

PEMBROKE

Olive Downs Coking Coal Project

Additional Information to the
Environmental Impact Statement

Appendix A

**Responses to Submissions
Received on the Draft EIS**

**Table A1-1
Olive Downs Coking Coal Project EIS Submission Register**

Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response
1. Department of Education				
1.1	Social Impacts	This Department has a nil response to the abovementioned report. Anticipated impacts generated by the project scope as set out in this draft EIS, can be absorbed within the existing schools network.	Nil.	Noted.
2. Private Submission				
2.1	Project Support	<p>I have reviewed the EIS submission for the Olive Downs Project and I commend the proposed approach to lessen the impact on the environment during the construction and operation phases and the commitment to restore the land to its current use of low-intensity cattle grazing. I am pleased that the environmental assessment establishes that there is a low impact to endangered regional ecosystems and that the proposed rehabilitation will somewhat rectify the fauna habitat degraded by historical agricultural practices and that significant biodiversity offsets will be established.</p> <p>I concur that the project will have a positive effect on the local communities in providing long-term locally based employment, have a significant flow-on effect to regional businesses supporting the project and to the whole of Queensland through coal royalties funding services such as hospitals, teachers and other civil services.</p> <p>The project will be a significant contributor to the improvement in the quality of life through the application of the metallurgical coal to produce steel used to support human endeavours including the manufacture of the equipment that is used in producing renewable energy sources.</p> <p>In conclusion, I fully support the proposed development.</p>	Nil.	Noted.
3. Private Submission				
3.1	Project Support	The Project will support a large indirect workforce, through suppliers, contractors, service providers and local business. I am in full support of this project.	I have no issues at present and am support of the project	Noted.
4. Department of Agriculture and Fisheries				
4.1	Management Plans	<p>(Note this comment also applies to Appendix C - Aquatic ecology assessment)</p> <p>(S3.3.11.3, pg3-166) (App C, S7.3, pg171, point 3)</p> <p>The use of a Native Fish Spotter Catcher is identified in the fauna management plan.</p>	Include adherence with the DAF - Fish Salvage Guideline in the Fauna Management Plan	Pembroke has prepared a Fauna Species Management Plan for the Project as outlined in Section 12 of the Additional Information to the EIS. The Fauna Species Management Plan includes the use of a native fish spotter catcher where dewatering activities are required, in accordance with DAF's Fish Salvage Guideline.
4.2	Groundwater impacts	<p>(S4.1.2, pg4-13)</p> <p>Aquatic habitat within the Isaac River, North Creek, Cherwell Creek and smaller tributaries are identified as having a high likelihood of being dependent on the surface expression of groundwater.</p>	<p>Model the waterways adjacent to the project area for the potential impact on fish habitat from mechanisms such as ratchet down.</p> <p>An immediate response to such an event should be included in an Alert to Action plan.</p> <p>Propose mitigation methods and opportunities If impacts are noted.</p>	<p>As outlined in Section 4.1.3 of the draft EIS states, the aquatic habitat associated with the Isaac River, North Creek, Cherwell Creek and smaller associated tributaries may be a GDE for a short period after a rainfall events. However, the aquatic habitat is ephemeral and the aquatic species that occur in this habitat are adapted to wetting and drying cycles (DPM Envirosciences, 2018c). In addition, the Project would result in negligible changes to baseflow contributions to North Creek or Cherwell Creek given the distance of these waterways from the proposed mining area (HydroSimulations, 2018). As a result, it is not expected that the Project would result in impacts on fish habitat, including through mechanisms such as 'ratchet down'.</p> <p>Notwithstanding, Pembroke has prepared a separate assessment of potential impacts to GDEs and wetlands, which is provided in Appendix E of the Additional Information to the EIS. Section 7 of Appendix E of the Additional Information to the EIS identifies that Pembroke has included additional commitments to conduct ongoing monitoring of the ecological characteristics of the potential GDEs and wetlands over the life of the Project (i.e. additional monitoring to what was committed to in the draft EIS). The ongoing monitoring will be used to validate the predicted impacts presented in the EIS, and identify whether any measures (such as habitat repair works, revegetation) need to be implemented to minimise any observed impacts.</p> <p>In addition, Pembroke would prepare a REMP for the Project and outlined in Appendix E of the Additional Information to the EIS.</p>
4.3	Fish Passage	<p>(S4.1.2, table 4-2, pg4-23) (S4.1.5, Table 4-8, pg4- 41)</p> <p>Fish passage for Offsets Identified in the table but dismissed as having no SRI.</p> <p>The risk profiles of the waterways and the magnitude and nature of the works it is likely that fish passage will be</p>	<p>Assess each of the mapped waterways and include likely impact sites (proposed surface development).</p> <p>Identify how impacts are being avoided or mitigated.</p> <p>Identify the SRI for each of the waterways and proposed offset.</p>	<p>The 'watercourses' (as defined by the Water Act 2000) that would be directly impacted by the Project are:</p> <ul style="list-style-type: none"> the Isaac River due to road crossings and conveyor crossings; Ripstone Creek due to the permanent watercourse diversion; and Cherwell Creek due to crossings associated with the proposed water pipeline and ETL.

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		<p>disrupted on a number of the mapped streams.</p> <p>Table 21 of Appendix C (pg167) identifies Impacts on:</p> <ul style="list-style-type: none"> • Purple waterways 515 metres. • Red waterways 11 556 metres • Amber waterways 20 350 metres • Green waterway 6437 metres 		<p>The other drainage features within the Project area were determined by DNRM to not meet the criteria to be mapped as a 'watercourse', and as such, have been determined to be 'drainage features' as per the definition in the Water Act 2000.</p> <p>As described in Section 4.1.3 of the draft EIS, watercourse crossings would be constructed with consideration to the relevant waterway zoning maps. This would allow Pembroke to apply the appropriate management measures in accordance with the <i>Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works</i> (DAF, 2017b) (i.e. using box culverts to permit crossing during low flow events, enabling fish passage to be maintained within / through the Project area).</p> <p>Each crossing would be designed to be inundated during moderate to high flow events allowing fish passage above and around the structure.</p> <p>The Aquatic Ecology Assessment provided in the draft EIS included a description, and assessment of the potential impacts to, 'Low' and 'Moderate' impact waterways. The assessment describes that, in the north of the Olive Downs South Domain, two mapped 'low risk' waterways run through a large dam, with a 'moderate risk' waterway mapped downstream of the dam (Figure 12 of the Aquatic Ecology Assessment). Fish passage is impeded by this dam, which is rarely expected to fill and allow for downstream flow. These waterways are of low stream order (1 and 2), are highly ephemeral, and are not considered to constitute, nor provide a conduit to, fish habitat areas essential for the breeding and / or survival of native fish.</p> <p>A paleochannel wetland in the east of the Olive Downs South Domain is mapped as 'moderate risk' waterway (Figure 12 of the Aquatic Ecology Assessment). Site observations suggest that this paleochannel wetland, does not connect with the Isaac River except during times of flood. Two seasons of survey effort at this location failed to yield fish catch and detected macroinvertebrate community compositions typical of temporary ponds and wetlands. This paleochannel wetland is not considered to constitute, nor provide a conduit to, fish habitat areas essential for the breeding and / or survival of native fish.</p> <p>Other mapped moderate and low risk waterways occur within the Project area (Figure 12 of the Aquatic Ecology Assessment). Each of these waterways are highly ephemeral, terminate within the Project area at their upstream extent, and are not considered to constitute, nor provide a conduit to, fish habitat areas essential for the breeding and / or survival of native fish.</p> <p>As such, Table 4-6 of the draft EIS outlines that the Project would not result in a significant impact on waterways providing for fish passage because:</p> <ul style="list-style-type: none"> • waterway crossings would be constructed with consideration of the Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works (DAF, 2017b) so as not to create a barrier to fish movement; and • the diversion of Ripstone Creek would be designed to replicate natural features and provide similar conditions to the original waterway, including stream hydraulics, geomorphology, instream habitat, bank profiles and bank vegetation, which, consequently, will provide habitat and refuge for fish inhabiting or passing through the diversion of Ripstone Creek. <p>Based on the above, the Project would not have a significant residual impact on Waterways Providing for Fish Passage given waterway crossings would be constructed with consideration to the Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works (DAF, 2017b) so as not to create a barrier to fish movement.</p>
4.4	Waterway barrier works	<p>(S4.1.4, Table 4-6, pg4-34 to 4-35)</p> <p>DAF mapping displays that:</p> <ul style="list-style-type: none"> • ML700034 contains Amber and Green Waterways • ML700033 Contains Purple, Red Amber and Green Waterways • ML700032 Contains Amber waterways <p>The information provided by the proponent as Appendix C (pg189 onwards) support that these waterways are correctly categorised.</p> <p>It needs to be stressed that even ephemeral streams can have significant value as seasonal fish habitat for foraging, breeding and refuge.</p>	<p>Use the waterway zonings within the ML to apply appropriate management measures based on the Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works.</p> <p>The area of activity outside the ML that intersect these waterways need to be managed as-per the ADR or through a DA process. These activities include upgrade/construction and maintenance of the mine access road, electricity transmission line, rail-loop and water pipeline.</p>	<p>The draft EIS assesses all aspects of the Project, including activities in areas proposed outside the MLA's.</p> <p>The 'watercourses' (as defined by the Water Act 2000) that would be directly impacted by the Project are:</p> <ul style="list-style-type: none"> • the Isaac River due to road crossings and conveyor crossings; • Ripstone Creek due to the permanent watercourse diversion; and • Cherwell Creek due to crossings associated with the proposed water pipeline and ETL. <p>As described in Section 4.1.3 of the draft EIS, watercourse crossings would be constructed with consideration to the relevant waterway zoning maps to apply the appropriate management measures in accordance with the Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works (DAF, 2017b) using box culverts to permit crossing during low flow events, enabling fish passage to be maintained within / through the Project area.</p>
4.5	Terminology	<p>(54.1.4, pg4-38)</p> <p>Reference to 'declared' animals</p>	Change 'declared' to feral or pest animals	The most recent terminology is noted and has been used throughout the Additional Information to the EIS where appropriate.
4.6	Biosecurity	<p>(S4.13.4, pg4-164) (S6.1.1, Table 6-2, pg6-12)</p> <p>The frequency of monitoring and control of feral animals every two years is insufficient.</p>	<p>Proponent recommended to commit to monitoring and control of feral animals every six (6) months.</p> <p>The frequency of monitoring and control of feral animals should be aligned with/informed by local government priorities identified through liaison with the relevant local government.</p>	<p>The frequency of monitoring and control of feral animals would be aligned with the local government priorities identified through liaison with the Isaac Regional Council.</p> <p>Further information on the management, monitoring and control of feral animals (including frequency of monitoring events) would be included in the Weed and Pest Management Plan which Pembroke will prepare for the Project (as described in Tables 6-1 and 6-2 of the draft EIS).</p>

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4.7	Terminology	(S5.3.6, pg5-36) Reference to 'Declared weed' is not aligned with current terminology as per the Biosecurity Act 2014	Update accordingly to 'Restricted' or 'Prohibited' plant species	The most recent terminology is noted and has been used throughout the Additional Information to the EIS where appropriate.
4.8	Ripstone Creek diversion	(S6.2.9, pg6-42) The diversion Commitments and Model conditions do not include creating the diversion to replicate the natural situation.	Ensure that the model conditions direct that the diversion section is formed to replicate natural habitat to the greatest possible extent. That is, to closely mimic the natural waterway in profile, flow speeds and where possible shade and instream structure.	<p>A Revegetation and Vegetation Management Plan will be developed as part of the Detailed Design in accordance with the DNRM Guideline and proposed EA Condition I2. The Ripstone Creek Diversion is proposed to replicate natural habitat to the greatest possible extent through the revegetation of riparian habitat as Eucalypt woodland similar to RE 11.3.2, RE 11.5.3 and RE 11.3.25 (Queensland Blue Gum [<i>Eucalyptus tereticornis</i>] or River Red Gum [<i>E. camaldulensis</i>] woodland with an understory of perennial grasses, sedges or forbs such as Common Couch [<i>Cynodon dactylon</i>] and Queensland Bluegrass [<i>Dichanthium sericeum</i>]) (Section 3 of the draft EIS).</p> <p>Section 13.7 of the Flood Assessment provided in the draft EIS provides details of the Functional Design of the Ripstone Creek Diversion. The proposed diversion reach has been designed to replicate the length, sinuosity and cross section of the relevant Ripstone Creek reach. The length and therefore longitudinal grade, as well as the sinuosity, closely resemble that of the existing reach. The section incorporates a low flow channel and active benches in a similar manner to the existing Ripstone Creek channel section although the benches have been widened to match the existing hydraulic capacity of Ripstone Creek for larger floods. Also, the proposed diversion has been designed to have a similar sediment transport regime.</p> <p>The proposed diversion will also have the same catchment type and a similar catchment area to the section of Ripstone Creek that is being replaced. Therefore, the catchment water quality and sediment regime draining to the proposed diversion will be the same as for the section of Ripstone Creek that is being replaced.</p> <p>In accordance with Section 1.5.4 of the DNRM Guideline, the Design Plan will include (but not be limited to):</p> <ul style="list-style-type: none"> • engineering drawings depicting the physical attributes and dimensions of the watercourse diversion; • the location, function and description of geomorphic and riparian vegetation features within the proposed watercourse diversion; • a revegetation and vegetation management plan (a revegetation plan); and • plans and specifications sufficient to complete construction and revegetation in accordance with the design.
4.9	Waterway barrier works	(Executive Summary, pg-iv) (59, pg180) Consideration of the Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works. Design of the Isaac River crossings in consultation with the Department of Agriculture and Fisheries.	<p>Consideration of the Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works should be undertaken for all works impacting mapped waterways within the ML.</p> <p>Condition the design of the Isaac River crossings to be undertaken in consultation with the Department of Agriculture and Fisheries.</p>	<p>Pembroke will continue to consult with DAF regarding the final design of the proposed watercourse crossings.</p> <p>As described in Section 4.1.3 of the draft EIS, watercourse crossings would be constructed with consideration to the relevant waterway zoning maps to apply the appropriate management measures in accordance with the Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works (DAF, 2017b) using box culverts to permit crossing during low flow events, enabling fish passage to be maintained within / through the Project area.</p> <p>Each crossing would be designed to be inundated during moderate to high flow events (which may negate the need for baffling) allowing fish passage above and around the structure.</p>
4.10	Fish Passage	(S5.13, Figures 31 to 31.5, pgs147 to 152) Figure underrepresents the waterways with potential for fish passage and containing fish habitat. While this figure "field-verifies" fish movement waterways it should include Moderate and Low impact waterways. These are a component of the system, which on their own and in isolation may appear to be of low value, but as component and a network hold and support high values. The information provided by the proponent as Appendix C (pg189 onwards) support that these waterways are correctly categorised.	Correct map and/or provide assessment of how each of the streams meets or does not meet the criteria to be managed as a waterway.	<p>The 'watercourses' (as defined by the Water Act 2000) that would be directly impacted by the Project are:</p> <ul style="list-style-type: none"> • the Isaac River due to road crossings and conveyor crossings; • Ripstone Creek due to the permanent watercourse diversion; and • Cherwell Creek due to crossings associated with the proposed water pipeline and ETL. <p>The other drainage features within the Project area were determined by DNRM to not meet the criteria to be mapped as a 'watercourse', and as such, have been determined to be 'drainage features' as per the definition in the Water Act 2000.</p> <p>Notwithstanding, the Aquatic Ecology Assessment provided in the draft EIS included a description, and assessment of the potential impacts to, 'Low' and 'Moderate' impact waterways. The assessment describes that, in the north of the Olive Downs South Domain, two mapped 'low risk' waterways run through a large dam, with a 'moderate risk' waterway mapped downstream of the dam (Figure 12 of the Aquatic Ecology Assessment). Fish passage is impeded by this dam, which is rarely expected to fill and allow for downstream flow. These waterways are of low stream order (1 and 2), are highly ephemeral, and are not considered to constitute, nor provide a conduit to, fish habitat areas essential for the breeding and / or survival of native fish.</p> <p>A paleochannel wetland in the east of the Olive Downs South Domain is mapped as 'moderate risk' waterway (Figure 12 of the Aquatic Ecology Assessment). Site observations suggest that this paleochannel wetland, does not connect with the Isaac River except during times of flood. Two seasons of survey effort at this location failed to yield fish catch and detected macroinvertebrate community compositions typical of temporary ponds and wetlands. This paleochannel wetland is not considered to constitute, nor provide a conduit to, fish habitat areas essential for the breeding and / or survival of native fish.</p> <p>Other mapped moderate and low risk waterways occur within the Project area (Figure 12 of the Aquatic Ecology Assessment). Each of these waterways are highly ephemeral, terminate within the Project area at their upstream extent, and are not considered to constitute, nor provide a conduit to, fish habitat areas essential for the breeding and / or survival of native fish.</p> <p>Given the above, no correction to Figures 31 to 31.5 of the Aquatic Ecology Assessment is required.</p> <p>Consideration of on-ground physical and biological attributes suggests that these waterways are unlikely to be determined as waterways that are necessary to provide for fish passage. In addition, the design of the watercourse crossings would comprise low flow culverts to enable the continued passage of fish throughout the waterway and the Isaac River crossings would be designed in consultation with DAF.</p>

