5. SOCIO-ECONOMIC ENVIRONMENT

5.1 SOCIAL IMPACT

EPA: A formal public consultation and complaints process needs to be established to provide information to the public, the opportunity for ongoing public comment or complaint and a channel whereby complaints are officially recorded, addressed and followed through to resolution, with advice on outcomes provided to complainants.

DHCS ask what mechanism will be made available to the community to lodge complaints about dust emissions and noise. How would these be monitored and assessed by the proponent?

Section 8.4 of the PER describes that the nearest population centre, Pine Creek, is located approximately 20 kilometres away. This distance is considered sufficient to ensure there is negligible risk of dust and noise impacting Pine Creek.

Arafura will liaise with the Pine Creek Community Government on company matters affecting the local community and provide a register for complaints related to the Mt Porter Gold Project (**Commitment S21**). The MMP will include a copy of the community complaint form and procedure and will define actions on any complaints received.

What consultation has occurred with the staff at the local health centre and what systems will be put in place to monitor the impact of the project on the health centre?

No specific consultation has occurred with the staff at the Pine Creek health centre. Consultation with a range of service organisations in Pine Creek will be undertaken prior to commencement of operations.

5.2 CULTURAL HERITAGE

NLC: Health and safety issues related to contamination of local foods by mine site wastes are a major concern for Traditional Owners around the Northern Territory. Development of locally based triggers for chemicals that are bioaccumulants or potential bioaccumulants (e.g. cadmium and thallium) must therefore also be referenced against ecotoxicological assessments for local biota if an adequate assessment of trophic transfer into the ecosystem and food-chain is to be performed.

Recommendation: Address the questions of safety of local foodstuffs that may be gathered by Traditional Owners from downstream regions impacted by the project. This needs to include impacts on aquatic and terrestrial flora and fauna and be undertaken in consultation with relevant Traditional Owners.

The ANZECC (2000) guidelines contain detailed discussion on water quality guidelines for the protection of human consumers of aquatic foods. The issue is very complex, with no single set of guideline values applicable. The following extracts from the ANZECC (2000) guidelines are relevant to this topic:

- Section 4.4.5.1: Although guidelines are provided for biological contaminants and for the tainting of animal flesh, a search of the available data has produced insufficient information for deriving water quality guidelines that will ensure the Australian and New Zealand food standards will be met.
- Section 8.3: For many organisms the key determinants that influence metal accumulation are the relative amounts of metal present in the environment, together with their chemical form. The bioconcentration factor (bcf) is the degree of enhancement of metal in the organism relative to its environment. Application of bcf's assumes that the metal concentrations in the organisms are at steady state with concentrations in the environment and that uptake of the metal is proportional to its concentration in water. However numerous factors affect bcf's, including water chemistry (salinity, dissolved organic matter), biological factors (organism size, reproductive stage) and the ability of organisms to regulate metal levels.
- Section 8.3.2.4: It seems logical that there ought to be some pattern in the sensitivity of species to toxicants i.e. if one species is sensitive to a particular toxicant, it would be sensitive to other toxicants. However, this is not necessarily the case. The search for a single most sensitive species is futile (Cairns 1986), as different species react differently to toxicants (Pedersen *et al*. 1994). No predictions can be made about the likely effect of a toxicant on a particular species.

From the above, it is evident that no single concentration of metals in water can be definitively applied as trigger levels or guideline values to prevent possible bioaccumulation in organisms.

The project is in a climate zone that makes field assessment of possible bioaccumulation difficult. Ephemeral creek systems, characterised by periods of no water in the creek are followed by heavy rainfall events producing 'pulses' of sediment and chemical loads from large catchment areas, with large dilution effects depending on the amount of rainfall. This does not produce "steady state" conditions.

In order to establish the likely risk from metal contamination by transport of material from the project site, Arafura has instead focussed on monitoring of water quality against general guideline values to detect if values are found significantly outside the range normally accepted. Figure 4.4.1 in the ANZECC (2000) guidelines provides a Decision Tree for determining if water quality is acceptable for the protection of aquatic species. This methodology is considered the most appropriate for the current proposal and will be incorporated into the water monitoring programme for the site.

AAPA: There does not appear to be any discussion of any sacred sites protection in this document.

No sacred sites have been identified in the project area. Arafura commissioned an additional archaeological survey (PER Appendix 9) as part of the project assessment. Assistance was sought from the Jawoyn Association, Aboriginal Areas Protection Authority, and the Northern Lands Council, as well as from local Jawoyn and Wagiman communities at Pine Creek prior to the survey. No local Traditional Owners could be identified. Arafura considers it has made reasonable efforts to consult local Traditional Owners who may have knowledge of sacred sites within the area. In the absence of identified sacred sites, no further action is planned.

MAGNT: It may be beneficial to have a reference collection of select artefacts recovered from the areas that will be disturbed to enhance knowledge and protect by placing into care some of this cultural heritage.

Section 8.3 of the PER details actions regarding Aboriginal heritage sites in proximity to mine activities. Several sites are identified that may be impacted by the project. Application to remove affected sites will be made under provisions of the *Heritage Conservation Act 2000*. Consultation with local Aboriginal representatives will occur in this process. Their wishes will be sought on the option of establishing any artefacts removed in a reference collection.

NRETA: The Heritage Management section does not talk about historic values such as mining history of area or artefact that might exist from this history. This area has a long mining history and that needs to be considered in the Heritage Management section of the EMP.

The area around Mt. Porter has been explored since the early 1980s. While the greater region has a history of mining dating back to the 1800s, the Mt Porter project area does not contain any area or artefact of historical significance. A search of the Australian Heritage Database did not register any sites within the Mt Porter area.

5.3 BITING INSECTS

MEB: It should be noted that there may be low to moderate mosquito problems in the months of March to June, due to breeding in residual pools in the adjacent ephemeral creek lines. Employees should be advised of this potential problem period. Mosquito species likely to be encountered in these months include Culex annulirostris, which is a vector of Ross River virus, Barmah Forest virus, Murray Valley encephalitis virus and other viruses, as well as the potential malaria mosquitoes Anopheles annulipes s.l. and An. bancroftii, and the pest mosquito Cq. xanthogaster.

Employees will be made aware of potential mosquito problems that may arise during operations as part of the project induction process (**Commitment S22**). The occurrence of mosquitoes will be minimised by eliminating potential mosquito breeding grounds and providing staff with personal protection including repellents and full length clothing. Operations will primarily be conducted in the dry season when the risk posed by mosquito populations is low.

The salt marsh mosquito Aedes (formerly Ochlerotatus) vigilax may be present in pest numbers in the months of September to November at the mine site, dispersing from distant tidal swamps and rivers. This species is recognised as a good vector of Ross River virus and Barmah Forest virus.

Comment noted.

MEB: The temporary earthern dams should be deep (>1m) and have steep sides (45o), to discourage margin vegetation growth and minimise the potential for mosquito breeding.

The earthen dams are temporary structures that will be removed at the completion of mining. Given the short duration of operations, it is unlikely that vegetation will develop around the

margins of the dams. Additionally, this water can be treated with larvicides (should mosquitoes be identified) as it will not be a source of potable water on site.

Compliance to the MEB guideline 'Guidelines for preventing mosquito breeding sites associated with mining sites' should be included as a commitment for this project. Also, the rehabilitation of mined areas such that no potential mosquito breeding sites remain, other than the open pit void, should also be listed as a commitment. Arafura Resources NL should commit to ensuring the open pit void has minimal potential to become a significant mosquito breeding site.

