |  |  |  |  |
| Management Actions   |   | Management Targets  | Monitoring  | Reporting   |  |  |  |  |  |  |
| X The Plan shall specify M<br>Management Targets, Mor<br>demonstrate that the object<br>met.   | anagement Actions,<br>itoring and Reporting to<br>tive in condition X will be   | X The Plan shall specify Management Actions,<br>Management Targets, Monitoring and Reporting to<br>demonstrate that the objective in condition X will be<br>met.  | X The Plan shall specify Management Actions, Management Targets,<br>Monitoring and Reporting to demonstrate that the objective in<br>condition X will be met.   | <ul> <li>X The proponent sha<br/>within seven (7) days</li> <li>X The proponent sha<br/>Assessment Report of<br/>and then subsequent<br/>thereafter or as other<br/>The Compliance Asso<br/>(6) be endorsed<br/>person dele<br/>behalf;</li> <li>(7) include a sta<br/>with the com</li> <li>(8) identify all p<br/>and prevent</li> <li>(9) be made pu<br/>Compliance</li> <li>(10) indicate any<br/>Assessmen</li> <li>X The Plan shall spee<br/>Monitoring and Report</li> <li>X will be met.</li> </ul> |  |  |  |  |  |  |
| <ul> <li>Management actions</li> <li>Implement the Enviror<br/>Assessment process p</li> <li>Drainage measures d<br/>minimise changes to<br/>including diversion d<br/>contouring as required</li> <li>Conduct weed hygiend<br/>engaging equipment p</li> <li>Implement targeted bi<br/>spraying regime post r</li> <li>Trigger level action - veg<br/>Undertake investigation int<br/>the indicator WNR vegetati</li> <li>Trigger level action – wee<br/>Implement targeted sprayin</li> <li>Threshold action – veget<br/>Increase the extent and fre<br/>vegetation condition monitor</li> </ul> | mental Heritage Impact<br>rior to land disturbance.<br>esigned and constructed to<br>natural surface water flow,<br>rains, rock cladding, and<br>e inspections on ground-<br>rior to arriving at site.<br>ennial weed inspection and<br>ainfall periods<br>etation condition<br>to the source of decline in<br>on condition.<br>eds<br>ig program<br>ation condition<br>quency of indicator WNR<br>pring to determine extent of | <ul> <li>Targets No unauthorised disturbance beyond the Development Envelope No measurable decrease in vegetation condition and plant condition values at impact sites only, validated by statistically significant trends over time Maintain weed presence and density within WNR adjacent to Development Envelope, comparable to pre-mining analogue sites.</li> <li>Trigger criteria – vegetation condition A decrease in 1 value of the approved vegetation condition scale rating in the WNR impact populations only.</li> <li>Trigger criteria – weeds An increase of 10% in area of existing weed populations compared to baseline weed survey, with no new weed species recorded within the Development Envelope.</li> <li>Threshold criteria – vegetation condition</li> </ul> | <ul> <li>Implementation of Before, After, Control, Impact (BACI) design comprising: <ul> <li>Baseline survey to assess the condition of WNR vegetation associations pre-disturbance and establish analogue and potential impact sites based on indicative monitoring locations (Figure 3-1)</li> <li>Installation of permanent photo monitoring points at impact and analogue sites</li> <li>Baseline weed survey within WNR adjacent to Development Envelope to define weed populations pre-disturbance and establish analogue and potential impact sites. Current weed species population shown in Figure 3-2).</li> <li>Annual (spring) monitoring program to assess the condition of WNR vegetation associations and to survey weed populations adjacent to the Development Envelope, during operations.</li> <li>WNR vegetation condition to be assessed using photographic monitoring and the vegetation scale and with consideration to the likely expression of impacts on vegetation in response to indirect risks.</li> </ul> </li> </ul> | Notification of potenti<br>will be provided to the<br>potential non-complia<br>actions identified will<br>the completion of an<br>An annual compliance<br>the Annual Compliance<br>the DWER by XX eac<br>The Compliance Asso<br>(6) be endorsed<br>to sign on th<br>(7) include a sta<br>with the con<br>(8) identify all pu<br>and prevents<br>(9) be made pul<br>Compliance<br>(10) indicate any<br>Assessment  |  |  |  |  |  |  |

ts (clearing) to Wanjarri Nature Reserve were

all advise the CEO of any potential non-compliance s of a potential non-compliance being known.

