DRAFT ENVIRONMENTAL SCOPING DOCUMENT

Proposal name:	**Mt Keith Satellite Project**
Proponent:	**BHP Billiton Nickel West Pty Ltd**
Assessment number:	**2122**
Location:	**80 kilometres north of Leinster**
Local Government Area:	**Shire of Leonora**
Public review period:	**Environmental review – no public review**
EPBC reference no:	**2017/8001 Not a Controlled Action**

1. Introduction

The Environmental Protection Authority (EPA) has determined that the above proposal is to be assessed under Part IV of the *Environmental Protection Act 1986* (EP Act).

The purpose of the Environmental Scoping Document (ESD) is to define the form, content, timing and procedure of the environmental review, required by section 40(3) of the EP Act. This draft ESD has been prepared by the EPA in consultation with the proponent, decision-making authorities and interested agencies consistent with the EPA's *Procedures Manual*.

Form

The EPA requires that the form of the report on the environmental review required under s. 40 (Environmental Review Document, ERD) is according to the Environmental Review Document template.

Content

The EPA requires that the environmental review includes the content outlined in sections 2 to 6 of this ESD.

Timing

Table 1 sets out the timeline for the assessment of the proposal agreed between the EPA and the proponent.

Table 1 Assessment timeline

Key assessment milestones	Completion Date
EPA approves Environmental Scoping Document	November 2017
Proponent submits first draft Environmental Review Document	December 2017
EPA provides comment on first draft Environmental Review Document *(6 weeks from receipt of ERD)*	19 January 2018
Proponent submits revised draft Environmental Review Document	January 2018
EPA prepares draft assessment report and completes assessment *(7 weeks from receipt of ERD)*	March 2018
EPA finalises assessment report (including two weeks consultation on draft conditions) and gives report to Minister *(6 weeks from completion of assessment)*	April 2018

Procedure

The EPA requires the proponent to undertake the environmental review according to the procedures in the *Administrative Procedures* and the *Procedures Manual*.

This draft ESD has not been released for public review. The ESD will be available on the EPA website (www.epa.wa.gov.au) upon endorsement and must be appended to the ERD.

2. The proposal

The subject of this ESD is the construction and operation of a nickel mine as a satellite operation to the existing Mt Keith Mine (the proposal). The proposal is located approximately 20 kilometres (km) south of the Mt Keith Mine and 80 km north of Leinster and intersects the Shire of Leonora and the Shire of Wiluna (Figure 1).

The proposal includes mining below the water table of low-grade nickel sulphides from two open mine pits, clearing of up to 878 hectares (ha) of native vegetation (which is also fauna habitat), water abstraction, a Waste Rock Landform (WRL), and minor support infrastructure including two bridge crossings over an ephemeral stream called Jones Creek.

Approximately 9.6 Million tonnes per annum of mined ore would be transported to the existing Mt Keith Mine for processing via a haul road. The existing processing plant and Tailings Storage Facility (TSF) at Mt Keith Mine are conditioned under Ministerial Statement 415 and do not form part of this proposal.

The proposal intersects the Mt Keith and Yakabindie Pastoral Leases, both of which are held by the proponent. The proposed haul road runs adjacent to the western boundary of the

Wanjarri Nature Reserve, which is classified as a Class A reserve under the *Land Administration Act 1997*.

The regional location of the proposal is shown in Figure 1 and the development envelope encompassing the physical elements of the proposal is delineated in Figure 2 and Figure 3.

The key characteristics of the proposal are set out in Tables 2 and 3. The key proposal characteristics may change as a result of the findings of studies and investigations conducted and the application of the mitigation hierarchy by the proponent.

Background

In 1990 the EPA assessed a proposal to mine nickel and process a low-grade nickel sulphide orebody in a similar location to the current Mt Keith Satellite Project within the Yakabindie Pastoral Lease. The 1990 proposal, referred to as the Yakabindie Nickel Project in Ministerial Statement 117, has not been implemented. The Mt Keith Satellite Project constitutes a substantial revision of the 1990 proposal, requiring referral under section 38 and under section 40 of the EP Act. Following the assessment, if the EPA were to recommend that Mt Keith Satellite Project may be implemented, revised conditions and procedures would be recommended.

Table 2 Summary of the proposal

Proposal title	Mt Keith Satellite Project
Proponent name	BHP Billiton Nickel West Pty Ltd
Short description	The proposal is to develop a nickel mine as a satellite operation to the existing Mt Keith Mine. The proposal includes two open pits, a waste rock landform (WRL) and a haul road corridor. Ancillary infrastructure that supports mining will also be located at the satellite operation. The mined ore will be processed at the existing Mt Keith Mine located approximately 20 km north of the satellite operation. The proposal is located 80 km north of Leinster and intersects the Shire of Leonora and Shire of Wiluna.