Arafura will operate in compliance with *'Guidelines for preventing mosquito breeding sites associated with mining sites'* **(Commitment S23).**

Information relating to rehabilitation objectives and commitments will be presented in the EMP as part of the MMP.

Mosquito borne diseases that could potentially be transmitted at the mine site include Ross River virus, Barmah Forest virus and Murray Valley encephalitis virus. Malaria is an illness caused by a parasite which is not endemic to Australia, the risk of malaria transmission at the mine site will only arise if a worker is sourced or returning from overseas with the infectious stages of malaria and is bitten by Anopheles mosquitoes at the mine site.

Comment noted.

The open pit lake should be stocked with hardy native fish during the rehabilitation process. Where practical, the sides of the open pit lake should be steep (45o or greater), to minimise the establishment of semi-aquatic vegetation and grasses at the water edge, to minimise potential mosquito breeding.

The sides of the open pit will be steep enough (>45°) to limit the establishment of semi-aquatic vegetation. The addition of hardy fish to the lake would require further research on the effects of introducing a biological control into the ecosystem. As such, Arafura will not commit to this option, however, the idea may be investigated.

The workshop and office area should be appropriately screened to prevent the entry of mosquitoes.

All doors and windows will be screened.

For Table 13, the peak abundance of Ochlerotatus normanensis should be January to April, while the peak abundance for Ochlerotatus vigilax should be September to January.

Comment noted. Table 4 shows the correct peak abundance of species.

Table 4: Potential Pest Mosquitoes of the Frances Creek Area

SPECIES	NUISANCE STATUS	POTENTIAL VECTORS	PEAK ABUNDANCE
ANOPHELES ANNULIPES S.L	+	MALARIA	NOVEMBER - APRIL
ANOPHELES BANCROFTII BLACK MALARIA MOSQUITO	+++	MALARIA	FEBRUARY - JULY
COQUILLETTIDIA XANTHOGASTER THE GOLDEN MOSQUITO	+++	NONE KNOWN	MARCH - AUGUST
CULEX ANNULIROSTRIS COMMON BANDED MOSQUITO	+++++	MURRAY VALLEY ENCEPHALITIS VIRUS KUNJIN VIRUS JAPANESE ENCEPHALITIS VIRUS ROSS RIVER VIRUS BARMAH FOREST VIRUS	JANUARY - AUGUST
CULEX PALPALIS FRESHWATER BANDED MOSQUITO	+++	MURRAY VALLEY ENCEPHALITIS VIRUS KUNJIN VIRUS JAPANESE ENCEPHALITIS VIRUS ROSS RIVER VIRUS BARMAH FOREST VIRUS	JANUARY - AUGUST
OCHLEROTATUS NORMANENSIS FLOODWATER MOSQUITO	+++++	ROSS RIVER VIRUS BARMAH FOREST VIRUS	JANUARY - APRIL
OCHLEROTATUS VIGILAX SALT MARSH MOSQUITO	+++++	ROSS RIVER VIRUS BARMAH FOREST VIRUS	SEPTEMBER - JANUARY

6. REHABILITATION AND CLOSURE

6.1 GENERAL COMMENTS

EPA: Describe long term closure methods planned to manage fauna access, prevent entrapment and allow escape.

NLC: Produce closure criteria and additional rehabilitation monitoring programmes that provide a wider range of information against which those closure criteria may be cross-referenced.

Closure criteria and rehabilitation monitoring details will be provided as part of the MMP.

EPA: The PER states topsoil will be initially stripped to a depth of 200mm (PER s.4.2), then later says to 100mm (PER s. 9.1.2.2). Clarification is needed on how deep this will be and how deep the topsoil actually is.

Topsoil is not of a uniform thickness over the entire project site. Observations from cutting areas on embankments and tracks in the project area indicate a topsoil depth of 200 millimetres could be stripped over the majority of the infrastructure areas. Some areas, however, such as the Ridge Crest, have very shallow and skeletal soils which may only allow for stripping to 100 millimetres in depth.

DEH: Following mine closure, are there any environmental implications of leaving detention basins with high levels of contaminants in them?

Diversion drains around the waste landform will be constructed in the wall of the surrounding natural low hills land unit (not on the edge of the waste rock landform). Therefore, sediment that settles in the detention basins is likely to contain a low level of contaminants, as it will consist of eroded materials from the existing natural landscape.

However, as the potential exists for some contaminants to build up in the detention basins, Arafura will ensure that sediment in the basins is removed at the completion of mining and in the post-mining phase as required (**Commitment S24**).

6.2 DRAFT REHABILITATION PLAN

Commitment is made to include a draft rehabilitation plan in the Mining Management Plan (MMP). The draft rehabilitation plan is of relevance in the assessment of the proposal under the Environmental Assessment Act (EA Act), yet the MMP occurs after determination is made under the EA Act. The MMP is not a public document nor consistently circulated within NT Government.

A draft Rehabilitation Plan should be prepared for inclusion in the Supplement to the PER. Although statement is made (PER s.11.3 / App.10:15) that rehabilitation will be performed in accordance with contemporary accepted industry best practice, indication is not clearly

presented as to what this represents to the proponent. Details of rehabilitation plans should be presented in the Supplement and draft rehabilitation plan.

Arafura is not required to produce a draft Rehabilitation Plan as part of the PER. Further details will be provided in the MMP which will include a Rehabilitation Plan. Mining cannot commence until the MMP has been approved, including approval of rehabilitation methods to be employed.

6.3 VEGETATION ESTABLISHMENT

Response to all comments is below as similar issues were raised by various bodies.

DEH: 9.1.3 stated that rehabilitation would be conducted at the conclusion of the mining operation. The first paragraph of 9.4.2 indicates that rehabilitation should be complete or well underway by the onset of the wet season rainfall. In such a short operation, will there be sufficient time and water to achieve enough growth to stabilise the landform and prevent sedimentation?

DEH: The PER states that supplementary seeding or planting may occur if rehabilitation monitoring demonstrates that revegetation is not proceeding in line with expected results. We recommend that you substitute will for may. Although these land units may be widely represented in the region, they none-the-less represent valuable habitat on a national scale.

DEH have commented that species selection for rehabilitation should include consideration of habitat requirements for listed species. Research should have already identified appropriate species and planting times. This PER does not indicate that the research has been done.

EPA comments that total reliance in the first season of rehabilitation on the topsoil's seed-bank would appear inappropriate. The PER is inconsistent in this regard. Rehabilitation plans for the WRD vary between a proposal to direct seed (s.4.7 or s.11.3.3), and one to delay supplementary seeding for at least ~2 years, before deciding if it is required (PER s.9.1.3 or APP10:15-Rehabilitation EMP).

Recommendation is made that active rehabilitation occur early in the first wet season with a combination of native tube stock grown from seeds of local provenance and direct seeding of similar tree and grass seed stocks. Best practice rehabilitation would have already initiated seed collection from native plants in and near the areas to be cleared, to allow for varying seeding times of target species, and so that sufficient quantities of seed are collected. No indication of this is evident in the PER. Consultation with regard to revegetation practices should occur with the NT branch of Greening Australia.

Choice of flora species for seed collection should be weighted to support local flora and fauna species of conservation significance and to optimise the habitat value of rehabilitated vegetation communities.