all submit to the CEO the first Compliance

on XX following the date of issue of this Statement t Compliance Assessment Reports on XX

rwise agreed in writing by the CEO.

essment Report shall:

d by the proponent's Chief Executive Officer or a egated to sign on the Chief Executive Officer's

atement as to whether the proponent has complied nditions;

potential non-compliances and describe corrective tative actions taken;

ublicly available in accordance with the approved Assessment Plan; and

y proposed changes to the Compliance

nt Plan required by condition X;

cify Management Actions, Management Targets, **orting** to demonstrate that the objective in condition

tial management target or objective non-compliance the DWER and the DBCA within 7 days of that ance being known. A report including any corrective be provided to the DWER and the DBCA following investigation into the potential non-compliance. the assessment report will be submitted as part of nece Assessment Report, which will be submitted to ch year.

sessment Report shall:

d by NiW's Asset President or a person delegated he Asset President's behalf;

atement as to whether the proponent has complied nditions;

potential non-compliances and describe corrective tative actions taken;

ublicly available in accordance with the approved Assessment Plan; and

proposed changes to the Compliance

Plan required by condition X.

| overall decline of condition in wider areas of analogue vegetation. Develop mitigation action plan in consultation with EPA.   | A decrease in 2 values of the approved vegetation condition scale rating in the WNR impact populations only.  |  |
|--|---|--|
| Threshold action – weeds<br>Review and implement revised weed monitoring and<br>control frequency and methods until weed populations<br>are reduced to below trigger criteria. | Threshold criteria – weeds<br>An increase of 20% in area of existing weed<br>populations compared to baseline weed survey, with<br>no new weed species recorded within the<br>Development Envelope adjacent to the WNR.<br>New weed species recorded within existing areas of<br>weed infestation within the Development Envelope<br>adjacent to the WNR. |  |
| Manatatian Osmilitian Manitaning Dramon  |   |  |

#### Vegetation Condition Monitoring Program

Establish series of analogue and impact monitoring plots at indicative locations which include:

- Demarcated quadrats, with corners marked and GPS coordinates recorded for each corner.
- Photographic point marked at the northwest corner of each plot.

#### Information to be recorded at each monitoring plot, at each repeat measure:

- Date and time of monitoring
- Weather conditions at time of monitoring
- Photograph from the northwest corner
- Any maintenance required for the site
- Any presence of weeds, and if present, estimate percentage weed cover
- Dust observations
- Vegetation condition observations
  - Estimated % of live canopy with the appropriate score as per Table 1
- Additional comments (including evidence of grazing on monitoring plants within the plot).

#### Assessment of Monitoring data to include:

- Preceding and current weather records reflecting seasonal conditions.
- Likely expression of impacts on vegetation in response to potential risks, as per Table 2.
- Use of remote sensing data to assess whole of site vs regional assessment of vegetation condition, described below.

#### Use of Remote Sensing

It is intended to use the Normalised Difference Vegetation Index (NDVI) tool, which is developed through the interpretation of satellite imagery. NDVI is calculated from the visible and near-infrared light reflected by vegetation. The chlorophyll in plant leaves strongly absorbs visible light for use in photosynthesis. The cell structure of the leaves however strongly reflects near-infrared. Healthy vegetation absorbs most of the visible light that hits it and reflects a large portion of the near infrared light. Unhealthy or sparse vegetation reflects more visible light and less near-infrared.

NDVI imagery will be obtained for dry seasonal conditions and wet seasonal conditions existing prior to the project commencement. This will provide baseline imagery for the Project. This tool provides standardised, high resolution imagery that can identify areas of change in vegetation vigour outside the small point focussed monitoring plots.

#### Monitoring Schedule

Collection of baseline data will commence prior to clearing, in Spring 2018 and will be undertaken for the first two years following implementation of the clearing program as per schedule provided in Table 3.