Table 3 Location and proposed extent of physical and operational elements

Element	Location	Proposed extent
Physical elements		
Mine pit (Goliath)	Figure 3	Clearing of approximately 212 ha of native vegetation within a development envelope of 1259 ha, mining in three stages within a 12 year timeframe.
Mine pit (Six Mile Well)		

Waste Rock Landform	Figure 3	Clearing of approximately 445 ha of native vegetation within a development envelope of 1259 ha.
Ancillary support infrastructure	Figure 3	Clearing of approximately 137 ha of native vegetation within a development envelope of 1259 ha.
Haul Road	Figure 2	Clearing of approximately 84 ha of native vegetation within a development envelope of 1259 ha.
Operational elements		
Pit dewatering	Figure 3	Water abstraction of up to 0.4 Gigalitres (GL) per year. Dewatering via bore/s and pit sumps.
Water requirement	NA	Up to 1.65 GL per year from existing licensed bore fields.
Waste rock	Figure 3	Up to 800 million tonnes of waste rock to be generated over the life of mine, to be stored in a WRL and used as backfill. Processes

3. Preliminary key environmental factors and required work

The preliminary key environmental factors for the environmental review are:

1. Flora and Vegetation
2. Terrestrial Fauna
3. Subterranean Fauna
4. Hydrological Processes
5. Inland Waters Environmental Quality
6. Social Surroundings

Table 4 outlines the work required for each preliminary key environmental factor and contains the following elements for each factor:

- **EPA factor** and **EPA objective** for that factor.
- **Relevant activities** – the proposal activities that may have a significant impact on that factor.
- **Potential impacts and risks** to that factor.
- **Required work** for that factor.
- **Relevant policy and guidance** – EPA (and other) guidance and policy relevant to the assessment.

Table 4 Preliminary key environmental factors and required work

Flora and Vegetation	
EPA objective	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.
Relevant activities	Clearing of native vegetation, groundwater abstraction, and potential alteration of surface water flows.
Potential impacts and risks	• Clearing of up to 878 ha of native vegetation within a development envelope of 1259 ha. • Removal and disturbance of conservation significant flora and vegetation, including vegetation units associated with the Violet Range Priority Ecological Community (PEC). • Potential to spread or introduce weeds. • Habitat fragmentation. • Increased risk (altered fire regime) for fire resulting in vegetation loss or change. • Impacts to adjacent native vegetation, including the Wanjarri Nature Reserve. • Loss of the native seed bank from the areas cleared.
Required work	1. Identify and characterise flora and vegetation in accordance with the standards of *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, December 2016). The survey should take into account areas that are likely to be directly or indirectly impacted as a result of the proposal, including a linear corridor survey of the haul road between Mt Keith Mine and the proposal. 2. Undertake baseline mapping of weed affected areas in any area likely to be directly or indirectly impacted as a result of the proposal. 3. Provide an analysis of flora and vegetation present within the development envelope and also present within the indirect disturbance areas outside of the development envelope. Where relevant, include in this analysis the conservation significance of flora and vegetation in a local and regional context. Analysis of impacts on vegetation to include: • the area (in ha) of each vegetation unit to be impacted (directly and indirectly) in a 'worst case' scenario; • the total area (in ha) of each significant vegetation unit to be impacted (directly and indirectly) in a 'worst case' scenario; and • identification of vegetation units which may represent a component of threatened or priority ecological communities, including but not limited to, the Violet Range PEC. Analysis of impacts on significant flora to include:

	• identification of any significant flora present or likely to be present; • the number of plants, and the number of populations of plants and habitat, to be impacted (directly and indirectly) as a result of the proposal in a 'worst case' scenario, i.e. if no mitigation measures were taken; • the total number of plants and populations within the local area or study area; and • a summary of the known populations of the species including distribution, number of populations and the number of plants or an estimate of the number of plants in the regional area. 4. Provide tables and figures of the proposed direct impact, or predicted extent of loss, and the predicted indirect impact to flora and vegetation, including but not limited to threatened and/or priority ecological communities, potential groundwater dependent ecosystems, threatened flora, priority flora and unnamed or new flora species. 5. Provide a detailed description of the cumulative impacts associated with the proposal on flora and vegetation, including direct impacts from clearing, and indirect impacts such as groundwater drawdown, altered drainage, changes in water quality, spread of weeds, fragmentation of vegetation, altered fire regimes, and dust. 6. Discuss and determine significance of potential direct, indirect (such as dust, downstream impacts, and weed invasion, etc.) and cumulative impacts to flora and vegetation as a result of the proposal at a local and regional level. 7. Discuss management measures, outcomes/objectives sought to ensure residual impacts (direct and indirect) are not greater than predicted. 8. Demonstrate that all practicable measures have been taken to reduce both the area of the proposed disturbance footprint and the development envelope based on progress in the proposal design and understanding of the environmental impacts. 9. Provide a Flora and Vegetation management plan to address significant residual impacts to flora and vegetation. The following should be addressed in the plan: • invasive species control - control of weeds, in particular through construction of infrastructure, transport and/or entry and exit points, vegetation units considered to have high local significance (e.g. rare units, habitat for conservation significant species) and in areas identified as in 'Excellent condition'; • monitoring program - to monitor the significant flora and vegetation communities identified; • management program - develop adaptive management actions to be triggered should monitoring show a decline as a result of implementing the proposal;

