Report and recommendations of the Environmental Protection Authority

Wingellina Nickel Project

Hinckley Range Pty Ltd

Report 1568

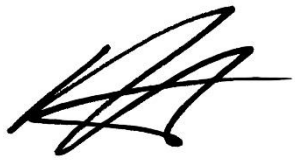
June 2016

Public Environmental Review
Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
4/11/13	Level of assessment set	
11/07/14	Final Environmental Scoping Document (ESD) approved	35
14/09/15	Public Environmental Review (PER) document released for public review	61
9/11/15	Public review period for PER document closed	8
1/02/16	Final proponent Response to Submissions report received	12
17/03/16	EPA meeting	6
15/06/16	EPA report provided to the Minister for Environment	13
20/06/16	Publication of EPA report (three working days after report provided to the Minister)	3 days
04/07/16	Close of appeals period	2

Timelines for an assessment may vary according to the complexity of the project and are usually agreed with the proponent soon after the level of assessment is determined.

In this case, the Environmental Protection Authority did not meet its timeline objective in the completion of the assessment and provision of a report to the Minister.



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1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on outcomes of the EPA's environmental impact assessment of the proposal by Hinckley Range Pty Ltd to develop and operate the Wingellina Nickel Mine and associated infrastructure. Hinckley Range Pty Ltd was nominated as the proponent responsible for the proposal.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires that the EPA prepare a report on the outcome of its assessment of a proposal and provide this assessment report to the Minister for Environment. The report must set out:

- what the EPA considers to be the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation of the proposal should be subject.

The EPA may also include any other information, advice and recommendations in the assessment report as it thinks fit.

The aims of environmental impact assessment and the principles of environmental impact assessment considered by the EPA in its assessment of this proposal are set out in the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2012.*

The proponent referred the proposal to the EPA on 25 September 2013. On 4 November 2013 the EPA set the level of assessment at Public Environmental Review (PER) with an 8-week public review period. The Environmental Scoping Document (ESD) for the proposal was approved on 11 July 2014 and the PER document was released for public review from 14 September 2015 to 9 November 2015.

Appendix 6 contains a summary of submissions from the public review period and the proponent's response to submissions (on CD at the back of this report and at www.epa.wa.gov.au). Relevant significant environmental issues identified from this process have been taken into account by the EPA during its assessment of the proposal.

This report provides the EPA's advice and recommendations in accordance with section 44 of the EP Act.

2. The proposal

2.1 Proposal summary

Hinckley Range Pty Ltd proposes to mine nickeliferous limonite ore from the Wingellina deposit located approximately 1,400 km north-east of Perth in the Shire of Ngaanyatjarraku close to the Northern Territory and South Australia borders (Figure 1).

The proposal also includes a water supply borefield in the Central Officer Basin located approximately 100 km to the south-west, and an overland pipeline adjacent to and aligned with existing roads connecting the borefield and the mine site (Figures 2 and 3).

The anticipated mine life is more than 40 years at a mining rate of up to 4.5 million tonnes per annum (Mtpa). The proponent proposes to use a high pressure acid leach (HPAL) process to produce a mixed nickel-cobalt hydroxide product. The mine is expected to produce approximately 40,000 tonnes of nickel and 3,000 tonnes of cobalt per year.

Up to 5.5 Mtpa of residues from ore processing (tailings) will be discharged to a paddock style tailings storage facility (TSF), with separate evaporation ponds to manage both TSF decant water and storm water.

Up to 12 gigalitres per annum (GLpa) of process supply water will be sourced from the Central Officer Basin borefield.

Natural gas for the power plant will be sourced from an existing gas field and transported to the mine site via existing roads.

The main characteristics of the proposal are summarised in Tables 1 and 2. A detailed description of the proposal is provided in Section 5 of the PER document (SNC Lavalin-Australia Pty Ltd 2015).

The potential impacts of the proposal on the environment identified by the proponent in the PER document (SNC Lavalin-Australia Pty Ltd 2015) and their proposed management are summarised in Table ES2 (Executive Summary) in the PER document.

Figure 1: Regional location

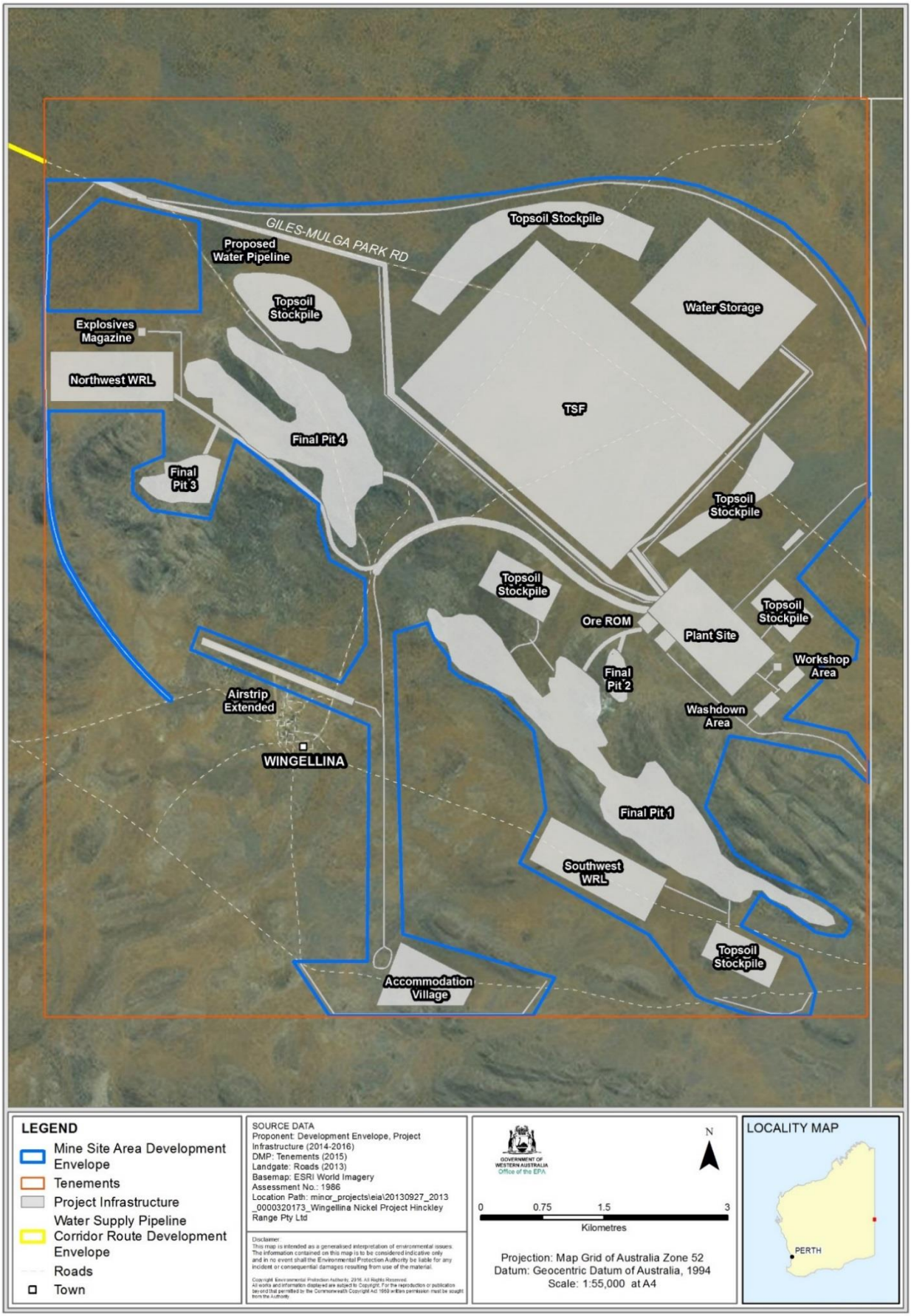

Figure 2: Mine site area development envelope and indicative footprint

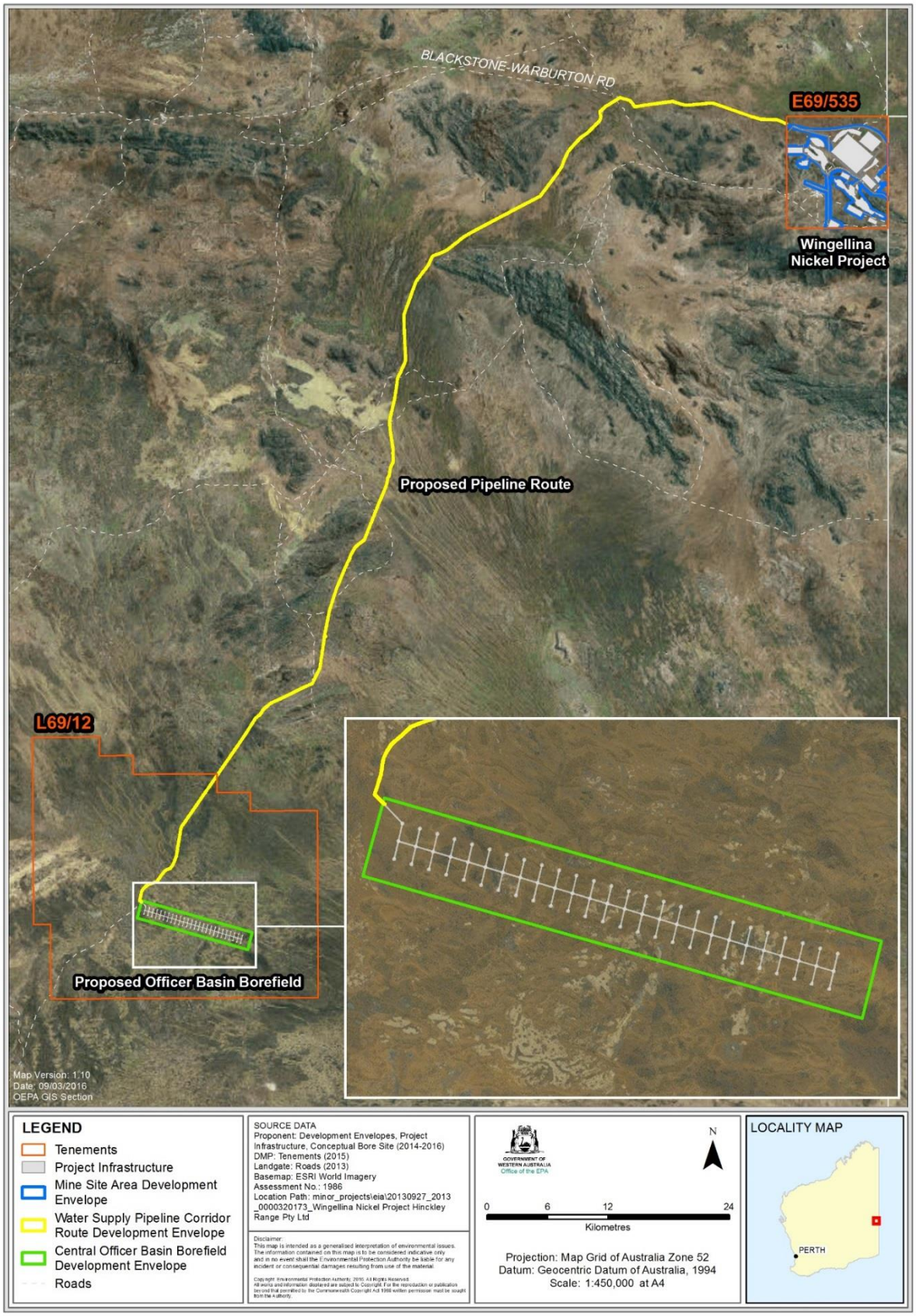

Figure 3: Central Officer Basin borefield and water supply pipeline corridor route development envelopes

Table 1: Summary of key proposal characteristics

Proposal title	Wingellina Nickel Project
Short description	The proposal is to mine nickeliferous limonite ore from the Wingellina deposit located approximately 1,400 km north-east of Perth, and use a HPAL process to produce a mixed nickel-cobalt hydroxide product. The proposal also includes a water supply borefield in the Central Officer Basin located approximately 100 km to the south-west, and an overland pipeline adjacent to and aligned with existing roads connecting the borefield and the mine site.

Table 2: Location and proposed extent of physical and operational elements

Element	Location	Proposed extent
Mine pits, supporting mine infrastructure (including HPAL processing plant), topsoil and waste rock storage areas, and tailings storage facility	Figure 2	Clearing of no more than 2,762 ha within the 5,875 ha Mine Site Area Development Envelope
Borefield and associated infrastructure	Figure 3	Clearing of no more than 94 ha within the 2,009 ha Central Officer Basin Borefield Development Envelope
Water supply pipeline and associated infrastructure	Figure 3	Clearing of no more than 117 ha within the 234 ha Water Supply Pipeline Corridor Route Development Envelope
Mine dewatering	Figure 2	Up to 0.5 GLpa groundwater abstraction within the Mine Site Area Development Envelope
Water supply	Figure 3	Up to 12 GLpa within the Central Officer Basin Borefield Development Envelope

2.2 Consultation

Five agency submissions and one public submission were received during the public review period. The key issues raised relate to:

- impacts on air quality, human health and magnetic video and audio tapes containing archived indigenous historical material from the discharge of atmospheric pollutants and fugitive particulate emissions;
- the potential for asbestiform materials to be present in the mine site area;
- the management of rehabilitation and mine closure; and
- the impact of the mine site development on aboriginal heritage sites.
-

The issues raised were addressed by the proponent in the Response to Submissions document that was received by the EPA on 1 February 2016 (SNC Lavalin-Australia Pty Ltd 2016, Appendix 6).