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4.11	Offsets	(S6.9.2, Table 21, pg167) (S7.2, Table 22, pg170) (S8.1, Table 23, pg174) The level of disturbance listed in Tables 21 and 22 does not get recognised in Table 23 - Offsets	Recommend to quantify the offsets required for the project or better justify the reassignment of the waterways.	Response to comment 4.10 provides a description of the reassignment of waterways and concludes that the 'Low' and 'Moderate' waterways within the Project area are not considered to constitute, nor provide a conduit to, fish habitat areas essential for the breeding and / or survival of native fish. As outlined in Table 4-6 of the draft EIS, the significant impact assessment that was conducted by DPM Envirosciences within the Aquatic Ecology Assessment confirmed that the Project would not result in a significant impact on waterways providing for fish passage, given: <ul style="list-style-type: none"> waterway crossings would be constructed with consideration to the Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works (DAF, 2017b) so as not to create a barrier to fish movement; and the diversion of Ripstone Creek would be sensitively designed to replicate natural features and provide similar conditions to the original waterway, including stream hydraulics, geomorphology, instream habitat, bank profiles and bank vegetation, to provide habitat and refuge for fish inhabiting or passing through the diversion of Ripstone Creek. As such, there is no requirement to provide an offset for this MSES, and therefore no need for these potential impacts to be recognised in Table 23 of the Aquatic Ecology Assessment.
4.12	Fish Passage	(57.3, pg171 to 172) There is no monitoring of fish passage identified in the plans.	Create and include a plan to monitor fish passage pre, during and post project.	Further information on Pembroke's proposed fauna monitoring strategy would be provided in the Fauna Species Management Plan.
5. Private Submission				
5.1	Project Support	I support the Olive Downs Project, it will provide substantial growth and employment for the local community. I grew up in a small town and I know the importance of job opportunities and positive impact it will have on the town and the local businesses. This along with the fact that the Olive Downs Mine will be operational for over 70 years are some of the main reasons I am a huge supporter of the project.	Nil.	Noted.
6. Private Submission				
6.1	Project Support	Pembroke have been clear about the mines environmental impact, I like their concept of long term land management.	Nil.	Noted.
7. Private Submission				
7.1	Project Support	The proposals set out by Pembroke in the Social Impact Management Plan to support local direct and indirect employment, local suppliers of good and services (including Indigenous businesses) and to provide skills training are all strongly supported. A particularly noteworthy benefit of the Project is that the workforce will be encouraged to live locally in Nebo, Moranbah, Dysart and/or Middlemount. The Economic Impact Assessment clearly shows this long-life coking coal mine will provide substantial long-term economic benefits at the local, regional, State and national level. The royalties and taxes paid will enable the provision of long-lasting community benefits that would otherwise not occur. The Draft Environmental Impact Statement for the Project addresses the required environmental and social matters set out in the Terms of Reference. The document itself is clearly laid out, accessible and well presented.	Nil.	Noted.
8. Private Submission				
8.1	Project Support	The Project will have the potential to sustain an average of 1,000 operational jobs during it's significant mine life, and an average of 500 over the construction period. The Project will support a large indirect workforce, through suppliers, contractors, service providers and local business. The Project will be a significant contributor to the local and regional economy, and provide net production benefits to Australia of approximately \$2 billion. The Project will produce metallurgical coal to be used to make steel. There is no alternative to metallurgical coal in the steel	Nil.	Noted.

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		<p>making process.</p> <p>Close partnerships have been formed with the Barada Barna traditional owners, providing a range of commercial and social opportunities to Indigenous communities for many years.</p> <p>The Project has been designed to minimise environmental impacts whilst delivering significant socio-economic benefits.</p> <p>Employees will be encouraged to live locally in Moranbah, Dysart, Nebo and Middlemount.</p>		
9. Private Submission				
9.1	Project Support	Good for the area. Building up of local towns and security of work.	No issues just as long as company says its going to do what in the submission.	Noted.
10. Private Submission				
10.1	Project Support	<p>I am in support of the Olive Downs project. Having had some previous discussions with the owners, they are incredibly aware of the surrounding community, and want to place emphasis in developing the community and supporting those around them. Significant direct employment will be generated by this project, and significant State revenues will be similarly generated to support further infrastructure projects in our great state. The positive flow on effects of this mine becoming operational can not be understated.</p>	Nil.	Noted.
11. Private Submission				
11.1	Contaminants	<p>Request no HFC based products be used in the blasting process by screening the imports of blast bags and their SDS information. They are a major contributor to high Global Warming with GWP as high as 1,430 when released an 4,450 in the blast!</p> <p>The release of a controlled refrigerants unlawful under the Australian Ozone Management Act, Section 45 and if prosecuted carries a fine for an individual up to \$63,000 and a corporation \$315,000.</p> <p>The Act is managed by the Federal DOEE.</p>	<p>Alternatives to HFC based blast bags with low or zero GWP are available from local manufactures, one of which has won a 2005 Environmental Award.</p> <p>Make the effort to choose carefully to mitigate the risk of heavy penalties and asset our Montreal Protocol target.</p>	Pembroke will prioritise use of non HFC products (utilising available information such as SDS information) when selecting blasting materials. This commitment has been included in the updated Proponent Commitments Tables described in Section 22 of the Additional Information to the EIS.
12. Private Submission				
12.1	Project Support	We see the project having wide spread benefits and the CQ communities. Encourage people to live locally and using local business will also breathe life into these smaller communities. Utilising local suppliers and manufacturers will also bring benefits of more jobs to surrounding industries.	Nil.	Noted.
13. Private Submission				
13.1	Project Support	<p>Olive Downs will have a significant positive economic and social impact on the Central Queensland region providing local jobs to help the mining communities and also the support areas of Mackay & Rockhampton.</p> <p>At the same time it will provide high quality metallurgical coal to the international market reducing emissions from poorer quality coal.</p>	Nil.	Noted.
14. Private Submission				
14.1	Project Support	This project will create many jobs	Nil.	Noted.
15. Private Submission				
15.1	Project Support	<p>Olive Downs will provide ongoing employment directly for employees of the mining company and indirectly for thousands of contractors over the life of the mine.</p> <p>Please consider the following points.</p> <p>The Project will have the potential to sustain an average of 1,000 operational jobs during it's significant mine life, and an average of 500 over the construction period.</p> <ul style="list-style-type: none"> · The Project will support a large indirect workforce, through suppliers, contractors, service providers and local business. · The Project will be a significant contributor to the local and 	Nil.	Noted.

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		<p>regional economy, and provide net production benefits to Australia of approximately \$2 billion.</p> <ul style="list-style-type: none"> · The Project will produce metallurgical coal to be used to make steel. There is no alternative to metallurgical coal in the steel making process. · Close partnerships have been formed with the Barada Barna traditional owners, providing a range of commercial and social opportunities to Indigenous communities for many years. · The Project has been designed to minimise environmental impacts whilst delivering significant socio-economic benefits. · Employees will be encouraged to live locally in Moranbah, Dysart, Nebo and Middlesmoot. 		
16. Private Submission				
16.1	Project Support	<p>Having met with the Pembroke Resources team on a number of occasions and reviewing the EIS, I fully support the development of Olive Downs for the following reasons-</p> <ul style="list-style-type: none"> - Large direct and indirect workforce requirements - Company commitment to local employment and residential workforce - Local content strategy and focus to support regional businesses - Strong indigenous participation plan and proven track record of working with TOs - Track record of working in partnership with the State Government and Isaac Regional Council - Collaborative approach with community through Town Hall meetings and willingness to be transparent with the mine plans - Extensive environmental assessment and management plans - Metallurgical coal rather than thermal coal - Extensive royalties for decades assisting to pay for state needs - Experienced executive and development team - Strong financial backing <p>Information for the points above were from -</p> <p>BBMC August Presentation in Mackay by Blair Richardson http://www.statedevelopment.qld.gov.au/assessments-and-approvals/olive-downs-project.html http://www.pembrokeresources.com.au/media.php</p>	Nil.	Noted.
17. Private Submission				
17.1	Project Support	<p>The region needs long term sustainable projects like Olive Downs. This is a world class asset that on face value would be a low cost / first quartile producer capable of sustaining a potentially fluctuating Met coal price. It would also encourage start up workforces during the construction period through to a steady state of up to 1000 operators post commissioning. The parent company and financial backer . It is run by industry professional with proven capability of not just starting up new projects but also the ability to sustain them whilst in operation.</p> <p>The benefits of a world class operation getting into production and there subsequent downstream benefits are well documented and would apply to this project.</p> <p>The Project will be a significant contributor to the local and regional economy, and provide net production benefits to Australia of approximately \$2 billion.</p> <p>This benefit only should be the catalyst to support a project like this getting into operation.</p> <p>The industry should be encouraging the development of more Met coal operations to sustain the ever increasing global needs of steel - there is no alternative to Met coal in the production of steel and Australia has the competitive advantage not just of the supply but also the quality of this</p>	I have reviewed the Draft EIS and have found little to be concerned of	Noted.

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		<p>product.</p> <p>Pembroke has developed a close relationship with the traditional owners - the Barada Barada which should be commended.</p> <p>The Central highlands and surrounding regions are still struggling and there is still ample available accommodation within the town of Dysart and Nebo. Having projects of this scale being opened will only improve the prospects of these regional towns particularly when the Parent company will be encouraging a localised workforce.</p>		
18. Private Submission				
18.1	Project Support	<p>We are supportive of the Olive Downs Coking Coal Project near Moranbah in Central Queensland. Our support is based on the development of jobs and wealth for the State of Queensland and Australia. It is important that these projects are created the right way with appropriate environmental processes over the life of mine. Our view is that the EIS has been well considered.</p> <p>The Project will have the potential to sustain an average of 1,000 operational jobs during it's significant mine life, and an average of 500 over the construction period. Our organisation does currently benefit from the development, but we would also like to see a large number of other people and organisations also benefit from a project of this nature over the long mine life proposed.</p> <ul style="list-style-type: none"> · In addition to the direct employment opportunities, the Project will support a large indirect workforce, through suppliers, contractors, service providers and local business. · The Project will be a significant contributor to the local and regional economy, and provide net production benefits to Australia of approximately \$2 billion. <p>Regional Queensland and North Queensland in particular will benefit from the development of this project. In our view the development of Northern Queensland and Australia is very important to the future prosperity of Australia.</p> <ul style="list-style-type: none"> · The Project will produce metallurgical coal to be used to make steel. There is no alternative to metallurgical coal in the steel making process. · Close partnerships have been formed with the Barada Barna traditional owners, providing a range of commercial and social opportunities to Indigenous communities for many years. · The Project has been designed to minimise environmental impacts whilst delivering significant socio-economic benefits. · Employees will be encouraged to live locally in Moranbah, Dysart, Nebo and Middlemount. <p>The Project maximises the use of existing regional infrastructure and by doing so minimises the regional impacts.</p>	Nil.	Noted.
19 Department of Transport and Main Roads				
19.1	Transport	<p>(Note that TMR's comments edit and add to previous comments provided on the Preliminary Draft EIS. Additional comments are shown in <i>italics in the table.</i>)</p> <p>Section 4.8 Transport, p4-131-132 and Appendix J - Road Transport Assessment, section 5.2.4 pg 17, Table 4-33 and Table 4-44</p> <p>The project Terms of Reference requires the provision of information concerning transport of inputs and outputs of the project.</p> <p>Traffic information concerning the project operations and construction phase inputs and outputs is dispersed throughout documents and does not sufficiently estimates vehicle types, numbers and types of loads, sources (origin of trips to the mine) to explain project inputs.</p>	<p>The project proponent is requested to provide a more detailed breakdown/summary in tabular form of construction and operations phase inputs indicating the following for each commodity:</p> <ul style="list-style-type: none"> • Input and waste type • Tonnage/volumes • Estimated number of loads • Estimated vehicle types for each element of the transport task • Trip origin/destination. <p>Further, the proponent is requested to provide details concerning any oversize- over mass movements during all project phases, for example, the transport of plant and equipment, haul-out truck tyres etc.</p> <p>Proponent is requested to provide correct sectional references regarding waste stream information used to discuss project transport tasks.</p>	<p>A detailed breakdown of the construction and operation inputs and outputs has been included in the table below. The approximate maximum quantities outlined in the table have been calculated based on the maximum payload of the proposed vehicles (i.e. 9 Axel B-Doubles and 6 axel Semi-trailers) in accordance with the <i>Common Heavy Freight Vehicle Configurations</i> (National Heavy Vehicle Regulator, 2019). This includes a maximum payload of 62.5 tonnes for the 9 Axel B-Doubles and a maximum payload of 42.5 tonnes for the 6 axel Semi-trailers.</p>