	• rehabilitation and closure – to address potential indirect impacts persisting after mining has finished (e.g. pit lakes); and • management of offset (if applicable). 10. Prepare a Mine Closure Plan consistent with *Guidelines for Preparing Mine Closure Plans* (DMP and EPA, 2015), which includes methodologies and criteria to ensure progressive rehabilitation of disturbed areas to a final agreed land use. 11. Predict the inherent and residual impacts before and after applying the mitigation hierarchy. 12. Describe proposed monitoring and management (in terms of the mitigation hierarchy) to achieve the predicted outcomes/objectives. 13. Determine and quantify any significant residual impacts by applying the Residual Impact Model and WA Offset Template in the *WA Environmental Offsets Guidelines*. 14. Where significant residual impacts remain, propose an appropriate offsets package that is consistent with the *WA Environmental Offsets Policy* and *WA Environmental Offsets Guidelines*. Spatial data defining the area of significant residual impacts should also be provided. 15. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.
Relevant policy and guidance	***EPA Policy and Guidance*** *Environmental Factor Guideline – Flora and Vegetation* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA, 2016). *Statement of Environmental Principles, Factors and Objectives* (EPA, 2016). ***Other policy and guidance*** *WA Environmental Offsets Policy* (The Government of Western Australia, 2011). *Environmental Offsets Policy* (Department of Sustainability, Environment, Water, Population and Communities, 2012). *WA Environmental Offsets Guidelines* (The Government of Western Australia, 2014). *Guidelines for Preparing Mine Closure Plans* (DMP and EPA, 2015). *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (EPA, 2016). *Technical Guidance – Flora and Vegetation Surveys for Environmental Impacts Assessment* (EPA, 2016).

Terrestrial Fauna	
EPA objective	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.
Relevant activities	Clearing of habitat, dewatering, alterations and disruptions to surface water flows and pools, vehicle movement and waste disposal.
Potential impacts and risks	• Clearing of up 878 ha of fauna habitat, including potential short range endemic (SRE) invertebrate fauna habitat. • Clearing of potential conservation significant fauna habitat, including Malleefowl and Black-flanked Rock-wallaby • Direct impacts to fauna from increased vehicle strikes, and as a result of construction and operation of the mine. • Potential to disrupt fauna habitat linkages. • Potential to introduce/attract feral animals. • Disturbance to waterbirds (including migratory species) from impacts to Jones Creek.
Required work	16. Provide a desktop review and analysis of all surveys of the proposal area undertaken, in accordance with EPA policy and guidance. The study should include: • a justification of how those surveys are relevant and representative of the development envelope and if they were carried out using methods consistent with the EPA guidance; and • a comprehensive listing of vertebrate fauna and SRE invertebrate fauna known or likely to occur in the habitats present, and identification of conservation significant fauna species likely to occur in the area. 17. Conduct Level 2 terrestrial fauna and SRE invertebrate surveys in areas that are likely to be directly or indirectly impacted as a result of the proposal. Surveys are to be undertaken in accordance with EPA policy and, where available, species-specific survey guidelines for relevant species listed under the *Wildlife Conservation Act 1950* and the *Environment Protection Biodiversity Conservation Act 1999*. 18. Conduct targeted surveys for conservation significant fauna that are known to or likely to occupy habitats in the project area if demonstrated to be required based on the results of the desktop study and field surveys. 19. For each relevant conservation significant species, including SREs, identified as likely to occur within the proposal area, provide: • baseline information on distribution (including known occurrences), ecology, and habitat preferences at both the site and regional levels;

	• size and the importance of the population from a local and regional perspective and potential percentage loss of the conservation significant species locally due to loss of habitat; and • maps illustrating the known recorded locations of conservation significant species and SRE invertebrates in relation to fauna habitat and the proposed disturbance and areas to be impacted. 20. Identify the fauna habitat types within and outside the areas of impact. Consider habitat types that provide important ecological function within the proposal area (e.g. geological features which may support unique ecosystems) and the conservation value of each habitat type from a local and regional perspective. 21. Assess the extent of direct and indirect disturbance, including percentages of habitat types to be disturbed or otherwise impacted, to assist in determination of significance of impacts. Information, including maps, must also differentiate habitat on the basis of use e.g. breeding habitat, migration pathways, and foraging/feeding/dispersal habitat. Consider whether the remaining habitat has adequate carrying capacity. 22. Describe and assess the significance of the potential direct, indirect (including downstream) and cumulative impacts as a result of the proposal on terrestrial fauna at a local and regional scale. 23. For all conservation significant species that are not likely to be impacted by the proposed action, but for which suitable habitat is present which could be impacted by the proposed action, include enough information to demonstrate that an impact on the species will not or is unlikely to occur. 24. Demonstrate application of the mitigation hierarchy to avoid and minimise impacts to terrestrial fauna. 25. Discuss the management and mitigation measures, outcomes/objectives sought to ensure direct and indirect residual impacts (following management and rehabilitation actions) are not greater than predicted. 26. Prepare a Mine Closure Plan consistent with the *Guidelines for Preparing Mine Closure Plans* (DMP and EPA, 2015), which addresses the need for progressive rehabilitation of habitat for conservation significant species. 27. Predict the inherent and residual impacts before and after applying the mitigation hierarchy. 28. Describe proposed monitoring and management (in terms of the mitigation hierarchy) to achieve the predicted outcomes/objectives. 29. Determine and quantify any significant residual impacts by applying the Residual Impact Model and WA Offset Template in the *WA Environmental Offsets Guidelines*. 30. Where significant residual impacts remain, propose an appropriate offsets package that is consistent with the *WA Environmental Offsets*

