



Rio Tinto Iron Ore

**Turee Syncline Iron Ore Project – Public
Environmental Review**

Response to Public Submissions

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1 Introduction

The Proponent, Hamersley Iron Pty Limited {a wholly owned subsidiary of Rio Tinto's iron ore business (Rio Tinto)}, is seeking to develop a new iron ore mine at the Turee Syncline deposit in the Pilbara region of Western Australia (WA). The proposed Turee Syncline Iron Ore Project (the Proposal) will involve the construction and operation of a greenfield mine site approximately 30 kilometres (km) north-east of Paraburdoo.

The Proposal will produce up to 10 million tonnes per annum (Mtpa) of dry ore from the Turee deposit over an expected operational mine life of approximately 18 years.

Purpose

This document is a summary of, and response to, submissions made on the Public Environmental Review (PER) for the Turee Syncline Iron Ore Project Proposal (EPA Assessment No. 1839).

Summary of Submissions

In total, six submissions were received in response to the Turee Syncline Iron Ore Project PER, from the following organisations and government agencies:

- 1 Department of Mines and Petroleum (DMP)
- 2 Department of Environment and Conservation (DEC)
- 3 Western Australian Museum
- 4 Public Submitter
- 5 Department of Water (DoW)
- 6 Department of Health (DoH)

2 Response to Submissions

This section provides details of Rio Tinto's response to individual comments raised in the submissions. The comments and corresponding responses are found in Table 1.

Table 1: Rio Tinto response to Public Submissions

Submitter	Submission and/or issue	Rio Tinto response
Submission 1.1 General comments		
Department of Mines and Petroleum (DMP)	<p>1. The DMP commented that some of the most significant aspects of this proposal (pits, waste dumps, land bridges) will occur on State Agreement Act tenure. Therefore, there will not be an opportunity for the DMP to undertake a more detailed environmental assessment of these aspects following the Public Environmental Review process. Project proposals submitted by proponents to the Department of State Development for approval under State Agreement legislation are not required to cover environmental or technical information. It is therefore considered essential by DMP that aspects such as waste characterisation, waste management, surface water management and rehabilitation/closure are addressed in detail and adequately assessed through the PER.</p>	Noted as a comment for the EPA to consider.
DMP	<p>2. The DMP contends that the preliminary and un-finalised nature of the site layout for Turee Syncline project makes it difficult to assess the acceptability of proposed environmental management measures and closure strategies.</p>	<p>Due to the un-finalised nature of the site layout, all options have been presented and assessed within the PER. The closure strategies within the Mine Closure Plan (MCP) which is presented in Appendix E of the PER, will be revised during the next revision in line with the DMP/EPA Guidelines.</p>
Submission 1.2 Waste characterisation		
DMP	<p>1. The DMP contend that the acid forming potential of the Mount McRae Shale to be exposed in Pit 3 is currently unknown and uncertainties such as this make it difficult to determine the potential AMD risk of the project.</p>	<p>Rio Tinto has undertaken characterisation of material from the Proposal. The results of testing on black shale from the Mount McRae Shale (MCS) indicate that this material is potentially acid forming (PAF) and will need to be managed on site. Oxidised shale was determined to be non-acid forming (NAF). These results are consistent with characterisation that has been carried out on similar material from other Pilbara sites.</p>

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		<p>Based on the mine planning information for Pit 3, it is expected that approximately 514 kt of MCS will be encountered. This contributes around 1.5% of the total waste to be removed from the pit. If all the MCS was unoxidised (i.e. Black shale), there is sufficient capacity for this material to be dumped and encapsulated. This is consistent with requirements under the RTIO Spontaneous Combustion and Acid Rock Drainage (SCARD) management plan.</p>
DMP	<p>2. The DMP contends that the PER lists a number of elements found to be enriched in the materials to be disturbed through mining and notes that the risk of these contaminants being released is low in near neutral pH environments. The PER does not, however, adequately address the risk of metalliferous drainage in the presence of AMD which would result in more acidic environments. As PAF material is present on site the potential exists for contaminants to be liberated by acid generation before any buffering material can neutralise it.</p>	<p>Rio Tinto agrees the PER does not adequately address the risk of metalliferous drainage in the presence of AMD. However, as a part of the geochemical characterisation programme undertaken for the Proposal, Rio Tinto has conducted testing to determine metals that will mobilise under acidic conditions as well as under near neutral conditions. The results have shown that additional metals will be mobilised under these acidic conditions as compared to the standard deionised water leaches. Where PAF material is encountered it will be placed into designated waste dumps, encapsulated and a store and release cover will be constructed to limit water infiltration through the waste dump and limiting acidic drainage water.</p>
DMP	<p>3. The DMP commented that the PER lacks clear commitments regarding management of PAF material if it is encountered. The AMD risk assessment provided in Appendix A recommends that further static testing be conducted on the materials with elevated sulphur contents to confirm that these materials can be adequately managed through encapsulation. The risk assessment also recommends that enriched elements should be included in water quality monitoring programs to identify if leaching is occurring. Neither the encapsulation of hostile waste nor water monitoring for contaminants are discussed in the PER.</p>	<p>Rio Tinto acknowledges the commitments around the management of PAF material are not clear within the PER. If hostile material is mined in significant volumes from the Proposal, groundwater surrounding the waste dump will be monitored for enriched and potentially mobile contaminants. Rio Tinto's SCARD and mineral waste management plans require that hostile waste be encapsulated and that the dumps be monitored for contamination. Audits will be undertaken both internally and by external parties to ensure site complies with these requirements.</p>

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DMP	<p>4. Comments provided by the DMP on the June 2012 version of the PER note that 43.7 million tonnes of physically adverse (erodible) materials have been identified at the Turee Syncline project but no strategies provided for managing this material.</p> <p>The most recent version of the PER does not appear to have addressed this comment as there is still no mention of management strategies for dispersive waste materials.</p>	<p>Although 43.7 million tonnes of material is classified as being of medium to high erodability, only 9 % of this (equivalent to approx. 13.6 Mt) is considered to be of high erodability based on its geology. The remaining volume of this material (30.5Mt) is of medium erodability. Overall, 70 % of waste material at the site has been classified as low erodability (101.6 million tonnes from a total of 145.3 million tonnes of mineral waste) and it is therefore expected that safe and stable landforms will be developed. In light of the DMP's comments management strategies will be revisited during the next revision of the closure plan.</p>
Submission 1.3 Surface Water Management		
DMP	<p>1. The PER only includes a map showing catchment areas for the Turee and Seven Mile creeks. No details are provided on flood levels or localised drainage patterns around the proposed infrastructure, pits and constructed landforms. It is acknowledged that some information is provided in the appendices however further detail should be provided.</p>	<p>Rio Tinto commits to further assessment of flood levels and localised drainage patterns around proposed infrastructure, pits and construction landforms during subsequent phases of the Turee development.</p>
DMP	<p>2. DMP is particularly concerned with the lack of information relating to surface water management around pits 4 and 5 (referred to as Risk Location 8 in the Surface Water Management document provided in Appendix A). A significant drainage line appears to exist between these pits which may impact on the pits themselves or be obstructed by other infrastructure (such as roads and landbridges). Specific management of surface water in this area should be discussed with strategies for avoiding ponding or bottlenecking of surface water and discharging of surface water into the pits.</p>	<p>Investigations at Turee show the creek passing between pits 4 and 5 is highly incised and there is a minimum of 12 m elevation difference between the creek and the edge of the pits. The depth of water during a 100 year ARI event has been estimated at around 2 m approximately 10 m lower than the pit crest. As such, the risk of flooding to pits is considered to be low. However, Rio Tinto commits to further assessment of the flood protection requirements during subsequent phases of the Turee development.</p>