In assessing this proposal and considering the submissions, the EPA notes that the proponent has sought to avoid and minimise environmental impacts associated with the proposal by:

- using best practice technology for natural gas fired power generation and sulphuric acid (H_2SO_4) production to minimise the emission of oxides of nitrogen (NO_X), sulphur dioxide (SO_2), and H_2SO_4 mist from the HPAL processing plant;
- using dust suppression measures on unsealed roads, stockpiles, the tailings storage facility (TSF), and Run of Mine (ROM) areas and monitoring dust levels (PM_{10} and nickel dust) at the locations of sensitive receivers;
- minimising vegetation clearing footprints during final design and avoiding drainage line and ridgeline vegetation where possible; and
- preparing a Mine Closure Plan which addresses closure objectives and completion criteria, legal compliance, post-mining landforms, ecosystem function and rehabilitation, stakeholder consultation, and the decommissioning of mining infrastructure.

3. Key environmental factors

In undertaking its assessment of this proposal and preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the EP Act to the extent relevant to the particular matter being considered. Appendix 3 provides a summary of the principles and how the EPA applied the relevant principles in its assessment.

Having regard to:

- the proponent's PER document;
- public and agency comments on the PER document;
- the proponent's response to submissions;
- the EPA's own inquiries;
- Environmental Assessment Guideline No. 8 *Environmental Principles, Factors and Objectives* (EPA, 2015a); and
- Environmental Assessment Guideline No. 9 *Application of a Significance Framework in the Environmental Impact Assessment Process* (EPA, 2015b),

the EPA identified the following key environmental factors during the course of its assessment:

1. **Air quality and atmospheric gases** – potential impacts on the environment and human health and amenity at nearby sensitive receptors from the discharge of atmospheric pollutants from the HPAL processing plant and fugitive dust emissions from the mine site;
2. **Flora and vegetation** – direct impacts from the clearing of flora and vegetation within the development envelopes; and
3. **Rehabilitation and decommissioning (Integrating factor)** – the management of rehabilitation and decommissioning is an important issue due to the presence of mine infrastructure, waste rock storage areas, tailings storage facility, and pit lakes after the cessation of mining.

Other environmental factors relevant to the proposal which the EPA determined not to be key environmental factors are discussed in the proponent's PER document (SNC Lavalin-Australia Pty Ltd 2015).

Appendix 3 contains the environmental factors identified through the course of the assessment and the EPA's evaluation of whether an environmental factor is a key environmental factor for the proposal. This includes environmental factors that were identified as preliminary key environmental factors at Level of Assessment which were included in the Environmental Scoping Document and were addressed in the proponent's PER document.

The EPA's assessment of the proposal's impacts on the key environmental factors is provided in Sections 3.1 - 3.3. These sections outline the EPA's conclusions as to whether the or not the proposal can be managed to meet the EPA's objective for a particular factor and, if so, the recommended conditions and procedures that should apply if the proposal is implemented.

In assessing this proposal, the EPA has also considered relevant published EPA policies and guidelines. Appendix 4 lists the relevant policies and guidance documents for each of the key environmental factors for this assessment and identifies the relevant matters discussed in, and principles derived from, each

policy and guidance document. The EPA has discussed the application of the relevant policy and guidance for each factor in Section 3.

The EPA notes that the following policy and guidance relating to the key environmental factors replaced or amended policy and guidance since the ESD was released:

- Environmental Assessment Guideline No. 8 *Environmental Principles, Factors and Objectives* (EPA 2015a); and
- Environmental Assessment Guideline No. 9 *Application of a Significance Framework in the Environmental Impact Assessment Process* (EPA 2015b);

The proponent considered the above current policy and guidance in its PER.

The following policy and guidance relating to the key environmental factors replaced or amended policy and guidance referred to in the PER:

- Environmental Protection Bulletin No. 19 – *EPA involvement in mine closure* (EPA 2015c).
- *Guidelines for preparing mine closure plans* (DMP & EPA 2015);

The EPA considered the above current policy and guidance (policy and guidance amended since the ESD was released) in its assessment (see sections 3.1 and 3.3 for further detail).

The EPA notes that other published policies and guidelines were also considered.

3.1 Air quality and atmospheric gases

EPA objective

The EPA's environmental objective for this factor is to *maintain air quality for the protection of the environment and human health and amenity, and to minimise the emission of greenhouse and other atmospheric gases through the application of best practice*.

Relevant EPA policy and guidance

The EPA policy and guidance applicable to Air Quality and Atmospheric Gases for this assessment and relevant matters discussed in each policy and guidance document, are outlined in Appendix 4. The EPA considers that the following policy and guidance is relevant to its assessment of the proposal in relation to this factor:

- Guidance Statement No. 3 – *Separation distance between industrial and sensitive land uses* (EPA 2005); and

- Guidance Statement No. 55 – *Implementing best practice in proposals submitted to the environment impact assessment process* (EPA 2003).

EPA assessment

Atmospheric emissions

The discharge of atmospheric pollutants from the HPAL processing plant and fugitive dust emissions from the mine site has the potential to impact on the environment, human health and amenity at the nearby sensitive receptors (the Wingellina townsite and the mine site accommodation village).

Appendix 1 in Guidance Statement No. 3 provides a generic separation distance of 1,500 m – 3,000 m between large open cut mining operations and sensitive land uses. The separation distances between the relevant mine site area infrastructure and disturbance areas and the Wingellina townsite and the proposed mine site accommodation village are approximately 2,000 m and 1,700 m, respectively. The EPA considers that the proponent has adequately addressed the relevant matters in Guidance Statement No. 3 because the separation distances between the HPAL processing plant and the sensitive land uses are within the range provided for in Guidance Statement No. 3 and the site specific studies referred to below indicate that the proposal will not have unacceptable impacts on the Wingellina townsite or the proposed mine site accommodation village.

The proposed HPAL processing plant would emit the following estimated annual quantities of atmospheric pollutants:

- Sulphur dioxide (SO_2) – approximately 938 tonnes per year;
- Oxides of nitrogen (NO_X) – approximately 91 tonnes per year;
- Particulate matter (PM) – approximately 1.9 tonnes per year; and
- Sulphuric acid mist (H_2SO_4) – approximately 89 tonnes per year.

The H_2SO_4 production facility within the HPAL processing plant would utilise the "double contact – double absorption" process with a caesium (Cs) catalyst to minimise SO_2 and H_2SO_4 mist emissions. The *European Commission Reference Document on Best Available Techniques for the Manufacture of Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilisers* (European Commission 2007) and the *European Fertilizer Manufacturers Association Best Available Techniques for Pollution Prevention and Control in the European Sulphuric Acid and Fertilizer Industries Booklet No. 3: Production of Sulphuric Acid* (EFMA 2000) indicate that the "double contact – double absorption" process with a Cs catalyst is best available technology for the production of H_2SO_4.

The H_2SO_4 production facility is expected to operate with an SO_2 emission intensity of 0.787 kilograms of SO_2 per tonne of H_2SO_4 produced. This SO_2 emission intensity is consistent with the best practice SO_2 emission intensities

listed in the European Commission 2007 and EFMA 2000 reference documents.

The SO_2 and H_2SO_4 emission concentrations in the H_2SO_4 production facility stack are predicted to be 500 mg/Nm^3 and 35 mg/Nm^3, respectively. The above stack emission concentrations compare favourably with the best practice SO_2 and H_2SO_4 stack emission concentrations listed in the EFMA 2000 reference document. The above H_2SO_4 stack emission concentration is also consistent with the best practice H_2SO_4 stack emission concentration listed in the European Commission 2007 reference document.

The PER document indicates that the predicted quantities of NO_X emissions from the gas turbines and boilers within the HPAL processing plant were based on the use of dry low NO_X burners. As a result, the NO_X stack emission concentration in the gas turbine and boilers stacks was assumed to be about 25 parts per million by volume dry (ppmvd). The use of dry low NO_X burners to minimise NO_X emissions is consistent with best practice.

In view of the above, the EPA considers that the proponent has adequately addressed the relevant matters in Guidance Statement No. 55, to avoid unnecessary waste discharges or degradation of the environment.

Fugitive particulate emissions

Fugitive particulate emissions will be generated by mining and blasting activities and from wind erosion at the TSF, waste rock storage areas, and topsoil and subsoil storage stockpiles.

The management measures that would be implemented to minimise fugitive particulate emissions include, but are not limited to:

- applying water to haul roads, working surfaces, and stockpiles as required, to minimise dust generation;
- controlling vehicle speeds on unsealed roads;
- scheduling blasting activities to coincide with favourable weather conditions where possible;
- consideration being given to sealing high-usage roads such as access roads servicing mining operations;
- maintaining material moisture levels to reduce dust generation from all crushing and screening operations;
- implementing progressive clearing and rehabilitation to minimise the area of exposed soil; and
- monitoring and reporting of dust levels.

Air quality modelling

Air quality modelling was undertaken to determine the potential for the atmospheric pollutant and fugitive particulate emissions from the proposal to impact on air quality and human health and amenity at sensitive receptors including the Wingellina townsite, air strip, and mine site accommodation village.

TAPM (The Air Pollution Model) was used for modelling NO_X (as NO_2), SO_2, PM_{10}, and H_2SO_4 emissions from the HPAL processing plant under the following operating scenarios:

- normal operation with the H_2SO_4 production facility operating (about 74% of operating time);
- normal operation with the H_2SO_4 production facility not operating (about 26% of operating time); and
- non-normal operation with start-up of the H_2SO_4 production facility (2 to 3 hours duration 5 times a year).

Subsequent to the release of the PER document, the proponent advised the EPA that the air quality modelling that was undertaken using TAPM was based on the use of either a single or double contact H_2SO_4 production facility without a caesium (Cs) catalyst, rather than a "double contact – double absorption" H_2SO_4 production facility with a Cs catalyst as indicated in the PER document. Given that the SO_2 and H_2SO_4 stack emission rates that were used in the modelling are significantly higher than what would actually be achieved by the H_2SO_4 production facility utilising the "double contact – double absorption" process with a Cs catalyst, the modelling provides a conservative assessment of the potential impacts on air quality.

The results obtained from the air quality modelling using TAPM indicate that the predicted NO_2, SO_2, PM_{10} ground level concentrations (GLCs) at the Wingellina townsite and mine site accommodation village will comply with the applicable criteria in the National Environmental Protection Measure (NEPM) ambient air quality standards (NEPC 2008). Predicted H_2SO_4 GLCs will also comply with the applicable criteria in the California Office of Environmental Health and Hazard Assessment, Acute Reference Exposure Level (REL) (California OEHHA 2014) and the New South Wales Department of Environmental and Conservation *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW DEC 2005) under all three operating scenarios.

The California Puff (CALPUFF) model was used for modelling fugitive particulate emissions as PM_{10}, $PM_{2.5}$, and total suspended particulates (TSP), and to determine monthly dust deposition rates.

Due to the absence of applicable TSP criteria in the NEPM ambient air quality standards, the PER document referred to the TSP criteria in the *Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992*. The air quality

modelling that was undertaken by the proponent compared the predicted TSP GLCs at sensitive receptors to the applicable criteria in the above regulations.

The results obtained from the air quality modelling using CALPUFF indicate that at the Wingellina townsite, airstrip, and mine site accommodation village the predicted:

- PM_{10} and $PM_{2.5}$ GLCs will comply with the applicable criteria in the NEPM standards;
- TSP GLCs will comply with the applicable criteria in the *Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992* (even though the Regulations do not directly apply to the proposal), and
- dust deposition rates will comply with the applicable NSW DEC 2005 criteria.

The proponent commissioned an independent peer review of the air quality modelling that was undertaken for the Wingellina Nickel Project (Pacific Environment Limited 2015) following a request from the Office of the EPA. The peer review confirmed that the use of TAPM and CALPUFF was suitable and appropriate for assessing the potential air quality impacts from the Wingellina Nickel Project. The main issues that were identified in the peer review related to:

- a discrepancy between the H_2SO_4 production facility stack emission temperature and velocity figures listed in the PER document and those used in TAPM; and
- whether the assumed figure of 85% for dust control for haul trucks, calcrete trucks and light vehicles travelling along on-site roads which was used to determine fugitive particulate emission GLCs was appropriate.

The responses provided by the proponent's air quality modelling consultant (Air Assessments 2015) to address the above issues indicated that:

- using the correct figures for the H_2SO_4 production facility stack emission temperature and velocity in TAPM would only have a relatively small effect on the predicted SO_2 and H_2SO_4 mist GLCs presented in the PER document, and that they would still comply with the applicable air quality criteria; and
- the figure of 85% for dust control for haul trucks, calcrete trucks and light vehicles travelling along on-site roads is appropriate as it can be achieved using water carts and propriety binders.

The proponent has prepared an Air Quality Management Plan (AQMP) (August 2015) for the Wingellina Nickel Project which covers both construction and operational activities and includes monitoring and management measures and air quality goals and targets. The objectives of the AQMP are to ensure that atmospheric emissions do not significantly impact on environmental values, or the health, welfare and amenity of the population and land uses, and to use all reasonable and practicable measures to minimise airborne dust.

Health risk assessment

The potential for atmospheric pollutant and fugitive particulate emissions to impact on human health at nearby sensitive receptors was considered in the health risk assessment (HRA) that was undertaken for the Wingellina Nickel Project. The HRA referenced the results obtained from the air quality modelling referred to above.

