

Environmental Review Document

Mulga Downs Iron Ore Mine

Figure 17-6: Cumulative Impact Assessment – IBRA Pre-European Vegetation

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17.2.3 Local Vegetation Types

Both the Mulga Downs Hub and Rail Spur Project and the Murray's Hill Project are located in the immediate area of the Proposal. Cumulative impacts to vegetation types has therefore been undertaken at a local scale in consideration of these projects (**Figure 17-7**).

Cumulatively, the three projects will not result in a loss greater than 15.86% of any vegetation type, with the majority of vegetation types being impacted by less than 8.51%. The maximum loss resulting from the Proposal is 14.79% (15.86% cumulatively) (AWL (1)); with losses to all other vegetation types associated with the Proposal being less than 7.05%.

More than 84% of the mapped extent of each vegetation type impacted will remain and therefore all vegetation types will continue to be represented in the local area. Based on the assessment, impacts to local vegetation types from these projects are unlikely to be significant, noting that these vegetation types are expected to extend beyond the areas surveyed.

Table 17-5: Cumulative Impacts - Local Vegetation Types

Vegetation Type	Mapped Extent In the Local Survey Area (ha)*	Proposal Loss (ha)	Mulga Downs Hub and Rail Loss (ha)**	Murray's Hill loss (ha)	Total extent impacted (Ha)	% Impact of Proposal	Total Cumulative % Impact
AaAxSL	3,628.68	68.53	25.01	0.00	93.54	1.89	2.58
AdEvWL	12,051.30	4.31	0.00	0.24	4.55	0.04	0.04
ASL (1)	1,854.75	64.95	0.00	42.32	107.27	3.50	5.78
ASL (2)	4,283.22	253.47	20.74	13.65	287.86	5.92	6.72
AWL (1)	14,111.52	2087.41	0.00	150.42	2237.83	14.79	15.86
AWL (2)	7,240.06	35.98	0.00	4.87	40.85	0.50	0.56
AWL (3)	4,066.26	8.83	0.00	0.00	8.83	0.22	0.22
AxAsSL	9,779.71	454.33	0.00	0.00	454.33	4.65	4.65
MSW	2,433.38	12.96	54.41	0.00	67.37	0.53	2.77
MTG (1)	576.38	40.61	0.00	0.00	40.61	7.05	7.05
MTGW	3,162.29	69.98	139.85	0.00	209.83	2.21	6.64
THG (1)	21,015.77	939.23	53.60	18.71	1,011.54	4.47	4.81
THG (2)	5,732.79	184.90	0.00	122.26	307.16	3.23	5.36
THGB	4,697.16	71.13	328.62	0.00	399.75	1.51	8.51
TvHG	122.15	0.31	4.50	0.00	4.81	0.25	3.94

*Note: area calculations are based on multiple surveys with some overlap and as a result some figures may be an overestimate.

**Maximum extent of either alignment option and excluding the area of overlap (hub) with the Proposal. Implementation of the Proposal will occur prior to the Hub and Rail Spur Proposal.

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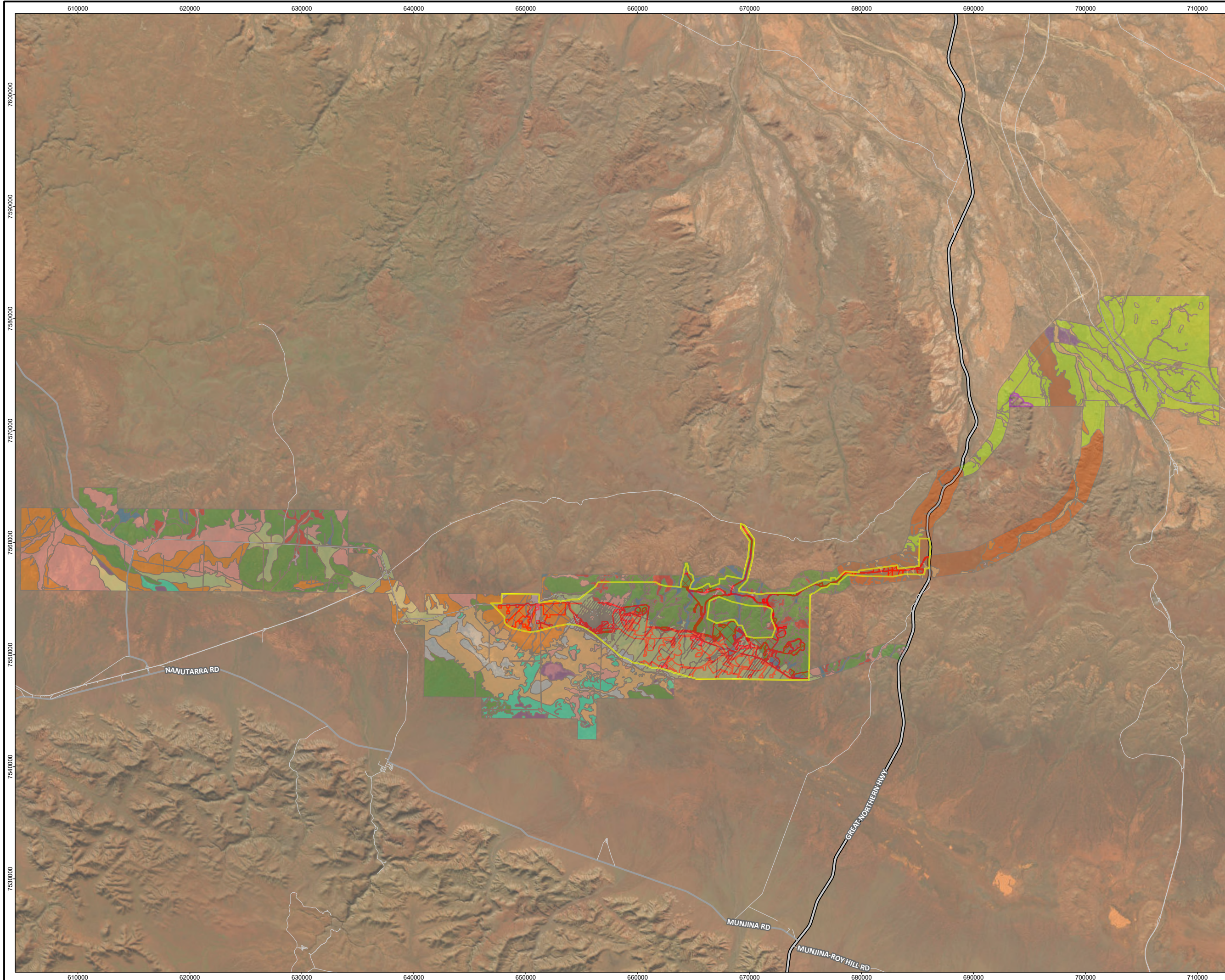
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Figure 17-7: Cumulative impacts - Local Vegetation Types

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- Legend**
- Development Envelope
 - Indicative Footprint
- Vegetation type**
- ASL (1)
 - ASL (2)
 - AWL (1)
 - AWL (2)
 - AWL (3)
 - AaAxSL
 - AdEvWL
 - AxAsSL
 - AxS
 - BpoFL
 - EFEBTG
 - EvWL
 - MSL (1)
 - MSL (2)
 - MSW
 - MTG
 - MTG (1)
 - MTG (2)
 - MTG (3)
 - MTGW
 - Mosaic of AdEvWL / *
 - THG (1)
 - THG (2)
 - THGB
 - THGG
 - TbHG
 - TvHG
 - TwHG
 - Restricted (Heritage)
 - Cleared/Disturbed area
- Roads (LGATE-195)**
- Highway
 - Major road



Job No: 67751
 Client: Hancock Prospecting Pty Ltd
 Version: A Date: 04-Nov-2024
 Drawn By: droberts Checked By: VC

Scale 1:310,000 at A3

Coord. Sys. GDA2020 MGA Zone 50

**Mulga Downs Iron Ore Mine
 Central Pilbara, Western Australia**

**CUMULATIVE IMPACTS ON LOCAL
 VEGETATION TYPES FOR THE PROPOSAL**

FIGURE 17.7

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17.2.4 Flora

Three 'Priority' flora species are present within the Indicative Footprint and will be impacted by the Proposal:

- *Hibiscus* sp. Mulga Downs (S. Hitchcock SH 638) (Priority 1);
- *Triodia veniciae* (Priority 1); and
- *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (Priority 3)

The cumulative impact of the Proposal and nearby projects on these species is outlined in **Table 17-6**.

All 3 species above will be impacted by the Proposal common to the other projects considered in the cumulative assessment. *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (Priority 3) and *Triodia veniciae* (Priority 1) species were recorded within the Mulga Downs Hub and Rail Spur project directly adjacent to the Proposal. *Hibiscus* sp. Mulga Downs (S. Hitchcock SH 638) (Priority 1) was recorded within the Murray's Hill proposal. The predicted cumulative impact on Priority flora species is therefore not considered to be significant and is unlikely to alter the conservation status of the species.

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Table 17-6 Cumulative Impacts to Conservation Significant Flora

Taxa	Total Records (# of individuals) across projects considered in Cumulative Assessment	Existing and Proposed Projects within Region (Development Envelope or Local Extent if known)											Cumulative Impact					Additional Records	
		Proposal – Indicative Footprint (Development Envelope)	Mulga Downs Hub and Rail	Koodaideri Iron Ore Mine and Infrastructure (MS 999)	Cloudbreak Iron Ore Mine LoM (MS899)	FMG Eliwana Railway Project (MS 1108)	FMG Solomon Mine (MS1062)	FMG Eliwana - Mine (MS 1109)	HPPL Murray's Hill (not assessed)	Marillan a Iron Ore Project (MS 855)	Yandicoogin a Iron Ore Project (MS 1038)	FMG Pilbara Transmission Project (not assessed)	Marandoo (MS 1020)	Cumulative Impact (individuals)	Cumulative % of the Proposal	Cumulative % impact of total records	Proposal contribution to % cumulative loss	WA Herbarium Records	Atlas of Living Australia Occurrence Records
<i>Hibiscus</i> sp. Mulga Downs (S. Hitchcock SH 638) (P1)	1,741	622 (1,427)	0 (0)	NA	NA	NA	NA	NA	31	NA	NA	NA	NA	653	35.73	37.50	95.25	4	0
<i>Triodia veniciae</i> (P1)	2,359	544 (1,099)	171	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	743	23.06	30.31	73.21	26	22
<i>Dolichocarpus</i> sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3)	180,169	2 (17)	118,322	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	118,324	0.001	65.67	0.002	38	0

NA – Not publicly available to determine whether impacts occurred, or taxa not listed as impacted.
Numbers represent records identified. Brackets are number of individuals impacted

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17.2.5 Surface Water Dependent Communities

The Proposal contains 9.22% of the mapped extent of potential sheet flow dependent vegetation across the projects considered in the cumulative assessment and will result in a loss of 14.05% of the known extent (**Table 17-7**). About 80% of the mapped extent of these communities will remain following clearing required for all projects considered in the cumulative impact assessment. It is noted that this assessment is based only on the known mapped extent as data is not available across the whole region. It is also noted that the total survey extent mapped in relation to the Proposal both inside and outside the Development Envelope is 44,964.21 ha (and including Murray’s Hill and Mulga Downs Hub and Rail spur). Therefore, the actual extent of impact is less than that presented in **Table 17-7**: and the total cumulative loss of mapped potential sheetflow vegetation is 15%.