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Submission 1.4 Closure and rehabilitation		
	<p>1. The DMP has made a number of previous comments about mine closure. There has been no revision in the mine closure plan in Appendix E in response to DMP's comments.</p>	<p>Rio Tinto has developed a closure vision that applies to all of its sites, which has been adapted to provide a standard set of objectives.. It is acknowledged that these objectives are broad, but will be expanded to include site specific objectives where needed to address all the closure issues relevant to a particular site.</p> <p>The closure planning process includes a step to assess the need for, and form, of any site-specific closure objectives. Such objectives may be required to address critical closure risks or protect key environmental or social values, where these are not sufficiently addressed by the standard objectives.</p> <p>The Proponent will reassess the wording of its objectives in light of DMP's comments.</p>
DMP	<p>2. The mine closure plan (MCP) in Appendix E is based on the 'satellite' option in which most supporting infrastructure is located at the existing Paraburdoo mine site (as opposed to Turee Syncline being a stand-alone operation). However, if approved the PER will presumably include both the stand-alone and satellite options and therefore the MCP must include closure strategies for both. Currently the closure strategies for some infrastructure associated with the "stand alone" option are not addressed in the MCP.</p>	<p>Rio Tinto acknowledges the mine closure plan has been based on the satellite option, however, these closure strategies will be reviewed during the next revision.</p>
DMP	<p>3. The PER recognises that poorly designed landforms can result in failure to meet closure objectives however very little detail is provided in the PER on the proposed design of landforms for the Turee Syncline project. For instance, the PER briefly mentions that waste dumps will be constructed with concave slopes however no further justification for a concave slope design is provided.</p>	<p>The original closure plan submitted included an overview of the final landform strategy for the site (Section 29). This detailed the fact that backfilling is not warranted due to the above water table (AWT) nature of the mine plan and the fact that AMD is a low risk for the site. The plan does however detail that progressive backfill that will be undertaken during operations for the construction of three waste dumps in Central pits 1, 2 and 4 in order to limit the disturbance footprint of the project. The plan also details the principles that will applied in achieving a suitable final landform for the site including:</p> <ul style="list-style-type: none"> • shaping of waste dumps;

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		<ul style="list-style-type: none"> • effective drainage structures; • safety abandonment bunds around pit shells; • decommissioning of infrastructure; and • rehabilitation using species representative of the natural vegetation communities in the area <p>Further to this, the closure plan commits to undertaking a hydrological assessment prior to the next closure plan iteration to determine the engineering requirements to appropriately manage surface water flows upon closure (Section 45: Task #3). Rio Tinto is currently undertaking research to determine the final landform requirements associated with land-bridges for all of its iron ore operations. It is anticipated that this work will be discussed with the relevant authorities and incorporated into the closure plan as available.</p> <p>Based on the preliminary nature of the mine plan, Rio Tinto feels that this level of detail is sufficient at this stage of project development.</p>
DMP	<p>4. Closure objectives and criteria appear to be vague and process based. As well, some closure objectives also appear to be related to business efficiencies rather than environmental outcomes. No measurement tools have been provided for the completion criteria meaning that they cannot be used to measure rehabilitation and closure success. The completion criteria section of the MCP should follow the format laid out in the DMP/EPA Guidelines for Preparing Mine Closure Plans.</p>	<p>As outlined in Section 24 of the MCP, Rio Tinto believes that post closure land uses for mining operations are limited. Although there is the potential for the Turee Syncline site to be subject to an alternative use, this cannot be investigated until ILUA negotiations with the Yinhawangka group are complete.</p> <p>At this stage the only viable closure option for the site is to rehabilitate the mine footprint, with the aim of maximising biodiversity outcomes and cultural heritage protection. Closure objectives have been formulated for the site based on this, and indicative completion criteria provided (Section 25).</p> <p>In a separate process, to the preparation of this closure plan, Rio Tinto is currently undertaking a review and update of its closure objectives, indicative completion criteria and measurement tools. This work is still on-going, though it should be noted the approach and original objectives have changed significantly. The new objectives and criteria will be written into closure plans when they have been agreed upon and finalised.</p>

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DEC	<p>5. Recommendation: That any mine voids be backfilled to a level that will prevent the formation of permanent surface water.</p> <p>Recommendation: That in the event that permanent water-filled voids are found to be environmentally acceptable and approved, the following provisions be mandated for implementation of the proposal:</p> <ul style="list-style-type: none"> • Management of void water quality; • Fencing (and funds to manage the fence in perpetuity) of the mine pit void post closure to restrict access by fauna; • Monitoring and control of introduced grazing animals resulting from an increase in fauna attracted to the water-filled void; and • Monitoring and control of increases in feral predators. <p>Discussion: Any permanent water-filled voids left after mining in the area will continue to present a residual risk and a management legacy for land managers and the State. DEC recommends that all mine voids be backfilled to a level that will prevent the formation of permanent surface water, to avoid potential long-term impacts on water quality and biodiversity values.</p>	<p>Complete or partial backfill of all pit voids is not proposed as the mine is above the water table. AMD has been categorised as a low risk for the operation (see Section 18.6 in the PER Document) and pit shells have been designed based on geotechnical drilling to ensure long-term pit wall stability. However, in line with the Rio Tinto objective of minimising disturbance footprint, it is expected that opportunities for in-pit backfilling will be utilised where practicable during operations.</p>
Submission 1.5 Short Range Endemic Fauna		
Western Australian Museum	<p>1. Land snail and isopod specimens collected by Bennelongia during the Short Range Endemic Invertebrate Survey have not been deposited with the WA Museum as required by EPA Guidance Statement conditions.</p>	<p>The majority of specimens were lodged with the museum during the identification process and the remaining snail and isopod material is currently being lodged.</p>