If after consultation with the owner of the pastoral lease it is proposed to also include grass species for future grazing, the grasses should be native species from seed collected locally,

to maintain genetic integrity of vegetation communities post-mining, and avoid introduction of species that will out-compete local species or become weeds.

Rehabilitation will commence prior to the wet season following completion of mining. This will include earthworks (reshaping and ripping) followed by direct seeding of coloniser species (such as *Acacias* and native grasses) that will establish quickly, stabilising the surface in the short-term. *Acacias* are also nitrate-fixating plants that provide a source of nitrogen to the soil, vital to plant development, aiding the establishment of other species.

Seedlings will not be grown for this project. Given the short duration of the project, the development of a nursery is impractical. Additionally, recent research into the availability of seeds through commercial companies has satisfied Arafura that an adequate quantity of seeds of selected species will be available for purchase in time for rehabilitation works. This will require early notification and correspondence with the seed provider to ensure collection of seeds at the appropriate time of the year. The proponent will also contact the Katherine branch of Greening Australia for information and assistance with native grass seed collection.

Seeds require sufficient moisture to last a dry period of several days. For this reason, the exact timing of direct seeding will be conducted based on consideration of weather data and local forecasts.

A vegetation and flora survey conducted by Low Ecological Services identified dominant species for each land unit. Further investigation into species selection was undertaken to produce a species mix for each land unit that may be used for rehabilitation. This mix of provenance species considers diversity, habitat and function, however, will be subject to seed availability and further research to be included in the Rehabilitation Plan as part of the MMP. Species are presented in Table 5.

Table 5: Species List for Rehabilitation

Land Unit: Low Hills	
Area to be rehabilitated: 10.64ha	
Landform: Waste Rock Stockpile	
SPECIES	**LAYER**
Eucalyptus tectifica	Upper canopy
E. tinitinans	Upper canopy
Brachychiton megaphyllus	Shrub
Acaia Coleana	Shrub
Acacia difficilis	Shrub
Sorghum plumosum	Understorey
Land Unit: Low Undulating Plains	
Area to be rehabilitated: 8.14ha	
Landform: Office, stores & workshop	
SPECIES	**LAYER**
E. tintinans	Upper canopy
Corymbia dichromophloia	Upper canopy
Acaia Coleana	Shrub
Acacia difficilis	Shrub
Sorghum plumosum to	Understorey
Themeda australis	Understorey
Land Unit: Swampy Meadow	
Area to be Rehabilitated: 1.18ha	
Landform: Waste Rock Stockpile	
SPECIES	**LAYER**
Melaleuca sp	Canopy
Pandanus spirilis	Canopy
Scleria sphacelata	Understorey

7. DRAFT ENVIRONMENTAL MANAGEMENT PLAN

The NLC considers that the Draft Environmental Plan appears adequate for this project, although it lacks specific details for a number of key areas (such as water quality management).

Produce a final version of the Environmental Management Plan and provide a copy of it to the NLC Mining and Major Projects Officers for review prior to commencing operations.

A final copy of the MMP will be provided to the NLC after approval by DPIFM. This is standard industry practice. Information presented in the NLC PER submission will be considered when drafting the MMP and associated EMP.

APPENDICES

APPENDIX 1
Summary of PER Submissions

Submission No.	Comment No.	Submittor	Comment	PER Reference	Subject	Supplement Reference	To be Addressed By
1	a	NLC	Downstream aquatic ecological conditions and the potential impact of the proposed mine on aquatic flora and fauna have not been considered in the PER. Recommendation: Address the potential impacts of this project on aquatic flora and fauna as required by the EPA guidelines for the EIS.	Section 9.5 & 9.6	Aquatic Flora and Fauna	Section 4.5	Paul/Bill Low
1	b	NLC	NLC echoes the proponent's concern that continued mining in this area will ultimately result in cumulative destruction of such habitats (Short-eyed Rock Wallaby) and loss of this animal to the locale. The proponent if truly concerned, should commit to minimising habitat destruction and to developing or protecting alternative suitable habitats within their lease.	Section 9.6	Fauna	Section 4.6	Paul Rokich/Bill Low
1	c	NLC	Health and safety issues related to contamination of local foods by minesite wastes are a major concern for Traditional Owners around the Northern Territory. Development of locally based triggers for chemicals that are bioaccumulants or potential bioaccumulants (e.g. cadmium and thallium) must therefore also be referenced against ecotoxicological assessments for local biota if an adequate assessment of trophic transfer into the ecosystem and food-chain is to be performed. Recommendation: Address the questions of safety of local foodstuffs that may be gathered by Traditional Owners from downstream regions impacted by the project. This needs to include impacts on aquatic and terrestrial flora and fauna and be undertaken in consultation with relevant Traditional Owners.	Sections 9.5, 9.6 & may come under 2.4 (existing land use)	Cultural Environment and Flora & Fauna	Section 5.2	MBS
1	d	NLC	Reassess the estimates of acid mine drainage that may reasonably be expected from the project. This will require a re-assessment of the geochemical data provided and provision of adequate information defining the porosity of the oxide material proposed as an encapsulant so that leaching characteristics can be better defined. Although the amount of PAF material is relatively small (estimated at 7,200 tonnes) and it is possible that any AMD will be low in quantity and have a small impact, environmental best practice requires no impact, suggesting the PAF material should be returned to the pit void for immersion by the residual pit water. Alternatively, the material could be encapsulated in a high quality, low porosity clay material to prevent rapid infusion of water to the PAF material.	Appendix 3 and Section 4.7 and 9.2	Waste Rock management/Acid Mine Drainage	Section 3.8	Ian Martin
1	e	NLC	Demonstrate the extent of connectivity between deep and shallow aquifers and surface flow areas (namely waterholes and Nellie Creek) to better determine the true amount of waste water, including potential seepage from the stockpiles, that may be entering the riparian environment.	Section 7.5 & 7.6	Groundwater and Surface Water	Section 4.1	SKM/Mike Dufty
1	f	NLC	The NLC does not understand why the proponent consistently references its data against Stock Water quality guidelines throughout the PER. The NLC believes that using livestock values for derivation of trigger values is inconsistent with the declared beneficial uses to 'maintain the health of aquatic ecosystems' and to maintain 'public rights to take water for domestic and/or stock purposes' for the Mary River environment downstream of the project. Recommendation: Specify and develop local watercourse trigger values that are based on appropriate ecotoxicological testing as well as using the ANZECC method. Development of triggers should be done in conjunction with stakeholders including Parks Australia North prior to operations commencing and must be determined in reference to the declared beneficial uses of the Mary River. Additionally, more representative background water quality data should be produced upon which these trigger values can be developed.	Section 7.6 & 14.	Surface Water and Stakeholder Consultation	Section 4.2	Mike Dufty
1	g	NLC	Produce closure criteria and additional rehabilitation monitoring programmes that provide a wider range of information against which those closure criteria may be cross-referenced.	Section 11.	Rehabilitation, Closure and Decommissioning	Section 6.1	Paul Rokich
1	h	NLC	Produce a final version of the Environmental Management Plan and provide a copy of it the NLC Mining and Major Projects Officers for review prior to commencing operations.	Appendix 10	Environmental Management Plan	Section 7	Arafura
1	i	NLC	Cumulative effects on the environment in general and the Mary River in particular from previous mining activities and from other planned developments (e.g. gold mining at Maude Creek and Iron Ore mining at Frances Creek) have not been considered during development of the PER	N/A	Cumulative effects	Section 2	Paul Rokich
2	a	AAPA	There does not appear to be any discussion of any sacred sites protection in this document.	Section 9.9	Cultural Environment	Section 5.2	Paul/Ben Gunn