Table 17-7: Cumulative Impacts - Sheet Flow Dependent Mulga

Mine	Mapped Extent Area within the Development Envelopes (ha)	Total Impact Area (Indicative Footprint) (ha)
The Proposal	9,725.74	2,973.51
Koodaideri Iron Ore Mine and Infrastructure Project	3,745	301
RHIO Mine	26,850.68	920.89
FMG Christmas Creek Iron Ore Mine and Expansion	26,709.00	10,244.00
FMG Cloudbreak Iron Ore Mine and Life of Mine Expansion	24,393.00	6,144.00
FMG Eliwana Railway Project	1,888.90	165.92
FMG Solomon Mine	7,076	NA
FMG Eliwana Mine	0.00	0.00
Mulga Downs Hub and Rail (noting some overlap with the Proposal)	1,737.55	514.56
Murray’s Hill	1,199.35	378.42
Marillana Iron Ore Project (MS 855)	NA	NA
FMG Pilbara Transmission Project (not assessed)	2186.26	96.46
Total (ha)	105,511.48	21,167.03
Proposal (%)	9.22	14.05
Cumulative Impact (% of extent within Development Envelopes)		20.06
Sheet Flow Vegetation Remaining		84,344.45 (79.94% remaining)

17.2.6 Priority Ecological Communities

The Development Envelope for the Proposal intersects an area of 407.50 ha of the ‘Four Plant Assemblages of the Wona Land System’ Priority 1 PEC of which 70.31 ha will be impacted.

There is 143,562.42 ha and 204,248.00 ha of the ‘Four Plant Assemblages of the Wona Land System’ Priority 1 PEC mapped within the Local and Regional Assessment Areas. The cumulative impact on this PEC is 24.66% of

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the known regional extent (**Figure 17-8** and **Figure 17-9**). The Proposal represent 0.05% of this impact, and is therefore a minor contributor.

17.2.7 Flora and Vegetation Cumulative Impacts

Based on the above predicted impacts, which utilised best available data from third party operations, the cumulative impacts of the projects considered in the assessment will contribute to approximately:

- The cumulative clearing of 10 land systems. The greatest cumulative impact is to the Jamindie System, with an estimated 3.45% loss of this land system from the subregion.
- Cumulative loss of between 1.77% and 35.38% of the individual vegetation associations, of which the Proposal contributes less than 1.24% of any vegetation association.
- Cumulative loss (of local mapped extent only) of between 0.04% and 15.86% of vegetation types, of which the Proposal contributes 14.79% of any vegetation type.
- Cumulative direct loss of 20.06 % of mapped sheet flow dependent vegetation within the project Development Envelopes of which the Proposal contributes 14.05%; and
- Cumulative loss (locally mapped information available only) of less than 35.73%, 23.06% and 0.001% and of Priority flora species *Hibiscus* sp. Mulga Downs (S. Hitchcock SH 638) (P1), *Triodia veniciae* (P1) and *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3). As discussed in **Section 9**, the Proposal (and therefore cumulatively with other projects), will not have a significant impact on these species given their broad distribution.
- Cumulative loss of 24.66% and 34.02% of the known extent of the 'Four Plant Assemblages of the Wona Land System' Priority 1 PEC within the Regional and Local Assessment Area respectively, of which the Proposal contributes 0.05%.

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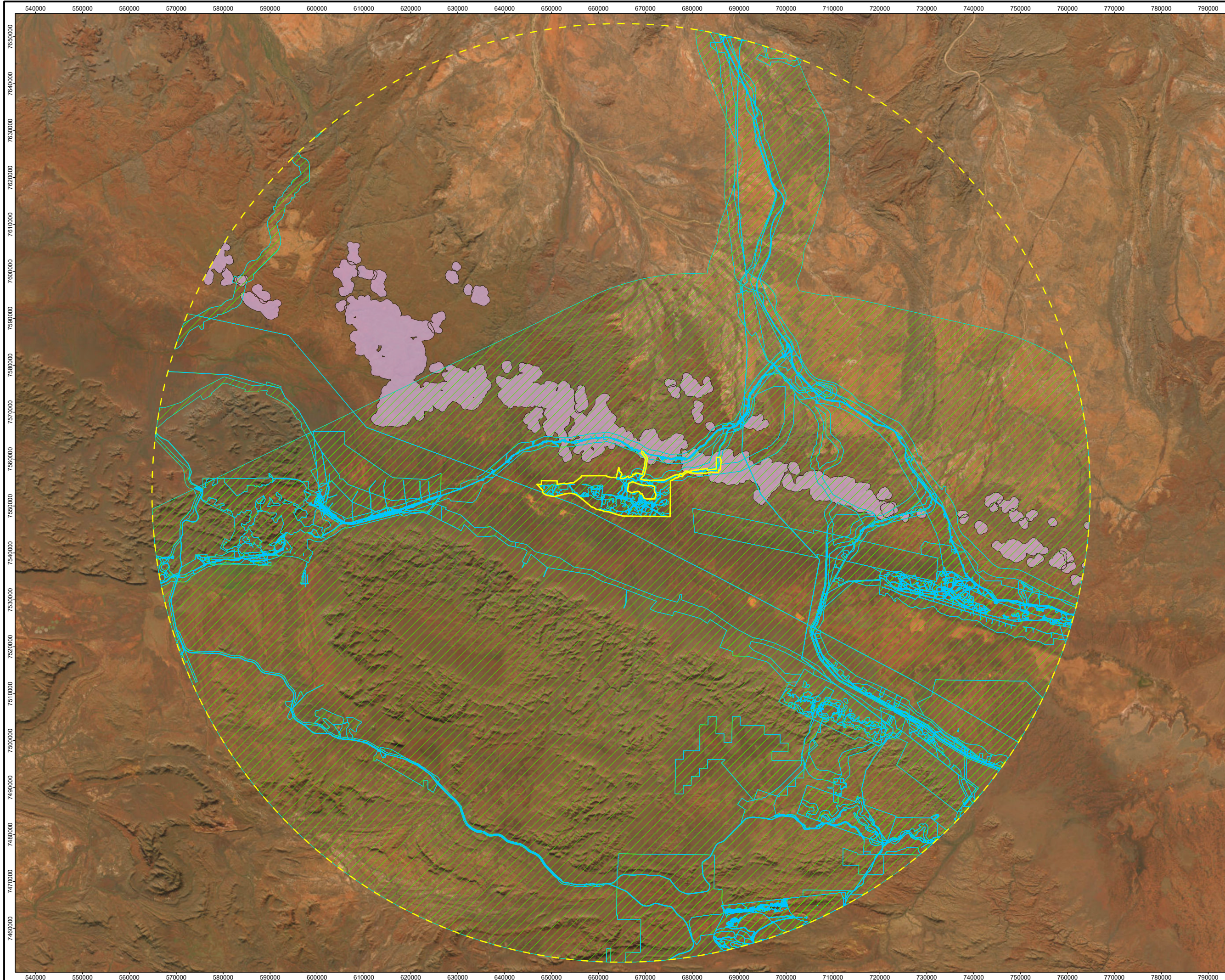
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Figure 17-8: Cumulative impacts – TEC and PEC

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- Legend**
- Development Envelope
 - 100km buffer
 - EPA Referred Significant Proposals (DWER-120) Clearing Instruments
 - Proposals (Areas Applied to Clear) (DWER-075)
 - Threatened Ecological Communities (DBCAs-038) Four plant assemblages of the Wona Landsystem (Priority 1)



Job No: 67751
 Client: Hancock Prospecting Pty Ltd
 Version: A Date: 30-Mar-2025
 Drawn By: droberts Checked By: MD

Scale 1:740,000 at A3

Coord. Sys. GDA2020 MGA Zone 50

**Mulga Downs Iron Ore Mine
 Central Pilbara, Western Australia**

CUMULATIVE IMPACTS - TEC AND PEC

FIGURE 17.8

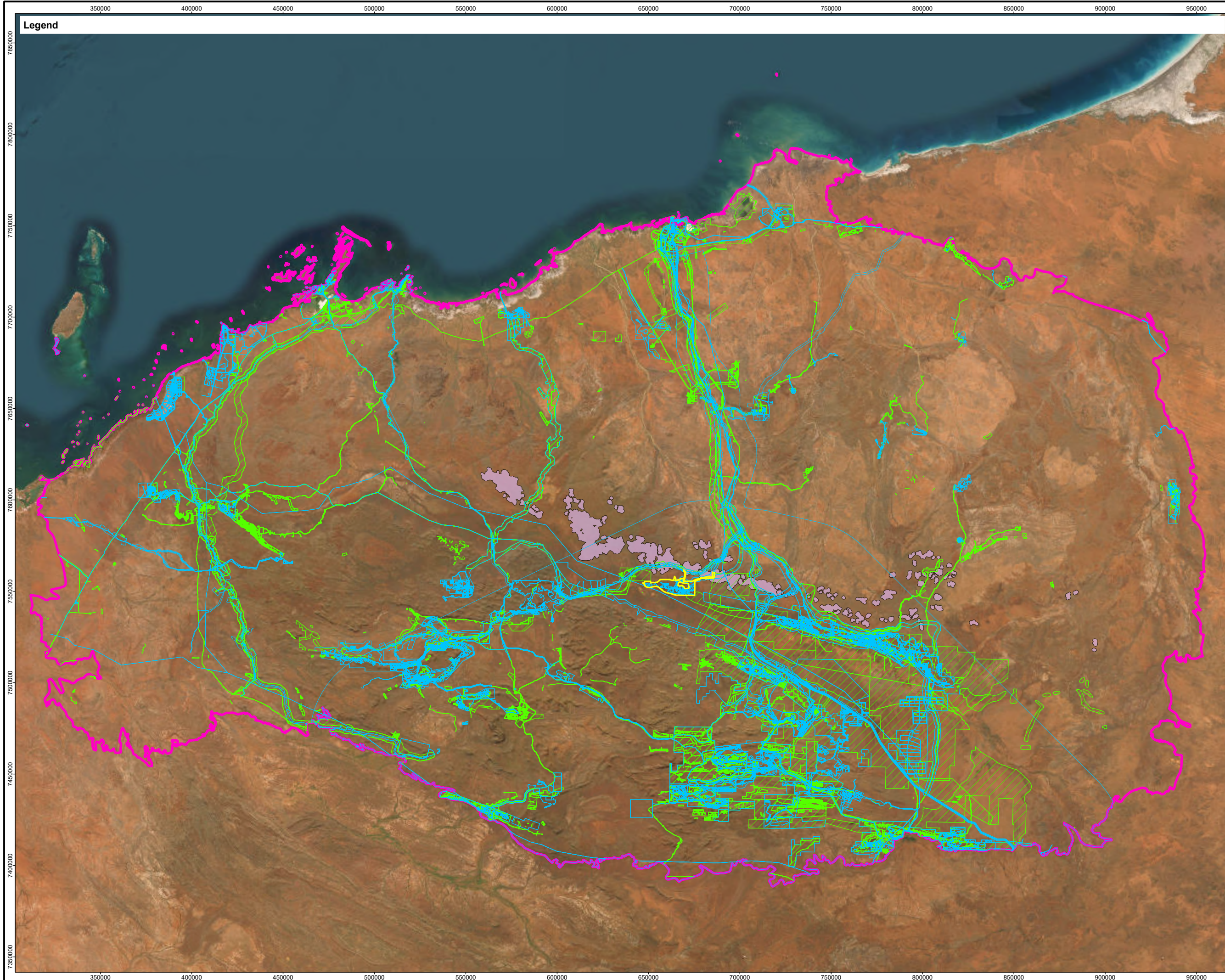
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Figure 17-9: Cumulative impacts –Pilbara IBRA TEC and PEC