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Western Australian Museum	<p>2. Specific comments related to Appendix A are:</p> <p><i>Gastrocopta deserti</i> is a synonym of <i>Gastrocopta mussoni</i> (Pokryszko, 1996)</p> <p><i>Gastrocopta hedleyi</i> is not mentioned in Solem (1986) rather Pokryszko (1996)</p>	<p>Both <i>Gastrocopta deserti</i> and <i>Gastrocopta mussoni</i> were described in 1917 by Pilsbry and <i>Gastrocopta deserti</i> has been recognized as a separate species by many other authors including Alan Solem and, more recently, Shirley Slack-Smith of the Museum. They were synonymised in 1996 by Pokryszko with the only remark justifying this being “It seems that <i>G. mussoni</i> and <i>G. deserti</i> are ecophenotypes or simply extremes of a continuous variability range, rather than distinct species”. Vince Kessner, who did the Bennelongia snail identifications, preferred to treat <i>Gastrocopta deserti</i> as a separate species. Rio Tinto believes this doesn’t have any implications for the assessment and what Bennelongia called <i>Gastrocopta deserti</i> occurs widely and is not considered to be an SRE.</p> <p>Rio Tinto acknowledges the wrong reference was provided in Appendix A as the source of information on <i>Gastrocopta hedleyi</i>. However, we believe the conclusion that existing information shows the species is not an SRE, is correct.</p>
Public Submitter	<p>3. The following comments were offered in relation to taxonomy and interpretation of SRE species.</p> <p>a) Barrowdillo pseudopyrgoniscus</p> <p>Pg. 17 of Appendix A of PER, Bennelongia 2012a and pg. 24 of Appendix A, Phoenix 2009 Part 1:</p> <p>Due to taxonomic advances Barrowdillo pseudopyrgoniscus is now considered restricted to Barrow and Varanus Islands (S. Judd, personal communication), and therefore the record of the species by Phoenix (2009) represents a misidentification based on limited amount of material available of the genus at the time. Consequently, the Barrowdillo specimens reported by Phoenix (2009) should be considered likely SREs as the genus is only sporadically found in the Pilbara based on four undescribed species (S. Judd, personal communication). Specimens of which are available for comparison.</p>	<p>Rio Tinto believes these comments represent a very precautionary, rather than risk-based, philosophy. If there were significant taxonomic or interpretative issues with the work in the PER, the Museum or DEC would have commented more extensively. The virtual absence of comments indicates the work is essentially sound.</p> <p>The only comment with potential assessment significance is comment A (<i>Barrowdillo pseudopyrgoniscus</i>). The facts of this comment are probably valid and the specimens at Turee Syncline may represent an SRE species. However, Simon Judd is the recognized WA expert on the group (isopods) and it was his opinion at the time the work was done that the animals were <i>Barrowdillo pseudopyrgoniscus</i>. Therefore, it is not unreasonable for the PER to present it this way.</p>

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	<p>b) Mygalomorphae sp.</p> <p>Pg. 16 of Appendix A, Bennelongia 2012a:</p> <p>The report lists three “Mygalomorphae sp.” records. Mygalomorph spiders can be identified to family or even genus level even if only juveniles or females were collected. Identification to lower taxonomic rank than just the infraorder Mygalomorphae will provide more information on the potential SRE status of these specimens and if molecular tools are required for further assessment.</p> <p>c) ?Aureocrypta sp.</p> <p>Pg. 16 of Appendix A, Bennelongia 2012a:</p> <p>Aureocrypta can clearly be delineated from the similar Synothele based on somatic features (i.e. colouration) and the genus need not to be listed with a question mark. The genus is not very common in the Pilbara region (although one widespread species is known – Aureocrypta ‘chichester’ or MYG057) and therefore molecular analyses should be employed to judge the distribution of the specimens collected at Turee Syncline.</p> <p>d) Eucyrtops sp. B04 and Synothele sp. B04</p> <p>Pg. 16 of Appendix A, Bennelongia 2012a:</p> <p>Eucyrtops sp. B04 is listed under Barychelidae, but the genus belongs to the family Idiopidae.</p> <p>Why was an apparent internal nomenclature used (“B04”), if a reference system for mygalomorph spiders exists at the WA Museum (WAM) that will allow the species to be placed into a regional context? If the specimen is a male, a MYG-morphospecies should be assigned, if it is a female or juvenile, a morphospecies designation pretends accuracy that cannot be provided as these life stages for this group can rarely be identified to species level in mygalomorph spiders.</p>	

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	<p>Similarly, Synothele sp. B04 has not been put into the context of the WAM nomenclature, although other species in Synothele were (Synothele MYG127A and 'xkarara'). Sequence data for both Synothele MYG127A and S. 'xkarara' is present at the WAM and the identity of Synothele sp. B04 in relation to these could easily be established by DNA barcoding. This is particularly important for Eucyrtops as it is a rarely collected genus in the Pilbara.</p> <p>e) Aname MYG001/MYG125</p> <p>Pg. 16 of Appendix A, Bennelongia 2012a:</p> <p>Aname MYG001 and MYG125 were both recently named (Harvey et al. 2012) and their respective scientific names, i.e. Aname mellosa (=MYG100) and Aname marae (=MYG125) should be used as they were known prior to the publishing of the PER (EcoLogical 2012). Aname mellosa females can be identified to species level based on their unique internal female genitalia, in contrast to A. marae for which females are not known (Harvey et al. 2012). However, the latter are somatically (colouration) much different to A. mellosa (Harvey et al. 2012) and the two species should be listed separately.</p> <p>There is also a discrepancy in relation to the distribution of these species (pg. 16 of Appendix A, Bennelongia 2012a) as they are listed as "both (...) widespread in the area and Pilbara (M. Castalanelli pers. comm. 2011)"; however, Harvey et al. (2012) only list a few localities NW of Tom Price for A. marae and therefore the species should be considered at least a potential SRE restricted to the vicinity of Tom Price unless conspecificity with the Turee Syncline spiders is proven.</p> <p>A. mellosa is currently believed to be a widespread species based on morphology, but molecular data (COI) show high sequence divergence between populations (>15%) suggesting either cryptic speciation or possibly localised populations that may have a conservation significant genetic make-up (M. Castalanelli,</p>	