Submission No.	Comment No.	Submittor	Comment	PER Reference	Subject	Supplement Reference	To be Addressed By
3	a	DEH	Please provide a map showing the land units and the project infrastructure and indicate where the potential habitat may be for listed species. If for example a species has a particular microhabitat preference, it needs to be clear whether that habitat will be impacted by mining activity. Please tie table 16 in with this comment and add a column to the table that lists potential species impacted for each land unit.	Section 7.7, 7.8 & 9.5.1	Flora, Fauna and Habitat	Section 4.6	Siobhan West
3	b	DEH	It would be appropriate to conduct wet season bird surveys pre and post mining.	Section 7.8.1	Fauna	Section 4.6	Bill Low
3	c	DEH	*Supplementary seeding or planting may occur if rehabilitation monitoring demonstrates that revegetation is not proceeding in line with expected results.* We recommend that you substitute will for may. Although these land units may be widely represented in the region, they none-the-less represent valuable habitat on a national scale.	Section 9.1.3	Revegetation/rehabilitation	Section 6.3	Paul Rokich
3	d	DEH	Isn't there a viable alternative to a septic system?	Section 9.3.1	Infrastructure.	Section 3.1	Paul Rokich
3	e	DEH	This section (9.3.2) does not address mitigation or prevention of all the potential issues in 9.3.1. If groundwater quality deteriorates, what will be done about it? Can anything further be done to prevent it in the first place? Likewise for acidification due to exposure in the pit void.	Section 9.3.2	Groundwater	Section 4.1	Paul/SKM
3	f	DEH	The SKM report indicates that although porosity of the local sediments is low, there is potential for permeability. What is the likelihood of pit contaminants seeping into groundwater and surfacing in springs?	Section 9.3.3	Groundwater	Section 4.1	SKM
3	g	DEH	9.1.3 stated that rehabilitation would be conducted at the conclusion of the mining operation. The first paragraph of 9.4.2 indicates that rehabilitation should be complete or well underway by the onset of the wet season rainfall. In such a short operation, will there be sufficient time and water to achieve enough growth to stabilise the landform and prevent sedimentation?	Section 9.4.2	Runoff, Rehabilitation, mine closure.	Section 6.3	Paul Rokich
3	h	DEH	Species selection for rehabilitation should include consideration of habitat requirements for listed species.	Section 9.5.2.3	Flora rehabilitation	Section 6.3	Paul Rokich
3	i	DEH	The monitoring program should include all listed species that are known to or may potentially occur in the area.	Section 9.6.2	Fauna Management	Section 4.6	Paul Rokich
3	j	DEH	7.7.1 describes the flora of the area as relatively homogenous and states that the dominant community is *Eucalyptus tintinans* associated with *Corymbia dichromphloia* and *E. miniata* , over tall *Sorghum* grassland understorey. Is it the case that none of this vegetation type will be cleared or impacted in any way?	Section 9.5.3	Flora Impact Assessment	Section 4.4	Siobhan West
3	k	DEH	Putescible wastes are known to attract feral animals and should be removed from the site.	Section 9.8	Domestic Waste	Section 3.6	Paul Rokich
3	l	DEH	Research should have already identified appropriate species and planting times. This PER does not indicate that the research has been done.	Section 11.3	Rehabilitation, Closure	Section 6.3	Siobhan West
3	m	DEH	Is figure 6.1 in Appendix 7 out of date now? It indicates that about half of the riparian rainforest and the riparian swampy meadow will be impacted. This does not tally with Table 16.	Appendix 7	Flora and Fauna Survey	Section 4.4	Paul Rokich
	n	DEH	Following mine closure, are there any environmental implications of leaving detention basins with high levels of contaminants in them?	Section 11	Mine Closure	Section 6.1	
4	a	DHCS	Clarification is required as to whether a mess will be provided on site for staff. Commercial food preparation facilities need to be registered as food business under the *Food Act 2004* and should comply with the requirements of the *Food Act 2004* and *Food Standards* .	Section 4.3	Infrastructure	Section 3.2	Arafura
4	b	DHCS	Effluent disposal systems must comply with the requirements of the *Code of Practice for Small On-site Sewerage and Sullage Treatment Systems and the Disposal or Reuse of Sewerage Effluent.*	Section 9.8	Waste materials - sewerage	Section 3.6	Arafura
4	c	DHCS	The potable water supply must comply with *NH&MRC Australian Drinking Water Guidelines 1996* . Bore setbacks to onsite wastewater disposal shall be in accordance with the *Code of Practice for Small On-site Sewerage and Sullage Treatment Systems and the Disposal or Reuse of Sewerage Effluent.*	Section 9.8, 9.4 & 9.3	Drinking water and waste water	Section 3.2	Arafura
4	d	DHCS	What mechanism will be made available to the community to lodge complaints about dust emissions and noise? How would these be monitored and assessed by the proponent?	Section 9.7	Air quality & Noise	Section 5.1	Paul Rokich/Arafura
4	e	DHCS	What consultation has occurred with the staff at the local health centre and what systems will be put in place to monitor the impact of the project on the health centre?	Section 9.10	Socio-economic Environment	Section 5.1	Arafura
5	a	DPIFM	Detention basins are likely to fill quickly and/or have the potential to erode. How will sediment loads to these basins be managed in the medium term while vegetation is establishing and will there be a commitment to maintain these structures?	Appendix 5, Section 8.2	Surface Water	Section 4.2	Paul Rokich
5	b	DPIFM	Figure 5 The main access track goes through two riparian swampy meadows. Has this access track already been constructed and if not can these wetter areas be avoided to minimise impact on wetland fauna that inhabit them.	Section 7.2	Fauna and habitat	Section 4.6	Paul Rokich
5	c	DPIFM	Section 4.5.1, figure 4: This diagram is intended to be a cross-sectional view of the open pit but does not appear to show the open pit profile. It is hard therefore to accept the statement in section 4.7 which states that 70-75% of the waste rock in the pit is oxidised. Fig 4 shows a large proportion of ore in the primary/sulphide zone.	Section 4.5.1 & 4.7	Pit dimensions and waste rock	Section 3.8	Paul Rokich/Ian Martin