Given that NO_2, SO_2, PM_{10}, $PM_{2.5}$, TSP, and H_2SO_4 GLCs and dust deposition rates at the Wingellina townsite and the mine site accommodation village were predicted to comply with the applicable air quality criteria, the HRA focussed on the impact on human health from nickel contained within the fugitive PM_{10} emissions.

The HRA derived the nickel concentration in the fugitive PM_{10} emissions via a chemical analysis of depositional dust sampled across sites located within the project area, including the Wingellina townsite and the proposed mine site accommodation village.

The HRA determined that the cumulative annual average nickel concentration in the fugitive PM_{10} emissions would be 0.0020 $\mu g/m^3$ at the Wingellina townsite and 0.0023 $\mu g/m^3$ at the mine site accommodation village. These predicted cumulative annual average nickel concentrations are below the Western Australian Department of Health (DoH) chronic exposure health guideline annual average concentration for nickel dust of 0.003 $\mu g/m^3$.

The DoH has advised the Office of the EPA that the HRA is acceptable, and that it is satisfied with the Wingellina Nickel Project proposal subject to:

- the proposal including a dust management plan which incorporates monitoring for PM_{10} and nickel dust using hi-volume air samplers; and
- the proponent undertaking dust sampling and analysis in accordance with the relevant Australian Standards and EPA-approved methodology so that the results can be compared with existing Western Australian health guidelines.

The EPA notes that the proponent's updated AQMP (August 2015) does not contain a separate dust management plan, but does include monitoring for PM_{10} and nickel dust using hi-volume air samplers and it states that dust sampling and analysis will be carried out in accordance with the relevant Australian Standards and EPA approved methodology and results compared with existing Western Australian health guidelines. In the PER, the proponent has also committed to developing a dust management plan. The EPA considers that the AQMP addresses the above requirements of the DoH. The EPA also considers that the AQMP can address the potential impact of SO_2, NO_2 and particulate matter on the indigenous historical material archive at the Media Centre, raised in the submission on the PER from the Ngaanyatjarra Media Aboriginal Corporation.

The EPA has proposed a management-based Condition Environmental Management Plan (EMP) for air quality, consistent with the EPA's revised condition framework in EAG 11 (EPA 2015d) and the Condition Environmental Management Plan framework in EAG 17 (EPA 2015e). This would require revision of the proposed AQMP.

Summary

Having particular regard to the:

(a) relevant EPA policy and guidance pertaining to Air Quality and Atmospheric Gases;

(b) use of best available technology in the HPAL processing plant to minimise NO_X, SO_2, and H_2SO_4 emissions;

(c) management measures that would be implemented to minimise fugitive particulate emissions;

(d) results obtained from air quality modelling which indicate that the predicted NO_2, SO_2, PM_{10}, $PM_{2.5}$, TSP, and H_2SO_4 ground level concentrations (GLCs) and dust deposition rates at sensitive receptors will comply with applicable air quality criteria;

(e) results obtained from the health risk assessment (HRA) which indicate that the predicted cumulative annual average nickel concentration in the fugitive PM_{10} emissions at sensitive receptors will be below the DoH's chronic exposure health guideline for nickel dust;

(f) advice received from the DoH that the HRA is acceptable, subject to certain requirements; and

(g) scope and content of the proposed Air Quality Management Plan (AQMP) which addresses the requirements of the DoH,

the EPA considers that the proposal can be managed to meet the EPA's objective for air quality and atmospheric gases, provided that a condition is imposed requiring the proponent to develop and implement an Air Quality Management Plan (AQMP), based on the AQMP submitted during the assessment, to maintain air quality for the protection of the environment and human health and amenity.

The EPA notes that, should the Minister decide that the proposal may be implemented, the Department of Environment Regulation (DER) will also regulate air quality emissions, under Part V of the the *Environmental Protection Act 1986* (EP Act). The DER has advised the EPA that air quality impacts associated with the HPAL processing plant can be regulated by the DER under the provisions of Part V of the EP Act. The EPA's view is that the details relating to air quality emissions would be most appropriately dealt with the through the Works Approval and Licence issued under the provisions of Part V of the EP Act. The EPA recommends that the Licence contains appropriate stack emission limits to achieve best practice SO_2, H_2SO_4, and NO_X stack emission concentrations for the HPAL processing plant. To minimise regulatory duplication, the EPA recommends that once the Licence under Part V is issued

(and within three years of substantial commencement of the proposal) the proposed Part IV condition relating to air quality is reviewed to determine whether it is still required.

3.2 Flora and vegetation

EPA objective

The EPA's environmental objective for this factor is to *maintain representation, diversity, viability and ecological function at the species, population and community level*.

Relevant EPA policy and guidance

The EPA policy and guidance applicable to Flora and Vegetation for this assessment and relevant matters discussed in the policy and guidance are outlined in Appendix 4. The EPA considers that the following policy and guidance is relevant to its assessment of the proposal in relation to this factor:

- Guidance Statement No. 51 – *Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia* (EPA 2004a);
- Position Statement No. 2 – *Environmental protection of native vegetation in Western Australia* (EPA 2000); and
- Position Statement No. 3 – *Terrestrial biological surveys as an element of biodiversity protection* (EPA 2002).

EPA assessment

Up to 2,762 ha of native vegetation will be cleared within the proposed Mine Site Area Development Envelope for the elements outlined in Table 1. Most of the vegetation located within the Mine Site Area Development Envelope is rated as being in 'Good to Excellent' to 'Pristine' condition.

Up to 211 ha of native vegetation will be cleared within the proposed Central Officer Basin Borefield Development Envelope and the Water Supply Pipeline Corridor Route Development Envelope. Most of the vegetation located in the Central Officer Basin Borefield Development Envelope and the Water Supply Pipeline Corridor Route Development Envelope is rated as being in 'Excellent' to 'Pristine' condition. Clearing within the Water Supply Pipeline Corridor Route Development Envelope will be restricted to a narrow zone adjacent to and aligned with existing roads.

The flora and vegetation surveys that were undertaken for the proposal were restricted to Tenement E69/535 (which includes the Mine Site Area Development Envelope), Tenement L69/12 (which includes the Mine Site Area Development Envelope), and the Central Officer Basin Borefield Development Envelope (Figure 3) as access to surrounding areas was not permitted by the traditional owners.

The PER document indicates that the proponent gave due consideration to Guidance Statement No. 51 and Position Statement 3. The EPA considers that the information presented for the Borefield and Pipeline development envelopes to be consistent with EPA Guidance Statement 51, however, the EPA considers that the Level 2 flora and vegetation survey that was undertaken within the Mine Site Area Development Envelope was not sufficient to enable the EPA to fully assess the impacts of the proposal on flora and vegetation (relevant matters in Guidance Statement No. 51 - see Appendix 4).

In the absence of further survey work within the Mine Site Area Development Envelope, the proponent provided additional information to the EPA following the release of the PER document in relation to the potential impact of the proposal on vegetation communities (SNC Lavalin-Australia Pty Ltd 2016). An analysis of multiple data sets undertaken by the proponent resulted in the reclassification of the vegetation communities that were described in the PER document into broader regional scale vegetation groups.

The distributions and mapped extents of the reclassified vegetation groups were compared to information derived from satellite imagery, the previous flora and vegetation surveys that were undertaken, and other appropriate sources. The EPA considers that this additional information is sufficient to enable the EPA to adequately assess the impact of the proposal on vegetation (see discussion in following *Vegetation* section).

Mine Site Area Development Envelope

Vegetation

Surveys identified 13 vegetation communities within five regional vegetation groups in the proposed mine site area development envelope during the flora and vegetation surveys.

Table 3 below lists the percentage of the mapped regional extent of each broad scale regional vegetation group that is located within the Mine Site Area Development Envelope. Table 3 also shows how the vegetation communities referred to in the PER document relate to the reclassified broader regional scale vegetation groups.

Table 3: Mine site area development envelope vegetation groups and communities

Regional vegetation groups	Vegetation communities	Mapped regional extent (ha)	Mapped extent within the development envelope (ha)	Percentage of the mapped regional extent within the development envelope
R1 – *Astrebla pectinata* Grasslands	5a	26,202	283	1.1%

Regional vegetation groups	Vegetation communities	Mapped regional extent (ha)	Mapped extent within the development envelope (ha)	Percentage of the mapped regional extent within the development envelope
R2 – *Acacia aneura* Shrublands	3a 3b 5b	146,385	4,225	2.9%
R3 – *Eucalyptus socialis* Mallee on low hills and lower slopes	1a 2a 2b 4a 6a 8 9	3,699	819 (410 ha impacted)	22% (11.1% impacted)
R4 – *Acacia* Shrubland over *Triodia scariosa* Grasslands on rocky hills and slopes	7	8,092	189 (43.7 ha impacted)	2.3% (0.5% impacted)
R5 – *Triodia scariosa* Grasslands on ridges and upper slopes	4b	45,008	226	5.0%

The R3 and R4 regional vegetation groups appear to be regionally restricted based on their relatively small mapped regional mapped extents as shown in Table 3. The proponent has advised the EPA that approximately 410 ha of the R3 regional vegetation group and 43.7 ha of the R4 regional vegetation group would be cleared within the Mine Site Area Development Envelope. Hence, approximately 11.1% of the mapped regional extent of the R3 regional vegetation group and 0.5% of the mapped regional extent of the R4 regional vegetation group will be impacted by clearing within the Mine Site Area Development Envelope.

Table 3 shows that no regional vegetation group would be reduced to below 30% of the pre-clearing extent, a relevant matter in Position Statement No. 2. The EPA notes that it was not possible to determine the precise impact to each vegetation community within each vegetation group, but that extrapolations from remote sensing data were used that provided sufficient information to assess impacts. Based on the potential impact at the vegetation group level, the EPA considers that clearing within the Mine Site Area Development Envelope is unlikely to have a significant impact on the viability of regional vegetation groups and their associated vegetation communities.

Flora

A total of 324 flora species were recorded during the flora and vegetation surveys within Tenement E69/535 (which includes the Mine Site Area Development Envelope), representing 45 families and 130 genera.

No Threatened Ecological Communities (TECs), Priority Ecological Communities (PECs), Declared Rare Flora (DRF) listed under the *Wildlife Conservation Act 1950*, or Threatened flora species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were recorded within the proposed Mine Site Area Development Envelope.

The following 4 Priority flora species were recorded within the survey area:

- *Menkea lutea* (Priority 1);
- *Goodenia lunata* (Priority 1);
- *Euphorbia inappendiculata* (Priority 2); and
- *Calotis latiuscula* (Priority 3).

Menkea lutea was recorded in the southern portions of the survey area. A small number of individuals were recorded near the accommodation village disturbance footprint. The majority of the occurrences of this species were recorded outside the proposed disturbance footprint.

Goodenia lunata was recorded at one location outside the proposed disturbance footprint. *Euphorbia inappendiculata* was recorded at a single location at the western edge of the survey area and outside Tenement E69/535. *Calotis latiuscula,* a Priority 3 species was recorded at two locations during the surveys, one of which was within the proposed disturbance footprint. However, this species has been recorded at numerous locations in the region.

The location of the priority species at the south and south-western edge of the study area, predominantly outside the proposed impact areas the Mine Site Area Development Envelope, indicate that impacts are likely to be minimal.

Central Officer Basin borefield

Vegetation

Six vegetation communities were identified within six regional vegetation groups within the proposed Central Officer Basin Borefield Development Envelope during the flora and vegetation surveys.

Table 4 below lists the percentage of the mapped regional extent of each broad scale regional vegetation group that is located within the Central Officer Basin Borefield Development Envelope. Table 4 also shows how the vegetation communities referred to in the PER document relate to the reclassified broader regional scale vegetation groups.

Table 4: Central Officer Basin borefield vegetation communities

Regional vegetation groups	Vegetation communities	Mapped regional extent (ha)	Mapped extent within the development envelope (ha)	Percentage of the mapped regional extent within the development envelope
1 – *Eucalyptus socialis* on plains	5	63,231	<31	<0.05%
2 – *Acacia aneura* on plains	4a 4b	193,556	<31	<0.01%
3 – *Eucalyptus gamopylla* on plains	3			
4 – Mixed *Eucalyptus* species / *Acacia aneura* / *Triodia* species on lower slopes	Not recorded	237,012	<31	<0.01%
5 – *Eucalyptus gongylocarpa* Grasslands on broad dunes	1			
6 – *Eucalyptus youngiana* on high dunes	2			

Table 4 indicates that clearing within the Central Officer Basin Borefield Development Envelope is unlikely to have a significant impact on the viability of regional vegetation groups and their associated vegetation communities, as there is only a small area of the mapped extent of the vegetation groups within the development envelope.

Flora

A total of 163 flora species from 32 families and 87 genera were recorded during the flora and vegetation surveys within Tenement L69/12 (which includes the Central Officer Basin Borefield Development Envelope).

No TECs, PECs, DRF listed under the *Wildlife Conservation Act 1950* or Threatened flora species listed under the EPBC Act were recorded within Tenement L69/12.

The following five Priority flora species were recorded within Tenement L69/12 (which includes the Central Officer Basin Borefield Development Envelope) during the flora and vegetation surveys:

- *Neurachne lanigera* (Priority 1);
- *Aristida jerichoensis* var. *subspinulifera* (Priority 3);
- *Calotis latiuscula* (Priority 3);
- *Goodenia modesta* (Priority 3); and
- *Stackhousia clementii* (Priority 3).