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	<p>presentation at Entomology conference Hobart, November 2012).</p> <p>There is also no proper justification why the Aname sp. n. listed in Appendix A, Phoenix (2009, pg. 26) are considered part of the Aname MYG001/MYG125 listing (pg. 16 of Appendix A, Bennelongia 2012a). A simple re-examination of the specimens lodged at the WAM could provide at least some indication to which group of Aname these specimens belong.</p> <p>f) Karaops</p> <p>Pg. 16 of Appendix A, Bennelongia 2012a:</p> <p>Which 'secondary characteristics' have been used to identify all Karaops juveniles as conspecific? Only colouration could have been used and this is notoriously unreliable in Selenopidae (Crews & Harvey 2011). In addition, Karaops was found in a number of different habitats during the survey and it is perceivable that more than one species is involved as members of the genus are generally very habitat specific and those from rocky outcrops highly localised. Molecular analyses should be employed to show conspecificity of the specimens collected.</p> <p>g) Pseudoscorpions</p> <p>Pg. 15 of Appendix A, Bennelongia 2012a:</p> <p>All possible SRE pseudoscorpions have been assigned internal nomenclatural codes although the WAM has developed a morpho-code (PSE-code) for this group that could place the species from the survey into regional context (i.e. Sundochernes PSE021 from the survey). Dr Harvey from the WAM is arguably the world-expert in pseudoscorpions and was apparently consulted for this assessment. If he couldn't designate a morphospecies, how were the specimens identified to this level?</p> <p>h) Scolopendra sp. B02, B03, B04</p> <p>Pg. 20 of Appendix A, Bennelongia 2012a:</p>	

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	<p>What are Scolopendra B02, B03 and B04? The genus has been comprehensively revised for Australia and only two species are known, i.e. <i>S. laeta</i> and <i>S. morsitans</i>?</p> <p>i) Chileneophilidae sp. B05</p> <p>Pg. 17 of Appendix A, Bennelongia 2012a:</p> <p>The report states in relation to a potential SRE centipede “the listing of Chileneophilidae sp. B05 as an SRE is precautionary; more extensive sampling will probably show the species to be moderately widespread.” However, no evidence is provided to support this statement, e.g. that it is based on known distributions of other geophilomorph centipedes or Chileneophilidae in the Pilbara, or on known species-specific habitat preferences? In our experience, these are poorly known in the Pilbara (or elsewhere in WA). If currently limited to the disturbance footprint, the species should be looked for outside the footprint.</p> <p>j) State of knowledge and comparison of specimens with WA Museum reference collection</p> <p>PER main document, pg. 94:</p> <p>Following on from some of the taxonomic issues above, the PER document states that “It is most likely that the 12 potential SRE species are currently known only from the Proposal area because there has been little invertebrate sampling across the Pilbara (Bennelongia, 2012a).”</p> <p>This statement does not reflect current scientific knowledge. After years of invertebrate sampling for mining projects and following the Pilbara Biological Survey 2004-2007 (DEC), the SRE invertebrate fauna of many areas of the Pilbara is now very well-known and regional context can be provided through the collections of the WAM.</p> <p>Some issues with the SRE assessment for the Turee Syncline project could have been avoided if the WAM reference collections were consulted and sequence data of potential SREs from surveys compared with</p>	

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	<p>sequences at the WAM for a thorough assessment of distributions.</p> <p>k) Habitat-based/risk-based assessment</p> <p>PER main document, pg. 94:</p> <p>The SRE impact assessment relies heavily on a habitat-based ('risk-based') approach, i.e. (p. 94):</p> <p>“Ten of the 12 potential SRE species recorded in the Proposal area were collected from drainage line habitat (including surrounding floodplains), which is well connected with surrounding areas because of the linear nature of the drainage lines and their floodplains, and is also widespread locally and regionally. The other two potential SRE species occurred in gullies/gorges, which are also considered to be relatively well connected and widespread. It is most likely that the 12 potential SRE species are currently known only from the Proposal area because there has been little invertebrate sampling across the Pilbara (Bennelongia, 2012a) and therefore significant impacts to SRE species in the proposal area are unlikely.”</p> <p>However, Guidance Statement 20 (p. 11) provides stringent prerequisites for this approach:</p> <ul style="list-style-type: none"> • a potential SRE taxon is represented by one or few specimens from only within proposed development areas • contextual data on the wider distribution and status of the taxon is unavailable from the WA Museum or the DEC • and additional targeted surveys appear unlikely to yield results in a reasonable timeframe. <p>All SREs reported were collected from inside the Proposal area only and in many cases from singleton or doubletons from a single habitat type, and therefore fulfil the first prerequisite for a risk-based approach. However, no effort was made to find potential SREs from inside the Proposal area outside the Proposal area,</p>	

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	<p>and in many cases comparison with WAM reference collections was not made, precluding the use of these collections for contextual data.</p> <p>Further surveys should be conducted outside the Proposal area to better understand the distribution of potential SREs collected during the surveys. Molecular analysis against the molecular database of the WAM or by examination and re-examination of existing WAM material could have provided contextual data for at least some species.</p> <p>If a habitat-based approach is being conducted, it should be much more differentiated in relation to the taxa in question. For example, populations of mygalomorph spiders may have very different micro-habitat preferences in a particular habitat due to the construction of permanent burrows than isopods or centipedes which generally live in deeper leaf litter.</p> <p>l) General statement about SRE ranges</p> <p>Pg. 17 of Appendix A, Bennelongia 2012a:</p> <p>The report states “The ranges of SRE species are usually orders of magnitude greater than the scale of impact of mining developments, so that SRE species are not at risk from mining developments because of their ranges alone.”</p> <p>How do the authors know that the “ranges of SRE species are orders of magnitude greater than the scale of impact of mining developments”? Has there ever been a statistical analysis of SRE distributions against the size of mining developments? With this argument, it appears that surveys for SREs are redundant (and indeed most cryptic vertebrate species of conservation significance, e.g. Northern Quoll) in environmental impact assessment for mining developments altogether and directly contradicts EPA Guidance Statement 20 and Harvey (2002).</p> <p>m) Error</p>	