Submission No.	Comment No.	Submittor	Comment	PER Reference	Subject	Supplement Reference	To be Addressed By
5	d	DPIFM	Section 7.4.3 indicates that 40% of the drilling samples show PAF material and 14% have medium/high levels of PAF. These figures seem at odds to the statement that "The percentage content of significantly PAF material appears small" especially when it is extrapolated out based on the mine producing 2.4 million tonnes of waste rock. These results indicate strongly that ARD could be a problem with this development.	Section 7.4.3	Acid Mine Drainage	Section 3.8	Ian Martin
5	e	DPIFM	Detention basins, while an effective means of reducing sediment will not provide remediation of acids and associated metals that the wetland filter may have provided. Shallow detention basins as described may also require on-going maintenance to ensure that the detention time of water is sufficient to allow sediments to drop out of solution. Downstream expression of mobilised salts should be considered here.	Section 9.4.2	Surface Water (Runoff and Containment Management)	Section 4.2	Ian Martin
5	f	DPIFM	What mining activities will be undertaken at night and will an assessment be completed on the impact of these activities on significant species that are active at this time?	Section 7.8	Fauna	Section 4.6	Paul Rokich
5	g	DPIFM	A more thorough Gouldian finch and partridge pigeon survey may be required to ensure these conservation significant species and their habitat is not detrimentally impacted upon.	Section 7.8.1	Fauna	Section 4.6	Siobhan West
5	h	DPIFM	Will an impact assessment be carried out on possible Partridge Pigeon impacts? Feeding and roosting habitats and drinking habitats (as they require water every day and walk up to 2 km to reach water resources).	Section 9.6.3	Fauna	Section 4.6	Siobhan West
5	i	DPIFM	Pandanus Waterhole is mentioned in Appendix 3, but little mention is made of it throughout the main document. Is it a significant permanent water source for conservation significant fauna and what are the potential impacts of mining activities on this body of water?	Appendix 3 Section 5.2	Fauna	Section 4.6	Siobhan West
5	j	DPIFM	App 5 Section 8.1. Indicates that it is likely the spring located in Pit Gully will cease flowing once the pit is excavated. What is the importance of this spring to conservation significant fauna in the dry season? Have fauna surveys targeted this water source in the driest months of the year?	Appendix 5, Section 8.1	Fauna	Section 4.6	Mike Dufty/Siobhan West
5	k	DPIFM	It has been stated that based on the observation of other open pits in the region, it is unlikely the pit lake that remains upon the completion of mining will overflow. This presumption lacks good science and a thorough investigation of groundwater recharge/ discharge associated with the proposed pit needs to be undertaken. Furthermore, there needs to be some discussion on evaporation rates and the effect of significant wet season rainfall events on the level of water in the pit lake. Recharge fluxes causing pit water to overflow will only be an issue after mining has ceased and it needs to be demonstrated that this will be monitored.	Appendix 5, Section 8.4	Surface water, groundwater & climate.	Section 4.1	Mike Dufty/SKM
5	l	DPIFM	Are monitoring results in Rainforest Gully likely to be influenced by the WRD in its vicinity? It may be beneficial to request an additional monitoring site further north to provide background readings of water quality prior to any possible contamination.	Section 7.6	Downstream water quality	Section 4.2	Mike Dufty
5	m	DPIFM	There is no commitment made to undertake a groundwater study prior to mining activities commencing. It would be beneficial to know the relationship between the final pit lake and the surrounding area for the sake of on-going monitoring. In regard to this Commitment 9.3.2 needs to be fleshed out to establish whether monitoring bores will be constructed to monitor the ground water quality associated with the pit, the WRD and nearby waterways (for the longterm)or will it be the monitoring of production bores.	Section 9.3.2	Groundwater study and monitoring	Section 4.1	Paul/Arafura
5	n	DPIFM	What is the hydrological relationship between the Swampy Meadow and other watercourses. Is there potential for leachates associated with the WRD to be mobilised quickly if they contaminate this swampy area?	Appendix 3, Section 5	Surface water	Section 4.2	Mike Dufty
6	a	EPA	The total greenhouse emissions from the project have not been estimated in the PER. This is a minimum requirement of the *NT Environmental Impact Assessment Guide: Greenhouse Gas Emissions.*	Section 9.7	Greenhouse emissions	Section 3.9	Siobhan West
6	b	EPA	Measures to be undertaken to minimise greenhouse emissions are indicated only in a very general way and do not provide the EPA Program with adequate information. For example, what energy efficient technologies or equipment will be adopted? How will employees be encouraged to be energy efficient in their day-to-day activities?	Section 9.7	Greenhouse emissions	Section 3.9	Siobhan West
6	c	EPA	There appears to be confusion in the document between local air quality issues and greenhouse gas issues. 'Section 9.7.2 Greenhouse Gases' refers to Table 17 which provides air quality data, and the final paragraph of section 9.7.4 also confuses greenhouse and air quality issues. This should be rectified.	Section 9.7	Greenhouse emissions	Section 3.9	Siobhan West
6	d	EPA	The greenhouse emissions from land clearing should be presented as part of the estimation of total predicted emissions.	Section 9.7	Greenhouse emissions	Section 3.9	Siobhan West
6	e	EPA	The paragraph regarding greenhouse emissions from landfill is confusing. Does the 10.5 tonne figure refer to carbon dioxide only, or carbon dioxide equivalent including emissions of carbon dioxide, methane and other greenhouse gases? It is recommended that the proponent review the NT Environmental Impact Assessment Guide: Greenhouse Gas Emissions and provide more information regarding greenhouse issues accordingly.	Section 9.7	Greenhouse emissions	Section 3.9	Siobhan West

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7	a	MAGNT	The PER all but ignores aquatic fauna, which run the risk of being impacted by tailings/chemical seepage or by pollution by chemicals in worst-case scenario of flood and disaster. While the neighbouring creeks are largely ephemeral, the PER states there are refuge holes plus a spring, and the issue of potential contamination needs to be addressed. Appendix 6 also refers to a permanent spring, which could be important refuge habitat, but this was not characterised nor sampled. It is suggested that an assessment of aquatic fauna is undertaken.	Section 7.6 & 7.8	Aquatic Fauna	Section 4.5	Mike Dufty/Siobhan West
7	b	MAGNT	It may be beneficial to have a reference collection of select artefacts recovered from the areas that will be disturbed to enhance knowledge and protect by placing into care some of this cultural heritage.	Section 9.9	Cultural Heritage	Section 5.2	Paul Rokich/Ben Gunn
8	a	MEB	It should be noted that there may be low to moderate mosquito problems in the months of March to June, due to breeding in residual pools in the adjacent ephemeral creek lines. Employees should be advised of this potential problem period. Mosquito species likely to be encountered in these months include *Culex annulirostris,* which is a vector of Ross River virus, Barmah Forest virus, Murray Valley encephalitis virus and other viruses, as well as the potential malaria mosquitoes *Anopheles annulipes s.l.* and *An. bancroftii,* and the pest mosquito *Cq. xanthogaster.* The salt marsh mosquito *Aedes (formerly Ochlerotatus) vigilax* may be present in pest numbers in the months of September to November at the mine site, dispersing from distant tidal swamps and rivers. This species is recognised as a good vector of Ross River virus and Barmah Forest virus.	Section 7.13	Biting Insects	Section 5.3	Siobhan West
8	b	MEB	Compliance to the MEB guideline 'Guidelines for preventing mosquito breeding sites associated with mining sites' should be included as a commitment for this project. Also, the rehabilitation of mined areas such that no potential mosquito breeding sites remain, other than the open pit void, should also be listed as a commitment. Arafura Resources NL should commit to ensuring the open pit void has minimal potential to become a significant mosquito breeding site.	Section 13	Biting Insects	Section 5.3	Siobhan West
8	c	MEB	The Public Health Act should also be applicable legislation to this project.	Section 3.2	Public Health Legislation	Section 2	Arafura
8	d	MEB	The drainage pipe to be placed along the creekbed to drain the pit gully should be of suitable dimensions to ensure no upstream impoundment of water occurs for periods that will enable mosquito breeding.	Section 4.7	WRD underdrainage	Section 4.2	Paul/Arafura
8	e	MEB	The temporary earthern dams should be deep (>1m) and have steep sides (45o), to discourage margin vegetation growth and minimise the potential for mosquito breeding.	Section 4.8	Surface Water Management	Section 5.3	Mike Dufty
8	f	MEB	For Table 13, the peak abundance of *Ochlerotatus normanensis* should be January to April, while the peak abundance for *Ochlerotatus vigilax* should be September to January.	Section 8.6	Biting Insects	Section 5.3	Siobhan West
8	g	MEB	The diversion drains for the waste rock stockpile should be of suitable dimensions to prevent upstream ponding for periods that will enable mosquito breeding. Silt runoff into the diversion drains should be prevented, to prevent the siltation of the drains that could lead to ponding and mosquito breeding. Detention basins should be designed to completely drain within 5 days, to prevent the creation of mosquito breeding.	Section 9.4.2	Runoff and Containment Management	Section 4.2	Mike Dufty
8	h	MEB	The watercourse that pit water will be discharged to should be monitored on a weekly basis, to ensure mosquito breeding is not created by the dry season discharge. Any mosquito breeding should be controlled with an appropriate larvicide. Indicators for potential mosquito breeding would be permanent ponding and the growth of semi-aquatic reeds and grasses in the watercourse receiving the pit water discharge.	Section 9.4.3	Water discharge	Section 4.2	Mike Dufty/Siobhan West
8	i	MEB	Mosquito borne diseases that could potentially be transmitted at the mine site include Ross River virus, Barmah Forest virus and Murray Valley encephalitis virus. Malaria is an illness caused by a parasite which is not endemic to Australia, the risk of malaria transmission at the mine site will only arise if a worker is sourced or returning from overseas with the infectious stages of malaria and is bitten by *Anopheles* mosquitoes at the mine site.	Section 9.13.1	Biting Insects	Section 5.3	Siobhan West
8	j	MEB	The open pit lake should be stocked with hardy native fish during the rehabilitation process. Where practical, the sides of the open pit lake should be steep (45o or greater), to minimise the establishment of semi-aquatic vegetation and grasses at the water edge, to minimise potential mosquito breeding.	Section 9.13.2	Biting Insects	Section 5.3	Siobhan West/Bill Low
8	k	MEB	The workshop and office area should be appropriately screened to prevent the entry of mosquitoes.	Section 9.13.2	Biting Insects	Section 5.3	Arafura
9	a	NT Police	Although warning signs and other road improvements are to be employed, it will be necessary to ensure road safety issues are appropriately managed. I therefore request that the mine operators establish a close working relationship with Pine Creek Police and Superintendent James O'Brien.	Section 9.11	Traffic/road safety	Section 3.3	Arafura