Neurachne lanigera was not recorded within 10 m of the proposed drill pads, drill line, or access track. The remaining Priority 3 species were predominantly recorded outside the Central Officer Basin Borefield Development Envelope.

However, five populations containing 98 individuals of the newly discovered flora species, *Goodenia* sp. aff. *quasilibera* (L. Ransom 868), were recorded within 10 m of the Central Officer Basin borefield access track and drill line route. The EPA understands that once this species has been formally described it is likely to be eligible for listing as a Priority 1 flora species. The EPA also understands that this new species has only been collected from two locations, one of which is in the proposal area. Neither of these locations is within a conservation reserve.

The EPA notes that a recommended alternative water supply borefield access track and drill line route was provided in the PER document (Figures 5, 6, 7 and 8 in Appendix H6) to minimise the impacts to *Goodenia* sp. aff. *quasilibera* (L. Ransom 868) from construction activities.

The proponent has advised the EPA that after the vegetation surveys within Tenement L69/12 were completed, a Programme of Works (PoW) was submitted to the Department of Mines and Petroleum (DMP) in November 2011 which covered access track construction, drill base line construction, drill pad construction, and a drilling program within Tenement L69/12. The PoW was approved by the DMP in January 2012, and as a result of the above sequence of works, the water supply borefield access track, drill line route, and drill pads were re-aligned along the above mentioned alternative route prior to the commencement of construction. The proponent has committed to using the re-aligned access track and drill line route.

To ensure that impacts to *Goodenia* sp. aff. *quasilibera* (L. Ransom 868) at the species and population level are minimised, the EPA has recommended that Condition 6 be imposed.

Water supply pipeline corridor route

Vegetation

Surveys identified 10 vegetation communities within seven regional vegetation groups within the proposed water supply pipeline corridor route during the flora and vegetation surveys.

Table 5 below lists the percentage of the mapped regional extent of each broad scale regional vegetation group that is located within the Water Supply Pipeline Corridor Route Development Envelope. Table 5 also shows how the vegetation communities referred to in the PER document relate to the reclassified broader regional scale vegetation groups.

Table 5: Water supply pipeline corridor route vegetation communities

Regional vegetation groups	Vegetation communities	Mapped regional extent (ha)	Mapped extent within the development envelope (ha)	Percentage of the mapped regional extent within the development envelope
R3 – *Eucalyptus socialis* Mallee on low hills and lower slopes	10	3,699	12.5	0.3%
R15 – *Grevillea juncifolia* on plains	9	23,313	<168	<0.7%
R8 – *Acacia aneura* on plains	4	193,556	<168	<0.09%
R11 – *Eucalyptus gamophylla* on plains	Not recorded			
R14 – *Acacia ligulata* – *Grevillea stenobotrya* – *Aluta maisonneuvei* on dunes	8	1,348	5.4	0.4%
R6 – *Eucalyptus camaldulensis* on drainage lines	6	Not mapped but widespread and common throughout central Australia	<168	N/A Insignificant
R7 – *Acacia aneura* on stony and calcareous sites	1 2 3 5 7			

Table 5 indicates that clearing within the Water Supply Pipeline Corridor Route Development Envelope is unlikely to have a significant impact on the viability of regional vegetation groups and their associated vegetation communities, as there is only a small area of the mapped extent of the vegetation groups within the development envelope.

Flora

A total of 180 flora species from 35 families and 102 genera were recorded during the flora and vegetation surveys within the proposed Water Supply Pipeline Corridor Route Development Envelope.

No TECs, PECs, DRF listed under the *Wildlife Conservation Act 1950* or Threatened flora species listed under the EPBC Act were recorded within the proposed water supply pipeline corridor route development envelope.

The following four Priority flora species were recorded within the Water Supply Pipeline Corridor Route Development Envelope during the flora and vegetation surveys:

- *Aristida jerichoensis* var. *subspinulifera* (Priority 3);
- *Calotis latiuscula* (Priority 3);
- *Goodenia modesta* (Priority 3); and
- *Stackhousia clementii* (Priority 3).

These flora species are widely distributed in the Australian arid zone and are unlikely to be significantly impacted by this development.

Summary

The EPA considers that vegetation clearing associated with the Wingellina Nickel Project is unlikely to result in any significant impacts to the diversity of flora and vegetation on a regional scale given the relatively minor impacts to conservation significant flora species and the widespread distribution of the affected vegetation types outside the proposal development envelopes based on the information in Tables 3, 4, and 5. Consistent with Position Statement No. 3, the EPA considers that the proponent has proposed reasonable measures to avoid impacts and the impacts to flora and vegetation will not result in unacceptable loss or compromise the regional biodiversity.

Having particular regard to the:

(a) relevant EPA policy and guidance pertaining to flora and vegetation;

(b) results obtained from the flora and vegetation surveys which indicate that no TECs, PECs, DRF, or Threatened flora species were recorded within the proposed mine site, Central Officer Basin borefield, and water supply pipeline corridor route development envelopes; and

(c) relatively minor impacts to conservation significant flora species and vegetation located within the mine site area, Central Officer Basin borefield, and water supply pipeline corridor route development envelopes,

the EPA considers that the proposal can be managed to meet the EPA's objectives for flora and vegetation provided that Condition 6 is imposed to minimise the impacts of the construction activities on *Goodenia* sp. aff. *quasilibera* (L. Ransom 868) at the species and population level.

3.3 Rehabilitation and decommissioning (Integrating factor)

The EPA's environmental objective for this factor is to *ensure that premises are decommissioned and rehabilitated in an ecologically sustainable manner*.

Relevant EPA policy and guidance

The EPA policy and guidance applicable to Rehabilitation and Decommissioning for this assessment and relevant matters discussed in the policy and guidance are outlined in Appendix 4. The EPA considers that the following policy and guidance is relevant to its assessment of the proposal in relation to this factor:

- Environmental Protection Bulletin No. 19 – *EPA involvement in mine closure* (EPA 2015c); and
- *Guidelines for preparing mine closure plans* (DMP & EPA 2015).

The PER referred to the 2011 version of the *Guidelines for preparing mine closure plans* and the 2013 version of Environmental Protection Bulletin No. 19, which were revised during preparation of the PER. The changes to Environmental Protection Bulletin No. 19 in the revised 2015 version reflect the changes to the factor and objective for Rehabilitation and Decommissioning, consistent with the updates to the revised Environmental Assessment Guideline No. 8 *Environmental Principles, Factors and Objectives* (EPA, 2015a).

Key updates to the 2015 version of the *Guidelines for preparing mine closure plans* include making the mine closure plan requirements at each stage of a mining operation clearer, reflecting a risk-based approach, and clarifying the general structure and content of Mine Closure Plans. The proponent acknowledges the 2015 version in the Response to Submissions document (SNC Lavalin-Australia Pty Ltd 2016, Appendix 6). The EPA considered the current versions of Environmental Protection Bulletin No. 19 and the *Guidelines for preparing mine closure plans* in its assessment as they set out the EPA's current policy position, and the content, in relation to the EPA's assessment, is not materially different from the versions referred to in the PER.

EPA assessment

The EPA identified Rehabilitation and Decommissioning as a preliminary key factor in the ESD due to the proximity of the Wingellina townsite to the large

scale landforms that would remain at closure, including tailings storage facilities and pit lakes. This is consistent with Environmental Protection Bulletin No. 19, that the EPA will assess mine closure if a certain aspect of mine closure poses a high environmental risk.

The proponent has undertaken a risk based assessment of decommissioning, mine closure and rehabilitation as part of its feasibility investigations for the proposed Wingellina Nickel Project. The most significant risks would be:

- a failure to rehabilitate the TSF and the waste rock storage facilities due to the presence of dispersive and sodic materials; and
- impacts to humans from the open pits and pit lakes.

The EPA notes that the proponent considered the 2011 version of the *Guidelines for Preparing Mine Closure Plans* during the preparation of the Mine Closure Plan (MCP) that the proponent provided during the assessment. The MCP was prepared in November 2014, prior to the release of the current 2015 version (DMP & EPA 2015) in May 2015. As stated previously, there are no material changes in the requirements between the 2011 and 2015 versions of the MCP. The EPA considered that the MCP provided with the PER was acceptable for its assessment as it is consistent with the 2015 version of the guidelines and it would be updated and refined throughout the life of the mine (consistent with both the 2011 and the current 2015 version of the MCP guidelines). The proponent acknowledges in the Response to Submissions document (SNC Lavalin-Australia Pty Ltd 2016, Appendix 6) that they will review rehabilitation and closure outcomes and revise the MCP as per the 2015 guidelines.

The MCP addresses closure objectives and completion criteria, legal compliance, post-mining landforms, ecosystem function and rehabilitation, stakeholder consultation, and the decommissioning of mining infrastructure (Refer to Table 14.3 in the PER document). The MCP is a live document that would be updated refined throughout the life of the mine. The PER document indicates that a measurement approach and quantitative standard values would be developed in accordance with these criteria, and presented within subsequent revised versions of the MCP. Where applicable, criteria would be measured against local target ecosystems, which would form the basis for the quantitative standard values. Rehabilitation would be undertaken progressively.

The MCP describes material characterisation to inform the risk assessment of waste landforms after the mine closes. As the waste rock that would be stored in the waste rock storage areas is non-acid forming, specific management measures such as segregation / isolation would not be required. The waste rock storage areas would be designed and constructed to be stable to minimise geotechnical and erosion risk during operations and after the mine closes.

The proponent undertook a Final Void Assessment as part of the MCP. Pit lakes are expected to form once mining activities cease and are predicted to function as groundwater sinks once dewatering ceases, as the stabilised groundwater levels are predicted to remain well below the regional water level. The water in

the pits is expected to become saline over time as evapotranspiration greatly exceeds rainfall. As groundwater is predicted to flow towards the pits, any changes in water quality within the pits are not expected to impact on the regional groundwater system.

The EPA's view is that the MCP contains an appropriate level of detail, consistent with the *Guidelines for Preparing Mine Closure Plans* for the Environmental Impact Assessment stage of the proposal. The EPA notes that the water level and salinity concentration predictions were based on modelling for the first 30 years of water level recovery. The EPA expects that the predictive modelling of pit lake water levels and quality would be subject to on-going refinement as more data becomes available during operations to inform and optimise the closure strategy for the pit lakes. This would include consideration of the accumulation of salts over time, and the percolation of salts from the pit walls into the pit lakes. The EPA expects that each future version of the MCP should include an updated pit lake assessment that would contain longer term modelling that includes an analysis of:

- groundwater flow and levels to confirm that the pit lake would be a sink and that there would be no impacts to the surrounding groundwater; and
- chemical interactions between the pit water and walls and an analysis other water quality parameters (as well as salinity) to better predict future pit lake water quality.

The MCP proposes monitoring in relation to pit lakes. The EPA also expects post-closure monitoring of the pit lakes to continue over a long period of time (i.e. decades) until the pit lake models can be optimised and validated.

Summary

Having particular regard to the:

(a) relevant EPA policy and guidance pertaining to Rehabilitation and Decommissioning; and

(b) the MCP prepared by the proponent,

the EPA considers that the proposal can be managed to meet the EPA's objectives for rehabilitation and decommissioning, provided that a condition is imposed that:

- requires a Mine Closure Plan to be prepared in accordance with the *Guidelines for Preparing Mine Closure Plans,* May 2015 (or any subsequent revisions of the guidelines), that includes:
    - pit lake models are regularly updated with additional information obtained during operations and post-closure;
    - post-closure monitoring of the pit lake occurs through the mine closure planning process until pit lake models can be optimised and validated to predict future water quality; and

- requires the Mine Closure Plan to be reviewed and revised at intervals not exceeding three years.

The DMP did not raise any issues related to Rehabilitation and Decommissioning during the assessment. In the submission received from the DMP during the public review period, the DMP advised that it considers that the progressive rehabilitation and trials/investigations that the proponent proposes to use to refine rehabilitation techniques is best practice and encouraged. The DMP also advised that it considers that the MCP and associated rehabilitation activities are appropriate for the identified closure issues, and that the associated risks could be adequately regulated and managed under the *Mining Act 1978* (Mining Act).

According to Environmental Protection Bulletin No. 19, the EPA will regulate mine closure if it assessed Rehabilitation and Decommissioning as a key factor. The EPA notes that a Mine Closure Plan prepared in accordance with the *Guidelines for preparing mine closure plans* is a statutory obligation (not a discretionary decision) under the Mining Act and that the *Guidelines for preparing mine closure plans* is a joint document prepared by the DMP and EPA to meet both Mining Act and EP Act regulatory requirements. The DMP has confirmed that it would require a MCP as a condition of the Mining Lease under section 74 of the Mining Act. The EPA's view is that the requirements of the condition for this proposal can be adequately regulated through the Mining Act, rather than a condition under Part IV of the EP Act.

4. Conditions

Section 44 of the EP Act requires that this assessment report must set out:

- what the EPA considers to be the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

4.1 Recommended conditions

The EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Hinckley Range Pty Ltd to develop and operate the Wingellina Nickel Mine and associated infrastructure is approved for implementation.

These conditions are presented in Appendix 5. Matters addressed in the conditions include the following:

(a) condition 6 is imposed which requires a revised air quality management plan to minimise the impacts of atmospheric and particulate emissions;

(b) condition 7 is imposed to minimise impacts to *Goodenia* sp. aff. *quasilibera* (L. Ransom 868) at the species and population level.