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Legend

- Legend**
- Development Envelope
 - EPA Referred Significant Proposals (DWER-120)
 - Clearing Instruments Proposals (Areas Applied to Clear) (DWER-075)
 - Pilbara IBRA region (DCCEEW)
 - Threatened Ecological Communities (DBC-038)
 - Four plant assemblages of the Wona Landsystem (Priority 1)



Job No: 67751
 Client: Hancock Prospecting Pty Ltd
 Version: A Date: 02-Apr-2025
 Drawn By: droberts Checked By: MD

Scale 1:1,900,000 at A3

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**Mulga Downs Iron Ore Mine
 Central Pilbara, Western Australia**

**CUMULATIVE IMPACTS -
 PILBARA IBRA TEC AND PEC**

FIGURE 17.9

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17.3 Terrestrial Fauna

All conservation significant fauna species that were recorded or are likely to occur within the Development Envelope will potentially be affected by cumulative impacts from existing or foreseeable future Proposals in the wider region.

Clearing of vegetation for the construction and operation of the Proposal will result in the loss of fauna habitat within the Development Envelope. Fauna habitat mapping has been completed for the Development Envelope. The Proposal will result in the clearing of up to 4,339.16 ha of native vegetation, comprising nine broad habitat types. Detailed mapping at the same scale is not available for the entire Chichester and Fortescue subregions. It is typically only completed to support the environmental impact assessment for projects that have been and will be developed across the Pilbara.

Land System mapping at a regional level by DPIRD provides an opportunity to assess cumulative impacts on broad landscape units as a surrogate for fauna habitat. The cumulative impacts on land systems have been considered for the Proposals identified in the cumulative assessment and are outlined in **Section 17.2**.

The greatest cumulative impact on land systems is the loss of approximately 3.45% of the Jamindie land system. As noted, this loss is conservative given the calculations were based on the approximate extent of the land system within the entire Development Envelope of each Proposal. The Jamindie land system is known to support Mulga Woodlands fauna habitat type. Mulga Woodlands are considered as low value generally offering minimal refugia to species of conservation significance. The Mulga Woodland has been disturbed by exploration activities (clearing tracks and drill pads) and evidence of grazing by cattle is present. Regionally this habitat type is generally well represented.

Each of the conservation significant fauna habitats identified as occurring or likely to occur within the Development Envelope are known to extend beyond the Development Envelope and throughout the broader Pilbara region.

The local impact to fauna habitats has been assessed using proposed impacts of the Proposal, Murray's Hill and Mulga Downs Hub and Rail to mapped fauna habitats (**Table 17-8**). More than 92% of any fauna habitat types mapped across the three projects will remain (i.e. total impacts are no more than 8% of the habitats within the local area).

Given the extent of fauna habitat that will remain within the Development Envelope and in surrounding areas, cumulative impacts to fauna habitats and conservation significant fauna species associated with the Proposal are unlikely to be significant.

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Table 17-8: Local Cumulative Impacts to Fauna Habitat

Habitat Type	The Proposal	Murray's Hill	Mulga Downs Hub and Rail*	Total Mapped Extent (ha)	Total impact across all projects (ha)	% Impact of all projects
	Extent within the Indicative Footprint (ha)	Extent within the Indicative Footprint (ha)	Extent within the Indicative Footprint (ha)			
Mulga Woodland	2,824.74	275.06	24.26	43,575.10	3,124.06	7.17
Rocky Hills	520.80	83.94	0.00	11,982.01	604.74	5.05
Stony Spinifex Plains and Hillslopes	813.97	35.35	83.35	62,690.54	932.67	1.49
Chenopod/ Cracking Clay Floodplain	15.72	0.00	0.00	983.20	15.72	1.60
Drainage Line/Floodplain	56.69	14.71	11.54	38,141.21	82.94	0.22
Gibber Cracking Clay	56.69	0.21	22.91	3,556.27	79.81	2.24
Rocky Plains and Footslopes	0.00	0.00	1180.68	32,444.58	1,180.68	3.64
Snakewood	8.04	0.00	14.91	731.62	22.95	3.14
Cracking Clay	28.10	0.00	160.57	5,529.69	188.67	3.41

**Maximum extent of either alignment option and excluding the area of overlap (hub) with the Proposal. Implementation of the Proposal will occur prior to the Hub and Rail Spur Proposal.

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17.4 Subterranean Fauna

Cumulative impacts represent the combination of ‘combined’ impacts, with impacts considered from known and reasonably foreseeable third-party operations surrounding the Development Envelope. This assessment is only possible when the direct impacts from these operations occur within the known range of troglofauna and stygofauna species and habitat values as detailed in **Section 8**.

There are no third-party mining projects within the immediate vicinity of the Development Envelope other than Murray’s Hill and the Mulga Downs Hub and Rail Spur projects. The Mulga Downs Hub and Rail Spur does not involve mining or excavation and water requirements are not such that it would cumulatively add to dewatering impacts from the Proposal.

Surveys were undertaken for the Murray’s Hill project and an assessment provided in *ecologia* (2011). The data collected from Murray’s Hill is already included in the MDIOM subterranean Fauna assessment and the impacts to any subterranean fauna collected is being assessed as part of the MDIOM.

Therefore, any cumulative impacts to subterranean fauna habitat values are as a result of the combined Proposal and Murray’s Hill. Given Murray’s Hill is above water table mining only, there are no anticipated impacts to stygofauna as a result of this project.

The key risk of cumulative impacts is therefore a result of removal of habitat for troglofauna. The habitat associated with the Murray’s Hill pit has been considered as part of the assessment of the Proposal and has been found to occur along the Chichester Ranges and is extensive. The Murray’s Hill project does not involve MAR and therefore there are no additional impacts to troglofauna habitat from this project as a result of groundwater mounding.

17.5 Air Quality

Construction and operation of the Proposal will result in emissions of dust that will contribute to the surrounding local and regional airsheds. In the context of the Proposal, the primary source of potential impacts to air quality are:

- Dust emissions associated with mining activities;
- Sources of airborne asbestos to be carried by the wind to off-site receptors due to Proposal activities.

17.5.1 Dust

Dust emissions may also be generated from both the Murray’s Hill and the Mulga Downs Hub and Rail Spur projects, which are located in close proximity to the Proposal. Given their proximity, dust emissions from these projects may cumulatively contribute air quality (dust) impacts in the local and regional area. Each project may result in a minor, temporary increase in localised dust.

The Pilbara is a naturally dusty environment with wind-blown dust being a significant contributor to the airborne dust levels. The nearest community (the Wirrilimarra Community) is more than 7 km from the combined Projects.

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Construction of all three projects are unlikely to occur simultaneously and will occur in a staged manner, limiting the cumulative dust impact. Given the expected localised impacts and noting that the Pilbara is a naturally dusty environment, significant cumulative impacts with other projects in the region are not anticipated.

HPPL will implement dust management measures to reduce dust emissions and subsequent deposition, throughout the Development Envelope over the life of mine. Dust emissions associated with construction and operation of the three projects will remain negligible and are unlikely to lead to an increase in the cumulative impact on local or regional airsheds.

Given the expected localised impacts and noting that the Pilbara is a naturally dusty environment, cumulative impacts with other projects within the 100 km cumulative impact assessment area are not anticipated.

17.5.2 Airbourne Asbestos

The ore bodies associated with the Proposal and Murray's Hill mine are located within the Marra Mamba Iron formation outcrop to the north of the Lower Fortescue River Valley, where the Brockman Iron Formation is absent, and therefore the potential for intersection of natural asbestiform minerals during mining is considered to be low. The Mulga Downs Hub and Rail Spur project does not involve mining or activities where potential natural asbestiform minerals may be intersected. Given this, the potential for cumulative impacts from mobilisation of airborne natural asbestiform minerals across the three projects is low.

The PESA undertaken for the Proposal included the Murray's Hill mine (**Appendix 13**). The assessment identified that asbestos impacts were likely limited to building materials within ancillary station infrastructure such as tank stands and bore infrastructure, the existing and classified asbestos contaminated area (registered ID 7303) associated with the former Mulga Downs homestead, the possible deposition of asbestos as a result of erosion from the Wittenoom mine area, and/or the potential importation of asbestos to the site for various reasons (including as a construction base for infrastructure or as dumped waste). The assessment concluded that there is a low risk of asbestos from existing structures, ground contamination (in-situ or from erosional deposition) or unexpected finds causing human health impacts at receptors through an inhalation pathway (JBSG 2023). The Mulga Downs Hub and Rail project is located within the Yule River catchment, north-east of both the Proposal and Murray's Hill. The Mulga Downs Hub and Rail project is located further from potential sources of asbestos, including the WAMA, and potential receptor locations. Based on the low risk of asbestos impacts across all projects, the potential for cumulative impacts is also considered low.

17.6 Terrestrial Environmental Quality

Cumulative impacts to terrestrial environmental quality have been considered in the context of Murray's Hill and the Mulga Downs Hub and Rail Spur Project, both of which are located in close proximity to the Proposal.