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	<p>PER main document, pg. 89:</p> <p>The PER document states that twelve ‘possible’ SRE species were recorded in the Proposal area, including “one scorpion, four pseudoscorpions, four mygalomorph spiders, one isopod, one centipede and one millipede”. This summary does not match the most recent SRE report (Appendix A of PER, Bennelongia 2012a) which lists two isopods and no millipede.</p>	
Submission 1.6 Groundwater		
Department of Water (DoW)	<p>1. The Department of Water commented that water supply options for the project have been presented, but neither option has been sufficiently assessed. The DoW will assess options for both the Wittenoorn Formation and Kalkamunda borefield, on presentation of further information. Both options have the potential to impact on pools associated with the Turee Creek alluvium, and the proponent will need to provide the DoW with a full impact assessment of each option before a water license could be approved.</p>	<p>Rio Tinto will submit all necessary material for the award of a 5C license prior to the commissioning of potential local water supply borefields at Turee Syncline. In the event that water cannot be sourced locally, Rio Tinto intend to source water for operational demands from the Greater Paraburdoo Water Scheme (GPWS).</p>
DoW	<p>2. Dewatering is not required as the ore is above watertable. Should the mine be redesigned to mine below watertable, the DoW would expect a separate referral to EPA, addressing potential impacts. As there is no dewatering in the proposal under assessment, DoW has no need to consider environmental water or regional drawdown impacts.</p>	<p>Noted.</p>
DEC	<p>3. Recommendation: That the proponent considers additional options for onsite water supply.</p> <p>Discussion: The proponent discusses options for onsite water supply including developing groundwater resources and/or sourcing water from the Greater Paraburdoo Water Scheme. The PER does not include consideration of utilising the excess dewater from surrounding mines,</p>	<p>Dewater may be locally available from Paraburdoo dewatering and will be utilised at the Proposal, if water is sourced from the GPWS. However, dewater alone will not be able to meet the demand profile of the site water demand, and to ensure that site water demand is met, a dedicated water supply (whether local, or the GPWS) is necessary.</p>

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	that is discharged into local creeks. Reuse of dewater is a preferred option for onsite water supply.	
DEC	<p>4. Recommendation: That the proponent determines background groundwater quality to enable any effects from operations to be observed.</p> <p>Recommendation: That the proponent implements a groundwater monitoring program to enable detection of any negative impacts to groundwater quality.</p> <p>Discussion: There is potential for deterioration of groundwater quality due to accidental spills and leaks of hydrocarbons or hazardous materials from the site. A groundwater monitoring regime should be established, inclusive of background data, to identify any contamination that may occur.</p>	Prior to establishment of potential local water supply borefields, Rio Tinto intends to characterise the background groundwater quality of the host aquifer.
Submission 1.7 Air quality		
Department of Health (DoH)	<p>1. Typically with operations of this type and scale the biggest concern is the dust impact on close by communities. The distance of the Hamersley Iron mining operations to the nearest permanent regional town and individual residence is significant to ensure that dust from Hamersley Iron activities will not present a health issue.</p> <p>The dust suppression activities proposed to protect local vegetation around the Hamersley Iron operations will further help to reduce the dust load in the ambient air.</p> <p>Natural land formations appear to add some protection to the temporary and permanent camp sites from potentially excessive dust emissions. Given the transient nature of the residents, dust is likely to be largely an amenity issue. Dust suppression measures should never-the-less be employed to reduce amenity impacts and potential short-term respiratory effects.</p>	The Proposed operation will remain consistent with <i>Rio Tinto Environmental Standard: Air Quality Control</i> , which provides a systematic process for identifying and minimising air pollutant emissions and their potential impacts.

Submitter	Submission and/or issue	Rio Tinto response
DEC	<p>2. Recommendation: That the proponent conducts dust modelling for the proposed operations.</p> <p>Discussion: Significant quantities of dust can be generated from blasting activities at open pit mines. Large plumes of dust can be generated that can travel over long distances. The PER document indicates the closest sensitive receptors to be 30km away; however the impacts of dust on the proposed accommodation village and surrounding vegetation is likely to be significant. Modelling should be conducted to assess the impacts of dust from the mine site. Modelling for health impacts (PM10) and amenity (TSP) should be conducted. Dust impacts on vegetation should also be assessed and managed to prevent damage to or loss of vegetation. DEC's Native Vegetation Conservation Branch should be contacted if necessary for dust criteria for protecting native vegetation health.</p>	<p>An e-sampler that monitors PM10 concentrations or similar system will be installed at the Turee Syncline accommodation and monitored in accordance with the relevant Australian Standard.</p> <p>Dust modelling will be undertaken prior to the commencement of mining and the predicted dust concentrations will be compared against both internal Rio Tinto standards and external standards including NEPM.</p> <p>Dust deposition on vegetation from the Proposal is likely to be restricted to immediate peripheral vegetation and will be mitigated by periodic high rainfall events, which would remove built-up materials on leaves. As per much of the vegetation in the Pilbara, native vegetation in the area is also expected to be reasonably tolerant to dust deposition and would not be at risk of physiological impacts.</p>
DEC	<p>3. Recommendation: That the accommodation camp is treated as a sensitive receptor and its location determined with consideration of adequate separation distances, prevailing winds and modelling data.</p> <p>Discussion: Initially operations will involve workers being accommodated 30km from the site. There is a strong possibility that an accommodation camp will be established in the future and this camp should be treated as a sensitive receptor. Site selection should include consideration of separation distances, prevailing winds and modelling data, to prevent dust impacts at the site.</p> <p>The proposed site for the accommodation camp, indicated in Figures 5 and 11 of the PER document, is potentially too close to the mine site.</p>	<p>Prior to the camp location and design being finalised, Rio Tinto will conduct dust and noise modelling against both internal Rio Tinto standards and external standards. Results of this modelling will be taken into consideration when the final camp location is determined.</p>

Submitter	Submission and/or issue	Rio Tinto response
DEC	<p>4. Recommendation: That ongoing dust monitoring is conducted at the accommodation camp.</p> <p>Discussion: If the accommodation camp is established, ongoing dust monitoring at the site should be conducted to ensure dust levels are managed and workers' exposure to dust is minimised. Monitoring will assist in assessing the health and amenity impacts of the operations.</p>	Please see response to item 2 above.
Submission 1.8 Water and wastewater treatment/disposal		
DoH	<p>1. The proposal refers to the potential use of groundwater for dust suppression and mining support facilities. No reference is made to requirements for testing and treatment of that water supply. The alternative to source potable water supplies for mine site infrastructure from Paraburdoo is acknowledged however treatment may be required once water is delivered and stored onsite.</p> <p>Drinking water is to meet the standards specified in the Australian Drinking Water Guidelines 2004. A drinking water quality management plan as per attached model is to be established and approved by the Water Unit, DoH. The attached documents are available for download at: http://www.public.health.wa.gov.au/3/974/2/minesites_and_exploration_camps.pm</p> <p>Although support infrastructure and ancillary mining facilities will be built at the mine site, the proposed treatment of sewage and disposal of effluent has not been addressed. An application will need to be lodged, via the local government, under the Health (Treatment of Sewage and Disposals of Effluent and Liquid Waste) Regulations 1974. The PER does not refer to the necessary building licenses or wastewater treatment plant/disposal approvals requirements.</p> <p>Information related to water and wastewater issues can</p>	<p>The Project will be implemented in compliance with all relevant environmental legislation and regulations, legal obligations and commitments, in accordance with the Rio Tinto Legal and Other Requirements Procedure.</p> <p>A Legal and Other Requirements Register will be developed and maintained throughout the Project in accordance with International Standards Organisation (ISO) 14001 and the Rio Tinto Legal and Other Requirements Register Template to ensure relevant all legal and other requirements have assigned accountabilities and a process is in place for compliance auditing. This register will be updated on a quarterly basis in accordance with Requirement 4.3.2 of AS/NZS ISO 14001:2004.</p>