The EPA notes that the DMP will regulate impacts related rehabilitation and decommissioning and would require a Mine Closure Plan that meets the requirements of the *Guidelines for preparing mine closure plans* (DMP & EPA 2015) as a condition of the Mining Lease under section 74 of the Mining Act.

4.2 Consultation

In developing these conditions, the EPA consulted with the proponent and the Department of Environment Regulation, Department of Health, Department of Mines and Petroleum, Department of Water, the Department of Aboriginal Affairs, and the Shire of Ngaanyatjarraku on matters of fact, technical feasibility and potential difficulties with implementation.

5. Recommendations

That the Minister for Environment notes:

1. that the proposal assessed is for the development and operation of the Wingellina Nickel Mine and associated infrastructure;
2. the key environmental factors identified by the EPA in the course of its assessment set out in Section 3; and
3. that the EPA has concluded that the proposal may be implemented to meet the EPA's objectives, provided the implementation of the proposal is carried out in accordance with the recommended conditions and procedures set out in Appendix 5 and summarised in Section 4.

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Appendix 1

List of submitters

Organisations:

1. Department of Aboriginal Affairs
2. Department of Environment Regulation
3. Department of Health
4. Department of Mines and Petroleum
5. Department of Water
6. Ngaanyatjarra Media Aboriginal Corporation

Appendix 2

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Appendix 3

Summary of identification of key environmental factors and principles

Summary of identification of key environmental factors

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
LAND			
Flora and vegetation	Approximately 2,762 ha of native vegetation will be cleared within the proposed Mine Site Area Development Envelope. An additional 211 ha of native vegetation will be cleared within the proposed Central Officer Basin Borefield Development Envelope and Water Supply Pipeline Corridor Route Development Envelope.	No submissions were received in relation to this factor.	Having regard to the scale of vegetation clearing that will be undertaken and the potential for conservation significant flora and vegetation to be impacted, the **EPA identified Flora and Vegetation as a key environmental factor.**
Terrestrial fauna	The clearing of up to 2,973 ha of native vegetation for the Wingellina Nickel Project has the potential to impact on terrestrial fauna through direct loss and the loss of suitable habitat.	No submissions were received in relation to this factor.	Terrestrial fauna was identified as a preliminary key environmental factor in the ESD for the proposal. Having regard to EPA Guidance Statement No. 56 – *Fauna Surveys for Environmental Impact Assessment in WA* (2004b) and Environmental Assessment Guideline 9 - *Application of a Significance Framework in the Environmental Impact Assessment Process* (EPA, 2015b) and given: • the existing impact to fauna habitats from grazing and fire in

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
			the Mine Site Area Development Envelope; and • the low number of records of conservation significant (Priority) fauna, the EPA considers that it is unlikely that the proposal would have a significant impact on terrestrial fauna and the proposal can meet the objectives for this factor. Accordingly, **the EPA did not identify Terrestrial Fauna as a key environmental factor** at the conclusion of its assessment.
Subterranean fauna	Pit dewatering and groundwater abstraction has the potential to impact on groundwater habitat used by stygofauna. Mining and related ground disturbance activities could potentially impact on troglofauna habitat.	No submissions were received in relation to this factor.	Subterranean fauna was identified as a preliminary key environmental factor in the ESD for the proposal. No obligate subterranean fauna species were recorded in the Mine Site Area Development Envelope or the Central Officer Basin Borefield Development Envelope from surveys. The proposal area does not contain suitable habitat for subterranean fauna. Having regard to Environmental Assessment Guideline 12 –

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
			Consideration of subterranean fauna in EIA in WA (EPA, 2013b) and EAG 9 - *Application of a Significance Framework in the Environmental Impact Assessment Process* (EPA, 2015b) and given: • the lack of suitable subterranean fauna habitat; and • the absence of stygofauna species within the Mine Site Area Development Envelope, the EPA considers that it is unlikely that the proposal would have a significant impact on subterranean fauna and the proposal can meet the objectives for this factor. Accordingly, **the EPA did not identify Subterranean Fauna as a key environmental factor** at the conclusion of its assessment.
WATER			
Hydrological processes	There may be impacts to aquifers and the ecosystems they support (including subterranean fauna habitat and groundwater dependent	**Department of Water** The DoW, under the *Rights in Water and Irrigation Act 1914* (RiWI Act), is responsible for the licensing of water abstraction. In regards to the above proposal this includes mine pit dewatering and the taking of	Hydrological Processes was identified as a preliminary key environmental factor in the ESD for the proposal. Having regard to Environmental Assessment Guideline 9 - *Application*

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
	vegetation) from dewatering, seepage from the waste rock storage areas, water storage facility, and TSF, and the abstraction of groundwater from the Central Officer Basin borefield	groundwater for processing and dust suppression requirements. The subject site is located in the East Murchison Groundwater Area, proclaimed under the RiWI Act 1914. The subject site is not a proclaimed surface water area under this Act. The DoW has previously reviewed the draft PER and provided advice to the Office of the Environmental Protection Authority that the level of hydrological investigation and assessment for Wingellina pit dewatering and the associated Officer Basin water supply borefield is sufficient to indicate that impacts on the environment, other users, and aquifer system groundwater resources is acceptable. Therefore, the DoW has no further comments to provide and is satisfied with the final PER.	*of a Significance Framework in the Environmental Impact Assessment Process* (EPA, 2015b) and given: • the lack of suitable subterranean fauna habitat; and • that there is unlikely to be groundwater dependent vegetation within the Mine Site Area Development Envelope, the EPA considers that it is unlikely that the proposal would have a significant impact on hydrological processes and the proposal can meet the objectives for this factor. Accordingly, **the EPA did not identify Hydrological processes as a key environmental factor** at the conclusion of its assessment. The EPA notes that the Department of Water will regulate abstraction of groundwater under the provisions of the RiWI Act.
Inland Waters Environmental Quality	There is the potential for impacts on groundwater quality during operations from the HPAL processing plant and seepage from the tailings storage facility (TSF) and waste rock	No submissions were received in relation to this factor.	Inland Waters was not identified as a preliminary key environmental factor in the ESD for the proposal. Tailings will be treated and neutralised prior to discharge to the TSF. Test pits within the TSF footprint indicate that

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
	storage areas. At closure there is the potential for impacts on groundwater from the TSF, waste rock storage areas and the pit lakes.		sandy clay is present to depths of between 0.6 m and 1.0 m. In view of the low permeability of this material the TSF will not require an artificial liner. The PER document indicates that seepage will be further reduced by the impermeable nature of the tailings. The waste rock that would be stored in the waste rock storage areas is non-acid forming. As a result, specific management measures such as segregation / isolation will not be required. The waste rock storage areas would be designed and constructed to be stable with respect to geotechnical and erosion risk. Pit lakes are expected to form once mining activities cease. The pit lakes are predicted to function as groundwater sinks once dewatering ceases. As groundwater is predicted to flow towards the pits, any changes in water quality within the pits are not expected to impact on the regional groundwater system, however there is uncertainty as to how the quality would change over time.

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
			Having regard to EAG 9 - *Application of a Significance Framework in the Environmental Impact Assessment Process* (EPA, 2015b) and given: • the treatment and neutralisation of the talings prior to discharge to the TSF; • the low permeability of the material in the area proposed for the TSF; and • the non-acid forming characteristics of the waste rock that will be stored in the waste rock storage areas, the EPA considers that it is unlikely that the proposal would have a significant impact on Inland Waters Environmental Quality during operations and the proposal can meet the objectives for this factor. Accordingly, **the EPA did not identify Inland Waters Environmental Quality as a key environmental factor** at the conclusion of its assessment. The potential impacts from the the TSF and the pit lakes after closure of the mine is assessed under the key

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
			integrating factor of Rehabilitation and Decommissioning.
AIR			
Air quality and atmospheric gases	The discharge of atmospheric pollutants from the HPAL processing plant and fugitive dust emissions from the mine site has the potential to impact on the environment and human health and amenity at nearby sensitive receptors. Greenhouse gas emissions from the Wingellina Nickel Project also have the potential to impact on the environment.	**Department of Health** *Health Risk Assessment (HRA)* The air quality HRA follows the required format and considers appropriate contaminants of concern. As previously stated to the EPA, there are number of uncertainties and weaknesses in the HRA however given the ascribed level of risk these can be managed with appropriate dust management plans that include monitoring for nickel in PM_{10}. The PER has been updated to reflect these requirements and provided the plans are implemented and the predicted Ni concentration confirmed with appropriate monitoring, then the potential for any future risk can be determined early. **Ngaanyatjarra Media Aboriginal Corporation** The Review report raises and addresses a number of potential environmental impacts flowing from the development and conduct of the mining and processing of the nickel deposit at Wingellina. These include the production of airborne pollutants: sulfur dioxide, nitrogen dioxide and particulate matter.	Having regard to the potential impacts from the discharge of atmospheric pollutants from the HPAL processing plant and fugitive dust emissions from the mine site on the environment and human health and amenity at nearby sensitive receptors, the **EPA identified Air Quality and Atmospheric Gases as a key environmental factor.** The proposal predicted generation of greenhouse gases up to 520,000 tpa. The ESD required the evaluation of greenhouse gases as per EPA Guidance Statement 12 - *Minimising Greenhouse Gas Emissions* (EPA, 2002), in particular provide a greenhouse gas inventory and benchmarking against similar technologies. The proponent provided a greenhouse gas inventory and benchmarked against similar technologies in the PER (SNC Lavalin-Australia Pty Ltd

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
		Of particular concern to NG Media is the potential negative impact that all these pollutants may have on our extensive archive of important and irreplaceable historical material, much of which takes the form of audio and video that was produced using magnetic tape formats like VHS, SuperVHS, MiniDV, and Betacam among others. The archive is currently stored in a temperature controlled room within the Media Centre at Wingellina and has recently been independently assessed to be of national significance (please see attached report –*Assessment of Historical Significance*, Vikki Plant, June 2015). While the models used for the PER predict that the concentrations of the airborne pollutants listed above should not exceed allowable limits with regard to Air Quality standards and goals in relation to potential negative human health impacts, no assessment has been made of the potential negative impact on the material in an archive such as ours While these comments are general in nature and do not specifically address the results from the data model used for the PER, they indicate that the presence of all three cited pollutants does pose some risk to the archive, particularly given the expected long duration of the mine life compared to the much shorter timeframes for potential damage, and that that risk exists at much lower levels of pollutants than those acceptable for human health. However, without specific data and modeling relevant to the air quality in the archive itself,	2015). The proponent confirmed in the PER that the proposal would generate approximately 500,000 tonnes (0.5 Mt) of carbon dioxide equivalent (CO_2-e) greenhouse gas emissions per year during normal operations. Environmental Protection Bulletin No. 24 – *Greenhouse gas emissions and consideration of projected climate change impacts in the EIA process* (EPA 2015), replaced Guidance Statement 12 in September 2015, after the PER document was finalised. Environmental Protection Bulletin No. 24 states that applying a significance framework as set out in Environmental Assessment Guideline No. 9, the EPA may decide to assess greenhouse gas emissions if a proposal's expected total greenhouse gas emissions are deemed to be significant. The EPA defines this as proposals that have the potential to significantly increase the State's greenhouse gas emissions, which totalled 70.5 Mt of CO_2-e in 2011-12. The EPA considers that the predicted emissions of 0.5 Mtpa (0.7% of the State's greenhouse gas emissions of

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
		it is not possible to ascertain exactly what level of increased risk would exist. It seems to me that the options for eliminating or mitigating the risk to the archive would be as follows: 1. An agreement is reached between the community and the mine developers to re-locate the community (including the Media Centre and its resident archive) to a location away from the mine site. Such a re-location would eliminate all risks to the archive from the mining and processing of the ore. (Obviously, delays to relocation would place the archive at risk for that period from the commencement of construction until the move actually happened); or 2. Measurement and modeling is undertaken by the mine developers to assess the risk of sulfur dioxide, nitrogen dioxide and increased particulate material penetrating to the air within the archive and appropriate steps taken to eliminate (as far as is possible) these contaminants. Alongside of this, work should be done to complete the digitisation of the assets held by the archive so that the content can be safely secured for posterity. (Digitisation is an ongoing project. Some digitisation of the assets has been completed already, but it is heavily reliant on sufficient funding. The National Library of Australia is one possible source – preliminary steps, such as the Significance Assessment,	70.5 Mt of CO_2-e in 2011-12) does not have the potential to significantly increase the State's greenhouse gas emissions. The EPA applied this guidance, as it reflects the EPA's current policy position. Therefore, the EPA did not assess greenhouse gas emissions further as part of the key environmental factor of Air Quality and Atmospheric Gases.