The Proposal has the potential to result in the following impacts to terrestrial environmental quality:

- Contamination of soils, surface water and groundwater from AMD, PAF and other activities which may result in spills, leaks or seepage;
- Redistribution of ACM that is present from historical anthropogenic activities.

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17.6.1 Contamination

The risk of contamination of soils, surface water and groundwater from WRDs due to AMD is significantly reduced given that none of the proposed mine pits, including the Murray's Hill pit will intersect the basal Nammuldi and Roy Hill Shale/Jerrinah Formation stratigraphic units, as these have been shown to have the highest sulfur levels and are most likely to lead to the generation of AMD (**Appendix 16**).

Any contamination of soils, surface water and/or groundwater arising from failure, leaks or seepage from saline water pipelines and/or water storage dams is likely to be localised and minor, able to be managed by other regulatory processes and unlikely to result in significant environmental impacts. The potential for cumulative impacts with either Murray's Hill or the Mulga Downs Hub and Rail Spur projects on Terrestrial Environmental Quality due to contamination is therefore considered low.

All these projects will be subject to regulation under the Mining Act, which will also regulate impacts to the environment arising from spillage of reagents, chemicals and hydrocarbons and pipeline failures, leaks/seepage via setting appropriate environmental outcomes and performance criteria relating to land and soils and water resources. Through the Mining Proposal and Mine Closure Plan assessment and approval process, environmental objectives and performance criteria will be established to ensure mining operations meet DEMIRS' environmental objectives for mining, which include land and soil and water resources as key environmental factors.

17.6.2 Asbestos Mobilisation

As noted in **Section 3.9** the ore bodies associated with the Proposal and Murray's Hill mine are located within the Marra Mamba Iron formation outcrop to the north of the Lower Fortescue River Valley, where the Brockman Iron Formation is absent, and therefore intersection of natural asbestiform minerals during mining is considered to be low. The Mulga Downs Hub and Rail Spur project does not involve mining or activities where potential natural asbestiform minerals may be intersected. Given this, the potential for cumulative impacts from mobilisation of natural asbestiform minerals is considered low.

Given the above, it is considered unlikely that significant risk will be posed to Terrestrial Environmental Quality from clearing, earthworks, construction and/or mining activities redistributing historical, anthropogenic ACM. The implementation of, and adherence to, an AMP, including procedures for the safe decommissioning and removal of ACM structures and an unexpected finds procedure can adequately manage ACM risks to Terrestrial Environmental Quality to ensure the EPA's objective for this environmental factor can be met.

17.7 Greenhouse Gas Emissions

The projected GHG emissions from the Proposal, cumulatively contributes to GHG's in a global context and therefore contributes to climate change. The contribution of the Proposal emissions to State, national and global emissions has been examined and discussed in **Section 12**.

The United Nations Framework Convention on Climate Change (UNFCCC) provides the framework for international cooperation to reduce global GHG emissions and limit temperature increases. The UNFCCC Paris Agreement entered into force on 4 November 2016, and Australia is committed to reducing GHG emissions by 26 to 28% below 2005 levels by 2030 (UNFCCC, 2016). Australia's Nationally Determined Contribution under

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Article 4 of the Paris Agreement was subsequently updated, in 2022, to a more ambitious commitment to reduce greenhouse gas emissions 43% below 2005 levels by 2030 (Commonwealth of Australia 2022).

The Greenhouse Gas Emissions Policy for Major Projects documents the State Government's commitment, to working with all sectors of the WA economy to achieve net zero GHG emissions by 2050 (GoWA 2024). The Western Australian Climate Change Bill, introduced to Parliament on 30 November 2023, will legislate the State target of net zero emissions by 2050. Furthermore, the bill will require interim 1 year point targets and 5-year cumulative emissions budgets for Western Australia (for 2035, 2040 and 2045) to be set.

The GHG emissions associated with the Proposal are not significant in the context of state or national emissions and will not impede the State GHG Policy aspiration of net zero emissions by 2050 given the relatively low emissions predicted as a result of the Proposal. It is also noted that GHGs accumulate over time and mix globally (IPCC, 2014), therefore the impacts of emissions from the Proposal on climate change cannot be assessed individually or in isolation. However, Scope 1 emissions (noting there are no Scope 2 emissions) associated with the Proposal, will contribute approximately 0.23% of state, 0.04% of national and 0.0004% of global GHG emissions, which represents a very minor contribution to any increases in emissions. At this scale, it is not possible to quantitatively assess the impact of the Proposed Changes to any local, state or global climate change.

17.8 Social Surroundings

The Development Envelope is located within the Banjima Native Title Determination Area which covers an area of 1,018,525.4 ha (**Figure 17-10**). This native title claim is overlapped by pastoral leases and major industrial and mining developments. The Proposal will cumulatively add to the impacts to Banjima Country through disturbance to heritage value of sites of cultural significance and Aboriginal heritage places and the loss of access to these sites and other places of importance. The value of and the significance of these impacts will be determined through ongoing consultation with Banjima and the Proposal's contribution to those cumulative impacts will be considered during the co-development of the SCHMP.

Historical pastoral activities may have degraded aspects of cultural heritage, but these effects are not well understood. Similarly, there are no publicly available records of registered heritage sites disturbed or destroyed under Section 18 of the AH Act, therefore making it difficult to assess the potential cumulative loss to Traditional Owners. Future surveys and consultation with Traditional Owners will assist with developing a greater understanding of the significance and extent of values and will inform future design and approvals under the AH Act. Sites will be avoided where possible, including implementation of an appropriate buffer, through the final design of the Indicative Footprint for the Proposal. HPPL will manage any sites of Aboriginal heritage significance that cannot be avoided in accordance with the AH Act.

In addition to the Proposal, the following projects assessed under Part IV of the EP Act intersect the Banjima Native Title Determination Area:

- APA – Port Hedland Power Station;
- Australian Aboriginal Mining Corporation;
- BHP Billiton Iron (excluding the strategic proposal boundary);
- Brockman Resources (Brockman Iron Ore Mine and railway and associated infrastructure);

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- Chichester Metals Iron ore Mine;
- Ferrus Pilbara Project;
- Hamersley Iron;
- Mount Bruce Mining (water transfer pipeline to Koodaideri);
- Mineral Resources (Bulk Ore Transport System);
- Pilbara Transmission Project;
- Rio Tino – Hope Downs 1;
- Robe River Mining;
- Pilbara Infrastructure Project;
- Goldfields Gas Pipeline JV;
- Murray’s Hill; and
- Mulga Downs Hub and Rail Spur.

Given the extent of overlap with Part V Purpose Permit areas with projects assessed under Part IV of the EP Act (refer to **Figure 17-10**) and the fact that Purpose Permit application areas are generally significantly higher than the actual extent of clearing proposed, calculations have not been provided for Purpose Permit applications.

Impacts in the Banjima Native Title Determination Area for projects assessed under Part IV of the EP Act are presented in **Table 17-9** and shown in **Figure 17-10**. The area of approved impact is 37% of the Banjima Native Title Determination Area and the Proposal will contribute an additional 0.4%.

Table 17-9: Cumulative Impacts – Banjima Native Title Determination Area

Impact Type	Extent (Ha)	% Impact of Native Title Determination Area
Approved Projects (Part IV)	385,073	37%
Proposal	4,339.16	0.4%
Total	441,909.16	37.4%

¹ Note the Development Envelope boundary is not reflective of the actual clearing extent and as such is expected to be an over-estimate

Potential cumulative impacts to Traditional Owners will be managed through ongoing consultation with Traditional Owners and the co-development and implementation of an SCHMP.

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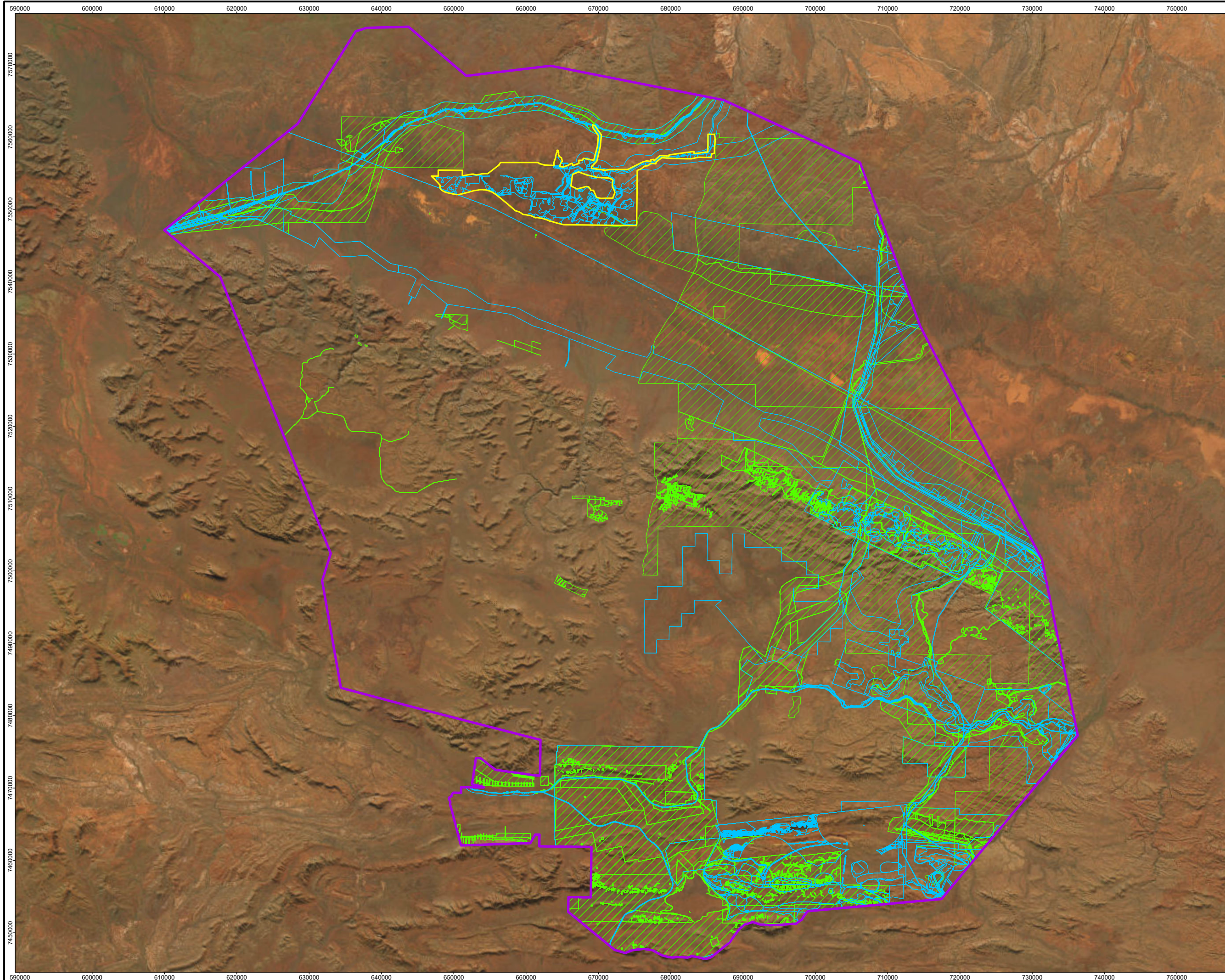
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Figure 17-10: Cumulative Assessment – Banjima Native Title Determination Area