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10	a	DPI	The start date given for the mine life leaves little scope for delays in relation to obtaining all necessary approvals or unsuitable weather conditions. It is expected that the operating phase will need to be extended, in which case the proponent would need to advise the various arms of the NGT at the time of the details of any extension and also the steps taken to ensure no environmental problems will result.	Section 4.5.3	Schedule	Section 2	Siobhan West
10	b	DPI	The PER should use consistent datum references, in some instances ground levels are referenced as metres RL and in others as metres AHD.	N/A	datum references	Section 2	Mike Dufty
10	c	DPI	Section 9.11 of the report relates to transport infrastructure and impacts, however does not identify expected traffic volumes. While the report indicates that road maintenance will be carried out to DPI standards, additional work, particularly to Mt Wells Road, beyond maintenance may be required. This will need to be addressed through the Mine Management Plan, in liaison with the Department of Planning and Infrastructure.	Section 9.11	Transport and Infrastructure	Section 3.3	Siobhan West
10	d	DPI	Section 9.8 of the document concerns waste and hazardous materials. The commitments given in this section are not considered to be sufficiently detailed to provide adequate safeguards: for example, reference is made to mobile equipment and light vehicle servicing activities being done on impervious surfaces, but does not detail how this is to be achieved i.e. bituminous surfaces, bunding etc.	Section 9.8	Hazardous Materials	Section 3.7	Siobhan West
11	a	EPA	It is unclear whether a resource would be sterilised if tailings and/or waste rock were returned to the pit. - Describe whether the gold resource is distinctly defined and will be fully extracted or is also present in waste rock and pit walls/floor in percentages below currently recoverable thresholds. - Present analyses of other recoverable mineral resources that will be typically present within the waste rock.	Section 4.1	Ore reserves & Waste Characterisation	Section 3.4	Ian Martin
11	aa	EPA	Predict potential downstream impacts of the mine relative to beneficial uses and users, of the aquifers.	Section 9.3.3	Downstream water users	Section 4.1	Mike Dufty
11	b	EPA	Present three-dimensional representation, to scale, of the project prior to, during, and post mining operations. Height contours and landscape features should be indicated.	Section 4.2	Project Description	Section 3.5	Mike Dufty
11	bb	EPA	Present modelling of progressive and long term pit water depths (AHD) and water quality, through wet and dry seasonal extremes. Depths relative to the pit rim and surrounding landscape should be included.	Section 7.5	Pit lake	Section 4.1	Mike Dufty
11	c	EPA	Statement is made (Exec Sum. s7.3) that pipeline infrastructure may impact upon pastoral activities. The PER is unclear as to whether pipelines will be buried or whether livestock/wildlife impacts such as exclusion of animals from water sources and migration routes, will be mitigated by other means. Clarification should be presented.	Section 4	Infrastructure and Fauna	Section 4.6	Siobhan West
11	cc	EPA	Provide a general outline of Toll or other processing technologies to be used at Union Reef in the processing of Mt Porter gold ore.	Gold Processing	Section 4.6	Section 3.4	Siobhan West
11	d	EPA	Statement is made in the PER that: The … content of significantly PAF material … all contain carbonaceous siltstone-BIF with visible sulphides. Because of the high free carbon content, the Eh value within waste rock stockpile of the PAF material should be extremely low and non-oxidising, thus minimising sulphide oxidation and the potential for acid generation. -Further explanation of these statements is required for the general reader, as well as the expected extent of sulphide oxidation in real terms. References that support these concepts should be quoted.	Section 4.7, 9.2 & 11.3.2	Waste Rock Management	Section 3.8	Ian Martin
11	d1	EPA	Potentially Acid Forming (PAF) material is proposed to be encapsulated within an envelope of oxide waste rock (PER s4.7, s11.3.2) stripped from the upper benches of the pit. -Given the importance of excluding water and oxygen from the PAF cell (PER s.11.3.2), provide design details including water influx rates/permeability through the material encasing the PAF core. Indicate available sources of clay or low permeablility material suitable and sufficient for containment of PAF material.	Section 4.7, 9.2 & 11.3.2	Waste Rock Management	Section 3.8	
11	d2	EPA	Predict future groundwater levels within the WRD, allowing for mounding of standing water levels under the weight of the WRD.	Section 4.7, 9.2 & 11.3.2	Waste Rock Management	Section 3.8	
11	d3	EPA	Indicate the buried depth range of the PAF cell. Location of the PAF encapsulation cell must be recorded/registered on the land title for the site, (or by an alternative appropriate recording method) for future notification.	NA	Waste Rock Management	Section 3.8	