Submitter	Submission and/or issue	Rio Tinto response
DEC	<p>be obtained from the Department of Health's Water Unit.</p> <p>2. Recommendation: That the proponent demonstrates that effluent from the wastewater treatment plants will be reused onsite where possible.</p> <p>Discussion: Reuse of effluent should be addressed where possible to ensure water is conserved onsite, as this site will be in water demand.</p>	<p>The optimisation of water resources forms part of Rio Tinto Iron Ore Sustainable Development Guiding Principles. Rio Tinto will endeavour to re use treated water from the workshop and washdown facilities for dust suppression where possible.</p> <p>All waste water including ablution effluent and washdown water will be managed in accordance with the Waste Management Plan to ensure no contamination of surface water and/or groundwater. The storage and disposal of waste waters generated by the Proposal will also be controlled in accordance with conditions set out in the environmental licences to be obtained by the proponent under Part V of the EP Act.</p>
Submission 1.9 Mosquito-borne disease control programs and services		
DoH	<p>1. The risk of mosquitoes and mosquito-borne diseases such as Ross River and Barmah Forest virus disease is largely unknown for this region and has not been taken into account in this PER. An additional risk in northern areas of WA is the rare, but potentially fatal, Murray Valley Encephalitis. There may be seasonal freshwater mosquito breeding habitat within close proximity to the subject land, particularly during and after the wet season. Additionally, there is the potential for mosquitoes to breed in on-site infrastructure and constructed water bodies if they are poorly designed.</p> <p>As the risk of exposure to these diseases for future residents/workers/visitors is unknown it is recommended the proponent liaises with the Environmental Health section of the Shire of Ashburton to determine the likelihood and the extent of this risk.</p> <p>Recommendations:</p> <p>Geography/Topography</p> <ul style="list-style-type: none"> The proponent must ensure proposed infrastructure and site works do not create additional mosquito breeding habitat as follows: 	<p>Rio Tinto is aware of the potential for the creation of breeding grounds for mosquitoes and for the associated risks posed from their potential to carry diseases. Consideration of occupational health risks forms part of Rio Tinto's standard approach to design and operation of its sites.</p>

Submitter	Submission and/or issue	Rio Tinto response
	<ul style="list-style-type: none"> - Changes to topography resulting from earthworks (e.g. the installation of pipelines, bores, borrow pits, water treatment plants, roads etc) must prevent run-off from creating surface ponding as it may become mosquito breeding habitat; - Water tanks and other water-holding containers must be sealed or screened to prevent mosquito access and breeding. Regular monitoring for mosquito larvae and treatment with larvicide may also be required; - Waste items (tyres, drums and other water holding receptacles) should be filled with sand/soil; kept undercover or punctured to reduce the chances of these items holding water and becoming mosquito breeding habitat; and - Constructed water bodies (drainage infrastructure, infiltration basins and swales, settling ponds, wetlands etc.) must be located, designed and maintained so they do not create or contribute to mosquito breeding. <p>Mosquito Management Plan</p> <p>The Department of Health requires a Mosquito Management Plan (MMP) to be developed to assess the risk to the community of exposure to nuisance and/or disease carrying mosquitoes. The proponent is required to develop an integrated MMP to manage mosquitoes and other nuisance insects to reduce the risk of exposure for residents/workers and visitors. This should comprise, but not necessarily be limited to, the following:</p> <ul style="list-style-type: none"> • Appropriate location, design and maintenance of project infrastructure to prevent mosquito breeding (e.g. wastewater, stormwater infrastructure); • Source reduction (removal or modification of mosquito breeding habitat); 	

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	<ul style="list-style-type: none"> • Monitoring of larval mosquitoes in and around the proposed infrastructure to inform the location and timing of control measures; • Control (chemical, physical, biological and/or cultural) of larval mosquitoes in man-made and natural breeding sites in close proximity to residential quarters and the workplace; • Monitoring of adult mosquitoes in and around the proposed infrastructure to inform the location and timing of control measures; • Control (chemical, physical, biological and/or cultural) of adult biting insects; • Ensuring mosquito management strategies comply with all Federal and State legislative requirements; and • Provision of advice and seasonal warnings to protect residents/workers and visitors including dissemination of information on: <ul style="list-style-type: none"> - Insect screening of accommodation and enclosed workspaces; - Personal repellents; and - Appropriate clothing to enable employees to reduce their exposure to biting insects. <p>Mining (residential and/or non-residential) sites and other development. Mine sites can be a particular risk for FIFO workers who may be living and working within areas of high mosquito risk and disease occurrence. To minimize workers' exposure:</p> <ul style="list-style-type: none"> • The proponent should work with the Shire of Ashburton (prior to finalizing location of accommodation facilities and other areas where workers will spend considerable periods of time, as required) to determine the extent of the risk 	

Submitter	Submission and/or issue	Rio Tinto response
	<p>from mosquitoes and mosquito-borne disease;</p> <ul style="list-style-type: none"> Accommodation and recreation infrastructure (if required) should be located as far away as possible from natural breeding sites of mosquitoes and other nuisance insects; and <p>Mosquito-proof design should be incorporated into building design for worker's accommodation/residential dwellings and recreational facilities (such as mosquito mesh on all doors and windows and the inclusion of enclosed outdoor recreation area) in order to minimize worker and visitor exposure to mosquito bites.</p>	
Submission 1.10 Conservation areas		
DEC	<p>1. Recommendation: That the proponent recognises that the Rocklea conservation area includes the area of Rocklea identified for proposed joint management adjacent to the rail corridor as well as the 2015 proposed reserve area.</p> <p>Recommendation: That all subsidiary documents and associated plans for this project refer to the latest proposal boundaries for the Turee Syncline Project as shown in the PER. Discussion: The PER recognises the portion of Rocklea pastoral lease that has been identified by DEC for 2015 exclusion from its lease and future addition to the conservation reserve system. The proponent has not identified the additional area to the west of this which will be impacted by the proposal and is a proposed joint management area for the purposes of conservation, to be managed under Section 8A (formally Section 16A) of the Conservation and Land Management Act 1984. The land will remain pastoral lease but will be managed for conservation purposes under an agreement between DEC and the proponent.</p>	<p>Rio Tinto recognises that the Rocklea conservation area includes the area of Rocklea identified for proposed joint management adjacent to the rail corridor as well as the 2015 proposed reserve area.</p>