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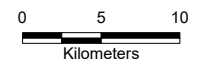


- Legend**
- Development Envelope
 - Clearing Instruments Proposals (Areas Applied to Clear) (DWER-075)
 - EPA Referred Significant Proposals (DWER-120)
 - Native Title Determination (LGATE-066)
 - Banjima People



Job No: 67751
 Client: Hancock Prospecting Pty Ltd
 Version: A Date: 30-Mar-2025
 Drawn By: droberts Checked By: MD

Scale 1:480,000 at A3



Coord. Sys. GDA2020 MGA Zone 50

**Mulga Downs Iron Ore Mine
 Central Pilbara, Western Australia**

**CUMULATIVE ASSESSMENT - BANJIMA
 NATIVE TITLE DETERMINATION AREA**

FIGURE 17.10

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17.8.1 Noise and Vibration

LGA (2024) undertook an assessment of the worst case cumulative noise emission scenario with the Proposal and the Mulga Downs Hub and Rail Spur Project. The worst case cumulative scenario is when mobile mining teams are working in the northernmost pit (Fridge Hill) combined with modelled process plant and Mulga Downs Hub and Rail proposed operations. The results are summarised in **Table 17-10**.

Table 17-10: Cumulative Predicted Noise Levels, L₁₀ dB(A) (LGA 2024)

Receiver	Approximate Nearest Distance to Mine	Predicted	Adjusted	Criteria Level	Assessment
Bat Caves	100 metres	68	68	70	Complies
Homesteads	33 km	-	-	35	Complies
Auski Village	23 km	-	-	35	Complies
Karajini Eco Retreat	37 km	-	-	35	Complies
Munjina East Gorge	36 km	-	-	35	Complies
Communities	8.5 km	20	25	35	Complies
Heritage Sites	150 metres	55	60	60	Complies
Private Mining Camp	21 km	-	-	35	Complies

Noise is predicted to be compliant at all highly sensitive receptors at less than 35 dB(A), noting that the Hooley Station homestead, Fig Tree Crossing, the northeast private mining camp and the Youngaleena Community are more than 20 km away and therefore levels are so low as to be incalculable by the noise model.

Predicted noise levels at all heritage sites are also compliant with the prescribed maximum of 60 dB L₁₀ apart from those heritage sites within 100 m of the Haul Road. The nearest heritage site is within 40 m of the haul road, therefore is predicted to receive the highest level of noise at 72 dB(A). Given these sites are located within the Development Envelope, access will be controlled and negotiation with the Traditional Owners who are the custodians of these areas is in process. While many sites are not likely to be inhabited for long periods by people, some may be sensitive to vibration levels caused by mining activity. The next closest site is 200 m away from the haul road and receives 65 dB(A). All other heritage sites receive no more than 40 dB(A).

17.8.2 Air Quality and Dust

HPPL will implement dust management measures to reduce dust emissions and subsequent deposition, throughout the Development Envelope over the life of mine. The Proposal may result in a minor, temporary increase in localised dust. Given the expected localised impacts and noting that the Pilbara is a naturally dusty environment.

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Cumulative impacts are not anticipated with the Proposal and the Murrays Hill project as mining activities will not occur at the same time. Cumulative impacts may occur however with the Proposal and the Hub and Rail Project given the overlap of construction and operations activities.

Haulage of ore from the Proposal was originally proposed either via Fenceline Road or via the Mulga Downs Hub and Spur project. The revised Proposal excludes Fenceline Road, replacing that haulage option with the Northern Haul Road, which is both further away from sensitive receptors (Youngaleena and Wirrilimarra communities) and common to both Proposals (i.e. the Northern Haul Road is common infrastructure for transport of ore associated with both the Proposal and the Hub and rail Spur project which may accept ore from third parties) thereby reducing the cumulative impact.

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18 Holistic Impact Assessment

This ERD provides a detailed assessment of the potential environmental impacts associated with the Proposal and the management strategies for each environmental factor. This section provides information regarding the key themes Land, Water, People and Air and how these connect and interact between the environmental factors identified for the Proposal.

The key environmental factors relevant to the Proposal are:

- Inland Waters (Section 7);
- Subterranean Fauna (Section 8);
- Flora and Vegetation (Section 9);
- Terrestrial Fauna (Section 10);
- Terrestrial Environmental Quality (Section 11);
- Greenhouse Gas Emissions (Section 12);
- Air Quality (Section 13); and
- Social Surroundings (including Aboriginal heritage) (**Section 14**).

HPPL acknowledges the relationships between environmental factors and that those interrelationships may require consideration and management to achieve good environmental outcomes. The Development Envelope contains important environmental values that relate to multiple factors, as demonstrated in **Figure 18-1**. **Table 18-1** provides a summary of the connections and interactions between the key environmental factors (grouped by the relevant EPA theme) and proposed mitigation that reflect the connections and interactions (shared with mitigation proposed for individual environmental factors). The connections and interactions between environmental factors have been identified and the mitigation proposed in this ERD and supporting management plans is considered sufficient to meet the principles contained in the EP Act and the EPA's objectives for individual factors, as set out in **Sections 7 to 14** respectively. Where a significant residual impact has been identified in the assessment, offsets are proposed. These impacts and proposed offsets are summarised in **Section 16**.

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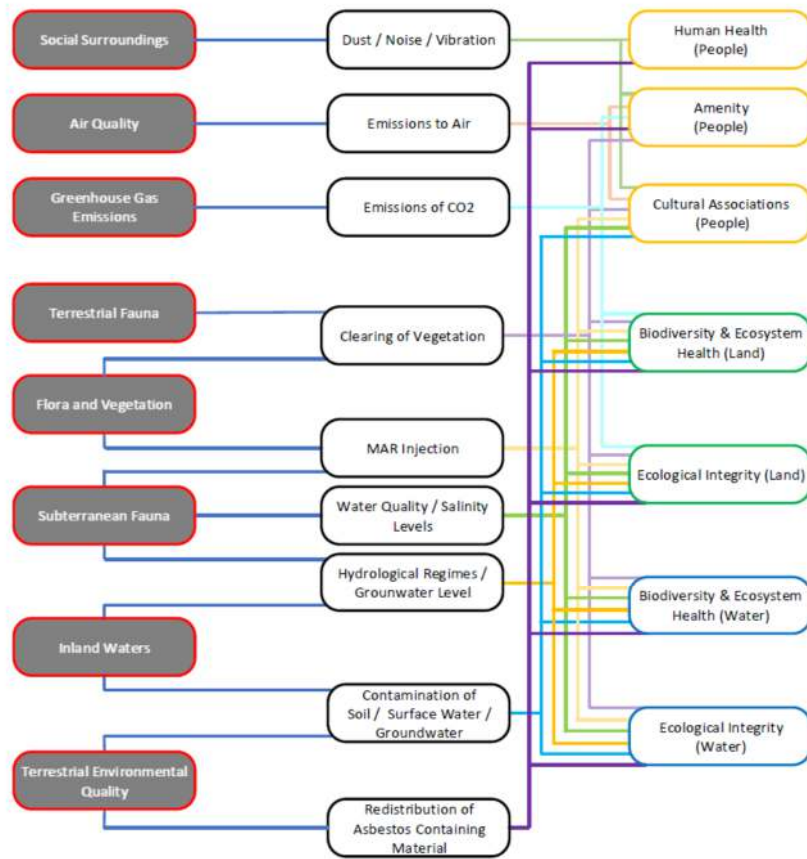


Figure 18-1: Relationships between environmental factors

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Table 18-1: Connections and interactions between key environmental factors and predicted outcomes

Theme	Environmental Factor	Connection and Interaction Pathway	Mitigation	Environmental Outcome / Significant Residual Impact
Land	Flora and vegetation	<ul style="list-style-type: none"> Provides habitat to terrestrial fauna. Contributes to maintenance of subterranean fauna habitat (through the loss of energy transfer to the subterranean environment). Contributes to maintenance of inland water quality, terrestrial environmental quality and landforms (e.g. through erosion prevention, sediment management, dust reduction). Assists in bio sequestration (GHG). Contributes to social surroundings (e.g. maintenance of air quality or inherent cultural values). 	<p>Avoid</p> <ul style="list-style-type: none"> Establishment of a FHEZ) which avoids impact to 1,320.82 ha of native vegetation and a FHEZ corridor which avoids impacts within an additional 991.45 ha area, both of which includes drainage lines to avoid fragmentation in that area of the Development Envelope. Impacts to the 'Freshwater Claypans of the Fortescue Valley' Priority 1 PEC are avoided. <p>Minimise</p> <ul style="list-style-type: none"> The Development Envelope and Indicative Footprint has been revised and reduced through iterative mine planning to reduce the extent of clearing required where possible resulting in a 5,288.84 ha reduction in impacts to native vegetation. Utilise areas of existing disturbance before clearing of new ground where possible. Proposal elements have been located to minimise impacts on environmental factors. 	<p>The significant residual impact of the Proposal to Flora and Vegetation, after the application of the mitigation hierarchy, is:</p> <ul style="list-style-type: none"> Clearing of up to 4,296.93 ha of native vegetation in Good to Excellent condition; Loss of up to 2,973.51 ha of potential sheet flow dependent vegetation; Loss of up to 4.31 ha of riparian vegetation; and Loss of up to 70.31 ha of the 'Four Plant Assemblages of the Wona Land System' Priority 1 PEC. <p>This significant residual impact is proposed to be offset via monetary contribution to the PEOF at the relevant rate.</p> <p>The Proposal can be managed to meet the EPA objective for flora and vegetation through the implementation of key mitigation, management and offset strategies.</p>

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Theme	Environmental Factor	Connection and Interaction Pathway	Mitigation	Environmental Outcome / Significant Residual Impact
			<ul style="list-style-type: none"> Phase the works to enable progressive clearing and where possible progressive rehabilitation. Implement programs for induction and education of the workforce with respect to flora and vegetation protection and management. Ensure clearing only occurs in approved ground disturbance areas (in accordance with an internal GDP. Located Proposal elements to minimise impacts to Priority flora species and locally significant vegetation communities. Implement induction and education of the workforce with respect to flora and vegetation protection and management. HPPL will ensure clearing only occurs in approved ground disturbance areas (in accordance with an internal GDP. An emergency management plan shall be developed and implemented and shall include methods for managing major environmental incidents, including but not limited to fire. Ensure compliance with the <i>Bushfire Act 1954</i>. 	