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
		have already been undertaken with a view to securing sufficient funds in the future. Part of the mine developers risk mitigation plan could include support to complete the digitisation process as quickly as possible). 3. Parts of the collection of Ngaanyatjarra Media have been described as "rare and irreplaceable" and much of it as "rare, ground breaking yet vulnerable" (page 15, *Plant, 2015*). As such, whatever measures are needed to safeguard these items for the future should be taken. While the archive is a 'man-made' feature of the local environment, it is pre-existing to the commencement of the mine and should be assessed as part of the environmental impact studies.	
PEOPLE			
Amenity	The amenity of nearby sensitive receptors may be affected by fugitive particulate emissions, noise and vibration, light spill, and increased road and air traffic movements.	No submissions were received in relation to this factor.	Amenity was identified as a preliminary key environmental factor in the ESD. Having regard to Guidance Statement No. 3 - *Separation distance between industrial and sensitive land uses* (EPA 2005), Environmental Assessment Guideline No. 13 - *Consideration of environmental impacts from noise* (EPA 2014), and Environmental Assessment Guideline

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
			9 - *Application of a Significance Framework in the Environmental Impact Assessment Process* (EPA 2015b) and given that: • predicted fugitive particulate emission concentrations and noise and vibration levels at nearby sensitive receptors complying with applicable criteria; and • impacts from light spill are not expected to be significant at nearby sensitive receptors, the EPA considers that it is unlikely that the proposal would have a significant impact on amenity and the proposal can meet the objectives for this factor. Accordingly, **the EPA did not identify Amenity as a key environmental factor** at the conclusion of its assessment. The EPA notes that the ESD refers to draft Guidance Statement No. 8. *Environmental* Noise (EPA 2007), which was replaced by Environmental Assessment Guideline No. 13 in September 2014. The proponent considered Environmental Assessment Guideline No. 13 in the PER. The EPA considered this guidance in its assessment, as it

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
			reflects the EPA's current policy position and was in place when the PER was released for public review.
Heritage	There are two aboriginal heritage sites located within the project area that will be impacted by construction activities.	**Department of Aboriginal Affairs** DAA has reviewed the relevant information and can confirm that there are currently 46 Aboriginal heritage places known to DAA as being located either wholly or partially within tenement E69/535 (the Project Area). It is noted that the Proponent has commissioned a number of heritage surveys over the Project Area between 2001 and 2008 in consultation with the Ngaanyatjarra Council, Traditional Owners of the area and Artefaxion. It is understood that these surveys have identified the presence of 35 archaeological places and ten ethnographic 'exclusion zones' on the tenement. It is also understood that all ten of the exclusion zones and 33 of the 35 archaeological places can currently be avoided by the proposed works and that the Proponent will seek consent under section 18 of the *Aboriginal Heritage Act 1972* (the AHA) to impact heritage places that cannot be avoided prior to any ground disturbance in those areas. It is further noted that the Proponent holds a mining agreement with the Traditional Owners and Native Title Holders of the Project area and that the agreement	Heritage was identified as a preliminary key environmental factor in the ESD. Having regard to Guidance Statement No. 41 – *Assessment of aboriginal heritage* (EPA 2004) and EAG 9 - *Application of a Significance Framework in the Environmental Impact Assessment Process* (EPA 2015b) and given that: • the proposal has been designed to avoid designated exclusion zones defined by the Traditional Owners, the EPA considers that it is unlikely that the proposal would have a significant impact on heritage and the proposal can meet the objectives for this factor. Accordingly, **the EPA did not identify Heritage as a key environmental factor** at the conclusion of its assessment.

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
		includes mechanisms for the protection and management of Aboriginal heritage. DAA advises that any potential impacts to Aboriginal heritage from the Proposal can be addressed through the mechanisms established in the mining agreement discussed above and the provisions of the AHA. DAA has released Aboriginal Heritage Due Diligence Guidelines (the Guidelines) to assist developers with planning and considering Aboriginal heritage during proposed works. It is recommended that the developer be made aware of the Guidelines. A copy of the Guidelines can be found on the DAA website at: http://www.daa.wa.gov.au/globalassets/pdf-files/ddg.	
Human health	The discharge of atmospheric pollutants from the HPAL processing plant and fugitive dust emissions from the mine site; noise and vibration from mining operations; and asbestiform materials, have the potential to impact on human health at nearby sensitive receptors.	**Department of Health** *Asbestiform Materials* It is noted that the mining location appears to coincide with medium probability of encountering asbestiform minerals based on the DMP state map of their occurrence. The PER document appears to omit reference to the potential for asbestiform minerals and their management, however in a subsequent email to the department evidence was provided that asbestiform material was not identified in over 50 diamond drill holes made over the intended mine site. As this issue has the potential to cause serious public health impact the EPA is to require the proponent to provide this	Human Health was identified as a preliminary key environmental factor in the ESD. In its response on the submission relating to asbestiform materials, the proponent notes that asbestiform materials have not been found at Wingellina during exploration activities. Based on recent Geological Survey of Western Australia mapping, there is a very low probability of the rocks in the Wingellina proposal development envelopes containing asbestiform materials.

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
		information to the EPA as evidence that asbestiform material has been considered. *Health Impact Assessment (HIA)* The HIA assessed the risks identified in the HRA against potential benefits the development may bring to the community. A number of socio-economic plans have been slated for development in consultation with the local community which if realised over time may greatly benefit the community. DOH is aware that the low level of literacy and numeracy in the community may serve as barriers to fully realising opportunities, however this should not serve as a deterrent for engaging with existing service providers in the region (government or private), to facilitate community engagement or to implement environmental health improvement programs. *Water Supply and Wastewater Disposal* The proponents are advised to address the following in due course: • Installation of wastewater treatment and disposal system/s associated with the accommodation village and worksite requiring separate approval of the DOH. • Potable water quality must be of the standard as specified under the *Australian Drinking Water Guidelines 2004*.	The proponent has also advised that prior to construction and ground disturbance, a Project Management Plan containing a risk assessment and an Asbestos Management Plan detailing required management measures needs to be approved by the DMP. Having regard to Guidance Statement No. 3 - *Separation distances between industrial and sensitive land uses* (EPA 2005), EAG No. 13 - *Consideration of environmental impacts from noise* (EPA 2014), and EAG 9 - *Application of a Significance Framework in the Environmental Impact Assessment Process* (EPA 2015b) and given: • there is a low probability of asbestiform materials occurring within the proposal development envelope; • noise and vibration levels at nearby sensitive receptors will comply with applicable criteria; and • impacts from light spill are not expected to be significant at nearby sensitive receptors,

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
			the EPA considers that it is unlikely that the proposal would have a significant impact on human health and the proposal can meet the objectives for this factor. Accordingly, **the EPA did not identify Human Health as a key environmental factor** at the conclusion of its assessment. The EPA notes that the DMP has confirmed that if the presence of asbestiform materials is likely, a Fibrous Minerals Management Plan would be required under the *Mines Safety and Inspection Act 1994.* The potential impacts from the discharge of atmospheric pollutants from the HPAL processing plant and fugitive dust emissions from the mine site on the environment and human health and amenity at nearby sensitive receptors is assessed under the key environmental factor of Air Quality and Atmospheric Gases.
INTEGRATING FACTORS			
Rehabilitation and decommissioning	The most significant residual risks to rehabilitation and	**Department of Mines and Petroleum**	Having regard to the proximity of the Wingellina townsite and large scale closure landforms, including tailings

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
	decommissioning were identified as being a failure to rehabilitate the TSF and the waste rock storage facilities due to the presence of dispersive and sodic materials, the potential impacts to humans from open mine pits and pit lakes.	A review of the Public Environmental Review document has been conducted and DMP provides the following comments: • The proposed practice of progressive rehabilitation and trials/investigations to refine rehabilitation techniques is considered best practice and widely encouraged by the Department of Mines and Petroleum (DMP). • DMP considers that the Mine Closure Plan (MCP) and associated rehabilitation activities are appropriate to the identified closure issues and the associated risks may be adequately managed under the *Mining Act 1978*. • When considering the environmental impacts and the potential for suitable rehabilitation and closure outcomes, DMP supports further investigation of open pit backfilling as an option for waste rock management and/or tailings management. It is however acknowledged that considerations other than environmental must also be taken into account. • Under the *Mining Act 1978*: - the MCP will need to be revised in accordance with the Guidelines for Preparing Mine Closure Plans (2015) for submission with the Mining Proposal. - Legal and appropriate tenure will be required for the proposed pipeline corridor prior to the submission of approval documentation to DMP.	storage facilities and pit lakes, that will need to be rehabilitated following the cessation of mining, the **EPA identified Rehabilitation and Decommissioning as a key integrating factor.**

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
Offsets	Potential residual impacts associated with the clearing of up to 2,973 ha of native vegetation.	No submissions were received in relation to this factor.	Offsets was identified as a preliminary key environmental factor in the ESD for the proposal. Having regard to the Environmental Protection Bulletin No. 1 - *Environmental offsets - Biodiversity*, EPA (2014), the *WA Environmental Offsets Policy* (2011), and the *WA Environmental Offsets Guidelines* (2014), and given that significant residual impacts are not expected as impacts can be managed through the avoidance of areas of environmental value and the implementation of mitigation actions, the EPA considers that it is unlikely that the proposal would have a significant residual impact. Accordingly, **the EPA did not identify Offsets as a key integrating factor** at the conclusion of its assessment. The EPA notes that the ESD and PER refer to Position Statement No 9 - *Environmental Offsets* (EPA 2006), EPA (2008) Guidance Statement No. 19 - *Environmental Offsets – Biodiversity* (EPA 2008) and the 2008 version of Environmental Protection Bulletin No. 1. These were replaced

Environmental factors	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of whether a factor is a key environmental factor
			by the *WA Environmental Offsets Guidelines* (2014) and the 2014 version of Environmental Protection Bulletin No. 1 in August 2014. The EPA considered this current guidance in its assessment, as it reflects the EPA's current policy position.

Summary of identification of principles

PRINCIPLES	
Environmental principles of the EP Act	
Principle	**Consideration**
1. The precautionary principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In application of this precautionary principle, decisions should be guided by –* *a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *b) an assessment of the risk-weighted consequences of various options.*	In considering this principle, the EPA notes that Air Quality and Atmospheric Gases; Flora and Vegetation; and Rehabilitation and Decommissioning could be significantly impacted by this proposal. The assessment of these impacts is provided in this report. Investigations on the biological and physical environment undertaken by the proponent have provided sufficient certainty to assess risks and identify measures to avoid or minimise impacts. The EPA has recommended conditions to ensure relevant measures are undertaken by the proponent. From its assessment of this proposal, the EPA has concluded that there is not a threat of serious or irreversible harm.
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.*	In considering this principle, the EPA notes that the proponent has proposed measures to avoid, minimise, rehabilitate impacts in accordance with the mitigation hierarchy in the *WA Environmental offsets guidelines* (Government of Western Australia, 2014). In assessing this proposal the EPA has recommended that a condition be imposed on the proponent in relation to managing impacts on flora. A Mine Closure Plan will also be required under the *Mining Act 1978* or the EP Act consistent with the *Guidelines for preparing mine closure plans* (DMP & EPA 2015) to ensure that the post-mine environment is ecologically sustainable. From its assessment of this proposal, the EPA has concluded that the health, diversity and productivity of the environment can be maintained and enhanced for the benefit of future generations.
3. The principle of the conservation of biological diversity and ecological integrity	In considering this principle, the EPA notes that the proposal would result in impacts to the newly discovered flora species, *Goodenia* sp. aff. *quasilibera* (L.

PRINCIPLES	
Conservation of biological diversity and ecological integrity should be a fundamental consideration.	Ransom 868) flora species which is likely to be eligible for listing as a Priority 1 flora species. . In assessing the proposal the EPA has considered these impacts and has taken into account measures proposed by the proponent to minimise impacts to the affected species and has recommended a condition to manage the impacts. The EPA has concluded that the proposal would not compromise the biological diversity or ecological integrity within this IBRA region. Through this assessment, the EPA has demonstrated that the conservation of biological diversity and ecological integrity was a fundamental consideration.
4. Principles relating to improved valuation, pricing and incentive mechanisms *(1) Environmental factors should be included in the valuation of assets and services.* *(2) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.* *(3) The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.* *(4) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solution and responses to environmental problems.*	In considering this principle, the EPA notes that the proponent would bear certain costs relating to waste and pollution, including avoidance, containment, decommissioning, rehabilitation and closure. The proponent would also be responsible for the costs relating to rehabilitation and decommissioning. The EPA has demonstrated due regard to this principle during the assessment of this proposal.
5. The principle of waste minimisation	In considering this principle, the EPA notes that the proposal would generate atmospheric pollutants and liquid and solid wastes. The proponent would be expected to address the waste hierarchy and minimise the generation of unavoidable wastes. Liquid and solid waste created as a result of implementation

PRINCIPLES	
All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.	of the proposal would be disposed of according to relevant regulations and legislation. The EPA notes that the discharge of atmospheric pollutants and liquid and solid wastes can be adequately regulated by the DER via appropriate Works Approval and Licence conditions under Part V of the *Environmental Protection Act 1986*.
Environmental principles of the EPA	
1. Best practice *When designing proposals and implementing environmental mitigation and management actions, the contemporary best practice measures available at the time of implementation should be applied.*	In considering this principle, the EPA notes that, the proponent is proposing to use the "double contact – double absorption" process with a caesium catalyst in the H_2SO_4 production facility within the HPAL processing plant to minimise SO_2 and H_2SO_4 mist emissions. This is best practice technology for H_2SO_4 production. The proponent will also use dry low NO_X burners in the gas turbines and boilers to minimise NO_X emissions which is consistent with best practice.
2. Continuous improvement *The implementation of environmental practices should aim for continuous improvement in environmental performance.*	The PER document indicates that the various EMPs will be continually reviewed and updated as necessary within the overall environmental management system (EMS) adopted for the Wingellina Nickel Project proposal, to improve environmental performance over time.

Appendix 4

Relevant EPA Policies and Guidance and identified matters

The EPA reviewed its policies and guidance documents for each environmental factor to determine their relevance to the assessment of the proposal. The EPA has outlined the relevant matters discussed in each policy and guidance document for the key environmental factors below.