	Policy and *WA Environmental Offsets Guidelines*. Spatial data defining the area of significant residual impacts should also be provided. 31. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.
Relevant policy and guidance	***EPA Policy and Guidance*** *Environmental Factor Guideline – Terrestrial Fauna* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA, 2016). *Statement of Environmental Principles, Factors and Objectives* (EPA, 2016). ***Other policy and guidance*** *Survey Guidelines for Australia's Threatened Mammals* (Department of Sustainability, Environment, Water, Population and Communities, 2011). *WA Environmental Offsets Policy* (The Government of Western Australia, 2011). *WA Environmental Offsets Guidelines* (The Government of Western Australia, 2014). *Guidelines for Preparing Mine Closure Plans* (DMP and EPA, 2015). *Technical Guidance – Sampling of Short Range Endemic Invertebrate Fauna* (EPA, 2016). *Technical Guidance – Sampling Methods for Terrestrial Vertebrate Fauna* (EPA, 2016). *Technical Guidance – Terrestrial Vertebrate Fauna Surveys Environmental Impact Assessment* (EPA, 2016).

Subterranean Fauna	
EPA objective	To protect subterranean fauna so that biological diversity and ecological integrity are maintained.
Relevant activities	Excavation for mining activities and abstraction of groundwater.
Potential impacts and risks	Direct and indirect mortality and loss of habitat through sub-surface disturbance and abstraction of groundwater for dewatering.
Required work	32. Undertake a desktop study to document the regional context of the subterranean fauna of the proposal area including, but not limited to,

	existing regional subterranean fauna surveys, and assessment of the likely presence and characteristics of subterranean fauna habitat. 33. Conduct Level 2 surveys inside and outside areas subject to direct and indirect impacts, in accordance with EPA policy and guidance. 34. Present the results of all relevant subterranean fauna surveys. Include comprehensive mapping of the distributions of species in relation to the proposed disturbance (including groundwater drawdown), and of the geology or hydrology predicted to support subterranean fauna habitats (including its extent outside the development envelope). 35. Discuss habitat prospectivity and demonstrate habitat connectivity within and outside the proposed disturbance area. 36. Identify and assess the potential direct, indirect, and cumulative impacts of the proposal on subterranean fauna, within the proposal area and regionally. Consider temporary (e.g. construction) vs ongoing (e.g. operations) impacts, including altered water regimes and water quality. 37. For taxa that may be impacted, provide information, including maps, on habitat connectivity and an explanation of the likely distribution of species within those habitats. Provide detailed descriptions of potential impacts to conservation significant species. 38. Identify any limitations associated with the survey data or existing knowledge and discuss their implications for the impact assessment. 39. Demonstrate application of the mitigation hierarchy to avoid and minimise impacts to subterranean fauna. 40. Discuss proposed management objectives, measures, and outcomes sought to ensure residual direct and indirect impacts are not greater than predicted. 41. Predict the inherent and residual impacts before and after applying the mitigation hierarchy. 42. Describe proposed monitoring and management (in terms of the mitigation hierarchy to achieve the predicted outcomes/objectives. 43. Determine and quantify any significant residual impacts by applying the Residual Impact Model and WA Offset Template in the *WA Environmental Offsets Guidelines*. 44. Where significant residual impacts remain, propose an appropriate offsets package that is consistent with the *WA Environmental Offsets Policy* and *WA Environmental Offsets Guidelines*. Spatial data defining the area of significant residual impacts should also be provided. 45. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.

Relevant policy and guidance	***EPA Policy and Guidance*** *Environmental Factor Guideline – Subterranean Fauna* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA, 2016). *Statement of Environmental Principles, Factors and Objectives* (EPA, 2016). ***Other policy and guidance*** *WA Environmental Offsets Policy* (The Government of Western Australia, 2011). *WA Environmental Offsets Guidelines* (The Government of Western Australia, 2014). *Instructions on How to Prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (EPA, 2016). *Technical Guidance – Sampling Methods for Subterranean Fauna* (EPA, 2016). *Technical Guidance – Subterranean Fauna Survey* (EPA, 2016).