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			<ul style="list-style-type: none"> Compliance with internal Hot Works Procedures. Fire-control equipment shall be available in fire-risk areas including but not limited to hazardous material storage areas, hot works job sites, service trucks. An adequate number of personnel shall be trained in basic fire awareness, fire response and use of fire suppression equipment. Dust management measures will be utilised to minimise dust emissions and subsequent deposition on retained native vegetation in proximity to disturbance. Dust control measures will be implemented throughout the life of the Proposal and may include: Saline water (> 5000 mg/L TDS) shall not be used for dust suppression unless approved by the Environmental Manager and where approved, dribble bars shall be used to control overspray onto adjacent vegetation; Dust suppression techniques (e.g. water trucks) shall be used on unsealed 	

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			<p>roads and access tracks, cleared areas and at locations of high dust risk;</p> <ul style="list-style-type: none"> • Vehicle speeds on haul roads, work and camp sites shall be reduced where necessary to minimise dust emissions; • Vegetation clearing and earthworks during high winds (>50 km/hr) shall be avoided; and • Zones for saline water use will be in place. This includes, for instance, using saline water on heavy vehicle roads that do not cross a drainage line or creek crossing, whilst not allowing saline water to be used on roads that cross drainage lines without an appropriately sized windrow, not using saline water on topsoil stockpiles etc <p>Rehabilitate / Monitor</p> <ul style="list-style-type: none"> • Construction areas no longer required for operations will be rehabilitated upon completion of construction. • Progressive rehabilitation of operational areas no longer required, throughout LoM. • Decommissioning and rehabilitation of disturbed areas at the end of LoM. 	

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			<ul style="list-style-type: none"> • Topsoil will be collected in windrows and stored for rehabilitation of temporary construction areas. • Topsoil will be recovered and stockpiled to a maximum height of 2 m to preserve the soil physical/chemical properties and seed bank for use over temporary construction areas or for future rehabilitation. • Topsoil will be progressively re-spread over temporary construction areas or utilised for future rehabilitation. • Rehabilitation will occur with vegetation comprised of native species of local provenance in accordance with a DEMIRS approved MCP. • Consultation with Banjima to determine which species are ideal for seed collection. • Decommissioning and rehabilitating of Development Envelope at end of LoM. Topsoil will be recovered and stockpiled to a maximum height of 2 m to preserve the soil physical/chemical properties and seed bank for use over temporary construction areas or for future rehabilitation. 	

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			<ul style="list-style-type: none"> • Consultation with Banjima to determine which species are ideal for seed collection. • Progressive rehabilitation will be undertaken as areas become available. • Ongoing monitoring and management of weeds within the Development Envelope. • The MCP will detail specific weed management measures in rehabilitation areas. • Impacts to vegetation as a result of altered hydrological regimes will be managed through the implementation of the Water Management Plan. • Conduct rehabilitation in accordance with the MCP. • Weed monitoring. 	
	Terrestrial fauna	<ul style="list-style-type: none"> • Disperse and pollinate flora. • Contributes to social surroundings: • scientific and cultural value. 	<p>Avoid</p> <ul style="list-style-type: none"> • Establishment of a FHEZ which avoids impact to 1,320.82 ha of habitat (including native vegetation). • Establishment of FHEZ Corridor which both avoids and minimises impact within 991.45 ha of habitat (including native vegetation). 	<p>The significant residual impact of the Proposal to Terrestrial Fauna, after the application of the mitigation hierarchy, is:</p> <ul style="list-style-type: none"> • Loss of up to 1,406.03 ha of high value habitat for conservation significant fauna species, comprising Rocky Hills; Stony Spinifex Plains and Slopes; and Drainage Lines / Floodplain.

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			<ul style="list-style-type: none"> Impacts to the 'Freshwater Claypans of the Fortescue Valley' Priority 1 PEC are avoided which provide important habitat for migratory species. Avoidance of 36 Category 4 caves within the FHEZ. Avoidance of six Category 4 caves within the FHEZ Corridor. Freshwater Claypans of the Fortescue Valley P1 PEC is outside the Development Envelope. This is habitat for Migratory species when inundated and foraging habitat for the Pilbara Leaf-nosed Bat and Ghost Bat, Northern Quolls and potentially the Night Parrot. Establishment of the FHEZ and FHEZ Corridor protecting breeding and foraging for conservation significant fauna and allowing dispersal across high value Rocky Hills Habitat. <p>Minimise</p> <ul style="list-style-type: none"> Implementation of the CSFMP. Utilise areas of existing disturbance before clearing of new ground where possible. Where possible Proposal elements have been located to avoid and 	<p>This significant residual impact is proposed to be offset via monetary contribution to the PEOF at the relevant rate.</p> <p>The Proposal can be managed to meet the EPA objective for terrestrial fauna through the implementation of key mitigation, management and offset strategies.</p>

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			<p>minimise impacts on environmental factors.</p> <ul style="list-style-type: none"> • Removal of Mulga West Borefield from the Development Envelope which reduces the extent of clearing and associated impacts. • HPPL will ensure clearing only occurs in approved ground disturbance areas (in accordance with a GDP). • No more than 4,339.16 ha of clearing within a Development Envelope of 16,848.53 ha. • Phase the works to enable progressive clearing and rehabilitation. • Manage construction and operational works through an EMS. • Implement programs for induction and education of the workforce with respect to flora and vegetation protection and management. • No permanent mining activities will be undertaken within the FHEZ corridor, however supporting activities may be required such as access tracks and a provision for a future conveyor and ancillary service corridor. 	

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			<ul style="list-style-type: none"> Implement the Water Management Plan. Appropriate permits will be obtained under the RiWI Act. Blasting requirements will be designed to meet vibration thresholds of susceptible caves. All machinery and vehicles shall be cleaned down of all soil and vegetation material prior to arriving or entering on site. Any soil and vegetation removed from machinery or vehicles during clean down upon arrival, but prior to entry on site shall be collected and disposed of offsite. All vehicles and machinery mobilised to site shall be inspected prior to entry to site and issued with a Weed & Soil Hygiene Certificates. Imported fill or other potential weed mediums to be certified by the supplier as being free from weed free sources prior to arrival on site. Areas of known weed-infestation will be identified and managed separately to weed free areas. Where areas of weed-infestation are to be disturbed or cleared, material will 	

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			<p>be stockpiled/placed in windrows separately from weed-free material.</p> <ul style="list-style-type: none"> Targeted control of infestations. An emergency management plan shall be developed and implemented and shall include methods for managing major environmental incidents, including but not limited to fire. Ensure compliance with the <i>Bushfire Act 1954</i>. Compliance with internal Hot Works Procedures. Fire-control equipment shall be available in fire-risk areas including but not limited to hazardous material storage areas, hot works job sites, service trucks. An adequate number of personnel shall be trained in basic fire awareness, fire response and use of fire suppression equipment. <p>Rehabilitate / Monitor</p> <ul style="list-style-type: none"> Implementation of the CSFMP. Construction areas no longer required for operations will be rehabilitated upon completion of construction. 	

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			<ul style="list-style-type: none"> Progressive rehabilitation of operational areas no longer required, throughout LoM. Decommissioning and rehabilitation of disturbed areas at the end of LoM. Consultation with Banjima to determine which species are ideal for seed collection, as informed by the ethnobotanical surveys. Implement the Water Management Plan. Rehabilitation of areas of land utilised for construction purposes will occur upon completion of construction. Progressive rehabilitation of temporary disturbance areas will be undertaken (such as borrow pits and temporary construction areas). 	
	Subterranean Fauna	<ul style="list-style-type: none"> Potential filtering and maintenance of subterranean ecosystem by recycling nutrients (Inland Waters) Contribution to social surroundings: scientific and cultural value. 	<p>Avoid</p> <ul style="list-style-type: none"> Complete avoidance is not possible for this Proposal; however, the Proposal has been designed so that excavation is contained to seven designate mine pits as per mining schedule. Excavation of troglofaunal habitat is contained in seven mine pits. 	<p>The significant residual impact of the Proposal to Subterranean Fauna, after the application of the mitigation hierarchy, is:</p> <ul style="list-style-type: none"> The loss of up to 96,048,900 m³ of troglofauna habitat from the excavation of pits. A reduction of up to 274,648,900 m³ of troglofauna habitat as a result of changes to the groundwater levels from MAR reinjection.

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			<ul style="list-style-type: none"> The number of pits has been reduced and mining output has been reduced from 20 Mtpa to 12 Mtpa avoiding troglofaunal habitat. <p>Minimise</p> <ul style="list-style-type: none"> Excavate no more than 66,731.74 m³ of Tertiary/Detritals identified as likely troglofauna habitat. Limit the reduction of habitat to 274,648,900 m³ of troglofauna habitat primarily in the CID/Pisolite. Undertake pit construction in stages to manage dewatering and MAR requirements – optimise the West to East mining scenario as outlined in Water Management Plan. Maintain the current beneficial use of groundwater as per the Water Management Plan, to limit the extent of groundwater extraction (and associated drawdown and MAR). Maintain groundwater levels such that there is no surface expression of groundwater (as a result of MAR) limiting troglofauna habitat. Implement management actions as defined in the Water Management Plan. 	<ul style="list-style-type: none"> Loss of up to 370,648,900 m³ of stygofauna habitat from dewatering of mine pits for LoM. The loss of stygofauna habitat as a result of changes to groundwater salinity from MAR and dewatering drawdown. There is potential to impact up to six species of troglofauna which have not been found outside the mine pit and mounding areas. No stygofauna taxa will be lost. The data shows dispersal is possible from areas of impact to areas outside any impact from the Proposal. Up to 14 have been found to be restricted, however there is no evidence of isolated or fragmented habitat where these taxa were found. Surveys for both stygofauna and troglofauna for this Proposal have been extensive and the area has been characterised in respect to significance as subterranean habitat. The likely habitat for stygofauna and troglofauna has been assessed and found to be extensive and continuous, dispersal has been displayed by the subterranean fauna at MDIOM.