1. Air quality and atmospheric gases

The EPA considers that the following policy and guidance is relevant to its assessment of the proposal in relation to this factor:

- Guidance Statement No. 3 – *Separation distance between industrial and sensitive land uses* (EPA 2005); and
- Guidance Statement No. 55 – *Implementing best practice in proposals submitted to the environment impact assessment process* (EPA 2003).

Guidance Statement No. 3 – Separation distance between industrial and sensitive land uses

Relevant matters discussed in Guidance Statement No. 3 for this assessment include:

1. The EPA's approach to protecting the amenity of sensitive land uses from emissions from industrial land uses.
2. When and how to use the generic separation distances.
3. The approach if generic separation distances cannot be met.

Guidance Statement No. 55 – Implementing best practice in proposals submitted to the environment impact assessment process

Relevant matters discussed in Guidance Statement No. 55 for this assessment include:

1. All relevant environmental quality standards must be met.
2. Common pollutants should be controlled by proponents adopting Best Practicable Measures to protect the environment.
3. There is a responsibility for proponents not only to minimise adverse impacts, but also to consider improving the environment through rehabilitation and offsets where practicable.

2. Flora and vegetation

The EPA considers that the following policy and guidance is relevant to its assessment of the proposal in relation to this factor:

- Guidance Statement No. 51 – *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in WA* (EPA, 2004a);
- Position Statement No. 2 – *Environmental protection of native vegetation in Western Australia* (EPA 2000); and
- Position Statement No. 3 – *Terrestrial biological surveys as an element of biodiversity protection* (EPA 2002).

The EPA notes that the *Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment* was released in December 2015. This was after flora and vegetation surveys were undertaken for the proposal (and after the proponent's Response to Submissions on the PER), therefore the EPA did not consider this document for the assessment.

Guidance Statement No. 51 – Terrestrial flora and vegetation surveys for environmental impact assessment in WA

Relevant matters discussed in Guidance Statement No. 51 for this assessment include the following objectives:

1. Surveys are planned and designed appropriately.
2. The analysis, interpretation and reporting is of a suitable quality and consistent methodology to enable the EPA to judge the impacts of proposals on flora and vegetation.
3. The environment, in particular significant flora and vegetation biodiversity is identified and protected.

Position Statement No. 2 – Environmental protection of native vegetation in Western Australia

Relevant matters discussed in Position Statement No. 2 for this assessment include the following, in relation to the EPA's consideration of biological diversity in assessing a proposal:

1. No known species of plant or animal is caused to become extinct as a consequence of the development and the risks to threatened species are considered to be acceptable.
2. No association or community of indigenous plants or animals ceases to exist as a result of the project.
3. There would be an expectation that a proposal would demonstrate that the vegetation removal would not compromise any vegetation type by taking it below the "threshold level" of 30% of the pre-clearing extent of the vegetation type.
4. Where a proposal would result in a reduction below the 30% level, the EPA would expect alternative mechanisms to be put forward to address the protection of biodiversity.
5. There is a comprehensive, adequate and secure representation of scarce endangered habitats within the project area and/or in areas which are biologically comparable to the project area, protected in secure reserves.
6. The on-site and off-site impacts of the project are identified and the proponent demonstrates that these impacts can be managed.

Position Statement No. 3 – Terrestrial biological surveys as an element of biodiversity protection

Relevant matters discussed in Position Statement No. 3 for this assessment include the following:

1. The EPA expects proponents to demonstrate in their proposals that all reasonable measures have been undertaken to avoid impacts on biodiversity. Where some impact on biodiversity cannot be avoided, it is for the proponent to demonstrate that the impact will not result in unacceptable loss.
2. The EPA expects proponents to ensure that terrestrial biological surveys provide sufficient information to address both biodiversity conservation and ecological function values within the context of the type of proposal being considered and the relevant EPA objectives for protection of the environment.
3. In the absence of information that could provide the EPA with assurance that biodiversity will be protected, the EPA will adopt the precautionary principle.

Position Statement No. 3 refers to definitions, principles and objectives in the first national biodiversity strategy *National Strategy for the Conservation of Australia's Biological Diversity* (Commonwealth of Australia, 1996). The EPA notes that the most recent version of the strategy, *Australia's Biodiversity Conservation Strategy 2010–2030* (Commonwealth of Australia, 2010), refers to a shortened definition of biological diversity and contains different principles. The 2010 Strategy also notes that a review of the 1996 Strategy found it difficult to objectively measure performance against the qualitative objectives in the 1996 Strategy and that there have been shifts in environmental management approaches regarding biodiversity conservation. Therefore, the EPA has not considered the matters relating to the 1996 Strategy to be relevant for this assessment.

3. Rehabilitation and decommissioning

The EPA considers that the following policy and guidance is relevant to its assessment of the proposal in relation to this factor:

- Environmental Protection Bulletin No. 19 – *EPA involvement in mine closure* (EPA 2015c); and
- *Guidelines for preparing mine closure plans* (DMP & EPA 2015).

The EPA notes that Guidance Statement No. 6 – *Rehabilitation of Terrestrial Ecosystems* was prepared in 2006 to guide the preparation of documentation for the environmental impact assessment process of EPA and to help produce management plans to rehabilitate vegetation. The more recent *Guidelines for preparing mine closure plans* (2011 and revised 2015) also guides the preparation of Environmental Impact Assessment documentation and mine closure plans (which include the rehabilitation of vegetation) for mining proposals. The EPA considers that the more recent *Guidelines for preparing*

mine closure plans is more relevant to its assessment than Guidance Statement No. 6.

Environmental Protection Bulletin No. 19 – EPA involvement in mine closure

Relevant matters discussed in Environmental Protection Bulletin No. 19 for this assessment include the following:

1. DMP and the EPA may both assess mine closure when an impact or risk is significant. The EPA is most likely to consider an impact or risk significant when an environmental asset with special or unique characteristic is being impacted, or a certain aspect of mine closure poses a high environmental risk.
2. Where Rehabilitation and Decommissioning is seen as a key integrating factor, the EPA will assess mine closure. A condition will be recommended to require a Mine Closure Plan to be prepared in accordance with the guidelines.

Guidelines for preparing mine closure plans

Relevant matters discussed in the *Guidelines for preparing mine closure plans* for this assessment include the following:

1. Mine closure planning should be an integral part of mine development and operations planning and it is a progressive process.
2. The EPA requires that Mine Closure Plans be prepared in accordance with the guidelines.
3. Where mining projects are subject to the Mining Act, and Rehabilitation and Closure is considered a Key Integrating Factor by the EPA, both DMP and the EPA will assess the Mine Closure Plan.
4. Where the EPA concludes that Rehabilitation and Decommissioning is a Key Integrating Factor in its EPA report on the proposal, the EPA will recommend a condition requiring a Mine Closure Plan to be prepared that is consistent with these guidelines.

Appendix 5

Identified decision-making authorities and recommended environmental conditions

Identified decision-making authorities

Section 44(2) of EP Act specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA's recommended conditions and procedures.

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified:

	Decision-making authority	Approval
1.	Minister for Environment	*Environmental Protection Act 1986*
2.	Minister for Mines and Petroleum	*Mining Act 1978*
3.	Minister for Water	*Rights in Water and Irrigation Act 1914* – Water abstraction licence
4.	Minister for Aboriginal Affairs	*Aboriginal Heritage Act 1972* – Section 18 clearances
5.	Director General, Department of Environment Regulation	*Environmental Protection Act 1986* - Works Approval and Licence
6.	Mining Registrar, Department of Mines and Petroleum	*Mining Act 1978* – Grant of Miscellaneous Licences
7.	Chief Dangerous Goods Officer, Department of Mines and Petroleum	*Dangerous Goods Safety Act 2004*
8.	District Inspector North Department of Mines and Petroleum	*Mines Safety and Inspection Act 1994*
9.	Executive Director, Public Health, Department of Health	*Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974* – Mine site accommodation village sewage management
10.	Chief Executive Officer, Shire of Ngaanyatjarraku	*Local Government Act 1995* – construction of mine site accommodation village

Note: In this instance, consultation and agreement is only required with DMAs No. 1 - No. 4, as they are Ministers.

Statement No. xxx

RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
***(Environmental Protection Act 1986*)**

WINGELLINA NICKEL PROJECT

Proposal: To mine nickeliferous limonite ore from the Wingellina deposit located approximately 1,400 km north-east of Perth.

Proponent: Hinckley Range Pty Ltd
Australian Company Number 052 098 496

Proponent address: 18-32 Parliament Place, WEST PERTH WA 6005

Assessment number: 1986

Report of the Environmental Protection Authority: 1568

Pursuant to section 45 of the *Environmental Protection Act 1986* it has been agreed that the proposal described and documented in Tables 1 and 2 of Schedule 1 may be implemented and that the implementation of the proposal is subject to the following implementation conditions and procedures:

1 Proposal implementation

1-1 When implementing the proposal, the proponent shall not exceed the authorised extent of the proposal as defined in Table 2 in Schedule 1, unless amendments to the proposal and the authorised extent of the proposal have been approved under the EP Act.

2 Contact details

2-1 The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

3 Time limit for proposal implementation

3-1 The proponent shall not commence implementation of the proposal after five (5) years from the date on this Statement, and any commencement, prior to this date, must be substantial.

3-2 Any commencement of implementation of the proposal, on or before five (5) years from the date of this Statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of five (5) years from the date of this Statement.

4 Compliance reporting

4-1 The proponent shall prepare, submit and maintain a Compliance Assessment Plan to the CEO at least six (6) months prior to the first Compliance Assessment Report required by condition 4-6, or prior to implementation, whichever is sooner.

4-2 The Compliance Assessment Plan shall indicate:

(1) the frequency of compliance reporting;

(2) the approach and timing of compliance assessments;

(3) the retention of compliance assessments;

(4) the method of reporting of potential non-compliances and corrective actions taken;

(5) the table of contents of Compliance Assessment Reports; and

(6) public availability of Compliance Assessment Reports.

4-3 After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 4-2 the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 4-1 and shall make those reports available when requested by the CEO.

4-5 The proponent shall advise the CEO of any potential non-compliance within seven (7) days of that non-compliance being known.

4-6 The proponent shall submit to the CEO the first Compliance Assessment Report fifteen (15) months from the date of issue of this Statement addressing the twelve (12) month period from the date of issue of this Statement and then annually from the date of submission of the first Compliance Assessment Report, or as otherwise agreed in writing by the CEO.

The Compliance Assessment Report shall:

(1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;

(2) include a statement as to whether the proponent has complied with the conditions;

(3) identify all potential non-compliances and describe corrective and preventative actions taken;

(4) be made publicly available in accordance with the approved Compliance Assessment Plan; and

(5) indicate any proposed changes to the Compliance Assessment Plan required by condition 4-1.

5 Public availability of data

5-1 Subject to condition 5-2, within a reasonable time period approved by the CEO of the issue of this Statement and for the remainder of the life of the proposal the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)) relevant to the assessment of this proposal and implementation of this Statement.

5-2 If any data referred to in condition 5-1 contains particulars of:

(1) a secret formula or process; or

(2) confidential commercially sensitive information;

the proponent may submit a request for approval from the CEO to not make these data publicly available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publicly available.

6 Air Quality - Management-based Condition Environmental Management Plan/s

6-1 Prior to the commencement of ground disturbing activities, the proponent shall prepare and submit a Condition Environmental Management Plan/s to the satisfaction of the CEO. This plan shall demonstrate that the following **environmental objective** will be met:

(1) minimise the impacts of atmospheric and particulate emissions, to maintain air quality for the protection of the environment and human health and amenity.

6-2 The Condition Environmental Management Plans shall:

(1) specify the **environmental objectives** to be achieved, as specified in condition 6-1;

(2) specify practicable **management actions** that will be implemented to demonstrate compliance with the environmental objective specified in 6-1. Failure to implement one or more of the management actions represents non-compliance with these conditions;

(3) specify measurable **management targets** to determine the effectiveness of the risk-based management actions;

(4) specify **monitoring** to measure the effectiveness of management actions against management targets, including but not limited to, parameters to be measured, baseline data, monitoring locations, and frequency and timing of monitoring. The monitoring shall include the following:

(a) appropriate location/s to monitor potential impacts at the Wingellina Media Centre;

(b) monitoring for PM_{10} and nickel dust using hi-volume air samplers; and

(c) dust sampling and analysis in accordance with relevant Australian Standards.

(5) specify a process for **revision** of management actions and changes to proposal activities, in the event that the management targets are not achieved. The process shall include an investigation to determine the cause of the management targets being exceeded;

(6) provide the format and timing to demonstrate that condition 6-1 has been met for the reporting period in the Compliance Assessment Report required by condition 4-6 including, but not limited to:

(a) verification of the implementation of management actions; and

(b) reporting on the effectiveness of management actions against management target(s).

6-3 After receiving notice in writing from the CEO that the Condition Environmental Management Plan/s satisfies the requirements of condition 6-2 for condition 6-1, the proponent shall:

(1) implement the provisions of the Condition Environmental Management Plan/s; and

(2) continue to implement the Condition Environmental Management Plan/s until the CEO has confirmed by notice in writing that the proponent has demonstrated the objectives specified in condition 6-1 has been met.