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		<p>It appears the proponent has not identified transport demand for oversize and over mass (OS- OM) or excess dimension transport tasks associated with construction and operations phases of the project.</p> <p>It is noted in Table 4-33 there is reference to information concerning waste stream volume to be located in Section 4, Table 4.44. This cross - reference is incorrect Table 4-44 is Area of Project Within Properties.</p>	<p>Proponent's response in the Draft EIS to TMR's comments on Preliminary draft EIS partially addresses the initial comment made.</p> <p><i>Table 5. 7 of the Road Transport Assessment addresses vehicle types, element of transport task, and trip origin/destination. Heavy vehicle movements broken down into numbers per day for Semi-trailers, 8-Doubles, and Rigid vehicles, but no information provided on how these numbers were determined. There are no estimates provided concerning volumes of project inputs such as fuel, explosives, general mine consumables or waste out. The proponent has not provided advice concerning any over-size over mass (excess dimension) or special vehicle transport proposed.</i></p> <p><i>There are no estimates provided of volumes of other project inputs such as fuel, explosives, general mine consumables.</i></p> <p><i>TMR requires more detailed breakdown of load types and tonnages.</i></p>	<table><tr><th colspan="6">Project Transport Requirements for Inputs and Outputs</th></tr><tr><th>Inputs</th><th>Approximate Maximum Quantity (tonnes per day)¹</th><th>Number of Loads (per day)</th><th>Vehicle type</th><th>Origin</th><th>Destination</th></tr><tr><td>Road Base Gravel</td><td>630</td><td>10</td><td>B-Doubles</td><td>Mackay</td><td>Project</td></tr><tr><td>Fill Material</td><td>270</td><td>5</td><td>B-Doubles</td><td>Mackay</td><td>Project</td></tr><tr><td rowspan="3">Other Construction Materials</td><td rowspan="3">1,100</td><td>5</td><td>B-Double</td><td>Mackay</td><td>Project</td></tr><tr><td>20</td><td>Semi-Trailer</td><td>Mackay</td><td>Project</td></tr><tr><td>10</td><td>Other</td><td>Mackay</td><td>Project</td></tr><tr><td rowspan="2">Operational Materials (including fuel, explosives and general mine consumables)</td><td rowspan="2">550</td><td>10</td><td>Semi-Trailer</td><td>Mackay</td><td>Project</td></tr><tr><td>2</td><td>B-Double</td><td>Moranbah</td><td>Project</td></tr><tr><th>Outputs</th><th>Quantity (tonnes per day)</th><th>Number of Loads (per day)</th><th>Vehicle type</th><th>Origin</th><th>Destination</th></tr><tr><td rowspan="2">Operational and Construction Wastes</td><td rowspan="2">Refer to Section 17 of the Additional Information to the EIS for specific waste stream volumes.</td><td>10</td><td>Semi-Trailer</td><td>Project</td><td>Mackay</td></tr><tr><td>2</td><td>B-Double</td><td>Project</td><td>Moranbah</td></tr></table> <p>Source: After Pembroke (2018)</p> <p>¹ Based on the maximum payload of the vehicles proposed in accordance with the <i>Common Heavy Freight Vehicle Configurations (National Heavy Vehicle Regulator, 2019)</i>.</p> <p>As outlined in Tables 6-1 and 6-2 of the draft EIS, Pembroke is currently preparing a Road Use Management Plan in consultation with DTMR for the Project which will include a more detailed breakdown of oversize over mass (excess dimension) or special vehicle transport required during all project phases. Oversize and over mass vehicle movements will be associated with the transport of large construction and operation fleet (e.g. dozers, haul trucks, graders, excavators, haul truck tyres) and large infrastructure components (e.g. materials for the construction of the CHPP, workshops and other site infrastructure).</p> <p>Pembroke has commissioned TTPP to prepare a Road Use Management Plan (RUMP) for the Project, in accordance with <i>Queensland Department of Transport and Main Roads Guideline for Preparing a Road-use Management Plan</i> (2018). TTPP has commenced preparation of the RUMP including specific consultation with DTMR and the Queensland Police in February 2019 to confirm the scope and consultation requirements.</p> <p>Pembroke and TTPP will continue to consult with DTMR as well as emergency service providers during preparation of the RUMP during March and April and will provide the RUMP to DTMR once it is complete.</p>	Project Transport Requirements for Inputs and Outputs						Inputs	Approximate Maximum Quantity (tonnes per day) ¹	Number of Loads (per day)	Vehicle type	Origin	Destination	Road Base Gravel	630	10	B-Doubles	Mackay	Project	Fill Material	270	5	B-Doubles	Mackay	Project	Other Construction Materials	1,100	5	B-Double	Mackay	Project	20	Semi-Trailer	Mackay	Project	10	Other	Mackay	Project	Operational Materials (including fuel, explosives and general mine consumables)	550	10	Semi-Trailer	Mackay	Project	2	B-Double	Moranbah	Project	Outputs	Quantity (tonnes per day)	Number of Loads (per day)	Vehicle type	Origin	Destination	Operational and Construction Wastes	Refer to Section 17 of the Additional Information to the EIS for specific waste stream volumes.	10	Semi-Trailer	Project	Mackay	2	B-Double	Project	Moranbah
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19.2	Transport	<p>Appendix D- Pavement Impact Assessment (PIA) Link Capacity Results and Appendix I - Pavement Impact Assessment (PIA) Data Tables</p> <p>There are some contradictory numbers generated in the Pavement Impact Assessment (PIA) SAR tables compared to the link capacity results volume generation rates showing pcu/hr.</p> <p>The difference between the 'combined link capacity' numbers compared to the 'baseline link capacity' numbers are not reflected in the SAR Tables.</p> <p>For example 'Background Traffic SAR - Gazetted' and 'Project Generated Percentage Change in SAR - Gazetted' should represent almost a 3-fold increase along Dingo-Mt Flora Road in 2028 but doesn't.</p>	<p>Review and correct as appropriate or provide explanation for any discrepancy. (The data displayed in the SAR tables is to coincide with corresponding traffic data).</p> <p><i>The Pavement Impact Assessment in Section 9 page 28 of Appendix J Road Transport Assessment does not identify any project SAR impacts greater than 5% of existing SARs on the Peak Downs Highway or Fitzroy Developmental Road.</i></p> <p><i>TMR has requested a copy from GTA Consultants of the digital spreadsheet file used to make the SAR comparison calculations in Appendix I of the Road Transport Assessment to be able to confirm the calculations but has not received a copy to date.</i></p> <p><i>Table 4-33 on page 4-132 of the draft EIS identifies project transport requirements. The number of loads per day should be reviewed, for example, the road base gravel quantity of 630 tonnes per day carried by 10 B-Doubles indicates a payload of 63 tonnes. The maximum legal payload for a B-Double is 40 tonnes (GML). The report should also</i></p>	<p>GTA Consultants has provided additional information to the Road Transport Assessment to reflect the comments provided by DTMR, including a revised Pavement Impact Assessment. Refer to Section 16 and Appendix G of the Additional Information to the EIS for the updated Pavement Impact Assessment results.</p> <p>The digital spreadsheet file used to make the SAR comparison calculations was provided to DTMR on 3 October 2018. An updated version of the spreadsheet (which was used to prepare the revised Pavement Impact Assessment) was provided to DTMR on 21 February 2019.</p> <p>As outlined in the response to comment 19.1, the approximate maximum quantities outlined in the table have been calculated based on the maximum payload of the proposed vehicles (i.e. 9 Axle B-Doubles and 6 axle Semi-trailers) in accordance with the <i>Common Heavy Freight Vehicle Configurations</i> (National Heavy Vehicle Regulator, 2019). This includes a maximum payload of 62.5 tonnes for the 9 Axle B-Doubles and a maximum payload of 42.5 tonnes for the 6 axle Semi-trailers.</p>																																																																

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			<p><i>detail how the quantities have been derived.</i></p> <p><i>More detailed information is required.</i></p>	
19.3	Transport	<p>AppendixJ- Road Transport Assessment- general comment</p> <p>The Road Transport Assessment does not sufficiently estimate and document the potential impacts of project traffic on the State-controlled road network, as required in the Terms of Reference.</p>	<p>The draft RTA should be updated with more detailed estimates at this stage and finalised at least 6 months prior to the commencement of project construction traffic. It should include wider assessment of increased road safety risk on state and local roads, beyond crash history in proximity to the mine, rather, for all public roads carrying substantial project traffic, especially heavy vehicles during the construction phase. This should not be postponed until the detailed design stage.</p> <p>Similarly, a draft Road-use Management Plan and summary Commitments Spreadsheet should be prepared, documenting actual commitments made in Chapter 11 of the RTA.</p> <p>These drafts will allow the proponent to finalise the Road-use Management Plan and the Road Safety Assessment and undertake any findings 6 months before construction commences. Consultation with DTMR on preparing these drafts is essential to ensure any impact mitigation strategies are acceptable.</p> <p><i>Draft/ sample documents (Guideline for preparing a Road-use Management Plan, Freight Summary & RMP Commitments spreadsheets provided to Office of CG for forwarding to proponent 13/7/18)</i></p>	<p>Pembroke originally lodged the draft EIS on 18 May 2018 with the OCG for review. As part of this review, DTMR was asked to provide comment on the adequacy of the draft EIS against the terms of reference. The submissions received on the original draft EIS were addressed by Pembroke and a revised draft EIS was lodged with the OCG on 27 July 2018, along with detailed responses to all comments.</p> <p>The OCG subsequently confirmed that the revised draft EIS was deemed to have adequately addressed all requirements of the ToR, including the assessment of potential impacts on the State-controlled road network as outlined in Section 11.97 to 11.100 (Transport) of the ToR.</p> <p>As outlined in Section 4.8.2 of the draft EIS, management strategies (which would be further detailed in the RUMP) that Pembroke would consider implementing to minimise potential road safety impacts on all public roads carrying Project traffic (including heavy vehicles) include:</p> <ul style="list-style-type: none"> • operation of lighting on-site would be in accordance with the relevant Australian Standards; • discourage staff from using roads that do not form part of the preferred access routes to the sites; • sponsorship of driver reviver rest areas to deal with driver fatigue; • developing policy on how long drivers can operate a vehicle and how many breaks they require; and • limiting overtime and developing safe driving plans. <p>In addition, an updated proponent commitment table is provided in Section 22 of the Additional Information to the EIS. This includes all commitments made within the road transport assessment (including the additional information provided by GTA).</p> <p>As outlined above, Pembroke is currently preparing a RUMP in consultation with DTMR for the Project which will include more further detail on the measures proposed to be implemented to maintain road safety.</p> <p>Pembroke will provide DTMR with a copy of the RUMP once it is finalised.</p>
19.4	Transport	<p>Appendix J - Transport Assessment, sS.2.2, p 17</p> <p>The proponent proposes to operate 24 hours per day, 7 days per week during both the construction and operational phases of the project. TMR notes that <i>Section 3. Assessment of Project Specific Matters</i> states the proponent's intention to include the appropriate lighting at the Fitzroy Developmental Road/ Willunga Domain Access Road intersection, as agreed to by TMR.</p>	<p>The Road-use Management Plan- List of Commitments should document this as agreement to provide intersection lighting, as determined in consultation with TMR.</p>	<p>An updated proponent commitment table is provided in Section 22 of the Additional Information to the EIS. This includes the commitment to provide appropriate lighting at the Fitzroy Developmental Road/ Willunga Domain Access Road intersection.</p> <p>As outlined above, Pembroke is currently preparing a RUMP in consultation with DTMR for the Project which will include more further detail on the proposed new intersection, including the installation of appropriate lighting.</p>
20. Private Submission				
20.1	Project Support	<p>I believe this project to be a major positive for the state of Queensland and for our nation. This project represents further endorsement of Australia's ability to supply to the world quality products to assist in continued world economic development. As a high quality metallurgical coal the Olive Downs Project also enables a reduction in environmental impact when producing high quality steel compared to lower quality material inputs. This product is a scarce commodity that those in the world need to be able to advance and live an improved standard of living, which we in many instances take for granted.</p>	<p>The EIS framework is rigorous and when the studies are completed correctly all issues related to the project are recognized and appropriate management/mitigation is nominated to be in place.</p>	<p>Noted.</p>
21. Department of Aboriginal and Torres Strait Islander Partnerships				
21.1	Aboriginal and Torres Strait Islander Employment	<p>The Indigenous employment KPI only relates to employment of Barada Barna people, a requirement of their Indigenous Land Use Agreement (ILU). There is currently no other employment target for Aboriginal and Torres Strait Islander people.</p>	<p>In addition to the Barada Barna people employment KPI, that a general Aboriginal and Torres Strait Islander peoples employment target be included that covers both the construction and operational phases. This target should be at least reflective of the Queensland Aboriginal and Torres Strait Islander population.</p>	<p>As acknowledged by DATSIP, Pembroke has formed an agreement with the Barada Barna Aboriginal Corporation. As described in Section 5.2.8 of the SIA, Pembroke and the Barada Barna Aboriginal Corporation have agreed on goals for employment of Indigenous people (not limited to the Barada Barna people):</p> <ul style="list-style-type: none"> • nine Indigenous employees during Years 1-10 of operations; • 14 Indigenous employees during Years 11-15 of operations; and • 28-30 Indigenous employees from Year 16 of operations. <p>Pembroke acknowledges these goals can be exceeded, pending availability of suitably qualified candidates.</p> <p>Further to this, Pembroke has committed to supporting the Barada Barna Aboriginal Corporation to establish and operate a Training Centre at Nebo to develop and offer work readiness and certified qualification programs to Indigenous people (not limited to the Barada Barna people). Pembroke will consider other opportunities to employ Aboriginal and Torres Strait Islander people during future revisions of the Health and Community Wellbeing Plan.</p> <p>Pembroke commits to consultation with DATSIP in relation to opportunities for employment for Aboriginal and Torres Strait Islander people.</p>

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22. Private Submission				
22.1	Project Support	I have read the draft environmental impact statement and fully support the Olive Downs Project. The positive benefits it will create for not only Moranbah but other surrounding towns and the employment prospects it will bring to the region will be significant. I believe the Project has been designed to minimise environmental impacts whilst delivering significant socio-economic benefits.	Nil.	Noted.
23. Private Submission				
23.1	Project Support	<p>The Olive Downs project will be a great opportunity for the Central Queensland region. This project will bring with it much needed jobs, especially for areas such as Dysart and Middledmount which were hit so hard with the recent mining downturns. By Olive Downs employing locally, this will bring new families to the region, therefore enrolling their kids in schools, spending money at the local businesses and utilising local attractions. There is also the indirect impact a mine such as Olive Downs has on a local economy. They will need cleaning companies, courier companies, local workforce providers, contractors and all of these people will live in the areas surrounding the mine, again providing those numbers in our schools and communities.</p> <p>As yet, there is no substitute for coal when it comes to making steel. And the world is not going to stop growing so the demand for steel will increase. We need to be at the forefront of being able to provide this for our future.</p>	Nil.	Noted.
24. Private Submission				
24.1	Project Support	<p>Metallurgical and PCI products the will be produced from the Project are integral to steel making and cannot be substituted therefore can justify the development of a large scale, long term project.</p> <p>Given the scale and longevity of the Project, it will provide significant employment and economic benefit for the region, beyond the expected mine life of existing operations.</p> <p>The Project appears to have taken significant steps, using best technology to minimise Environmental Impact.</p> <p>Considerations of the Original Owners have been taken into consideration and there appears to be a respectful relationship in place. From initial consultation with the Barada Barna People after the Project was acquired to the execution of an ILUA this year.</p> <p>Overall this project will have a significant social and economic benefit to the local community and all the people of Queensland.</p> <p>Relied on the EIS Executive Summary and Media Information from the Pembroke Resources Website.</p>	Nil.	Noted.
25. Private Submission				
25.1	Project Support	<p>Puma Energy support Pembroke Resources proposal to develop the Olive Downs Metallurgical Coal Project. High quality coal is essential for the manufacture of steal.</p> <p>Puma Energy constructed a new 68 million litre import terminal in Mackay in 2014, to support growth in agriculture, marine, transport and in particular the mining sector. Puma Energy's in-house project construction team continue to work on other terminal and depot projects around Australia. The Pembroke Resources Olive Downs Project would potentially support the ongoing employment of Puma Energy personnel in Mackay including;</p> <p>1. 3x Customer Service personnel</p> <p>a. Customer Service and Administrative personnel would</p>	Nil.	Noted.