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			<ul style="list-style-type: none"> • Implement the management actions as defined in the SFMMP. • Apply the developed habitat assessment model to updated species list. • Loss of no more than 370,648,900 m3 of stygofauna habitat from extraction of mine pits for LoM. • Implement mine schedule of staged pit excavation (optimise West to East mining scenario as per Water Management Plan). • Limit dewatering profile to that which is necessary for mining. • Limit MAR profile to that which is necessary for mining. • Backfilling of pits to reduce ex-pit WRDs. • Minimise the clearing of vegetation required where possible. • Design of potential contaminating facilities (landfill, WRD, TSF) to prevent seepage to surface water and/or groundwater. • Adhere to works approval and licence conditions under Part V of the EP Act. 	

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			<ul style="list-style-type: none"> Storage of contaminating materials in Australian Standard compliant locations with bunding, spill controls and leak prevention. Saline water (> 5000 mg/L TDS) shall not be used for dust suppression unless approved by the Environmental Manager and where approved, dribble bars shall be used to control overspray onto adjacent vegetation. WRD to be designed in accordance with the MCP. Design and construction of WRD with appropriate seepage and leachate control structures. Management of chemical and hydrocarbons, appropriate types and quantities of spill response equipment will be maintained. Manage any spills including any contaminated material, in accordance with the internal procedures; and investigate and report incidents in accordance with internal procedures, to prevent the recurrence of incidents of the same or similar nature. Limit mounding to that which is necessary for mining. 	

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			<p>Rehabilitate / Monitor</p> <ul style="list-style-type: none"> Develop and implement a MCP as approved by DEMIRS (as per the requirements of the Mining Act and DEMIRS Guidelines for Preparing Mine Closure Plan, March 2020). Progressive rehabilitation to be undertaken in accordance with a MCP assessed and approved by DEMIRS, as per requirements under the Mining Act. Monitoring program targeting troglofauna which have the highest level of endemism. Implement monitoring as detailed in the Water Management Plan and SFMP. Backfilling of pits to ensure backfill is above the water table after settlement, and as such pit lakes will be avoided. This will be further informed by future infield study work as part of the closure planning process. Spills and leaks of reagents, chemicals and hydrocarbons will be cleaned up in accordance with HPPL procedures. Conduct periodic inspections of chemical and hydrocarbon storage 	

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			<p>areas to confirm compliance with Licence conditions and applicable Australian Standards.</p> <ul style="list-style-type: none"> Ongoing groundwater monitoring and modelling will be undertaken for the mine and borefields throughout the mine in accordance with the Water Management Plan. 	
	Terrestrial Environmental Quality	<ul style="list-style-type: none"> Inland Waters: contamination resulting in reduced water quality. Changes to water quality affects: Habitat for terrestrial fauna and potential to impact on fauna health. Flora and vegetation impacts as a result of contamination and changes to water quality. Subterranean fauna habitat impacts as a result of contamination and changes to water quality. Social surrounding: human health (mobilisation of asbestos), water use and cultural significance. 	<p>Avoid</p> <ul style="list-style-type: none"> As a result of the AMD risk posed by elevated sulfur material at depth, HPPL purposely designed the pits to exclude basal Nammuldi Member subunits and Jeerinah Formation (Roy Hill Shale). The Development Envelope avoids the WAMA. The Mulga Homestead, which is a registered contaminated site, is excluded from the Development Envelope and has been fenced off with appropriate signage provided to prevent unauthorised access. <p>Minimise</p> <ul style="list-style-type: none"> The Proposal has been designed to avoid direct impacts to areas prone to ASS, such as wetlands. 	<ul style="list-style-type: none"> It is considered unlikely that significant risk will be posed to Terrestrial Environmental Quality from clearing, earthworks, construction and/or mining activities redistributing historical, anthropogenic ACM. Other regulatory processes such as DEMIRS' Mining Proposal and MCP will ensure waste structures such as waste rock dumps are designed, operated, decommissioned and closed to meet the EPA's objectives for Terrestrial Environmental Quality.

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			<ul style="list-style-type: none"> • Surface water diversions have been designed to ensure surface water flows avoid contact with WRDs. • Storage of contaminating materials in AS compliant locations with bunding, spill controls and leak prevention. • Appropriate siting of landfill facilities to avoid interaction with surface drainage. • If PAF material is encountered during mining, PAF material will be managed according to the Waste Management Plan to ensure final landform is non-acid forming. • Ongoing waste characterisation studies. • Waste rock material will be used as pit backfill to minimise the need for surface waste rock landforms. • Low stability or material the Uncertain or PAF classification waste rock material will not be placed on waste rock landform surfaces. • Competent waste rock material will be used to armour waste rock dump surfaces. • Waste rock landform design, including heights, slope lengths, batter angles 	

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			<p>and surface water control structures account for physical and chemical properties of waste rock.</p> <ul style="list-style-type: none"> Design landforms and infrastructure to contain sedimentation where possible. Toe bunds and sediment basins will direct and contain sediment runoff to prevent excessive scour and increased sediment volumes to the downstream environment. Adherence to Dangerous Goods licence conditions and Australian Standards Adherence to EP Act Part V licence conditions with respect to bulk chemical storage and landfill management. Disposal of waste to landfill will be a last resort. Materials will be repurposed or recycled where practicable. Adherence to the Asbestos Management Plan. The Proposal has been designed to avoid impacts to areas where ACM has been confirmed or is suspected, where practicable. <p>Rehabilitate / Monitor</p>	

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			<ul style="list-style-type: none"> • If unexpected PASS is encountered, disturbed soils or low pH waters will be neutralised prior to discharge. • Excavation or dewatering will cease until suitable management measures are employed. • If ASS has been disturbed or dewatered, monitoring of surface and groundwater quality in accordance with a Water Management Plan will continue until water return to below 'trigger' criteria. • Monitoring of surface and groundwater quality in accordance with a Water Management Plan to detect any adverse changes in water quality between the mine and sensitive receptors, with 'early response' criteria, 'trigger' criteria and 'threshold' criteria. • Progressive rehabilitation to be undertaken in accordance with a MCP assessed and approved by DEMIRS, as per requirements under the Mining Act. • Spills and leaks of reagents, chemicals and hydrocarbons will be cleaned up in accordance with HPPL procedures. 	

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			<ul style="list-style-type: none"> Pipelines, water storage dams and landfills will be appropriately decommissioned and disturbed areas rehabilitated, unless there is a specific agreement in place with a third party to take ownership and responsibility of the infrastructure post mining. The requirements will be regulated as per a MCP to be assessed and approved by DEMIRS, in accordance with the Mining Act. All chemical and hydrocarbon storage areas will be appropriately decommissioned and closed as per DEMIRS requirements of the MCP, in accordance with the Mining Act. ACM-contaminated areas will be rehabilitated where appropriate, and asbestos management will be subject to monitoring through the AMP. 	
Water	Inland Water	Hydrological regimes support: <ul style="list-style-type: none"> Terrestrial fauna. Subterranean fauna. Flora and vegetation. 	<p>Avoid</p> <ul style="list-style-type: none"> Minimisation is considered to be the key measure as complete avoidance is not possible for the Proposal. Divert surface water flows away from mining areas to avoid the potential for contamination. <p>Minimise</p>	<ul style="list-style-type: none"> After the mitigation hierarchy has been applied, no significant residual impact to environmental values supported by hydrological processes or water quality are expected and HPPL considers that the Proposal can be managed to meet the EPA's objectives for inland waters.

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		<ul style="list-style-type: none"> Social Surroundings: Culturally and ecologically significant. Beneficial water use. 	<ul style="list-style-type: none"> The Water Management Plan will be implemented. Surface water management during construction, mining and closure will be designed to minimise adverse impacts on the natural function and environmental value of watercourses, water quality and sheet flow downstream of the mine area. Adherence to permit requirements under the RiWi Act. <p>Rehabilitate / Monitor</p> <ul style="list-style-type: none"> Implement the monitoring as outlined in the Water Management Plan. Implement the approved MCP. Temporary infrastructure will be removed and natural flow paths, and catchments, reestablished in these areas. 	
People	Social Surroundings	<ul style="list-style-type: none"> Culturally and ecologically significant: Flora and vegetation. Terrestrial fauna. Inland waters. 	<p>Avoid</p> <ul style="list-style-type: none"> Development Envelope excludes the lodged Mungurru site. Heritage sites will be demarcated and identified as no-go areas for site personnel prior to ground disturbing works. 	Overall, with the implementation of mitigation actions as formalised and detailed within management plans, impacts to Social Surroundings are considered manageable and that the EPA's objectives for this factor can be met. This will be managed via ongoing consultation with Banjima Traditional Owners and other relevant stakeholders.

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		<ul style="list-style-type: none"> Amenity (visual, dust, noise). Access. 	<ul style="list-style-type: none"> Aboriginal cultural heritage, or suspected Aboriginal cultural heritage, must not be removed from any heritage place under any circumstance, unless authorised under the AH Act. Removal of the Mulga West borefield from the Development Envelope avoids impacts on Yindjibarndi Country. Indicative Footprint amended to avoid key heritage sites with ongoing refinement of the Mine Plan to maximise site avoidance and avoid access restrictions. Avoidance buffers of 25 m (individual sites may have additional buffers applied in consultation with Banjima traditional owners) will be established around retained heritage sites within the Development Envelope, in consultation with Traditional Owners. These avoidance buffers will be demarcated and managed in accordance with appropriate site procedures. This will be monitored via the GDP process. HPPL will consult with the Banjima Traditional Owners regarding asbestos management. The Proposal is located outside of the WAMA. HPPL is not proposing to undertake any mining in 	<p>The post-mining landform will be consistent with features in the wider surrounding landscape, indicative of mining operations within the Pilbara and will be managed in accordance with MCP(s).</p> <p>Impacts to amenity (dust, noise and visual impacts) can be managed through industry standard measures.</p>

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			<p>proximity to Wittenoom and has no intention to reopen Wittenoom.</p> <ul style="list-style-type: none"> Direct impacts to claypans (including Koodjeepindarrna and Ngarlganoona pools) and Fortescue valley are avoided through Proposal design. <p>Minimise</p> <ul style="list-style-type: none"> Facilitate Banjima Traditional Owner involvement in monitoring activities where possible. Minimise clearing areas as far as practicable. Ongoing consultation with Traditional Owners during the Proposal. Waste dumps will be designed to blend in with the surrounding landscape. Noise, dust and vibration mitigation measures to be implemented. Implement the CHMP. Implement water management measures, including implementation of the Water Management Plan. Engagement with Traditional Owners to identify sites of cultural significance and avoid impacts to these sites where possible. 	