Hydrological Processes	
EPA objective	To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected.
Relevant activities	Surface water diversions, and dewatering groundwater for mining activities.
Potential impacts and risks	• Impacts to the natural surface water flow as a result of placement, design and operation of mine pits and associated infrastructure. • Impacts to surface water resources such as Jones Creek from groundwater drawdown and alterations to surface water flows. • Impacts to subterranean fauna, as a result of groundwater drawdown and mounding.
Required work	46. Characterise the baseline hydrological and hydrogeological regimes and water quality, both in a local and regional context, including, but not limited to, water levels, water chemistry, stream flows, flood patterns, and water quantity and quality. This is to include a detailed description of the geological framework within the zone impacted by groundwater abstraction and any interdependence between surface and groundwater features/bodies. 47. Provide a detailed description of the design and location of the proposal elements with the potential to impact surface water or groundwater,

	including but not limited to, the two creek crossings over the ephemeral stream Jones Creek and abstraction bore locations. 48. Provide a detailed description of any investigations undertaken to determine potential impacts of proposed abstraction on the aquifer, environment and surrounding users (e.g. investigations via drilling of production and monitoring bores, test pumping, geophysical logging and chemical analysis of groundwater). 49. Provide a conceptual model of the surface and groundwater systems incorporating the results of monitoring conducted, including the extent of connectivity between surface and groundwater systems. 50. Provide a conceptual mine water balance over the life of the proposal and discuss the capacity to reuse surplus mine dewater. 51. Discuss the potential environmental impacts and benefits of identified surplus water management options (i.e. discharge of excess mine dewater, reuse on site, local water supply, aquifer recharge etc.) and discuss the most appropriate water management strategy for the proposal. 52. Model the impact of different flooding scenarios during operations and post-closure on infrastructure and final landforms. 53. Investigate groundwater drawdown due to groundwater abstraction associated with the proposal. Analyse, discuss and assess surface water and groundwater impacts. The analysis should include: • changes in groundwater levels and changes to surface water flows associated with the proposal; • the nature, extent and duration of impacts; and • cumulative impacts with other projects and referred proposals, for which relevant information is publicly available. 54. Demonstrate application of the mitigation hierarchy to avoid and minimise impacts to Hydrological Processes. 55. Prepare a Mine Closure Plan consistent with the *Guidelines for Preparing Mine Closure Plans* (DMP and EPA, 2015) which addresses the development of completion criteria to maintain the hydrological regimes of groundwater and surface water so that environmental values are maintained post closure. 56. Provide a description of monitoring, management, closure and rehabilitation arrangements and attach a management plan. 57. Outline the outcomes/objectives, trigger and contingency actions to ensure impacts (direct and indirect) are not greater than predicted. 58. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.

Relevant policy and guidance	***EPA Policy and Guidance*** *Environmental Factor Guideline – Hydrological Processes* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA, 2016). *Statement of Environmental Principles, Factors and Objectives* (EPA, 2016). ***Other policy and guidance*** *Operational policy No. 5.12 – Hydrogeological reporting associated with a groundwater well licence* (DoW, 2009). *Western Australian water in mining guidelines* (DoW, 2013). *Guidelines for Preparing Mine Closure Plans* (DMP and EPA, 2015). *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (EPA, 2016).

Inland Water Environmental Quality	
EPA objective	To maintain the quality of groundwater and surface water so that environmental values are protected.
Relevant activities	Construction and operation of proposal including dewatering groundwater for mining activities, waste landforms, pit lakes, storage and use of hazardous materials and hydrocarbons, and waste facilities.
Potential impacts and risks	• Contamination of groundwater as a result of groundwater abstraction/dewatering causing oxidation of sulphides potentially present in deposits. • Contamination of groundwater as a result of mixing with water formed in a pit lake after closure. • Contamination of surface water and drainage lines through spillage of reagents, chemicals or hydrocarbons. • Contamination of surface water from surplus dewater injection. • Reduction in surface water quality as a result of poor containment of potentially contaminated run-off from active mining areas. • Attraction of native fauna which may be harmed in accessing and/or contact with water or by attracting fauna or stock which may harm surrounding flora and vegetation (including the Violet Range PEC and Wanjarri Nature Reserve), or predators which may prey on native fauna.
Required work	59. Characterise the baseline surface water and groundwater quality and quantity, both in a local and regional context, including but not limited to, water levels, water chemistry, spring and stream flows, flood