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11	dd	EPA	Indicate the extent that dust/fragments from mined ores and waste rock could represent environmental contaminants or human health hazards if such dust were to be dispersed around the mine-site and along road transport corridors. Indicate how dust containment from loads will occur during road transport.	Ore Dust	N/A	Section 3.7	Ian Martin
11	e	EPA	The EPA Program expects that design of the Mt Porter WRD cover system will incorporate considerations outlined in *TEAM NT 2004. 11)* Explain how the Mt Porter WRD design meets principles set out in TEAM NT (2004): Ch. 4. 12) Provide detail on the construction of the waste rock dump, particularly with respect to any in situ or liner system being used to prevent leaching of contaminated water.	Section 4.7 & 9.2	Waste Rock Stockpile	Section 3.8	Paul Rokich
11	ee	EPA	As per commitment 9.6.2g, management measures to minimise harm to fauna by road operations, should be included in the draft Fauna Management Plan (App.10.5 and Exec.Sum.s7.6).	Section 9.6	Fauna Management	Section 4.6	Siobhan West
11	f	EPA	Commitment is made to deep rip waste rock stockpile slopes on the contour to assist water absorption and minimise erosion (PER s.9.2.2). This would be appropriate if the WRD contained an impermeable clay layer or membrane underneath a thick (~2m) topsoil layer, but this has not been proposed. Commitment 9.2.2f needs clarification in relation to any intent to discourage water from reaching the PAF cell (PER s.11.3.2).	Section 9.2	Waste Rock Rehabilitation	Section 3.8	Paul Rokich
11	ff	EPA	The PER states topsoil will be initially stripped to a depth of 200mm (PER s.4.2), then later says to 100mm (PER s. 9.1.2.2). Clarification is needed on how deep this will be and how deep the topsoil actually is. Commitment is made to include a draft rehabilitation plan in the Mining Management Plan (MMP). The draft rehabilitation plan is of relevance in the assessment of the proposal under the Environmental Assessment Act (EA Act), yet the MMP occurs after determination is made under the EA Act. The MMP is not a public document nor consistently circulated within NT Government.	Section 4.2 & 9.1.2.2	Rehabilitation	Section 6.2	Paul Rokich/Siobhan West
11	g	EPA	- Explain how new watercourses will be designed to inhibit surface water infiltration through the WRD. - Provide design detail of creek diversions around the waste rock stockpile, to explain how wet season sediment transport and erosion of the newly placed waste rock and topsoil will be prevented. - Specify design parameters of sedimentation basins and drains in terms of Average Recurrence Interval (ARI) rainfall events. - Predict the consequences of rainfall events exceeding ARI design thresholds.	Section 4.7 & 9.2	Waste Rock Dump & Surface Water	Section 4.2	Mike Dufty/Paul Rokich
11	gg	EPA	Total reliance in the first season of rehabilitation on the topsoil's seed-bank would appear inappropriate. The PER is inconsistent in this regard. Rehabilitation plans for the WRD vary between a proposal to direct seed (s.4.7 or s.11.3.3), and one to delay supplementary seeding for at least ~2 years, before deciding if it is required (PER s.9.1.3 or APP10:15-Rehabilitation EMP).	Section 4.7 & 11.3.3	Rehabilitation	Section 6.3	Paul Rokich/Siobhan West
11	h	EPA	Rock armoured spillway structures are proposed on the sides of the WRD (PER s.4.7). Potential exists for rock armoured spillways to be peripherally eroded during high rainfall events, and end up perched above or beside the actual flow channels. - What ARI rainfall event will the drains be designed to? - Describe in concept how peripheral erosion around rock-armoured spillways will be prevented (such as using soft engineering methods).	Section 4.7 & 9.3	Waste Rock Dump & Surface Water	Section 4.2	Mike Dufty/Paul Rokich
11	hh	EPA	Recommendation is made that active rehabilitation occur early in the first wet season with a combination of native tube stock grown from seeds of local provenance and direct seeding of similar tree and grass seed stocks. Best practice rehabilitation would have already initiated seed collection from native plants in and near the areas to be cleared, to allow for varying seeding times of target species, and so that sufficient quantities of seed are collected. No indication of this is evident in the PER. Consultation with regard to revegetation practices should occur with the NT branch of Greening Australia.	Section 11	Rehabilitation	Section 6.3	Paul Rokich/Siobhan West

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11	i	EPA	Mine drainage does not have to be acidic to contain environmentally significant concentrations of dissolved metals and or salts. - Present consideration of the potential for non-PAF rock placed in the waste rock dump and in various land-contouring situations to create neutral drainage of minerals and salts. Characterisation, management, monitoring and contingency plans to address any such potential should be presented.	Section 4.7 & 9.4	Waste Characterisation and management	Section 3.8	Ian Martin
11	ii	EPA	If after consultation with the owner of the pastoral lease it is proposed to also include grass species for future grazing. The grasses should be native species from seed collected locally, to maintain genetic integrity of vegetation communities post-mining, and avoid introduction of species that will out-compete local species or become weeds.	Section 11	Consultation & Rehabilitation	Section 6.3	Paul Rokich/Siobhan West
11	j	EPA	- Undertake AUSRIVAS biological monitoring on local streams to confirm the condition assessment reported in the PER. - Water quality data should be used to develop a statement of condition that could be used to set a level of species protection. 95% protection was assumed with no justification (catchment uses, existing water quality, historic water quality etc). Mary River water quality should be protected to 99% level, as this is an area of Kakadu National Park at the point where the Nellie Creek system enters the Mary River.	Section 9.4.5	Surface Water Monitoring	Section 4.2	Mike Dufty
11	jj	EPA	Choice of flora species for seed collection should be weighted to support local flora and fauna species of conservation significance and to optimise the habitat value of rehabilitated vegetation communities.	Section 11	Rehabilitation	Section 6.3	Paul Rokich/Siobhan West
11	k	EPA	Provide description of the required discharge regime from the activity. The water management system should be designed to be zero water discharge as a Best Practice Environmental Management measure (or at least zero discharge to an ARI of 1:10).	Section 9.4.3	Surface water discharge	Section 4.2	Mike Dufty
11	kk	EPA	Present commitments and contingency plans against a situation where revegetation and erosion control, or acid mine drainage prevention, are found over successive wet seasons to be inadequate.	Section 14	Commitments	Section 2	Siobhan West
11	l	EPA	Present design standards for sedimentation basins – i.e. to what size particles, and to what level of treatment?	Section 9.4.2	Sediment basins	Section 4.2	Mike Dufty
11	ll	EPA	A draft Rehabilitation Plan should be prepared for inclusion in the Supplement to the PER. Although statement is made (PER s.11.3 / App.10:15) that rehabilitation will be performed in accordance with contemporary accepted industry best practice, indication is not clearly presented as to what this represents to the proponent. Details of rehabilitation plans should be presented in the Supplement and draft rehabilitation plan.	N/A	Rehabilitation	Section 6.2	Paul Rokich/Siobhan West
11	m	EPA	Given the function of sediment ponds to accumulate sediments and progressively fill, describe how ponds will be maintained in working order in the longer term after machinery has been removed from the site.	Section 9.4.2	Sediment ponds	Section 4.2	Mike Dufty
11	mm	EPA	Indicators of future water depth within the pit appear to vary (in PER s.7.5.3) from 190-195 AHD (30-35m above pit floor) to ~210AHD (~11m below ground level). These (underlined) values can't both be true if the pit is to be 115m deep (PER s.4.2) Clarification of these figures is needed.	Section 7.5.3 and Section 4.2	Final Pit	Section 4.2	Mike Dufty
11	n	EPA	1:10 dilution proposed in PER s.9.4.4 may be insufficient for some of the aquatic toxicants likely to be discharged from the site; discuss treatment systems for contaminated water.	Section 9.4.4	Contaminated water	Section 4.2	Mike Dufty
11	nn	EPA	A formal public consultation and complaints process needs to be established to provide information to the public, the opportunity for ongoing public comment or complaint and a channel whereby complaints are officially recorded, addressed and followed through to resolution, with advice on outcomes provided to complainants.	N/A	Public complaints	Section 5.1	Siobhan West
11	o	EPA	What ARI does designing systems for 500mm and 100mm rain events represent? (under PER table 15);	Section 9.4.4	Extreme Rainfall Events	Section 4.2	Mike Dufty
11	oo	EPA	Recommendation is made that an on-site environmental manager be appointed for the project.	N/A	Persons Responsible	Section 2	Siobhan West
11	p	EPA	Present ARI calculations if possible based upon up-to date data (PER s.7.1) to better incorporate recent climate changes and estimate future patterns.	Section 7.1	Climate	Section 4.2	Mike Dufty
11	pp		-Indicate the extent, diversity and conservation status of existing riparian flora beside ephemeral creeks in East Gully and Pit Gully.	Appendix 7	Flora	Section 4.4	Siobhan West
11	q	EPA	Provide description of any water recycling, or irrigation programs.	Section 9.4	Water recycling	Section 4.2	Siobhan West
11	r	EPA	Provide detail on water separation systems based on quality or use within the water management system, particularly dewatering water (PER s.9.4.6).	Section 9.4	Waste water treatment	Section 4.2	Siobhan West
11	s	EPA	Illustration should be presented of all the components of the water management system with water balance, rainfall, evaporation and annual through volumes marked.	Section 9.4	Water management	Section 4.2	Mike Dufty