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			<ul style="list-style-type: none"> Minimise, as far as practicable, interactions with significant water features and impacts to surface water flow, including changes to the hydrological regimes of culturally significant water sources. Minimise clearing and access restrictions within areas used for cultural purposes or areas that have cultural significance (e.g. at watercourse crossings). Ensure sediment controls are in place during construction at waterway crossings. Implement a SCHMP that is co-developed with the Banjima Traditional Owner group. Implement Waste Rock Management Plan. The Proponent will implement standard dust management measures to minimise potential airborne dust emissions and associated impacts to amenity. This includes (but is not limited to) use of dust suppression on access roads and open areas, water sprays for ore processing, transport and stockpiles, limiting the number and height of stockpiles, 	

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			<p>controlling/reducing trip distance and ensuring vehicles are confined to designated routes with speed limits strictly enforced.</p> <ul style="list-style-type: none"> Operating noise, vibration and potential mitigation measures (e.g. sound absorption devices) must be considered when selecting equipment. Equipment must be fitted with appropriate noise reduction devices (where necessary) to comply with Proposal HSE and regulatory requirements. Blasting activities must be undertaken in accordance with Mines Safety Inspection Regulations 1995 and Noise Regulations. Regularly inspect, maintain and replace mobile equipment so that noise levels are minimised during the equipment life. Implement HPPL's Drill and Blast near ACH Procedure. <p>Rehabilitate / Monitor</p> <ul style="list-style-type: none"> Personnel must not enter an Aboriginal Cultural Heritage site or a HRZ without prior consent. 	

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			<ul style="list-style-type: none"> Ongoing engagement with Traditional Owners to understand key impacts and avoid where possible. Appropriate education of the workforce will occur through the implementation of a Cultural Awareness Training program. Adherence to internal GDP procedures. Maintenance of Traditional Owner access to culturally significant places where safe and practical. Implement a CHMP. Implement HPPL’s Heritage Management Framework; a suite of management procedures. Maintenance of access to culturally significant places where safe and practical. Impacts to specific sites of cultural and heritage significance, if unavoidable, will be discussed with Traditional Owners and Approvals sought under the AH Act. Salvage of heritage material will be undertaken, where appropriate, in consultation with Traditional Owners, prior to direct impact. 	

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			<ul style="list-style-type: none"> Repatriation and restitution of salvaged Heritage material will be undertaken in consultation with Traditional Owners. Post-closure access to sites of cultural significance will be maintained. Post-closure access restrictions will be limited only to areas immediately adjacent to remaining open pits (due to safety reasons). Monitoring for dust, noise and visual impacts will be ongoing. Monitoring surface water quality in accordance with a Water Management Plan. WRDs at closure will be rehabilitated to ensure they are stable, non-polluting and revegetated. Closure landforms are designed to minimise long-term impacts to hydrological regimes associated with sites of cultural significance. Groundwater recovery will be investigated and incorporated into the final MCP, to be submitted to support the Mining Proposal. Monitor sites of cultural and heritage significance and the avoidance buffer zones. Report new or unauthorised 	

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			<p>disturbances to culturally sensitive sites and avoidance buffers.</p> <ul style="list-style-type: none"> Rehabilitation and closure of the Proposal will be undertaken to meet land use outcomes negotiated in consultation with Traditional Owners, including incorporation of bushtucker/ medicine species, and habitat for traditional hunting species and the objectives of the MCP, as required under the Mining Act. Seed collection prior to/during construction and operations for use in rehabilitation with involvement of Traditional Owners. 	
Air	Air Quality	<ul style="list-style-type: none"> Terrestrial Environmental quality (asbestos) Social Surroundings: <ul style="list-style-type: none"> Amenity. 	<p>Avoid</p> <ul style="list-style-type: none"> Complete avoidance of volatile emissions and dust is not possible. Asbestos contaminated areas will be clearly demarcated and access restricted. Known asbestos contaminated area (abandoned infrastructure area) has been excised from the Development Envelope, and access to site structure containing ACM will be restricted. <p>Minimise</p>	<ul style="list-style-type: none"> No significant changes to ambient air quality are predicted at sensitive receptor locations due to the implementation of the Proposal. Low risk of activities associated with the Proposal causing disturbance to ACM and asbestiform minerals within the Development Envelope. <p>The EPA objective for this factor can therefore be met.</p>

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			<ul style="list-style-type: none"> • Standard dust management measures will be utilised to minimise dust emissions, including: <ul style="list-style-type: none"> ○ Dust suppression techniques (e.g., water trucks) used on unsealed roads and access tracks, cleared areas and at locations of high dust risk; ○ Vehicle speeds on haul roads, work and campsites shall be reduced where necessary to minimise dust emissions; ○ No vegetation clearing and earthworks during wind speed greater than 50 km/hr; and ○ Clearing activities will be staged to minimise areas of exposed surfaces. • Induction and education of the workforce and contractors with respect to dust minimisation. • Adherence to the AMP. <p>Rehabilitate / Monitor</p> <ul style="list-style-type: none"> • Progressive rehabilitation as areas become available. • Dust monitoring at the Wirrilimarra and Youngaleena Communities. 	

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			<ul style="list-style-type: none"> Any dust complaints received will be reported to HPPL and entered into the incident management system. If ACM is found onsite during construction and operation, it will be remediated as per AMP. <p>Asbestos management will be subject to monitoring through the AMP.</p>	
	Greenhouse Gases	<ul style="list-style-type: none"> Social Surroundings: Amenity. 	<p>Avoid – avoid emissions through best-practice design;</p> <p>Reduce – reduce emissions over the project life; and</p> <p>Offset – offset some or all residual emissions.</p>	The Proposal will contribute to global greenhouse gas emissions.

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Abbreviations

Abbreviation/Acronyms	Definition
AH Act	<i>Aboriginal Heritage Act 1972 (WA)</i>
ACHM	Australian Cultural Heritage Management
ACM	Asbestos Containing Material
AMD	Acid Mine Drainage
AMP	Asbestos Management Plan
ARI	Assessed on referral information
AS	Australian Standard
AWS	Automatic Weather Station
BESS	Battery Energy Storage System
BIF	Banded Iron Formation
BNTAC	Banjima Native Title Aboriginal Corporation
BoM	Bureau of Meteorology
CEO	Chief Executive Officer
CHMP	Cultural Heritage Management Plan
CID	Channel Iron Deposit
CR	Critically Endangered
CS Act	<i>Contaminated Sites Act 2003 (WA)</i>
Cth	Commonwealth
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DMA	Decision Making Authority
DMIRS	Department of Mines, Industry Regulation and Safety(-2023)
DEMIRS	Department of Energy Mines, Industry Regulation and Safety (2023-)
DPIRD	Department of Primary Industries and Regional Development
DSO	Direct Shipping Ore
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EN	Endangered
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
ERD	Environmental Review Document
ESA	Environmentally Sensitive Area
ESD	Environmental Scoping Document
EWB	Ecohydrological Water Model

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FHEZ	Fauna Habitat Exclusion Zone
FMG	Fortescue Metals Group
GDP	Ground Disturbance Procedure
GHG	Greenhouse Gas
GL/a	Gigalitres per Annum
ha	Hectares
HanRoy	HanRoy Iron Ore Project Pty Ltd
HPPL	Hancock Prospecting Pty Ltd
IBRA	Interim Biogeographic Regionalisation of Australia
IPCC	Intergovernmental Panel on Climate Change
kL	Kilolitres
kL/d	Kilolitres per day
km	Kilometres
LoM	Life of Mine
LpA	Sound pressure level
LTUs	Lower Taxonomic Units
LV	Light vehicle
m	Meters
MAR	Managed Aquifer Recharge
MCP	Mine Closure Plan
MDI	Mulga Downs Investments Pty Ltd
MDIO	Mulga Downs Iron Ore Pty Ltd
MDIOM	Mulga Downs Iron Ore Mine
MDIOP	Mulga Downs Iron Ore Proposal
MMIF	Marra Mamba Iron Formation
MNES	Matters of National Environmental Significance
mRL	Meters Relative Level
Mt	Million tonnes
Mtpa	Million tonnes per annum
MW	Mega watts
MWh	Megawatts
NGER Act	<i>National Greenhouse and Energy Reporting Act 2007 (Cth)</i>
OTUs	Operational Taxonomic Unit
P	Priority
PAF	Potential Acid Forming
PCD	Proposal Content Document
PEC	Priority Ecological Community (WA listing)

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PEOF	Pilbara Environmental Offsets Fund
PER	Public Environmental Review
PESA	Preliminary Environmental Site Assessment
PMCP	Preliminary Mine Closure Plan
RHI	Roy Hill Infrastructure Pty Ltd
RoM	Run of Mine
Roy Hill	Roy Hill Holdings Pty Ltd
S43a	Section 43a
SAQP	Sampling and Analysis Quality Plan
SBA	Stand Basal Area
SCHMP	Social Cultural Heritage Management Plan
SRE	Short-range endemic
t CO ₂ -e	tonnes carbon dioxide equivalent
TDS	Total Dissolved Solids
TSF	Tailings Storage Facility
VU	Vulnerable
WA	Western Australia
WAMA	Wittenoom Asbestos Management Area
WMP	Water Management Plan
WoNS	Weeds of National Significance
WRD	Waste Rock Dump
WWTP	Waste Water Treatment Plant

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Appendix 1 Proposal Content Document

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Appendix 2 HanRoy Environmental Policy

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Appendix 3 Preliminary Mine Closure Plan

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Appendix 4 AQ2 Baseline Water Studies

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Appendix 5 AQ2 Groundwater and Surface Water Impact Assessment

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Appendix 6 Water Management Plan (GWMP, SWMP & VHMMP)

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Appendix 7 Peer Reviews – GHD and Middlemis

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Appendix 8 Subterranean Fauna Reports

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Appendix 9 AQ2 Subterranean Habitat Assessment

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Appendix 10 Flora and Vegetation Reports

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Appendix 11 Terrestrial Fauna Reports

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Appendix 12 CSFMP

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Appendix 13 JBSG Preliminary Environmental Site Assessment

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Appendix 14 Senversa Voluntary Auditors Report

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Appendix 15 Mine Earth Baseline Soil and Landform Assessment

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Appendix 16 Waste Characterisation and Solute Reports

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Appendix 17 Asbestos Management Plan

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Appendix 18 Air Quality Monitoring Program

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Appendix 19 Ambient Noise Monitoring Program

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Appendix 20 Noise and Vibration Assessment

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Appendix 21 Visual Impact Assessment

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Appendix 22 Salinity Memo

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Appendix 23 Impact Reconciliation Procedure

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Appendix 24 Aquatic Desktop Report (Biologic 2023)

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Appendix 25 ACHM 2024 – Ethnobotanical survey of the Mulga Downs Iron Ore Mine & Hub and Rail Spur

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Appendix 26 BEC 2024 Mulga Downs Iron Ore Mine: Subterranean Fauna Survey 2019-2024

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Appendix 27 LGA 2024

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Appendix 28 PSM 2024

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Appendix 29 SFMMP

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Appendix 30 Banjima Social Surroundings Assessment (May 2024)

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