	patterns, catchment boundaries. This is to include a detailed description of the geological framework within the zone to be impacted by groundwater abstraction and any interdependence between surface and groundwater features/bodies. Include, where relevant influences on water availability. 60. Provide a detailed description of the design and location of the proposal elements with the potential to impact surface water and groundwater quality, including but not limited to, utilisation and storage of chemicals and/or hydrocarbons. 61. Identify a suitable water source and discuss the potential direct and indirect impacts. Identify contingency options and discuss the impact of each option. 62. Document any potential pathways for contamination to occur, including but not limited to, dust from the Run-Of-Mine pad, operational leaks and spills, drainage from and erosion of WRL surfaces and contamination from the final void pit lake. 63. Provide a conceptual mine water balance over the life of the proposal and discuss the capacity to reuse surplus mine dewater. 64. Provide an assessment on the physical and chemical characteristics of the proposed WRL and pit lake. 65. Undertake a pit lake risk assessment to determine the potential impact to hydrological processes and surface water from Acid and/or Metalliferous Drainage (AMD). 66. Analyse, discuss and assess surface water and groundwater impacts. The analysis should include but not be limited to: • changes in groundwater levels and changes to surface water flows associated with the proposal; • the nature, extent, and duration of impacts; • the impact of changing water quality or sources on environmental values; and • cumulative impacts with other projects and referred proposals, for which relevant information is publicly available. 67. Analyse, discuss implications of water filled pit lakes on values (particularly biological) both directly and in the surrounding environment. 68. Demonstrate application of the mitigation hierarchy to avoid and minimise impacts to Inland Waters Environmental Quality. 69. Prepare a Mine Closure Plan consistent with the *Guidelines for Preparing Mine Closure Plans* (DMP and EPA, 2015) which addresses the development of completion criteria to maintain the quality of groundwater and surface water, and management or removal of

	artificial sources (i.e. pit lakes), so that environmental values are maintained post closure. 70. Provide a description of monitoring, management, closure and rehabilitation arrangements. 71. Outline the outcomes/objectives, trigger and contingency actions to ensure impacts (direct and indirect) are not greater than predicted. 72. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.
Relevant policy and guidance	***EPA Policy and Guidance*** *Environmental Factor Guideline – Inland Water Environmental Quality* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA, 2016). *Statement of Environmental Principles, Factors and Objectives* (EPA, 2016). ***Other policy and guidance*** *Guidelines for Preparing Mine Closure Plans* (DMP and EPA, 2015). *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (EPA, 2016).

Social Surroundings	
EPA objective	To protect social surroundings from significant harm.
Relevant activities	Clearing of native vegetation, excavation for mining activities. Construction of two creek crossings over Jones Creek and haul road that is adjacent to the Wanjarri Nature Reserve.
Potential impacts and risks	• Loss/disturbance to identified and unidentified Aboriginal heritage sites. • Disturbance to cultural associations within the area. • Temporary/permanent constraint on traditional cultural activities. • Prevention or change in access to an Aboriginal heritage site. • Alterations to hydrological processes. • Impacts to amenity values of Wanjarri Nature Reserve (including visual landscape, scenic and visual aesthetic values and recreational tourism).
Required work	73. Characterise the heritage and cultural values of the development envelope and any other areas that may be indirectly impacted to identify sites of significance and their relevance within a wider regional context.

	74. Characterise the land use and amenity values of Wanjarri Nature Reserve particularly noting important areas for human use that could be affected by noise, dust and light-spill emissions, visual amenity issues and access to the reserve from mining. 75. Conduct Aboriginal heritage surveys to identify Aboriginal heritage sites of significance and identify concerns in regard to impacts from proposed mining operations. 76. Provide a detailed description of the heritage and amenity values of the development envelope, Jones Creek, and the Wanjarri Nature Reserve, and provide a figure(s) of the heritage locations and proposed disturbance. 77. Provide details of consultation with Traditional Owners to determine appropriate management of culturally sensitive areas. 78. Provide details of consultation with the Department of Biodiversity, Conservation and Attractions to determine appropriate management of impacts to the Wanjarri Nature Reserve. 79. Assess the impacts of the proposal on heritage sites and/or cultural associations as a result of implementation of the proposal, including those arising from changes to the environment which may impact on ethnographic and archaeological heritage significance. 80. Predict the residual impacts on heritage and amenity, for direct, indirect and cumulative impacts after considering avoidance and minimisation measures. 81. Outline the outcomes/objectives, management, monitoring, trigger and contingency actions to ensure impacts to heritage and amenity (direct and indirect) are not greater than predicted. 82. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.
Relevant policy and guidance	***EPA Policy and Guidance*** *Environmental Factor Guideline – Social Surroundings* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (EPA, 2016). *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA, 2016). *Statement of Environmental Principals, Factors and Objectives* (EPA, 2016). ***Other policy and guidance*** *Guidance Statement 41 – Assessment of Aboriginal Heritage* (EPA, 2004). *Aboriginal Heritage – Due Diligence Guidelines Version 3.0* (DAA and DPC, 2013).

4. Other environmental factors or matters

The EPA has identified the following other environmental factors or matters relevant to the proposal that must be addressed during the environmental review and discussed in the Environmental Review Document:

Existing Mt Keith Mine and Ministerial Statement 415:

- provide details regarding the disposal of waste for the proposed Mt Keith Satellite Project, including but not limited to the management of the TSF that is conditioned under Ministerial Statement 415.

Greenhouse Gas emissions:

- characterise sources of greenhouse gas emissions from the proposal and estimate the expected direct and indirect greenhouse gas emissions in accordance with the *National Greenhouse and Energy Reporting Act 2007*; and
- analyse the intensity of greenhouse gas emissions (i.e. quantify the Carbon Dioxide generated per tonne of product produced) and compare with published benchmarked practice for equivalent operations.