Submitter	Submission and/or issue	Rio Tinto response
	<p>The potential future purpose of this land should be acknowledged by the proponent and displayed on the Turee Syncline Project maps.</p> <p>The mine closure plan and the significant species management plan refer to boundaries from the draft PER and should be updated to recognise the area managed for conservation within Rocklea as well as the area to be managed directly by DEC from 2015.</p> <p>The mine closure plan does not recognise the Rocklea 2015 proposed conservation reserve area.</p>	
DEC	<p>2. Recommendation: That the proponent manages weeds to avoid impacts on DEC managed land.</p> <p>Discussion: The introduction of new weeds and increased occurrence of existing weeds in the mine area and infrastructure corridor due to increased mining activities poses a significant risk to the biodiversity and conservation values of Karijini National Park (KNP) and the Rocklea proposed 2015 addition to conservation reserve system. Strict weed hygiene and management procedures should be implemented to prevent the introduction and/or spread of weeds within the project area, or to the National Park and proposed conservation reserve area.</p> <p>The southern portion of KNP is relatively undisturbed compared with the northern portion of the National Park. There is potential for weeds to spread from the project area to the proposed conservation reserve area or the southern portion of the National Park.</p> <p>DEC is aware that Red Natal (<i>Melinis repens</i>), a highly invasive weed species, is being monitored and managed at Paraburdoo mine site by the proponent. Care should</p>	<p>Vegetation and flora values in and around the Proposal area will be protected through implementation of measures in accordance with the Vegetation and Flora Management Plan contained in the Operational Environmental Management Plan (OEMP). Measures relating to rehabilitation of disturbed areas will be implemented in accordance with the MCP. Key management measures to be implemented include prioritising poorer condition areas of vegetation for disturbance, maintaining ecological linkages between vegetation and habitat within and outside of the Proposal area and restricting access to areas of retained vegetation to prevent disturbance and the spread of weeds.</p> <p>Other key measures of the Vegetation and Flora Management Plan include:</p> <ul style="list-style-type: none"> • Restricting clearing to the extent allowed within the mining area, infrastructure corridor, accommodation camp, access roads and borefield • Reducing clearing footprint by clearly planning and marking clearing areas, and obtaining internal ground disturbance authorisation for all areas to be cleared in accordance with Rio Tinto's Approvals Request System Flagging in the field and recording GPS coordinates of observed Priority Flora species in earthmoving equipment to assist with the prevention of disturbance • Implementing weed hygiene measures for mobilisation and demobilisation of mining equipment entering and leaving the Proposal

Submitter	Submission and/or issue	Rio Tinto response
	<p>be taken not to introduce this weed to the Turee Syncline Project area given the potential for ore to be transported to Paraburdoo mine site for processes and train loading.</p>	<p>area as required in accordance with hygiene procedures and personnel to use designated tracks and roads only</p> <ul style="list-style-type: none"> • Internally reporting, recording, mapping, and monitoring the distribution and abundance of target weed species (particularly Ruby Dock) and reporting new weed infestations as they are discovered • Undertaking weed control in disturbed areas as part of the annual weed control program and as required • Managing Declared weeds in accordance with the Department of Agriculture and Food Declared Plant Control Codes • Undertaking progressive rehabilitation of disturbed areas with local native species • Implementing fire management measures
DEC	<p>3. Recommendation: That the proponent develops and implements communication and cooperation protocols with DEC in the Turee Syncline Project fire management plan.</p> <p>Discussion: Due to the proximity of the Turee Syncline Project to KNP there is a requirement for ongoing consultative arrangements between DEC and the proponent in regard to fire management. DEC undertakes prescribed burns, as well as being responsible for managing bushfire within and threatening DEC managed lands. The fire management plan should be developed collaboratively with DEC to document agreed communication and cooperative arrangements to manage fire.</p>	<p>Fire management measures will be implemented as part of the Proposal in accordance with the Construction Environmental Management Plan and the Flora and Vegetation Management Plan contained in the OEMP to minimise the risk of fire occurring as a result of the Proposal.</p> <p>Fire management will include:</p> <ul style="list-style-type: none"> • undertaking basic fire awareness and fire fighting training for all personnel (including contractors) prior to commencing work on-site; • providing the appropriate fire fighting equipment on-site at all times; • maintaining adequate fire breaks across the mine site and around working areas to reduce fire risk; • undertaking removal of any material stuck around exhaust manifolds as part of routine vehicle checks; • ensuring a fire spotter is present when clearing vegetation; and • using diesel power vehicles. <p>Due to the proximity of the Turee Syncline Project to Karijini National Park, Rio Tinto will consult with DEC in regard to fire management.</p>

Submitter	Submission and/or issue	Rio Tinto response
DEC	<p>4. Recommendation: That the proponent ensures that the potential impacts of the Turee Syncline workforce on KNP are avoided through developing and implementing a workforce management plan to CEO requirements and in consultation with DEC.</p> <p>Recommendation: That formalised communication protocols between DEC's Pilbara Region / KNP staff, and the proponent are established prior to any ground disturbing activities being undertaken for the proposed development.</p> <p>Discussion: The Turee Syncline Project is located in close proximity to a portion of KNP that is remote from the focus area for recreational activity and day to day visitor management. To ensure that the development does not result in the diversion of DEC resources to manage additional visitors in this area, the proponent should prepare and implement a workforce management plan including provision of induction material on the significance of KNP, appropriate conduct and behaviour within the park, and disciplinary measures. The plan should also ensure that any access by staff to the park is via already established tracks or roads and does not interfere with other National Park users.</p> <p>Formalised communication protocols between the DEC's Pilbara Region (including KNP staff) are recommended due to the close proximity of the Turee Syncline Project to KNP and Rocklea 2015 proposed conservation reserve area. DEC is responsible for the management of fire, weeds and feral animals on these lands and management of these matters requires communication and liaison with land managers, surrounding land owners / users and should be established prior to any ground disturbing activities being undertaken for the</p>	<p>Rio Tinto has experience with managing workforces that are accommodated in on-site camps; such management includes providing for recreational and leisure activities at the camps. Rio Tinto will also draw on its workforce management experience from Cape Lambert to Emu Siding Rail Duplication and the Marandoo camp, which is located in proximity to the northern entrance of Karijini National Park and close to the main visitor attractions. A key component of the workforce management approach at the Marandoo camp includes implementation of a comprehensive induction program which addresses informing mine and contractor personnel:</p> <ul style="list-style-type: none"> • as to appropriate, low impact behaviour within the Park; • to remain on established vehicle access tracks and walking trails; • of the potential for off-road access to result in increased erosion and weed dispersal; and • of the relevant Park policies and requirements, including in relation to access fees, camping, campfires, firewood collection and alcohol consumption. <p>Rio Tinto currently has an existing communication protocol in place with the rangers at Millstream Chichester National Park and would commit to a similar type of arrangement.</p>