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		<p>spend approximately 20 hours per week servicing this customer, if we were to win the supply contract.</p> <p>2. 2x Sales personnel based in Mackay</p> <p>3. 18 Drivers, 2 Schedulers, and one supervisor currently based in Mackay</p> <p>4. 3x personnel to operate the Puma Energy import terminal in Mackay</p> <p>This contract would also require further investment in capital equipment to support the operation. Currently we have 9x B-Double Configurations currently based in Mackay to support existing business.</p>		
26. Department of Natural Resources and Mines				
26.1	Vegetation clearing	On the mining lease – vegetation clearing is not assessable development under Planning Regulation 2017, Schedule 21, Part 1, 1, (6), it is a resource activity as defined under the Environmental Protection Act 1994, section 107.	<p>Relevant Purpose Determination –</p> <p>Prior to submitting a development application to clear native vegetation, the applicant must first obtain written confirmation from the Department of Natural Resources, Mines and Energy (DNRME) that the proposed development is for a relevant purpose under section 22A of the Vegetation Management Act 1999.</p>	Noted.
26.2	Vegetation clearing	Off the mining lease – The applicant has identified that there will be some infrastructure located off the mining lease. Any vegetation clearing within regulated vegetation off the mining lease will be assessable development unless it considered not assessable development under the Planning Regulation 2017, Schedule 21.	<p>Development application –</p> <p>For all vegetation clearing identified as assessable development under the Planning Act 2016, the applicant should refer to the State Development Assessment Provisions (SDAP), Module 16 Native Vegetation Clearing, Table 16.2.2 PO1-PO4 and Table 16.2.3 PO7, PO11, PO16, PO22 –PO24, PO27- PO28 for Extractive Industry.</p> <p>The applicant should note that where there is likely to be a significant residual impact, an environmental offset is likely to be required.</p> <p>To assist with determining the likelihood of a significant residual impact, the applicant should refer to Significant Residual Impact Guideline, December 2014. Should it be determined that there will be a significant residual impact requiring offsets, the proponent should refer to the Queensland Environmental Offsets Policy, June 2018.</p>	Noted. The impacts associated with the works proposed to be conducted off-lease are detailed in Section 3.1 of the draft EIS, including an assessment of potential significant impacts, in accordance with the <i>Significant Residual Impact Guideline, December 2014</i> . In addition to this, a biodiversity offset has been proposed by Pembroke in accordance with the <i>Queensland Environmental Offsets Policy (Version 1.6)</i> (DES, 2018) and would be implemented as described in Section 10 of the Additional Information to the EIS.
26.3	Water Plan	Section 1 – Introduction, Table 1-2 (Page 1-11) Table 1-2 lists the Water Plan (Fitzroy Basin) 2011 and Fitzroy Basin Resource Operations Plan, 2011. The reference to the latter is incorrect. The Water Plan (Fitzroy Basin) 2011 is implemented through the Fitzroy Basin Water Management Protocol 2018.	Change reference from Fitzroy Basin Resource Operations Plan, 2011 to Fitzroy Basin Water Management Protocol 2018.	Pembroke notes the most recent terminology. This terminology has been used throughout the Additional Information to the EIS documentation.
26.4	Overland flow	<p>Section 2 Project Description, Section 2.7.3 Water Consumption: Dust Suppression (page 2-69) and Water Supply (Page 2-72)</p> <p>The report states that ‘water for haul road dust suppression would be sourced from the water storage dams on-site. ...The average daily usage for haul road dust suppression for Stage 1 is 1.3 ML/day and up to 5.3 ML/day for subsequent stages (Appendix E)’.</p> <p>The report states that “the modelling results show that the external water requirements generally reduce over the life of the project... primarily due to the continual increase in mine disturbance area (and subsequent capture of rainfall runoff)...”</p> <p>It is not clear whether the incidental capture of overland flow water meets limitations imposed by the Water Plan (Fitzroy Basin) 2011.</p>	<p>The proponent must ensure that the take of water sourced for the project external to the proposed water from Eungella pipeline, including overland flow water, is in accordance with the provisions of the Water Act 2000 and Water Plan (Fitzroy Basin) 2011.</p> <p>The proponent is advised to contact the department directly to discuss this matter further.</p>	<p>Section 97 of the Water Act 2000 provides a general statutory authorisation for a person to take overland flow water that is not more than the volume necessary to satisfy the requirements of an environmental authority if the impacts of the take were assessed and conditioned as part of the grant of an environmental authority. The Project water management system described and assessed in the draft EIS includes the capture of overland flow water. Section 4.3.3 of the draft EIS describes the assessment of the Project capturing parts of existing catchment areas. Accordingly, the take of overland flow water has been assessed through the draft EIS.</p> <p>Pembroke expects that an environmental authority will be granted for the Project which will include a condition authorising the take of overland flow water, as assessed in the EIS.</p>
26.5	Overland flow	<p>Attachment 3 Regulatory Framework, Section 3.4.6 Other State Legislation - Water Act 2000 (Page A3-7)</p> <p>The report states (with reference to Appendix E and a summary in Section 4.3) that the proponent has assessed the impacts of the take of overland flow water for use within the site water management system. This includes the take and interference of overland flow water entering the water storage dams and up-catchment diversions. It is mentioned that the proponent will seek an EA with a condition permitting the take or interference with this water.</p> <p>It is not clear whether the impacts of the take will be assessed and conditioned as part of the granting of an EA. Any take of</p>	<p>The proponent must ensure that any take of overland flow water additional to the authorised take under a water licence or to satisfy the requirements of an EA must be in accordance with provisions of the Water Plan (Fitzroy Basin) 2011.</p> <p>The proponent should refer to Division 9, Regulating overland flow water under the Water Plan (Fitzroy Basin) 2011 for further information.</p> <p>The proponent is advised to contact the department directly to discuss this matter further.</p>	<p>As described above, Section 97 of the Water Act 2000 provides a general statutory authorisation for a person to take overland flow water that is not more than the volume necessary to satisfy the requirements of an environmental authority, and in accordance with Section 100 of the Water Act 2000 this authorisation is not limited by the operation of the Water Plan (Fitzroy Basin) 2011. Pembroke does not intend to take any additional overland flow water to that which has been assessed in the draft EIS. As such, Division 9 of the Water Plan (Fitzroy Basin) 2011 does not need to be considered by the draft EIS.</p> <p>Section 4.3.3 of the draft EIS describes the assessment of the Project capturing parts of existing catchment areas. Accordingly, the take of overland flow water has been assessed through the draft EIS.</p> <p>Pembroke expects that an environmental authority will be granted for the Project which will include a condition authorising the take of overland flow water, as assessed in the EIS.</p>

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		overland flow water additional to the authorised take under a water licence or to satisfy the requirements of an EA must be in accordance with provisions of the Water Plan (Fitzroy Basin) 2011. The Water Plan (Fitzroy Basin) 2011 places a 50ML storage limitation on capturing overland flow water (section 110 (2)(b)(ii)) and also limits incidental take of overland flow water to the operation of a storage facility on a catchment of not more than 250 ha (section 110(2)(g)).		
26.6	Terminology	Attachment 3 – References, Section 7 References (Page 7-3) Reference to Department of Natural Resources and Mines (2011) - Fitzroy Basin Resource Operations Plan is incorrect. The correct name for the department is Department of Natural Resources, Mines and Energy. Water Plans are implemented through a range of documents. The Water Plan (Fitzroy Basin) 2011 is implemented through the Fitzroy Basin Water Management Protocol (which replaced the previous Fitzroy Basin Resource Operations Plan 2014 mentioned in this section and a range of other documents).	Update all relevant references to reflect the correct name of the Department of Natural Resources, Mines and Energy and, where abbreviation is used, DNRME throughout the text of EIS and its attachments. Remove all references to Fitzroy Basin Resource Operations Plan and replace them with references to Fitzroy Basin Water Management Protocol or the Water Plan (Fitzroy Basin) 2011 as required.	Pembroke notes the most recent terminology. This terminology has been used throughout the Additional Information to the EIS documentation. It should be noted that, where the documentation is referencing a source document published prior to the department's name change (i.e. 2011), Department of Natural Resources and Mines has been retained.
26.7	Mitigation and management measures	Appendix D Groundwater Assessment, Section 8.1 – Mitigation Measures/Groundwater Use (Page-105) This section provides an outline on potential mitigation measures. It is however, very brief and generic in nature.	Provide more detail as to what measures are more likely for the predicted impacts and what other feasible long term "alternative sources" does Pembroke foresee as being available.	Section 8.1.2 of the Groundwater Assessment (Appendix D of the draft EIS) describes the use of make good measures to ensure the bore owner has access to a similar quantity and quality of water for the water bore's authorised purpose. This may include lowering pump sets, deepening a bore to maintain access to water, constructing a new water supply bore, providing water from an alternative source, or financial compensation. Of the five bores that are predicted to experience more than 1 metre of drawdown, maintenance works at four of the bores (i.e. lowering of the pump and/or deepening of the bore) is expected to result in providing access to a similar quantity and quality of water for the water bore's authorised purpose. For the other bore (Bore 8 on the Olive Downs property), lowering of the pump and/or deepening of the bore may not result in a reliable ongoing supply of water, until such time as groundwater levels recover (after approximately 2044) (Section 7.2.1 of the Groundwater Assessment, Appendix D of the draft EIS). If maintenance works do not result in a reliable water supply, Pembroke could provide an alternative water supply (e.g. from Pembroke's Eungella pipeline allocation or from its onsite water sources) or financial compensation to the landholder. The appropriate make good measure will be determined in consultation with each relevant land holder.
26.8	Overland flow	Appendix E Surface Water Assessment Part A: Section 6.3 – Proposed Water Management Infrastructure (Page-73); Section 7.4 – Conceptual Water Management System Configuration and Schematic (Page-90); Section 7.6 – Water Storages and Diversions (Page-96), Section 7.7 – Clean Water Storages and Diversions (Page-96); Section 8.3.4.1 – Overland Flow Capture (Page-123) and Table 8-2 Estimated Annual Average Water Take from NWWD (page 124) The Appendix refers to the construction of a number of water storages as part of the proposed water management system. Some of them will capture clean overland flow water. Locations of the infrastructure are indicative. The report refers to construction of two up-stream (water) storages with a modelled capacity of 438ML (storage NWWD) and 311 ML (storage CWD). Section 7.7 indicates the NWWD storage is an existing farm dam that will continue to collect up-catchment runoff from a catchment of around 2,015 ha. The NWWD will operate as a buffer storage for raw water direct from the Eungella pipeline. The estimated annual volume of up catchment water take provided in Table 8-12, indicates a variation of between 417ML/year to 151ML/year during different phases of the project. The SWD storage is described as a partitioned water storage to segregate up-catchment runoff from the mine affected water management system. It will collect runoff from a catchment of around 1,425 ha. There will be no take of water from the CWD. Unless the take of overland flow water is specifically conditioned in the EA, the Water Plan (Fitzroy Basin) 2011 places a 50ML storage limitation on capturing overland flow water (section 110 (2)(b)(ii)). The water plan also limits incidental take of overland flow water to the operation of a storage facility on a catchment of not more than 250 ha (section 110(2)(g)). There is no information in the report that demonstrates how the capture of clean overland flow water into the proposed water management infrastructure will be in accordance with the Water Plan (Fitzroy Basin) 2011.	The proponent must demonstrate that any water storages that capture overland flow water are in accordance with the Water Plan (Fitzroy Basin) 2011. The proponent should refer to Division 9, Regulating overland flow water under the Water Plan (Fitzroy Basin) 2011 for further information. The proponent is advised to contact the department directly to discuss this matter further.	Section 97 of the Water Act 2000 provides a general statutory authorisation for a person to take overland flow water that is not more than the volume necessary to satisfy the requirements of an environmental authority if the impacts of the take were assessed and conditioned as part of the grant of an environmental authority. The Project water management system described and assessed in the draft EIS includes the capture of overland flow water. Section 4.3.3 of the draft EIS describes the assessment of the Project capturing parts of existing catchment areas. Accordingly, the take of overland flow water has been assessed through the draft EIS. Pembroke expects that an environmental authority will be granted for the Project which will include a condition authorising the take of overland flow water, as assessed in the EIS.