It is also important that the proponent be aware that other factors or matters may be identified during the course of the environmental review that were not apparent at the time that this ESD was prepared. If this situation arises, the proponent must consult with the EPA to determine whether these factors and/or matters are to be addressed in the ERD, and if so, to what extent.

5. Stakeholder consultation

The proponent must consult with stakeholders who are affected by, or are interested in the proposal. This includes the decision-making authorities (see section 6), other relevant state and Commonwealth government agencies.

The proponent should demonstrate how it has undertaken, or plans to undertake consultation with the Shire of Leonora, Shire of Wiluna and local community as the proposal sits within both local government areas.

The proponent should demonstrate how it has undertaken, or plans to undertake consultation with the Tjiwarl Traditional Owners, who were granted native title over the proposal area in December 2016.

The proponent must document the following in the ERD:

- identified stakeholders;
- the stakeholder consultation undertaken and the outcomes, including decision-making authorities' specific regulatory approvals and any adjustments to the proposal as a result of consultation; and
- any future plans for consultation.

6. Decision-making authorities

At this stage, the EPA has identified the authorities listed in Table 5 as decision-making authorities (DMAs) for the proposal. Additional DMAs may be identified during the course of the assessment.

Table 5 Decision-making authorities

Decision-making authority	Relevant legislation
1. Minister for Environment.	*Wildlife Conservation Act 1950*.
2. Minister for Water.	*Rights in Water and Irrigation Act 1914.*
3. Minister for Aboriginal Affairs.	*Aboriginal Heritage Act 1972*.
4. Executive Director Environment Division, Department of Mines, Industry Regulation and Safety.	*Mining Act 1978.*
5. Chief Dangerous Goods Officer, Department of Mines, Industry Regulation and Safety.	*Dangerous Goods Safety Act 2004.*
6. State Mining Engineer, Department of Mines, Industry Regulation and Safety.	*Mines Safety and Inspection Act 1994.*
7. Director General, Department of Water and Environmental Regulation.	*Environmental Protection Act 1986 and Environmental Protection (Clearing of Native Vegetation) Regulations 1974.*