### Table 1. Observable Plant Condition Scale

| Score | Descriptor                                 | Prevailing conditions  | Observations   |
|-------|--|--|--|
| 1 a-d | Plants<br>vegetative                       | Normal, dry season   | Foliage healthy and normal for prevailing seasonal<br>conditions. Foliage may be (a) actively growing, (b)<br>static or (c) reduced and/or (d) may demonstrate<br>variable levels of auxiliary pigments (anthocyanins).<br>No flower buds initiated, no flowers present, no<br>fruits attached to plant. |
| 2     | Plants pre-<br>reproductive                | Normal, soon after rainfall  | Foliage healthy and normal for prevailing seasonal conditions. Flower buds initiated but no flowers open, no fruits attached to plant.   |
| 3     | Plants reproductive                        | Normal, following sufficient rainfall  | Foliage healthy and normal for prevailing seasonal conditions. Flowers open, developing fruits may be attached to plant.   |
| 4     | Plants post-<br>reproductive               | Normal, drying season,<br>following sufficient rainfall  | Foliage healthy and normal for prevailing seasonal conditions. No flowers present. Current season fruits containing viable seeds may be attached to plant and/or the plant may have recently dehisced viable seeds.  |
| 5     | Plants<br>exhibiting<br>reduced<br>foliage | Either<br>(a) Reflecting extended dry<br>seasonal conditions; or<br>(b) Abnormal, localised<br>impacts possible, requires<br>investigation | Foliage observably reduced and not normal for<br>prevailing seasonal conditions. Plants exhibiting<br>discoloured-yellowed leaves, increased leaf fall.  |
| 6     | Plants with<br>partial dead<br>canopies    | Abnormal, localised impacts possible, requires investigation   | Foliage observably reduced and not normal for<br>prevailing seasonal conditions. A portion (estimate<br>% of plant canopy is alive) of the plant canopy is<br>alive while a proportion is dead (dried leaves<br>attached or dead stems held within plant canopy).  |
| 7     | Plant<br>completely<br>dead                | Abnormal, localised impacts possible, requires investigation   | No live foliage held on plant, no live bark observable, irreversible death of plant.   |

### Table 2. Potential Risks and Expression in Vegetation

| Risk                     | Expression in Vegetation  |
|--------------------------|---|
| Dust deposition          | Observable and recordable dust on foliage causing reduced photosynthetic and            |
|                          | transpirational efficiencies. Gradual decline in vegetation vigour, reduced canopies,   |
|                          | reduced growth rates, reduced flowering and fruiting success, deaths of some            |
|                          | individuals.  |
| Salt water over-spray    | Immediate death of susceptible plants.  |
| Salt water migration in  | Immediate death of susceptible plants affected and a progressive expansion of the       |
| surface runoff           | impact area.  |
| Salt water migration in  | Immediate death of susceptible plants affected and a progressive expansion of the       |
| sub soil through-profile | impact area. Salt migrates slowly in soils with a high silt or clay content but resides |
| drainage                 | within that soil for long periods. Salt migrates through sandy soils rapidly and can    |
|                          | leach away leaving non-saline soils in a short time frame.                              |
| Interruptions to sheet   | Gradual decline in vegetation vigour, reduced canopies, reduced growth rates,           |
| flow causing             | reduced flowering and fruiting success; deaths of areas of vegetation noted rapidly     |
| decreased infiltration   | after infrastructure development, particularly after extended dry periods and then a    |
|                          | stabilisation of the impact zone with limited successful recruitment.                   |
| Concentrated surface     | Obvious new areas of channelised flow, erosion and potential waterlogging, decline      |
| runoff exacerbating      | in condition and deaths of vegetation.  |
| erosion                  |   |

### Table 3. Monitoring program schedule

| Monitoring                      | Spring 2018 | Summer<br>2018-19 | Autumn<br>2019 | Winter<br>2019 | Spring<br>2019 | Summer<br>2019-20 | Autumn<br>2020 | Winter<br>2020 | Spring<br>2020 and<br>annually<br>thereafter  |
|---------------------------------|-------------|-------------------|----------------|----------------|----------------|-------------------|----------------|----------------|---|
| Vegetation Condition (annually) | Baseline    |                   |                |                | Baseline       |                   |                |                | Monitoring<br>for<br>assessment<br>of impacts |



Figure 3-1

Indicative Monitoring Locations for Wanjarri Nature Reserve



Figure 3-2 Current weed species populations