Submitter	Submission and/or issue	Rio Tinto response
	proposed development.	
Submission 1.11 Flora		
DEC	1. Recommendation: That the proponent clarifies the impacts of the Turee Syncline Project on priority listed flora prior to any ground disturbing activities being undertaken for the proposed development.	Please see response to Submission 1.10 item (2).
	<p>Discussion: The Turee Syncline Project will potentially impact on several priority listed flora species. The PER does not provide an assessment of the total impacts of the Project on the local (and where appropriate regional) populations of priority listed flora. It is expected that proponent provides quantitative impact tables for priority listed flora in environmental review documentation, and while this information was requested in DEC's comments on the draft PER, it has not been provided.</p> <p>Impacts on priority listed flora should be avoided where practicable, in particular impacts on <i>Aristida lazaridis</i> (Priority 2), <i>Gunnipopsis propinqua</i> (Priority 3) and <i>Sida</i> sp. Barlee Range (Priority 3). Where flexibility exists in relation to the location of infrastructure it is recommended that these species are avoided.</p>	
Submission 1.12 Fauna		
DEC	<p>1. Recommendation: That the proponent commits to further consultation with DEC regarding fauna management and trenching, in the event that the water supply pipeline requires burying.</p> <p>Discussion: The PER indicates that if a water supply pipeline is installed as part of the Turee Syncline Project, it is most likely to be installed above ground. In the event</p>	<p>Trenching for underground pipes may be required for the Proposal. Routine management measures associated with trenching include:</p> <ul style="list-style-type: none"> • all foundation holes, drill holes and trenches shall be covered, fenced, ramped or bunded to prevent stock or fauna entrapment / injury; • pipe ends shall be capped; • trenches will be inspected twice daily for fauna This will comprise a

Submitter	Submission and/or issue	Rio Tinto response
	<p>that the pipeline is placed underground and pipeline trenching is required, the proponent should consult DEC regarding best practice management for terrestrial fauna during trenching activities.</p>	<p>morning (am) inspection and an afternoon (pm) inspection; and</p> <ul style="list-style-type: none"> • fauna egress ramps shall be no further than 1km apart along open trenches. <p>A Pipeline Installation Management Plan will be developed and implemented prior to the commencement of trenching. This will include management measures associated with fauna becoming trapped in open trenches.</p>
Submission 1.13 Subterranean fauna		
DEC	<p>1. Recommendation: That if one or both of the proposed borefields are developed as a component of this proposal the proponent clearly demonstrates that the abstraction of groundwater will not unacceptably impact on the conservation of potentially restricted stygofauna species only known from the Turee Syncline Project area.</p> <p>Recommendation: That if it is determined that the Turee Syncline Project will potentially impact on restricted stygofauna species only known from the Turee Syncline area, the proponent demonstrates to the EPA how potential impacts are to be managed.</p> <p>Discussion: The information provided as a part of the PER is insufficient to enable DEC to appropriately assess the potential risk to and impacts on potentially restricted stygofauna and their associated habitat, resultant from groundwater abstraction. The PER provides a habitat risk assessment and infers the likelihood of stygofauna occurring in the borefield areas as well as providing information on the hydrogeology (i.e. extrapolated and inferred from characteristics of the surrounding geology and groundwater) of the area. The PER does not, however, provide sufficient information on the suitability and extent of potential stygofauna habitat (or available water) that exists in the area, or the extent of the potential drawdown associated with project borefields. The proponent should commit to further investigations on the potential risk to and impact of the project on potentially restricted stygofauna if one or both of the proposed borefields is developed as a component of this proposal.</p>	<p>Rio Tinto commits to further investigate the potential risk to restricted stygofauna, if the business undertakes to assess the potential borefields for water supply purposes.</p>

Submission 1.14 Climate change

<p>DEC</p>	<p>1. Recommendation: That the proponent demonstrates how climate change considerations will be incorporated into infrastructure and site design, in order to reduce risks to natural environment both during the operational life of the project and post closure.</p> <p>Discussion: Climate change impacts in the north west are likely to include more intense cyclones which will present an increased risk of inundation and flooding in the region. This could lead to infrastructure deterioration/damage and potentially contamination of the environment (e.g. as a result of spills, stockpiles being compromised etc). It is recommended that the proponent provide an assessment of the appropriateness of current standards for infrastructure on-site and site design specifications under future climate change conditions and identify the measures that will be put into place to meet any shortfalls. This will assist in improving the resilience of the site to climate change impacts and avoid or reduce potential future risks to the natural environment.</p> <p>2. Recommendation: That projections of climate change impacts on water resources are incorporated in the analysis of the potential environmental impacts of the water supply options being considered by the project.</p> <p>Discussion: Climate change may result in changed rainfall patterns and therefore changed sustained yields for water resources potentially affected by the proposal, including the ground water resources that may be used to supply water to the project.</p> <p>3. Recommendation: That consideration is given to whether surface water management measures will be sufficient to cope with any potential change in the</p>	<p>This comment is considered to exceed the reasonable expectations of an environmental impact assessment.</p> <p>The climate of the Pilbara is highly seasonal and significantly influenced by the number and intensity of cyclones that cross the Pilbara. The unpredictable nature, duration and specific course that cyclones take when crossing the Pilbara significantly affects seasonal rainfall patterns and results in highly variable rainfall, both geographically and temporally.</p> <p>In recognition of the significant fluctuation and extreme weather that can result from direct contact of a cyclone with the site, engineering designs have typically adopted a conservative approach of applying a 100 year ARI standard. Given the projected project life it is unlikely to experience a 100 year ARI storm event.</p> <p>It is therefore considered that even if it was possible to reach a consensus on the likely predicted changes in climate in the Pilbara during this time, that the conservative approach of applying a 100 year ARI design standard to handle the unpredictable nature storms events in the Pilbara more than adequately provides sufficient protection to the site.</p>
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	<p>intensity and frequency of flood events that may occur in the future due to climate change.</p> <p>Discussion: The climate science regarding projections of future impacts of climate change on cyclone activity in the North West of WA is still developing. However some work in this area suggests that it is possible that in the future, whilst the frequency of cyclones may not change, the proportion of those cyclones that are of higher category (more intense) may increase. This could potentially lead to a change (increase) in the risk of both the frequency and scale of large flood events.</p>	
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