Figure 1 – Regional location

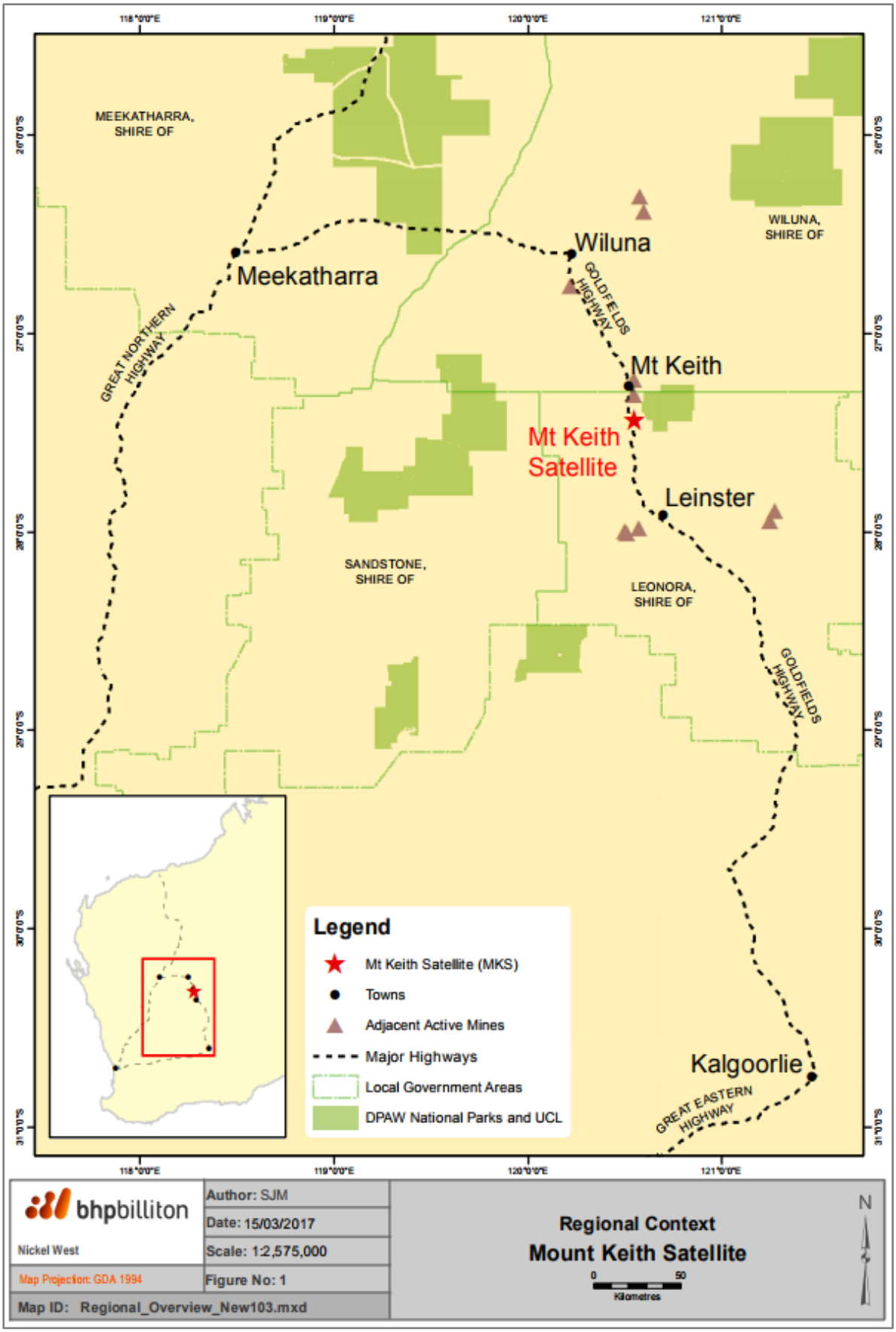

Figure 2 – Development envelope

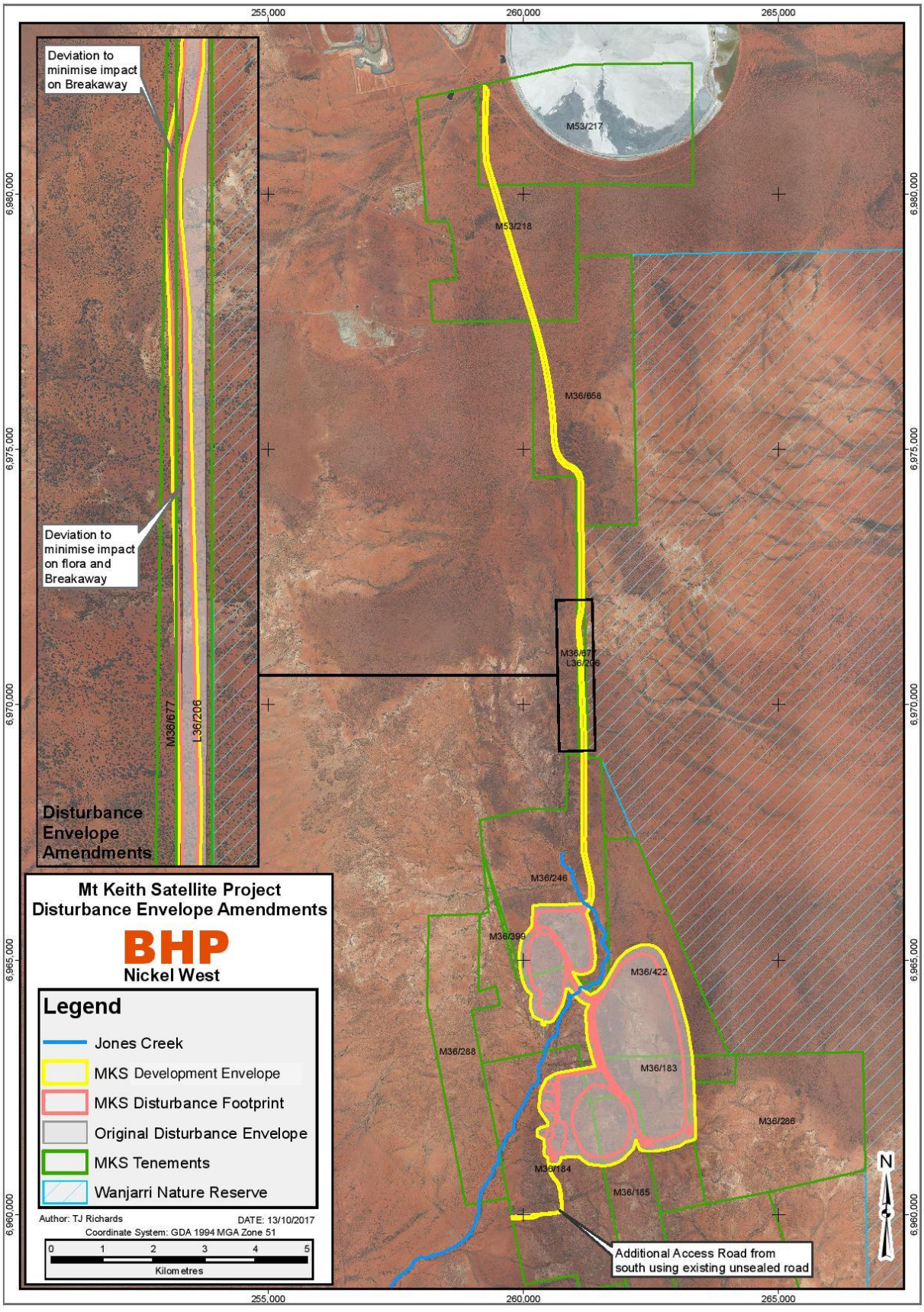

Figure 3 – Mine area