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26.9	Water licensing	<p>Appendix E Surface Water Assessment Part A, Section 8.3.4 – External Makeup Requirements (Page-121)</p> <p>The report notes that Pembroke has applied for two licences for the take of 65ML of unallocated general reserve water from the Isaac River. It also indicates that 'any additional requirement for extraction from the Isaac River would be subject to separate licences to be applied for at a later date (in accordance with the Water Plan (Fitzroy Basin) 2011, to ensure no adverse impacts on water availability for other licences water users'.</p> <p>Furthermore, the report mentions that 'potential water harvesting opportunities from the site up-catchment water dams'. The report does not state how additional water can be sourced in accordance with the Water Plan (Fitzroy Basin) 2011.</p>	<p>The proponent must ensure that the take of surface water sourced for the project external to the proposed water from Eungella pipeline, is in accordance with the Water Plan (Fitzroy Basin) 2011.</p> <p>The proponent is advised to contact the department directly to discuss this matter further.</p>	<p>Section 8.3.4 of the Surface Water Assessment states that in the unlikely event additional external water is required, additional water allocation from the Eungella or Burdekin networks operated by SunWater could be sought by Pembroke over the life of the Project to meet raw water demands. It is also noted that Pembroke has applied for two licences for the take of 65 ML of unallocated general reserve water from the Isaac River, which would serve as a water source for construction activities. Any additional requirement for extraction from the Isaac River would be subject to separate licences to be applied for at a later date (in accordance with the <i>Water Plan (Fitzroy Basin) 2011</i>), to ensure no adverse impacts on water availability for other licensed water users.</p> <p>In addition to the up-catchment water storage, Section 2.7 of the draft EIS identifies that external supply of raw water would be provided by the water pipeline constructed from the existing Eungella water pipeline network. Day-to-day external water supply requirements would be guided by the capture of incident rainfall and runoff within the mine water management system as it is developed (i.e. stormwater and mine affected water); and capture of overland flow as described in Section 2.4.9 of the draft EIS.</p> <p>Subject to availability of flows and obtaining relevant licences, direct pumping of water from the Isaac River may be undertaken opportunistically to minimise the external water supply requirements as required. For example, if Pembroke's application for 65 ML of unallocated general reserve water from the Isaac River is successful, water from the Isaac River could be pumped and used for Project construction activities, instead of relying on bringing water to site from other sources. If the relevant water licences are obtained, the pump and associated infrastructure would be located at the mine access road Isaac River crossing. Pumping of water from the Isaac River would be undertaken in a manner as to avoid and minimise potential impacts on aquatic ecology, including:</p> <ul style="list-style-type: none"> • starting the pump slowly and then gradually ramping up velocity; • installing a suitable self-cleaning screen; and • regularly inspecting the pump and screen. <p>Pembroke commits to contacting DNRM regarding the above.</p>
26.10	Water licensing	<p>Appendix E Surface Water Assessment Part A, Section 11.2 – Water Management System Performance (Page-184)</p> <p>The report notes that 'if additional external water is required, additional water licences would be sought and purchased by Pembroke over the life of the project to meet raw water demands.'</p> <p>The report does not state how additional water can be sourced in accordance with the Water Plan (Fitzroy Basin) 2011.</p>	<p>The proponent must ensure that the take of surface water sourced for the project external to the proposed water from Eungella pipeline, is in accordance with the Water Plan (Fitzroy Basin) 2011.</p> <p>The proponent is advised to contact the department directly to discuss this matter further.</p>	See response to comment 26.9.
26.11	Tenure	<p>New Appendix –Land Tenure</p> <p>As previously advised, land tenure issues are not adequately addressed in this EIS. The following recommendations refer to land tenure requirements under the Land Act 1994, the Stock Route Management Act 2002 and the Land Title Act 1994.</p> <p>State land, roads, reserves, stock routes and leasehold land affected by the project have not been adequately identified and plans for their management detailed.</p>	<p>The proponent must ensure that prior to the commencement of any occupation, activity or construction upon any lands, all appropriate land tenure is secured and all necessary approvals and/or consents from all parties holding a lawful interest in the lands is obtained.</p> <p>The proponent must identify and produce high quality mapping of, all of the land impacted by the project, current land tenure of all lands impacted by the project, the current tenure of all land within the project area, including freehold tenure, conservation tenures and State and Commonwealth tenures, including traditional owner access to land determinations.</p> <p>The proponent must identify all</p> <ul style="list-style-type: none"> - proposed future land tenure of all lands impacted by the project, - proposed future management and ownership arrangements for the lands associated with the project - the final proposed land tenure, landform and rehabilitation outcomes that will be achieved at the decommissioning of the project and - how these will interact with the surrounding lands following decommissioning. <p>The proponent must identify all</p> <ul style="list-style-type: none"> - land on which native title has been extinguished, - land subject to native title claims and - approved Indigenous Land Use Agreements. <p>In addressing these requirements, the following information should be included in the EIS:</p> <p>State Freehold Land</p> <p>For freehold lands impacted by the project, the proponent is required to negotiate with relevant landowners for any required easements, land purchases or acquisitions and/or the payment of any agreed consideration or compensation monies. It should be noted that the State of Queensland, via its various government departments and agencies, may constitute a relevant landowner.</p>	<p>Figures 2-16, 2-17a and 2-17b of the draft EIS shows the relevant tenure of the lands within the Project area. In addition, Section 4.11.2 of the EIS states that the Barada Barna People are the determined native title holders of the land within and surrounding the Project. Native title was determined to exist in small parts of the Project area, along the rail spur and water pipeline corridor, and along the Isaac River, by the Federal Court in the Barada Barna People's Native Title Determination (QC2008/011). Native title is extinguished over the remainder of the Project area.</p> <p>The Barada Barna Aboriginal Corporation RNTBC, which holds native title on trust for the Barada Barna People, is also the Aboriginal Party for the area of the Project under the ACH Act.</p> <p>The Additional Information to the EIS confirms that Pembroke will provide a Plan of Operations for the Project. The Plan of Operations will contain the information requested by DNRME.</p> <p>As described in Section 2.2.1 of the draft EIS, mapping was presented on Figures 2-15, 2-16, 2-17a and 2-17b of the draft EIS to show additional cadastre information (lot/DP numbering), and areas where Native Title exists.</p> <p>No "State and Commonwealth tenures" or "conservation tenures" are within the Project area.</p> <p>As detailed in Section 4.10.2 of the draft EIS, the Project is located within the Barada Barna People (QC2016/007) Native Title Determination Area registered with the National Native Title Tribunal (NNTT) (2016), and within areas subject to private Indigenous Land Use Agreements (ILUAs) QI2011/031 and QI2012/062 between the Barada Barna People and petroleum mining companies (Arrow and QGC, respectively) (Figure 2-15 of the draft EIS). Pembroke has formed an ILUA and a CHMP with the Barada Barna People to manage the risk of harm to Aboriginal cultural heritage by activities associated with the Project.</p> <p>Noted. Pembroke has commenced negotiations with relevant landowners.</p> <p>As described in Section 4.10.2 of the draft EIS, there are two areas designated as Stock Routes (Reserves) that would be intersected by the Project pipeline and rail spur, within MLA 700035 (Figure 2-17b of the draft EIS).</p> <p>While the pipeline would be buried (and therefore would not impede the use of these lots as Stock Routes), the rail spur would reduce the area of the Travelling Stock Route within Lot 15 CNS111 by approximately 6 ha (or approximately 2% of the lot size).</p> <p>The impact is not likely to significantly impact the use of the Stock Routes. It is also noted that the Stock Route within Lot 15 CNS111 does not connect to any other Stock Route and is therefore not expected to be widely used. Notwithstanding the above, the rail spur would be fenced to prevent access by stock. Pembroke will engage with DNRME and the IRC regarding the potential impacts to the stock route network and any mitigation measures considered necessary.</p> <p>Section 4.8 and Appendix J of the draft EIS include mitigation measures for potential impacts to the road network associated with the construction and operation of the Project. No unallocated State land, State leases, State Forests or National Parts are present within the Project disturbance footprint.</p>

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			<p>State Land</p> <p>The proponent is required to identify all instances where the project will impact on lands administered by the State of Queensland (via its various government departments and agencies) and/or local government, collectively referred to as state lands. This must include impacts of the project on roads, stock routes, unallocated state land, state leases, reserves, state forests and national parks.</p> <p>Prior to the commencement of any occupation, activity or construction on state lands, the proponent is required to secure all appropriate tenure and gain all necessary approvals and/or consents from all parties holding a lawful interest in the lands. The proponent is required to develop sufficient mitigation strategies to address all identified impacts to state land.</p> <p>It should also be noted that, in accordance to the Native Title Act (Cwth) 1993, Native Title must be adequately addressed prior to the granting of any tenure interests over state lands. The proponent is encouraged to engage with the department early to ascertain likely implications of Native Title to the project area. It should be noted that it is not uncommon for the resolution of native title to take in excess of 2 years, should the native title parties agree to negotiate.</p> <p>Land administered by the Department of Natural Resources, Mines and Energy (DNRME)</p> <p>The proponent is required to identify all land administered by DNRME under the Land Act 1994 and the Stock Route Management Act 2002 that will be impacted by the project and engage with DNRME to develop a strategy to resolve all associated land tenure issues and/or consent requirements, including Native Title, prior to any occupation, activity or construction</p> <p>Decommissioning & Rehabilitation</p> <p>The proponent is required to develop an acceptable decommissioning tenure management plan that clearly details the extent of the areas impacted by the project and the future land tenure, management and ownership of the project site. The tenure management plan should detail the final proposed land tenure, landform and rehabilitation outcomes that will be achieved at the decommissioning of the project and how these will interact with the surrounding lands and land tenures following decommissioning of the mine.</p> <p>Engagement with DNRME</p> <p>State land tenure dealings may take an extended period of time to negotiate and resolve hence early engagement by the proponent is required to minimise the risk of any delays to the project. It should be noted that it is not uncommon for complex land tenure dealings to take more than 2 years to resolve.</p> <p>The proponent is advised to contact the department directly to discuss this matter further.</p>	<p>As described in Section 4.11 of the draft EIS, Pembroke has formed an ILUA and CHMP with the Barada Barna people for the Project.</p> <p>Section 2.2.1 of the draft EIS describes the relevant parcels of land that are administered by DNRME. Pembroke will engage with DNRME regarding obtaining relevant tenure for these parcels of land.</p>
27. Collin Biggers and Paisley Pty Ltd				
27.1	Against Project	<p>The Project is not an ecologically sustainable development in breach of the Object of the EP Act.</p> <p>The Project is a breach of the precautionary principle.</p> <p>The Project is a breach of the intergenerational equity principle.</p> <p>The Project will cause serious environmental harm and adversely affect the environment.</p> <p>In the circumstances: the draft EIS does not provide sufficient response to the terms of reference.</p>	Nil.	<p>As outlined in Section 3.3.13 of the draft EIS, the design, planning and assessment of the Project have been carried out applying the principles of ecologically sustainable development, through:</p> <ul style="list-style-type: none"> incorporation of risk assessment and analysis at various stages in the Project design, environmental assessment and decision-making; adoption of high standards for environmental and occupational health and safety performance; consultation with regulatory and community stakeholders; assessment of potential greenhouse gas emissions associated with the Project; and optimisation of the economic benefits to the community arising from the development of the Project. <p>In addition, it can be demonstrated that the Project can be undertaken in accordance with ecologically sustainable development principles through the application of measures to avoid, mitigate and offset the potential environmental impacts of the Project and where relevant adaptive management would be implemented.</p> <p>Section 3.3.13 of the draft EIS describes that the Project would be undertaken in accordance with the principles of Ecological Sustainable Development</p> <p>Section 3.3.13.2 of the draft EIS describes that the Project has been designed in consideration of the Precautionary Principle. The Proponent will employ preventative measures through management plans to ensure the Project does not result in a threat of serious or irreversible environmental harm, and will operate in accordance with the conditions of its mining lease, environmental authority and plan of operations.</p>

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				<p>The Project's impacts will be mitigated and monitored in accordance with the Project's management plans as set out at Section ES1.6 of the draft EIS.</p> <p>Section 3.13.3.3 of the draft EIS described how the principles of intergenerational equity have been addressed. The Project incorporates numerous operational controls and environmental management measures to ensure potential impacts to the environment are minimised, which is complemented by the Proponent's assessment of the social and economic impact of the mitigated Project with regard to the existing and future generations.</p> <p>Section 6 of the draft EIS provides a description of the environmental protection commitments and model conditions which would be adopted for the Project to avoid serious environmental harm and adverse effect to the environment.</p> <p>Attachment 2 of the draft EIS describes where the document addresses each of the requirements of the final Terms of Reference.</p>
27.2	Groundwater impacts	The Proposed Conditions are inadequate in that they do not protect, or fail to sufficiently protect, groundwater supplies.	Nil.	As identified in Table 6-1 of the draft EIS, Pembroke proposes to prepare a Water Management Plan and establish a groundwater monitoring network as part of the Project. The Water Management Plan would describe the process that Pembroke would take should monitoring data indicate that groundwater resources have been affected and the remediation actions that would be implemented. Pembroke is currently in the process of preparing this plan.
27.3	Surface water impacts	<p>(d) The draft EIS does not, or fails to sufficiently:</p> <p>(i) quantify the risk of surface runoff quality being affected in the way described above;</p> <p>(ii) identify how the quality of surface runoff would be affected;</p> <p>(iii) identify a strategy for operation of water storage dams in such a way that zero uncontrolled release would be achieved; and</p> <p>(iv) identify:</p> <p>(A) how water collected in sediment dams would be reused on-site; or</p> <p>(B) the proposed controlled release strategy for the Project, such that any controlled releases would achieve the regional water quality objectives for the Isaac River, such that it is not possible to properly consider whether the Proposed Conditions protect or sufficiently protect groundwater supplies.</p>	Nil.	<p>Section 4.2.3 of the draft EIS describes the potential impacts of the Project on the quality of surface runoff. Section 4.2.3 of the draft EIS states that the Project water balance model was used to assess the risk of uncontrolled releases from the mine affected water management system. No uncontrolled releases to the Isaac River were modelled (Appendix E of the draft EIS).</p> <p>Further to this, Section 8.3 of Appendix E of the draft EIS describes the proposed water management system for the Project, including the proposed controlled release strategy in support of the Proposed Conditions.</p>
27.4	Final landform	The draft EIS fails to address, or fails to sufficiently address, whether the proposed temporary levees and permanent highwall emplacements would provide sufficient flood protection for active open cut pits in the event of a probable maximum flood, such that it is not possible to properly consider whether the Proposed Conditions protect or sufficiently protect groundwater supplies.	Nil.	<p>The existing PMF (and comparisons of afflux for the developed and post-mining cases) are of no relevance because mine related infrastructure (e.g. temporary levees) are not specifically designed for PMF events. Such levees are designed for 1,000 year event (0.1% AEP) + freeboard in accordance with the 'Manual for assessing consequence categories and hydraulic performance of structures' which states: 'All regulated levees are required to provide a minimum of 1:1000 AEP flood protection.'</p> <p>In accordance TOR 11.108, the PMF for the post-mining scenario is presented in Appendix F of the draft EIS to assess how the project changes flooding characteristics and is affected by floods, and importantly demonstrates flood immunity for the final voids. Section 4.3.3 of the draft EIS states:</p> <p>Further, the post-mining flood modelling undertaken by Hatch (2018b) identified that based on the final landform design, flood waters would not enter any of the final voids in events up to and including the PMF event (Appendix F of the draft EIS).</p>
27.5	Groundwater impacts	The draft EIS fails to sufficiently identify a protocol for mitigating the effect of hazardous substances on groundwater or surrounding soil, such that it is not possible to properly consider whether the Proposed Conditions protect or sufficiently protect groundwater supplies.	Nil.	As identified in Table 6-1 of the draft EIS, Pembroke proposes to prepare a Water Management Plan and establish a groundwater monitoring network as part of the Project. The Water Management Plan would describe the protocol for mitigating the effect of hazardous substances on groundwater. Pembroke is currently in the process of preparing this plan.
27.6	Groundwater impacts	The draft EIS does not identify, or fails to sufficiently identify, how the Proponent will ensure that the coarse rejects do not contaminate the groundwater or surrounding soil, such that it is not possible to properly consider whether the Proposed Conditions protect or sufficiently protect groundwater supplies.	Nil.	<p>As detailed in Section 4.2.3 of the draft EIS, a Geochemistry Assessment was conducted by Terrenus Earth Sciences (2018) and is presented in Appendix L of the draft EIS. The assessment was undertaken to evaluate the geochemical nature of potential spoil and coal reject materials likely to be produced from the Project (particularly during the first 10 years of mining operation) and to identify any environmental issues that may be associated with mining, handling and storing these materials. Based on the geochemical testwork, waste rock is expected to:</p> <ul style="list-style-type: none"> be overwhelmingly non acid forming (NAF) with excess acid neutralising capacity (ANC) and have a negligible risk of developing acid conditions; and generate relatively low-salinity surface runoff and seepage with low soluble metals concentrations. <p>Overall, the geochemical assessment found that approximately 70% of potential coal reject material has essentially no risk associated with acid generation, with the remaining 30% of coal reject material having a relatively low degree of risk associated with potential acid generation.</p>
27.7	Groundwater impacts	<p>(m) The draft EIS does not identify, or fails to sufficiently identify:</p> <p>(i) the proportion or percentage of waste rock materials the Proponent expects to be:</p> <p>(A) sodic (including the percentages of waste rock materials</p>	Nil.	<p>See response to comment 27.6. In addition, Section 4.2.4 of the draft EIS states that, where highly sodic and/or dispersive spoil is identified, this material would not be placed in areas which report to final landform surfaces and would not be used in construction activities.</p> <p>It is expected that highly sodic and dispersive waste rock may not, in some cases, be able to be selectively handled and preferentially disposed of – although Pembroke would take reasonable measures to identify and selectively place highly sodic and dispersive waste rock.</p>