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11	t	EPA	Estimate wastewater quality and provide details on how this was estimated, including parameters used.	Section 9.4	Waste water monitoring	Section 4.2	Mike Dufty
11	u	EPA	Describe seepage from the WRD and proposed monitoring and treatment/management contingencies if found to contain elevated levels of acids, minerals or salts.	Section 9.2 & 9.4	Waste Rock Stockpile Seepage	Section 3.8	Ian /Mike
11	v	EPA	Detail plans for any groundwater monitoring bores to be used to monitor for development of groundwater contamination plumes from the pit or WRD.	Section 9.3	Groundwater monitoring	Section 4.1	SKM
11	w	EPA	Groundwater modelling should be undertaken to the extent that 3-dimensional mapping of aquifers intersected by the pit, or potential seepage from the waste rock stockpile, occurs.	Section 7.5	Groundwater Modelling	Section 4.1	SKM
11	x	EPA	Model groundwater aquifer transport rates into and away from the pit and waste rock stockpile, including the influence of seasonal variations.	Section 7.5	Groundwater Modelling	Section 4.1	SKM
11	y	EPA	Groundwater quality should be modelled for quantity and quality for any acidic and also neutral drainage that may occur.	Section 7.5	Groundwater quality	Section 4.1	Mike Dufty
11	z	EPA	Flow dynamics and expression points of affected aquifers should be predicted, with estimates of time lags before contaminated plumes would be expected to emerge as surface flows.	Section 7.5	Groundwater flow	Section 4.1	SKM
11	qq	EPA	Describe the extent to which, in the long term, pit water quality is likely to represent a health risk to native animals, birds and livestock.	Appendix 3	Pit water quality	Section 4.2	Siobhan West
11	rr	EPA	If the depth is actually to be more in the range of 10-30m below ground level (i.e. the pit rim) and 70-100m above the pit floor, argument against returning PAF material to the pit post-mining is weakened and should be re-evaluated.	Appendix 3	Waste Rock Management	Section 4.2	Paul Rokich
	ss	EPA	Describe long term closure methods planned to manage fauna access, prevent entrapment and allow escape.	Section 11	Mine Closure	Section 6.1	Siobhan West
11	tt	EPA	Describe any proposed mitigation measures against long term degradation of pit water quality.	N/A	Pit water quality	Section 4.2	Siobhan West
12	a	NRETA	Under section 9, Licensing Requirements, the document states that, the use, storage, discharge and management of water within the mining tenements is covered by the conditions of the Mining Management Plan under the NT Mining Management Act 2001 and is administered by the Department of Primary Industries, Fisheries and Mines. Monitoring sites and applied water quality standards should be subject to approval by the Department of Natural Resources, Environment and the Arts. The targets are not really targets as they talk about implementing strategies before operation but don't say anything about strategies over the life of the Mine. An example is "All weeds under control by year X of operation".	Section 9.3 & 9.4	Water Management	Section 4.2	Paul Rokitch
12	b	NRETA	The "land unit information" outlined in 6.2 makes little reference to soil types and therefore cannot be assessed on how each of these units should be managed to prevent erosion and sediment loss. The range of soil types in the area need to be identified consistently in order for the proponent to develop an erosion risk plan and subsequently implement erosion and sediment control measures.	Section 6.2	Soil Types	Section 4.3	Paul Rokich
12	c	NRETA	The Weed Management Plan must clearly state the methods to be used to prevent the introduction of noxious declared weeds and the methods used to control existing and new weed infestations. To prevent a breach of the NT Weed Management Act 2001, the applicant is required to comply with all management measures designed to achieve the objectives of the Weed Management Plan. The weed management plan should be subject to the approval of NRETA.	Section 9.5.2.2	Weed Management	Section 4.4	Siobhan West
12	d	NRETA	The PER relies on Wilson et al. (1990) (the 1: 1 million vegetation map) to describe the vegetation, even though it is acknowledged that there is a more detailed vegetation study conducted in the area in 1993. Why was this detailed study not given more attention in the PER? The overall conclusions may have been the same, but, given that the Gouldian Finch is one of the species of concern, a detailed consideration of the extent of its preferred breeding tree (Eucalyptus tintinanns) would have been useful.	Section 7.7 & 7.8	Biodiversity	Section 4.4	Siobhan West
12	e	NRETA	The major deficiency in the PER is the lack of consideration of Acid Mine Drainage and its potential impact on the aquatic ecosystems both on site and downstream in the Ferguson and Daly Rivers. Since the waste dump is on top of two minor watercourses, the chances of this contamination occurring must be high, yet there is no mention of the problem.	Section 9.5 & 9.6	AMD & Aquatic ecosystems	Section 4.2	Siobhan West
12	f	NRETA	All the monitoring requirements should be included as management strategies as well.	N/A	Management strategies for Park Management	Section 2	Siobhan West
12	g	NRETA	The Heritage Management section does not talk about historic values such as mining history of area or artefact that might exist from this history. This area has a long mining history and that needs to be considered in the Heritage Management section of the EMP.	Section 8 & 9.9	Heritage Management	Section 5.2	Siobhan West

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12	h	NRETA	Any weed management program should recognise the potential of weeds to spread from the mine site downstream and into the broader catchment (potentially into the McKinlay section of Mary River National Park). A commitment to some cooperative weeds management with the Station owners should be considered.	Section 9.5.2.2	Weed Management	Section 4.4	Siobhan West
12	i	NRETA	As per the Bushfires Act 1996, any new land holder would be required to ensure that a 4 metre firebreak is installed and maintained along all boundaries.	N/A	Legislation	Section 2	Siobhan West

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