6-4 In the event that monitoring, tests, surveys or investigations indicate exceedance of management targets specified in the Condition Environmental Management Plan/s, the proponent shall:

(1) report the exceedance in writing to the CEO within 21 days of the exceedance being identified;

(2) investigate to determine the cause of the management targets being exceeded;

(3) provide a report to the CEO within 90 days of the exceedance being reported as required by condition 6-4(1). The report shall include:

(a) cause of management targets being exceeded;

(b) the findings of the investigation required by conditions 6-4(2);

(c) details of revised and/or additional management actions to be implemented to prevent exceedance of the management target(s);

(d) relevant changes to proposal activities.

6-5 In the event that monitoring, tests, surveys or investigations indicate that one or more management actions specified in the Condition Environmental Management Plan/s have not been implemented, the proponent shall:

(1) report the failure to implement management action/s in writing to the CEO within 7 days of identification;

(2) investigate to determine the cause of the management action(s) not being implemented;

(3) investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to the failure to implement management actions;

(4) provide a report to the CEO within 21 days of the reporting required by condition 6-5(1). The report shall include:

(a) cause for failure to implement management actions;

(b) the findings of the investigation required by conditions 6-5(2) and 6-5(3);

(c) relevant changes to proposal activities; and

(d) measures to prevent, control or abate the environmental harm which may have occurred.

6-6 The proponent:

(1) may review and revise the Condition Environmental Management Plans, and

(2) shall review and revise the Condition Environmental Management Plans as and when directed by the CEO.

6-7 The proponent shall implement the latest revision of the Condition Environmental Management Plan/s, which the CEO has confirmed by notice in writing, satisfies the requirements of condition 6-2.

7 Conservation significant flora [*Goodenia* sp. aff. *quasilibera* (L. Ransom 868)]

7-1 Prior to the commencement of ground disturbing activities, the proponent shall prepare and submit a survey plan to the satisfaction of the CEO. This plan shall demonstrate that the following environmental outcome will be met:

(1) The proponent shall implement the proposal in a manner that avoids, or where avoidance is not practicable, minimises the impact on the flora species *Goodenia* sp. aff. *quasilibera* (L. Ransom 868).

7-2 The survey plan shall:

(1) when implemented, determine the presence of *Goodenia* sp. aff. *quasilibera* (L. Ransom 868) within the Water Supply Pipeline Corridor Route Development Envelope and the Central Officer Basin Borefield Development Envelope; and

(2) detail the proposed methodology for the targeted flora survey.

7-3 After receiving notice in writing from the CEO that the survey plan satisfies the requirements of condition 7-2(2), the proponent shall undertake the targeted flora survey in accordance with the survey plan.

7-4 On completion of the targeted flora survey, the proponent shall report to the CEO on the following:

(1) completion of the targeted flora survey in accordance with the survey plan; and

(2) the results of the targeted flora survey, including an infrastructure map which shows:

(a) locations of all known records of *Goodenia* sp. aff. *quasilibera* (L. Ransom 868), required by condition 7-2(1);

(b) the final alignment, dimensions, and locations of the infrastructure within the Water Supply Pipeline Corridor Route Development Envelope and the Central Officer Basin Borefield Development Envelope that demonstrates that all known records of *Goodenia* sp. aff. *quasilibera* (L. Ransom 868) will be avoided and impacts minimised.

7-5 After receiving notice in writing from the CEO that condition 7-4(2)(b) satisfies the requirements of condition 7-1, the proponent shall implement the proposal consistent with condition 7-4(2)(b).

Schedule 1

Table 1: Summary of the proposal

Proposal title	Wingellina Nickel Project
Short description	The proposal is to mine nickeliferous limonite ore from the Wingellina deposit located approximately 1,400 km north-east of Perth, and use a HPAL process to produce a mixed nickel-cobalt hydroxide product. The proposal also includes a water supply borefield in the Central Officer Basin located approximately 100 km to the south-west, and an overland pipeline adjacent to and aligned with existing roads connecting the borefield and the mine site.

Table 2: Location and authorised extent of physical and operational elements

Column 1	**Column 2**	**Column 3**
Element	**Location**	**Authorised extent**
Mine pits, supporting mine infrastructure (including HPAL processing plant), topsoil and waste rock storage areas, and tailings storage facility	Figure 1	Clearing of no more than 2,762 ha within the 5,875 ha Mine Site Area Development Envelope
Borefield and associated infrastructure	Figure 2	Clearing of no more than 94 ha within the 2,009 ha Central Officer Basin Borefield Development Envelope
Water supply pipeline and associated infrastructure	Figure 2	Clearing of no more than 117 ha within the 234 ha Water Supply Pipeline Corridor Route Development Envelope
Mine dewatering	Figure 1	Up to 0.5 GLpa of groundwater abstraction within the Mine Site Area Development Envelope.
Water supply	Figure 2	Up to 12 GLpa of groundwater abstraction within the Central Officer Basin Borefield Development Envelope

Table 3: Abbreviations and definitions

Acronym or abbreviation	Definition or term
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986*, or his delegate.
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986*
GLpa	Gigalitres per annum
ha	Hectare
HPAL	High pressure acid leach
km	Kilometres
Mtpa	Million tonnes per annum
OEPA	Office of the Environmental Protection Authority

Figures (attached)

Figure 1 Mine Site Area Development Envelope

Figure 2 Central Officer Basin Borefield and Water Supply Pipeline Corridor Route Development Envelopes

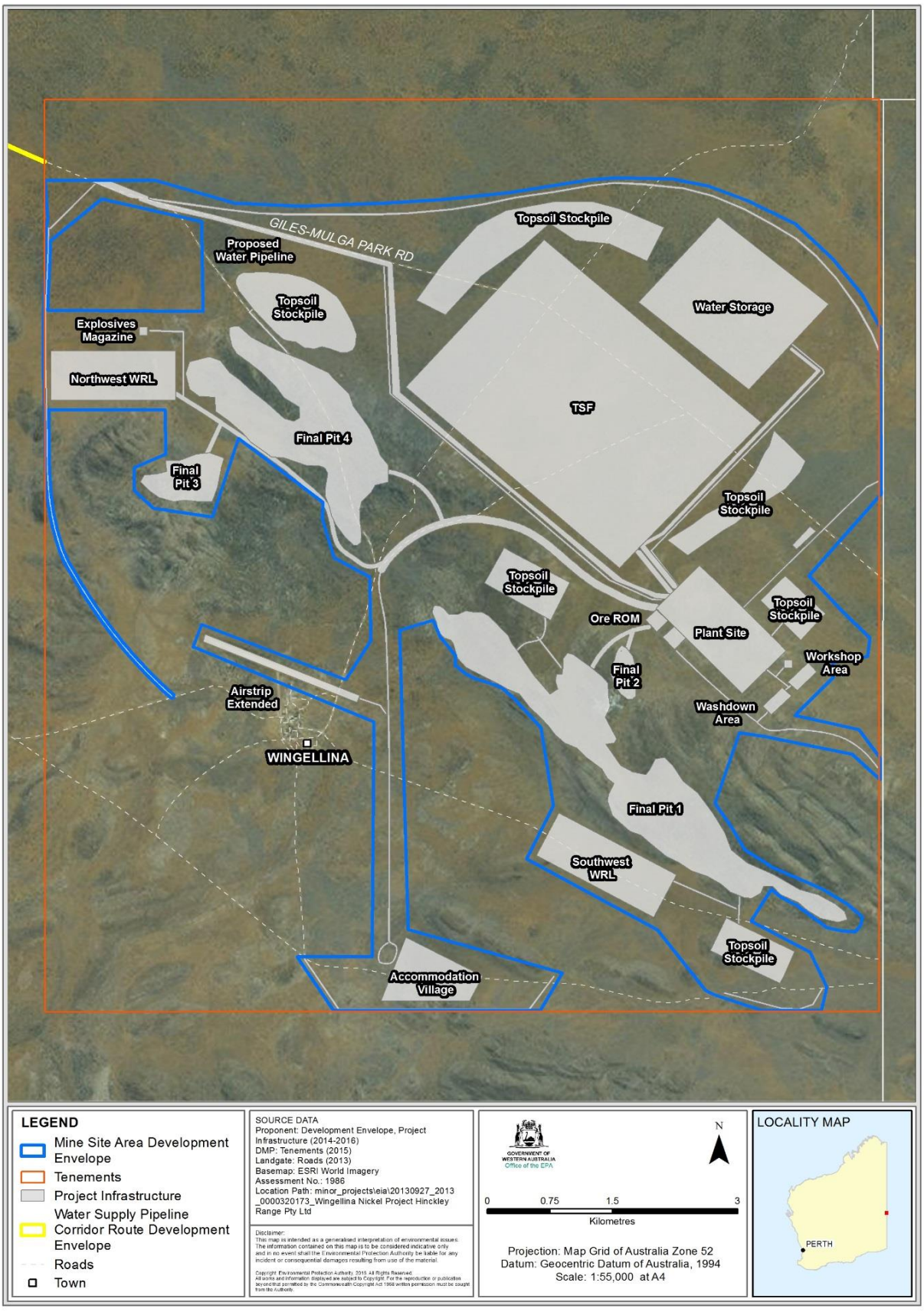

Figure 1: Mine Site Area Development Envelope

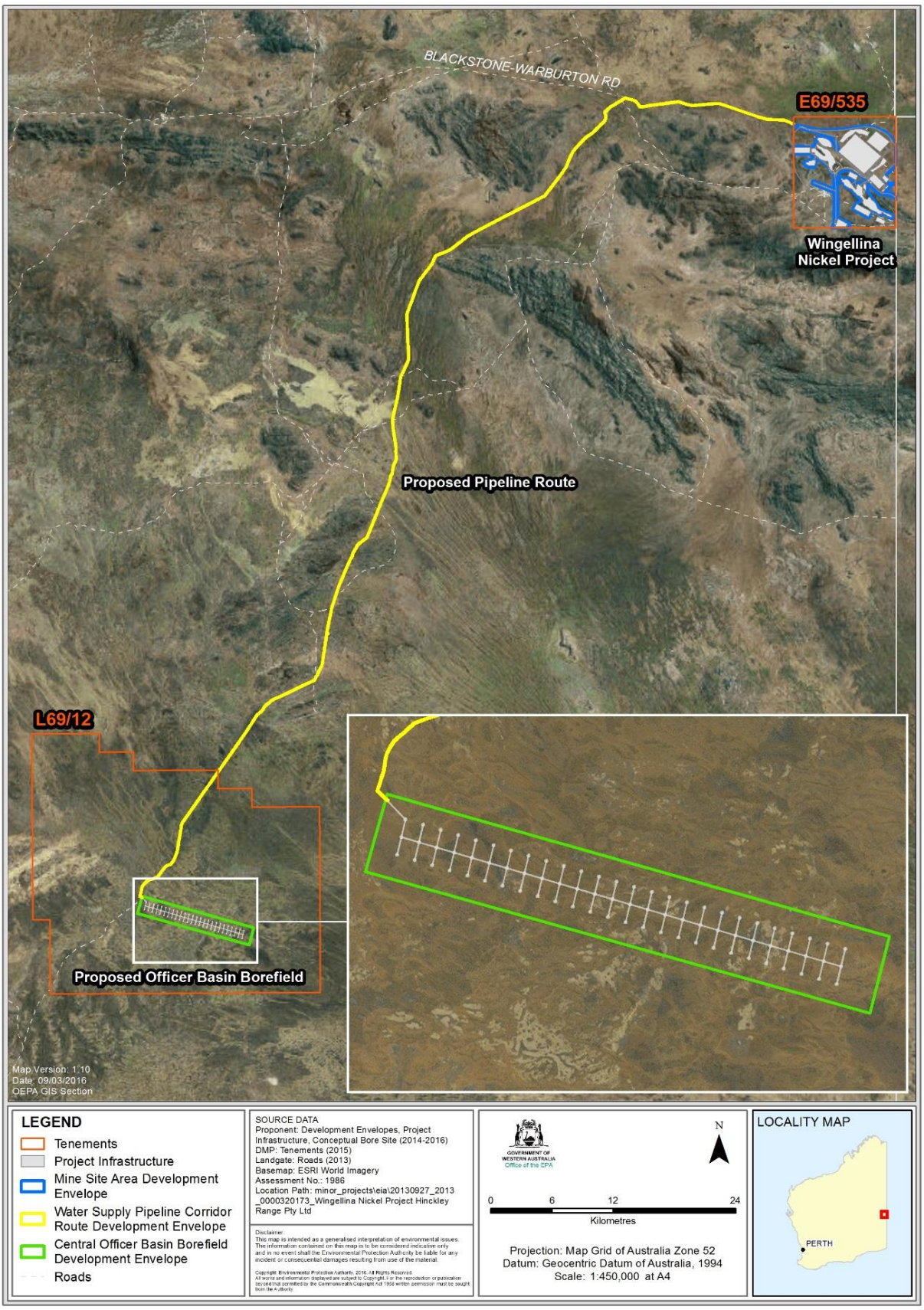

Figure 2: Central Officer Basin Borefield and Water Supply Pipeline Corridor Route Development Envelopes

Schedule 2

Coordinates defining the three Wingellina Nickel Project development envelopes are held by the Office of the Environmental Protection Authority:

- Mine Site Area Development Envelope – Document reference number (2016-1452564315106).
- Central Officer Basin Borefield Development Envelope – Document reference number (2015-1449805493763).
- Water supply Pipeline Corridor Route Development Envelope – Document reference number (2015-14409805495375).

Appendix 6

Summary of submissions and proponent's response to submissions

Provided on CD in hardcopies of this report and on the EPA's website at www.epa.wa.gov.au