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		the Proponent expects to be saline sodic and alkaline sodic); (B) highly sodic; (ii) the method the Proponent intends to use to identify and separate sodic or highly sodic waste rock material from non-sodic waste rock material; and (iii) how the Proponent intends to limit or mitigate the effects of runoff or seepage in the absence of selective handling waste rock emplacements contain sodic or highly sodic waste rock materials, such that it is not possible to properly consider whether the Proposed Conditions protect or sufficiently protect groundwater supplies.		In such cases, waste rock landforms would need to be constructed with short and low (shallow) slopes (indicatively slopes less than 15% and less than 200 m long) and progressively rehabilitated to minimise erosion (Appendix L of the draft EIS).
27.8	Groundwater impacts	The draft EIS does not identify, or fails to sufficiently identify, how the Proponent will ensure that any chemical or other dust suppressants used do not contaminate the groundwater or surrounding soil, such that it is not possible to properly consider whether the Proposed Conditions protect or sufficiently protect groundwater supplies.	Nil.	As outlined in Section 4.2.4 of the draft EIS (underlining added for emphasis), a Water Management Plan would be prepared prior to commencement of construction cognisant of the DES guideline for the Preparation of water management plans for mining activities (DERM, 2010) and would include: <ul style="list-style-type: none"> • details of the potential sources of contaminants that could impact on water quality; • a description of the water management system for the Project; • measures to manage and prevent saline drainage and sodicity; • measures to manage and prevent acid rock drainage; • corrective actions and contingency procedures for emergencies; and • a program for monitoring and review of the effectiveness of the Water Management Plan.
27.9	Groundwater impacts	(q) The draft EIS does not identify, or fails to sufficiently identify, whether pit dewatering will be required in periods of high seasonal rainfall and if so, whether it will be possible to do so in such way as to stay above the water table in those circumstances having regard to: (i) the total peak groundwater inflow; and (ii) the average groundwater inflow, such that it is not possible to properly consider whether the Proposed Conditions protect or sufficiently protect groundwater supplies.	Nil.	Section 4.3.4 of the draft EIS states, over the life of the Project, there would be numerous options for adaptive management of the mine water management system to accommodate climatic conditions. For example, temporary adjustments to pumping arrangements could be made to accommodate very wet or dry periods. These alternative management approaches would be used to reduce the risks to the Project associated with climatic variability and could include, for example, advanced dewatering within the proposed open cut pit extents.
27.10	Groundwater impacts	(s) The draft EIS does not identify, or fails to sufficiently identify: (i) the effect the inflow of water to the final voids will have upon the groundwater levels in the surrounding area; (ii) the extent to which the lake would become saline and what effect the lake's increasing salinity would have upon the groundwater regime in the surrounding area; and (iii) the effect of the gradually increasing salinity may have upon the groundwater regime in the surrounding area in the event that the final voids do not behave as expected by the Proponent, such that it is not possible to properly consider whether the Proposed Conditions protector sufficiently protect groundwater supplies.	Nil.	Section 4.1.3 of the draft EIS states that water within final voids would evaporate from the lake surface and draw in groundwater from the surrounding geological units. Evaporation from the lake surface would concentrate salts in the lake slowly over time (Appendix D of the draft EIS). This gradually increasing salinity is not expected to pose a risk to the surrounding groundwater regime as the final voids are predicted to remain permanent sinks (Appendix D of the draft EIS). Given the final voids would be sinks, the final voids would not result in any adverse groundwater quality related impacts on GDEs (Appendix A of the draft EIS).
27.11	Groundwater impacts	(u) The draft EIS does not, or fails to sufficiently: (i) quantify the cumulative groundwater drawdown and depressurisation in relation to the Project and other relevant mining or gas operations; (ii) quantify the groundwater depressurisation caused by the Project; or (iii) identify the methods the Proponent proposes to take to limit or mitigate the effect of groundwater depressurisation caused by the Project, such that it is not possible to properly consider whether the Proposed Conditions protect or sufficiently protect groundwater supplies.	Nil.	As identified in Section 4.2 of the draft EIS, the Groundwater Assessment (Appendix D of the draft EIS) has considered the cumulative drawdown impacts of the Project and surrounding mines (existing and approved), as well as the approved Bowen Gas Project. Further to this, Pembroke note that, in their advice on the draft EIS, the IESC state: <i>The proponent has provided an appropriate assessment of potential cumulative groundwater impacts for the project, through incorporation of information from neighbouring mines and the proposed coal seam gas project into the numerical model.</i>
27.12	Groundwater impacts	(w) The draft EIS does not, or fails to sufficiently: (i) quantify what is meant by: (A) "relatively low-salinity"; or (B) "low soluble metals concentrations";	Nil.	Appendix L of the draft EIS (Geochemistry Assessment) contains a detailed description of the salinity (EC) and soluble metal concentrations of potential soil samples. Table 3 of the Geochemistry Assessment also separates these values into categories from "very low" to "very high".

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		<p>(ii) identify the effect of that run-off or seepage on the surrounding groundwater regime in circumstances where the Proponent:</p> <p>(A) has identified that the lake is likely to become increasing saline over time as a consequence of evaporation; and</p> <p>(iii) has failed to identify the effect of the lake's increasing salinity on the surrounding groundwater regime, such that it is not possible to properly consider whether the Proposed Conditions protect or sufficiently protect groundwater supplies.</p>		<p>Section 4.1.3 of the draft EIS also states, water within final voids would evaporate from the lake surface and draw in groundwater from the surrounding geological units. Evaporation from the lake surface would concentrate salts in the lake slowly over time (Appendix D of the draft EIS). This gradually increasing salinity is not expected to pose a risk to the surrounding groundwater regime as the final voids are predicted to remain permanent sinks (Appendix D of the draft EIS). Given the final voids would be sinks, the final voids would not result in any adverse groundwater quality related impacts on GDEs (Appendix A of the draft EIS).</p>
27.13	Surface water impacts	<p>At section 2.7.6 of the draft EIS, the Proponent outlines a controlled release strategy for discharges of mine affected water into the Isaac River and Ripstone Creek. The Proposed Conditions provide for a controlled release strategy at Section 6.2.6 (Schedule F -Water). However:</p> <p>(i) the Proposed Conditions do not identify maximum release rates for Ripstone Creek (instead, the Proposed Conditions identify maximum release rates for the Isaac River only); and</p> <p>(ii) there is no evidence to suggest that the Proponent has considered the cumulative impact of other mines discharging water into the same or closely connected waters in accordance with the Department of Environment and Science's Model Mining Conditions in circumstances where:</p> <p>(A) Ripstone Creek is also subject to releases from the following mining operations: Peak Downs; Moranbah North; Moranbah North Coal; BHP Coal; and BHP Billiton Mitsubishi Alliance.</p> <p>(B) the Isaac River is also subject to releases from the following mining operations: Poitrel (via New Chum Creek); Peak Downs; Peabody Energy; Goonyella Riverside; Goonyella Broadmeadow; Fitzroy (CQ); Carborough Downs; Burton; BHP Coal; and BHP Billiton Mitsui Coal (via New Chum Creek).</p>	Nil.	<p>Section 2.2.6 of the draft EIS recognises the following (underlining added for emphasis):</p> <p><i>The Ripstone Creek catchment area is approximately 286 km², with predominant land use within the catchment being stock grazing and the Peak Downs mine (which has approval to release water to Ripstone Creek).</i></p> <p><i>Boomerang Creek runs west to east, south of the Olive Downs South domain and joins the Isaac River between the Olive Downs South domain and Willunga domain. One Mile Creek is a tributary of Boomerang Creek, with its confluence approximately 4 km upstream of the point at which Boomerang Creek enters the Isaac River.</i></p> <p><i>The Boomerang Creek catchment area (including One Mile Creek) is approximately 156 km², with predominant land use within the catchment being stock grazing and the Saraji Coal Mine. The Saraji Coal Mine has an existing diversion of Boomerang Creek and has approval to release water to Boomerang Creek.</i></p> <p><i>Phillips Creek has a catchment area of approximately 487 km² to the confluence with the Isaac River. Land uses within the Phillips Creek catchment include low intensity cattle grazing and open cut mining. The Saraji and Lake Vermont mines both have existing diversions/levees on Phillips Creek and approval to discharge waters to Phillips Creek.</i></p> <p>In consideration of this, Section 2.7.6 of the draft EIS states:</p> <p><i>Controlled water release conditions have been developed for releases to the Isaac River and Ripstone Creek, based on the DEHP Guideline Model Mining Conditions. The water balance model has been configured to simulate these release conditions, using salt measured as electrical conductivity (EC) as the target parameter. The proposed water release conditions are provided in Table 2-10, based on flow and EC monitoring at the Deverill gauging station on the Isaac River, and the proposed Project controlled release points (P9, P20, P33, P46 and WROM).</i></p>
27.14	Noise and vibration	<p>In respect of noise pollution, the Proposed Conditions set out at section 6.2.4 of the draft EIS (Schedule D —Noise) are inadequate in that they fail to sufficiently observe the Department of Environment and Heritage Protection's Guideline - Noise and Vibration from Blasting (Blasting Guideline). The Proposed Conditions</p> <p>do not:</p> <p>(i) require that all blasting be carried out in a proper manner by a competent person in accordance with best practice environmental management;</p> <p>(ii) prohibit blasting in circumstances where:</p> <p>(A) a temperature inversion or a heavy, low cloud cover is present (on the basis that values of airblast overpressure will be higher than normal in surrounding areas); or</p> <p>(B) strong winds are blowing from the blasting site towards sensitive or commercial locations;</p> <p>(iii) prescribe the way in which compliance with airblast overpressure is to be assessed having regard to the specifications for noise measurement equipment, specifically the Blasting Guideline requires that:</p> <p>(A) blast noise only be measured by noise measurement equipment having a lower limiting frequency 2Hz (- 3dB response point of the measurement system) and a detector onset time of not greater than 100 microseconds as assessed in accordance with AS —1259; and</p> <p>(B) ground vibration instrumentation used for compliance monitoring must be capable of measurement over the range 0.1 mms~ to 300mms~ with an accuracy of not less than 5% and have a flat frequency response to within 5% of the frequency range of 4.5Hz to 250Hz.</p>	Nil.	<p>The proposed conditions in Appendix B of the Additional Information to the EIS, including those relating to noise and vibration, have been developed in consideration of the Model Mining Conditions and the EPP Noise.</p> <p>It is noted that blasting will be carried out in a proper manner by a competent person in accordance with best practice environmental management. Blasting activities will generally be limited to the hours of 6.00 am to 6.00 pm and would generally not take place on public holidays</p> <p>Blasting will be scheduled in consideration of predicted meteorological conditions.</p> <p>Blast monitoring will be conducted in accordance with the relevant guidelines and Australian Standards.</p>
27.15	Air quality	<p>(b) In respect of air pollution, the Proposed Conditions set out at section 6.2.2 (Schedule B —Air) are inadequate on the basis that they fail to sufficiently observe:</p>	Nil.	<p>The proposed conditions in Appendix B of the Additional Information to the EIS, including those relating to noise and vibration, have been developed in consideration of the Model Mining Conditions and the EPP Noise.</p>

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		<p>(i) the Environmental Protection Act 7994 (Qld) Guideline — Application requirements for activities with impacts to air in that the proposed conditions do not describe what measures anrill be implemented to minimise the emission of contaminants to air, including pollution control equipment and management techniques for all emission sources; and</p> <p>(ii) the National Environment Protection (Ambient Air Quality) Measure (Air Quality Measure) in that Condition 61(b) requires that the concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM-o) be no more than 50 micrograms per cubic metre over a 24 hour averaging period for no more than five exceedances;</p> <p>• however, the maximum allowable exceedance prescribed by the Air Quality Measure is none.</p>		
27.16	Visual amenity	(c) In respect of light pollution, the Proposed Conditions set out at section 6.2 are inadequate on the basis that they fail to observe the Department of Environment and Science's Model Mining Conditions. The Proposed Conditions do not impose any requirements in relation to nuisance caused by light relating to the Project, even though the Proponent is aware of the proximity of sensitive places.	Nil.	Section 6.1.3.8 of the draft EIS states: that Pembroke would take all reasonable and feasible measures, in consideration of AS 4282–1997 Control of the obtrusive effects of outdoor lighting, to mitigate visual and off-site lighting impacts of the Project.
27.17	Ripstone Creek diversion	<p>(d) In respect of water pollution, section 2.7.2 of the draft EIS identifies that the Project will require the diversion of the Ripstone Creek waterway. However, the Proposed Conditions set out at section 6.2.9 (Schedule I -Watercourse Diversions) fail to sufficiently observe the Department of Natural Resources, Guideline: Works that interfere with water in a watercourse -watercourse diversions (Watercourse Diversions Guideline) in that:</p> <p>(i) the Proposed Conditions do not require the Proponent to achieve, or even aim to achieve, the following key objectives:</p> <p>(A) ensuring that the Ripstone Creek diversion is self-sustaining;</p> <p>(B) ensuring that the Ripstone Creek diversion positively contributes to river health values for the Isaac River system; and</p> <p>(ii) the Proposed Conditions do not expressly require that the Proponent produce an operation and monitoring plan as part of the design plan for the Ripstone Creek diversion; and</p> <p>(iii) it is unclear whether the functional designs submitted at Section 13.7 of Annexure F to the draft EIS, forming part of the Proponent's application for an EA have been certified as required by the Watercourse Diversions Guideline.</p>	Nil.	<p>Section 4.4.4 of the draft EIS states:</p> <p><i>The Ripstone Creek Diversion has been designed in consideration of the Water Act 2000 and the Environmental Protection Act 1994, and to, as far as possible, replicate the natural hydraulic behaviour of the Ripstone Creek waterway.</i></p> <p><i>An assessment of the potential impacts of the diversion was undertaken as part of the Flooding Assessment (Appendix F). Hatch (2018b) concluded that by comparing the results of the flood modelling with the ACARP guidelines for the Bowen Basin, the diversion would not change the hydraulic behaviour of the waterway significantly.</i></p> <p>Further to this, the proposed conditions in Appendix B of the Additional Information to the EIS, including those relating to watercourse diversions, have been developed in consideration of the Model Mining Conditions.</p>
27.18	Rehabilitation	<p>(a) Section 6.1.3 of the draft EIS indicates that the Project site is to be progressively rehabilitated. Rehabilitation is to commence within two years of areas becoming available for rehabilitation. However, the Proposed Conditions set out at Section 6.2.8 (Schedule H -Land and Rehabilitation) are inadequate because:</p> <p>(i) they do not require rehabilitation to commence within two years of areas becoming available for rehabilitation; and</p> <p>(ii) further, contrary to best practice the Proposed Conditions do not prescribe a timeframe in which rehabilitation works must commence following areas becoming available for rehabilitation.</p>	Nil.	<p>As indicated in the comment, Section 6.1.3 of the draft EIS states:</p> <p><i>The Project area (e.g. waste rock emplacements and infrastructure areas) would be progressively rehabilitated and revegetated, to create stable post mining landforms. Rehabilitation would commence within two years of areas becoming available for rehabilitation.</i></p> <p>Further to this, the proposed conditions in Appendix B of the Additional Information to the EIS, including those relating to rehabilitation, have been developed consistent with the Model Mining Conditions.</p>
27.19	Noise and vibration	(b) The draft EIS does not identify, or fails to sufficiently identify, what steps would be taken by the Proponent to modify mining operations to achieve compliance with relevant noise criteria at privately-owned dwellings if required, such that it is not possible to properly consider whether the Proposed Conditions protector sufficiently protect against noise pollution.	Nil.	<p>As outlined in Section 4.9.4 of the draft EIS, Pembroke would also implement proactive and reactive noise control measures. These measures would include the use of weather forecasting and real time measurement of meteorological conditions and noise levels to modify mining operations as required in order to achieve compliance with applicable noise limits at the nearest sensitive receptors.</p> <p>Modifying mining operations could include reducing the intensity of particular operations, relocating particular operations or halting particular operations.</p> <p>With the proposed noise management measures in place, including proactive and reactive noise control measures that are considered good or best practice, it is reasonable to expect that the noise objectives would be met during the operation of the Project.</p>

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				Given the flexibility and robustness of the proposed mitigation measures, this would be the case even with additional noise generating activities in the region (e.g. new or expanded mining operations).
27.20	Noise and vibration	The draft EIS does not identify, or fails to sufficiently identify, whether the Proponent has considered the impact of noise from the crushing and screening plants and the Coal Handling Preparation Plant on nearby privately-owned dwellings, such that it is not possible to properly consider whether the Proposed Conditions protect or sufficiently protect against noise pollution.	Nil.	<p>The items and sound power levels included in the noise model are listed in Table 17 of the Noise and Blasting Assessment. This includes the CHPP, dump hopper and sizers.</p> <p>As described in Section 2.4 of Appendix K of the draft EIS:</p> <p><i>There are few near neighbours with the closest located approximately 12.2 km from the Coal Handling and Preparation Plant (CHPP). A summary of the sensitive receptors relevant to the Project include:</i></p> <ul style="list-style-type: none"> • Vermont Park (12.2 km east of the proposed CHPP); • Seloh Nolem 1 (19.0 km south east of the proposed CHPP); • Seloh Nolem 2 (19.7 km south east of the proposed CHPP); • Old Bombandy (41.4 km south east of the proposed CHPP); • Willunga (32.2 km south east of the proposed CHPP); and • Leichardt (31.4 km south-east of the proposed CHPP). <p>The Noise and Vibration Assessment therefore assesses the potential impacts from the Project, including operation of the CHPP, on the relevant receivers identified above.</p>
27.21	Noise and vibration	(e) Sections 4.9, 6.1, 6.2 and Appendix K of the draft EIS refer to noise and vibration but fail to properly address noise pollution caused by the Project.	Nil.	Appendix K of the draft EIS has been developed to address the final Terms of Reference relevant to the Noise and Vibration Assessment. Section 6 of the Noise and Vibration Assessment provides a detailed assessment of the potential noise impacts associated with the Project.
27.22	Air quality	<p>(a) The Proposed Conditions set out at section 6.2.2 (Schedule B —Air) fail to protect air quality on the basis that there are no conditions prescribed which:</p> <p>(i) impose limits or restrictions upon discharges of contaminants to air caused by the Project (other than dust and particulate matter); and</p> <p>(ii) require the Proponent to conduct a monitoring program of contaminant releases to the atmosphere.</p>	Nil.	The proposed conditions in Appendix B of the Additional Information to the EIS, including those noise and vibration, have been developed in consideration of the results of the Noise and Vibration Assessment and are consistent with the Model Mining Conditions.
27.23	Visual amenity	(a) The Proposed Conditions set out at Section 6.2 fail to protect visual amenity on the basis that no conditions dealing with visual amenity have been proposed by the Proponent.	Nil.	<p>Section 4.10.3 of the draft EIS states:</p> <p><i>Although the highwall emplacement would be constructed within 1 km of the Vermont Park dwelling, visual impacts from this 25 m high landform are not anticipated to be significant given the intervening vegetative screening.</i></p> <p><i>The larger out-of-pit waste rock emplacements would be located at least 5 km from the privately owned dwellings. As visual prominence diminishes with distance, and in consideration of intervening vegetation, it is expected that the visual impact of the elevated Project landforms would not be significant at nearby dwellings.</i></p> <p>...</p> <p><i>The overland conveyor would be located approximately 700 m from the closest privately-owned dwelling (Seloh Nolem 1). The conveyor would generally be 1 m to 2 m above ground level. At a distance of at least 700 m, visual impacts from the overland conveyor are not expected to be significant.</i></p> <p><i>The Willunga domain mine infrastructure area would be at least 4 km from the closest dwelling. Infrastructure at the Willunga domain would reach heights of approximately 18 m. At distances of 4 km or greater, visual impacts from the mine infrastructure areas are not expected to be significant.</i></p> <p><i>The Olive Downs South domain mine infrastructure area would be at least 8 km from the closet dwelling. Infrastructure at the Olive Downs South domain would reach heights of 20 to 30 m. At distances of 8 km or greater, visual impacts from the mine infrastructure areas are not expected to be significant.</i></p>
27.24	Groundwater impacts	<p>(b) The draft EIS does not identify, or fails to sufficiently identify:</p> <p>(i) the steps to be taken by the Proponent to ensure that the saline water bodies described above remain below the pre-mining groundwater level; or</p> <p>(ii) any monitoring programme to be implemented by the Proponent to ensure that saline water within the voids does not migrate into surrounding aquifers, such that it is not possible to properly consider whether the Proposed Conditions sufficiently provide for appropriate methods of remediating left over voids.</p>	Nil.	Section 4.1.3 of the draft EIS states that water within final voids would evaporate from the lake surface and draw in groundwater from the surrounding geological units. Evaporation from the lake surface would concentrate salts in the lake slowly over time (Appendix D of the draft EIS). This gradually increasing salinity is not expected to pose a risk to the surrounding groundwater regime as the final voids are predicted to remain permanent sinks (Appendix D of the draft EIS). Given the final voids would be sinks, the final voids would not result in any adverse groundwater quality related impacts on GDEs (Appendix A of the draft EIS).
27.25	Final landform	<p>(d) The Proposed Conditions set out at Section 6.2.8 (Schedule H -Rehabilitation) are inadequate on the basis that Table H1:</p> <p>(i) in relation to the proposed rehabilitation objectives, requires only that:</p> <p>(A) final voids be isolated from the Isaac River;</p> <p>(B) final void hydrology be understood; and</p>	Nil.	Section 5.2.3 of the draft EIS states that during a PMF event, the flood water along the highwall emplacements is predicted reach a maximum height of 6 m. Accordingly, there is a significant freeboard above the PMF event to protect the final voids from all flood waters.

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		<p>(C) final voids be predicted to act as groundwater sinks into perpetuity;</p> <p>(ii) in relation to the performance indicators, requires only that Isaac River flood waters be isolated from the final voids but does not prescribe that the final voids be isolated such that they would be isolated in the event of a probable maximum flood; and</p> <p>(iii) similarly, in relation to the proposed completion criteria, requires only that the final voids are protected from possible inflows associated with floods from the Isaac River but does not prescribe that the final voids be isolated such that they would be isolated in the event of a probable maximum flood.</p>		
27.26	Climate change impacts	<p>(f) The draft EIS is inadequate in that it does not address, or fails to sufficiently address, whether the model used to assess the likely long-term water level behaviour of the final voids accounts for the impact of changes to climate (insofar as is practicable), such that it is not possible to properly consider whether the Proposed Conditions sufficiently provide for appropriate methods of remediating left over voids.</p>	Nil.	<p>A climate change assessment was conducted as part of the Surface Water Assessment and the results were considered throughout the report. Section 8.6 of the Surface Water Assessment (Appendix E of the draft EIS) states that the climate change impact assessment for the Project was undertaken adopting the projections and methodologies given in the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Commonwealth Bureau of Meteorology (BoM) report entitled "Climate Change in Australia Technical Report" (CSIRO, 2015). This report provides guidance on the possible projections of future climate for the East Coast based on a current understanding of the climate system, historical trends and model simulations of the climate response to changing greenhouse gas and decreasing aerosol emissions.</p>
27.27	Groundwater impacts	<p>(h) The draft EIS does not, or fails to sufficiently:</p> <p>(i) quantify what is meant by "relatively low-salinity" and "low soluble metals concentrations"; or</p> <p>(ii) identify the effect of that run-off or seepage on the surrounding groundwater regime in circumstances where the Proponent:</p> <p>(A) has identified that the lake is likely to become increasing saline over time as a consequence of evaporation; and</p> <p>(B) -has failed to identify the effect of the lake's increasing salinity on the surrounding groundwater regime, such that it is not possible to properly consider whether the Proposed Conditions sufficiently provide for appropriate methods of remediating left over voids.</p>	Nil.	<p>Appendix L of the draft EIS (Geochemistry Assessment) contains a detailed description of the salinity (EC) and soluble metal concentrations of potential soil samples. Table 3 of the Geochemistry Assessment also separates these values into categories from "very low" to "very high".</p> <p>Section 4.1.3 of the draft EIS also states water within final voids would evaporate from the lake surface and draw in groundwater from the surrounding geological units. Evaporation from the lake surface would concentrate salts in the lake slowly over time (Appendix D of the draft EIS). This gradually increasing salinity is not expected to pose a risk to the surrounding groundwater regime as the final voids are predicted to remain permanent sinks (Appendix D of the draft EIS). Given the final voids would be sinks, the final voids would not result in any adverse groundwater quality related impacts on GDEs (Appendix A of the draft EIS).</p>
27.28	Rehabilitation	<p>The draft EIS is inadequate in that the proposed timeframe of two years is too far distant in relation to the rehabilitation of final voids. Further, the Proposed Conditions set out at Section 6.2.8 (Schedule H -Land and Rehabilitation):</p> <p>(i) do not require rehabilitation to commence within two years of areas becoming available for rehabilitation;</p> <p>(ii) further, contrary to best practice the proposed conditions do not prescribe a timeframe in which rehabilitation works must commence following areas becoming available for rehabilitation.</p>	Nil.	<p>Pembroke has provided further information on the Project's rehabilitation strategy (refer to Section 4 and Appendix D of the Additional Information to the EIS). Appendix D of the Additional Information to the EIS outlines that progressive rehabilitation would be undertaken in accordance with the following process:</p> <p>Decommissioning</p> <ol style="list-style-type: none"> 1. Project infrastructure is to be decommissioned in accordance with the Final Rehabilitation Report (or subsequent documents required under regulation). 2. Any potentially contaminated areas are to be tested and where required, remediated, in accordance with the EP Act following infrastructure decommissioning. <p>Landform Establishment</p> <ol style="list-style-type: none"> 1. After the completion of bulk materials handling in each domain, finalised landform areas would be re-profiled to final slopes, and drainage structures installed consistent with the Plan of Operations (or subsequent documents required under regulation). 2. Final landform elevations and slopes are to be surveyed to determine compliance with the specifications (landform slopes, final elevations, etc.) set out in the Plan of Operations (or subsequent documents required under regulation) prior to the placement of growth media. <p>Growth Media Development</p> <ol style="list-style-type: none"> 1. Soil application depths, amelioration requirements and soil application equipment on rehabilitated landforms are to be in accordance with the Plan of Operations (or subsequent documents required under regulation). 2. Suitable soil preparation on final landforms (e.g. ripping on contour or tilling) is to be undertaken prior to establishment of vegetation. <p>Ecosystem Establishment</p> <ol style="list-style-type: none"> 1. After placement of growth media on profiled landforms, a sterile cover crop is to be sown if required to stabilise the growth media and minimise soil erosion. 2. Unless in declared drought conditions, after the placement of growth media on profiled landforms, each domain would be revegetated in accordance with the nominated post-mining land use within six months of the growth media development phase being completed. 3. Upon commencement of mining, representative reference sites for the waste rock emplacement domain will be established. Timing of reference sites for other domains would be linked to Table 5.

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				<p>4. After revegetation establishment in a domain, representative rehabilitation transects would be monitored in that domain and in corresponding sites in accordance with the requirements of the Plan of Operations (or subsequent documents required under regulation).</p> <p>Ecosystem Development</p> <p>Monitoring of native vegetation rehabilitation is to be undertaken in accordance with the Plan of Operations (or subsequent documents required under regulation). Conditions in Appendix B of the Additional Information to the EIS have been developed consistent with the Model Mining Conditions.</p>
27.29	Tenure	<p>(b) The draft EIS does not identify, or fails to sufficiently identify:</p> <p>(i) the extent to which use of the Stock Routes will be affected by the Project; or</p> <p>(ii) the steps the Proponent intends to take to minimise the impact of the Project upon use of the Stock Routes, such that it is not possible to properly consider whether the Proposed Conditions sufficiently protect the health of residents and livestock.</p>	Nil.	<p>As described in Section 4.10.2 of the draft EIS, there are two areas designated as Stock Routes (Reserves) that would be intersected by the Project pipeline and rail spur, within MLA 700035 (Figure 2-17b of the draft EIS).</p> <p>While the pipeline would be buried (and therefore would not impede the use of these lots as Stock Routes), the rail spur would reduce the area of the Travelling Stock Route within Lot 15 CNS111 by approximately 6 ha (or approximately 2% of the lot size).</p> <p>The impact is not likely to significantly impact the use of the Stock Routes. It is also noted that the Stock Route within Lot 15 CNS111 does not connect to any other Stock Route and is therefore not expected to be widely used. Notwithstanding the above, the rail spur would be fenced to prevent access by stock. Pembroke will engage with DNRME and the IRC regarding the potential impacts to the stock route network and any mitigation measures considered necessary.</p>
27.30	Golden Mile important agricultural area	<p>(d) The draft EIS does not or, fails to sufficiently:</p> <p>(i) predict the impact of the Project upon the Golden Mile important agricultural area;</p> <p>(ii) prescribe conditions for the proposed EA to minimise the impact of the Project upon the Golden Mile important agricultural area; or</p> <p>(iii) in the absence of prescribed conditions, identify targets to be met to minimise the effect of the Project upon the Golden Mile important agricultural area, such that it is not possible to properly consider whether the Proposed Conditions sufficiently protect the health of residents and livestock.</p>	Nil.	<p>Section 2.2.9 of the draft EIS states that the southern part of the Project is located within what is known as the 'Golden Mile' important agricultural area (Figure 2-14 of the draft EIS). This area covers approximately 1,000,000 ha and has been identified as an area of high quality grazing and cropping land. The Project would impact approximately 1% of the Golden Mile important agricultural area but would not impact any existing high-quality cropping land, as described in Section 2.2.9 of the draft EIS.</p> <p>Given the proportionally small footprint of the Project within the important agricultural area, and the fact that no supply chains or agricultural industries would be impacted by the Project, impacts to the sustainability or success of the important agricultural area are not predicted.</p>
27.31	Noise and vibration	<p>(a) The Proposed Conditions set out at Section 6.2.4 address blasting noise limits and prescribe blasting noise exceedances. However, the Proposed Conditions do not:</p> <p>(i) address vibrations from blasting; nor</p> <p>(ii) prescribe exceedances for vibrations from blasting.</p> <p>(b) In the circumstances:</p> <p>(i) the draft EIS does not provide sufficient response to the terms of reference; and</p> <p>(ii) the Proposed Conditions are inadequate because they do not have regard to, or fail to have sufficient regard to, the effect of vibrations from blasting.</p>	Nil.	<p>Section 4.9.3 of the draft EIS states:</p> <p><i>The blasting assessment in Appendix K predicts overpressure and vibration levels would be below the relevant criteria at all sensitive receptors for the life of the Project.</i></p> <p><i>Blast designs may be adjusted when blasting in Pit ODS8 within 2 km of the "Vermont Park" residence, as described in Section 4.9.4.</i></p>
28. Whitehaven Coal Limited				
28.1	Tenure	<p>In March and May 2018, Whitehaven, through its subsidiary Whitehaven WS Pty Ltd, entered into sale agreements to acquire a 100% interest in (among other things):</p> <p>(a) Mineral Development Licence (MDL) 183 and related approvals and contracts; and</p> <p>(b) Lot 4 on CNS15 (Wynette Station).</p> <p>These sale agreements have now completed.</p> <p>As shown in Figures 2.16 and 2.17a of the EIS, the Project directly abuts the eastern and northern boundaries of MDL 183, and the infrastructure corridor within MLA 700035 traverses Wynette Station</p>	Nil.	Noted.
28.2	Resource sterilisation	<p>Impact on MDL 183 and future development - Potential resource sterilisation by infrastructure corridor</p> <p>Section 11.39(b) of the term of reference for the EIS (TOR) requires Pembroke to discuss the potential impacts, and related mitigation measures, of the proposed land use, including in relation to 'any existing mining, petroleum, geothermal and greenhouse gas storage tenures underlying or adjacent to the project, and any to be applied for as part of this project and the potential for resource sterilisation'.</p> <p>Pembroke's MLA 700035 runs along the boundary of MDL</p>	<p>Pembroke has provided limited design detail of the infrastructure that is proposed to be located within the rail corridor. Certainly, there is no assessment of the potential implications of flood protection works which otherwise will need to be constructed in the floodplain within MDL 183.</p> <p>Specifically, changes to the height of floodwaters and the potential need to elevate Pembroke's rail infrastructure has not been considered.</p> <p>Pembroke appears to have only considered the footprint of this proposed infrastructure, rather than the broader implications it may</p>	<p>The proposed rail corridor for the Project is located outside the MDL 183 boundary, to the east of the Norwich Park Branch Railway. As the Project rail corridor is located outside MDL 183 it does not sterilise any coal resources within the Whitehaven mining tenement. Where the Project water pipeline traverses MDL 183, it is located wholly within a public road reserve to the west of the Norwich Park Branch Railway. Pembroke does not require Whitehaven's consent to locate the proposed water pipeline within the road reserve as a Mining Lease is not being sought and Whitehaven is not the owner of the land.</p> <p>Further to this, at the time of lodging the draft EIS, there was no publicly available information as to the location and extent of a resource within MDL 183, nor was there any publicly available information regarding any Whitehaven application for a Mining Lease and/or Environmental Authority for any area within MDL 183. As such, there is no information regarding any proposed levee structures or proposed locations of blasting activities which Pembroke is able to consider within its EIS.</p>

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		<p>183, and will contain the rail spur to the Norwich Park Branch Railway, 66kV electricity transmission line (ETL), and water pipeline. The water pipeline also traverses a small area at the northern end of MDL 183.</p> <p>At page 2-74 of the EIS, Pembroke asserts that development of the Project would not sterilise any coal resources that would otherwise be accessed by other mining operations. Other than locating the rail spur outside the boundaries of MDL 183, no mitigation measures are proposed in relation to the infrastructure corridor's impact on other coal tenements.</p> <p>Whitehaven is concerned that Pembroke has failed to properly consider or address the impact of the infrastructure corridor on the recovery of resources within MDL 183, and the foreseeable restriction on development the rail corridor is likely to have on MDL 183.</p> <p>In order to access coal resources in the northern and eastern portion of MDL 183 and that are within the Probable Maximum Flood limit, it will be necessary for Whitehaven to construct a temporary levee in this area, to protect the mine operation from potential flooding of the Isaac River.</p> <p>Whitehaven's levee would then be situated between the proposed rail corridor and the known coal resource within MDL 183.</p>	<p>have on coal resource sterilisation. As a result, Pembroke has failed to adequately address the potential for coal resource sterilisation that is likely to arise as a result of the rail corridor development, or propose any means to mitigate this potential impact.</p> <p>Pembroke has also failed to consider the potential blast radius required in order for Whitehaven to develop the open cut coal resource on MDL 183.</p> <p>There is no consideration of the potential impact of train movements on Whitehaven's operations and there is no consideration of whether or not a setback distance may result in coal resource sterilisation. No mitigation measures have been proposed in this regard.</p>	<p>Notwithstanding, Section 9.2.4 of the draft EIS Flood Assessment states that, where the Project rail spur is located near the Isaac River and where it crosses drainage lines, culverts and spans between piers would be used to minimise impacts to the flooding regime. As part of the detailed design of the Project rail spur, a detailed flood study along the rail corridor has been commissioned by Pembroke. In particular, the detailed design and flood study were prepared to integrate the Project rail spur with Aurizon's flood design criteria, and to confirm the sizing for culverts and bridge structures along the length of the rail spur.</p> <p>A number of culverts and a bridge structure have been incorporated into the design to allow Isaac River flood waters to pass under the rail spur and then drain back to the Isaac River as a flood event recedes. The culverts and bridge structure would also allow the existing local catchments to the south of the rail spur to drain to the Isaac River via the existing drainage paths.</p> <p>The detailed flood study has also modelled a levee structure along the southern side of the rail spur, along the inside of the MDL 183 northern boundary (indicatively where a flood levee for the Winchester South Project would be located). The flood modelling showed that although the levee would slightly increase flood heights and velocities along parts of the Project rail spur, no changes to the design of the rail spur would be required (i.e. the changes to flood characteristics due to the levee would not require an increase in height of the rail spur, or a change in the embankment design to withstand localised increases in flood velocities).</p> <p>Further, the flood modelling predicts that the Project rail spur would provide a 'shielding' effect to the levee, minimising flood velocities and levels that would otherwise occur if the rail spur was not constructed.</p> <p>Pembroke will continue to engage with Whitehaven regarding infrastructure design and rail movements.</p>
28.3	Temporary levees	<p>Impact on MDL 183 and future development - Risk of failure of levee structures</p> <p>Page 4-91 of the EIS provides that 'the Project would excise part of the Isaac River floodplain during operation, which has the potential to increase flood levels in areas adjacent to and potentially upstream of the Project.'</p> <p>Pembroke proposes the construction of temporary flood levees and permanent highwall emplacements to provide immunity for infrastructure and mining operations during a 0.1% AEP flood event. The suitability of these structures to withstand flood impacts is critical to the safe development and operation of both projects.</p> <p>The Hatch report in Appendix F of the EIS assesses the consequence category of the temporary levees, as regulated structures, based on conceptual design information provided by Pembroke. The report states that the consequence category for all temporary levees in the 'failure to contain – overtopping' and 'dam break' scenarios is 'low'.</p> <p>The EIS fails to outline the methodology used to assess the various failure events. Further, this assessment does not consider a 'failure to contain – seepage' scenario as required by the MACCHPS. Accordingly, Whitehaven is concerned that the EIS fails to properly consider circumstances in which the temporary levees leak, or fail to withstand flooding impacts to any degree. The EIS fails to identify any contingencies should the temporary levees fail.</p> <p>Further, there is limited to no information in the EIS on the design and structural integrity of the various levees, and it is not evident from the EIS that a geotechnical assessment of the stability of the structures has been conducted.</p>	<p>An assessment of all levees against all failure event scenarios must be undertaken to understand the potential flood impacts to neighbouring land and developments.</p>	<p>The Project includes an out-of-pit waste rock emplacement on the north-eastern corner of Whitehaven's Wynette Station (within MLA 700035). A temporary levee is proposed to be constructed around the waste rock emplacement to isolate it from floodwaters until such time as the waste emplacement has been constructed and rehabilitated. After this time, this temporary levee would be decommissioned.</p> <p>As stated in Section 13.4.2 of the draft EIS Flood Assessment, the temporary levees have been assessed in accordance with the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (Version 5.0)</i>. As the temporary levees are designed to prevent the ingress of non-mine affected flood water into an operational area or catchment of a containment system, and the temporary levees would be constructed within the extent of a 1:1,000 year flood event, the temporary levees are considered to be regulated structures.</p> <p>Section 13.4.2 of the draft EIS Flood Assessment describes that a suitably qualified and experienced person assessed the consequence category of the temporary levees for a "failure to contain – overtopping" and "dam break" scenarios as "low consequence". Section 2.3.1 of the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (Version 5.0)</i> states that there is no requirement for a consequence assessment for a "failure to contain – seepage" scenario to be conducted for levees.</p> <p>Pembroke is seeking the Model EA Conditions for regulated structures, as stated in the DES <i>Guideline – Structures Which are Dams or Levees Constructed as part of Environmentally Relevant Activities</i> (2017). These EA conditions regulate the design, construction and monitoring of regulated structures. Consistent with the proposed EA Conditions for regulated structures, a 'design plan' for the Project's regulated structures will be prepared in accordance with the <i>Guideline – Structures Which are Dams or Levees Constructed as part of Environmentally Relevant Activities</i> (2017).</p>
28.4	Waste rock dumps	<p>Impact on Wynette Station - Out of pit waste rock dumps</p> <p>As shown in Figure 2.3 of the EIS, the Project proposes both active and rehabilitated out of pit waste rock dumps within MLA 700035. A waste rock dump is proposed on the north-eastern corner of Wynette Station, directly adjacent to the southern banks of the Isaac River.</p> <p>Section 10.11 of the TOR requires that Pembroke provide information relating to 'waste rock management and waste rock dump stability, and any potential impacts from sediment runoff and contaminant transport'. Further, the TOR requires Pembroke to provide sufficient information relating to 'site drainage, erosion and stormwater management, flood protection and waste water management'.</p>	<p>Pembroke has failed to properly address the impacts of this waste rock dump on Wynette Station, particularly:</p> <p>(d) its potential instability during and following a flooding event;</p> <p>(e) in restricting access to the Isaac River;</p> <p>(f) noise and dust impacts on cattle grazing; and</p> <p>(g) visual amenity impacts for future residents of Wynette Station.</p>	<p>The draft EIS Flood Assessment prepared for the Project considered potential flooding impacts associated with all Project landforms and temporary levees. As described above, the temporary levees would be designed and operated as regulated structures to prevent flood waters up to a 1:1,000 year event reaching operational areas, including the waste emplacement partly constructed on the Wynette Station. In particular, the Flood Assessment modelled the 'final landform' which shows that, after the temporary levees are removed, the stream velocity along the toe of the proposed waste emplacement located within MLA 700035 is predicted to be very low (<0.5 m/s) even during very large flood events (i.e. a 1:1,000 year flood event, as shown in Appendix C of the Flood Assessment).</p> <p>Section 2.7 of the draft EIS provides a detailed description of the Project water management strategy, including a description of the site drainage, erosion and stormwater management, flood protection and waste water management.</p> <p>The Project coal resource is shallowest in the northern extent of the MLA 700035 (i.e. within Pit ODS1). As is typical for open cut mining, the shallowest coal is targeted first, before mining towards the deeper coal resources. Until enough space is available for in-pit emplacement of waste rock, the waste rock material is emplaced out-of-pit. As such, an out-of-pit emplacement is required in close proximity to Pit ODS1.</p>

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				<p>Given the constraint of the Isaac River to the east and north of Pit ODS1 and coal resources to the south (i.e. Pit ODS2), an out-of-pit waste emplacement is required to the west of Pit ODS1 on the Wynette property.</p> <p>As this emplacement would only impact a small portion of the property, and it would not prevent access to the other undisturbed parts of the property, it is not considered to have a significant impact on the viability of the agricultural enterprise.</p> <p>With respect to potential visual impacts, it is noted that Wynette Station does not currently have a dwelling constructed on it, and Pembroke understands Whitehaven has purchased the property with the intent of developing an open cut coal mine within MDL 183.</p> <p>Accordingly, Pembroke does not consider it likely that the Project would result in visual amenity impacts at the Wynette property.</p> <p>Refer to response 28.8 with respect to potential noise and dust impacts on cattle.</p>
28.5	Waste rock dumps	<p>Impact on Wynette Station - Flooding and seepage impacts</p> <p>Section 11.64 of the TOR provides that the EIS must identify the quantity, quality and location of all potential discharges of water, including diffuse sources such as seepage from waste rock dumps. The TOR further requires Pembroke to assess the potential impacts of any discharges and the practices and procedures that would be used to avoid or minimise impacts.</p> <p>Pembroke acknowledges that these out-of-pit waste rock dumps may produce seepage as a result of rainfall inundation. Runoff is anticipated to be captured in sediment dams and managed under a mine water management system. Insufficient detail is provided as to the long-term impacts on surface water drainage, soil and geotechnical stability considerations, particularly with reference to the potential impacts on Wynette Station.</p> <p>An Erosion and Sediment Control Plan is proposed to be developed in the future to manage erosion and divert runoff.</p>	<p>However, insufficient information has been provided in respect to the mitigation measures proposed under this control plan, particularly in respect to Wynette Station.</p> <p>Pembroke proposes to construct a temporary levee around the out of pit dump. Further to the considerations raised above on the lack of information on the geotechnical performance of the proposed levees, the specific potential impacts on the future use of Wynette Station must be addressed.</p>	<p>The Project water management system includes erosion and sediment control measures to manage runoff from waste rock emplacements. Until rehabilitation of waste rock emplacements is complete, runoff from the landforms would be captured within drains and directed to sediment dams prior to reuse or release in accordance with the proposed EA conditions.</p> <p>The Geochemistry Assessment included in the draft EIS concluded, based on the geochemical test work, that waste rock is expected to:</p> <ul style="list-style-type: none"> be overwhelmingly non-acid forming (NAF) with excess acid neutralising capacity (ANC) and have a negligible risk of developing acid conditions; and generate relatively low-salinity surface run-off and seepage with low soluble metals concentrations. <p>As outlined in Section 4.2.4 of the draft EIS, where seepage from waste emplacements (operational and rehabilitated emplacements) is identified, monitoring will be conducted to confirm the above predictions. This includes monitoring seepage which may be identified from the portion of the emplacement proposed to be located on the Wynette property. Monitoring would involve 'standard' water quality parameters including, but not limited to, pH, EC, major anions (sulfate, chloride and alkalinity), major cations (sodium, calcium, magnesium and potassium), TDS and a broad suite of soluble metals/ metalloids.</p>
28.6	Adjacent property impacts	<p>Impact on Wynette Station - Severance of Wynette Station</p> <p>Section 6.7 of the TOR requires Pembroke to 'present feasible alternatives of the project's configuration (including individual elements) that may improve environmental outcomes'.</p> <p>Pembroke's rail infrastructure entirely severs the northern portion of Wynette Station from the southern portion. This will destroy the value of Wynette Station, and will give rise to substantial operational difficulties.</p> <p>Pembroke expects that between four and six trains, and potentially up to eight trains, would be loaded per day.</p>	<p>Pembroke has failed to adequately address the scheduling and duration of loading activities, and has failed to adequately ensure that these activities allow for the efficient and effective use of Wynette Station.</p> <p>Pembroke has failed to consider alternative locations for the out of pit dumps or for the proposed infrastructure corridor, in light of the obvious and substantial impacts they will have on Wynette Station.</p>	<p>The rail spur and pipeline corridor have been located to avoid Whitehaven's MDL 183. The corridor is proposed to be located in the northern part of Whitehaven's Wynette Station.</p> <p>The rail spur and pipeline have been designed to incorporate cattle underpasses and level crossings at various locations to enable cattle and vehicles to move below/across the infrastructure corridor and access the Isaac River. These underpass points would also accommodate water distribution infrastructure to allow the landholder to move water from pumping locations on the Isaac River to other parts of the property.</p> <p>A 4-strand stock fence would be installed along the rail spur to control cattle access. Cattle grids and stock gates would be constructed at all existing access tracks to allow for continued access.</p> <p>Section 2.10.2 of the draft EIS presents a justification for the design and location of the out-of-pit waste rock emplacements, in consideration of best practice landform design, requires the construction of out-of-pit waste rock emplacements on a small part of the north-east corner of Wynette Station.</p> <p>The Project coal resource is shallowest in the northern extent of the MLA 700035 (i.e. within Pit ODS1). As is typical for open cut mining, the shallowest coal is targeted first, before mining towards the deeper coal resources. Until enough space is available for in-pit emplacement of waste rock, the waste rock material is emplaced out-of-pit. As such, an out-of-pit emplacement is required in close proximity to Pit ODS1. Given the constraint of the Isaac River to the east and north of Pit ODS1 and coal resources to the south (i.e. Pit ODS2), an out-of-pit waste emplacement is required to the west of Pit ODS1 on the Wynette property.</p> <p>As this emplacement would only impact a small portion of the property, and it would not prevent access to the other undisturbed parts of the property, it is not considered to have a significant impact on the viability of the agricultural enterprise.</p> <p>Wynette Station does not currently have a dwelling constructed on it, and Pembroke understands Whitehaven has purchased the property with the intent of developing an open cut coal mine within MDL 183. Pembroke does not consider an assessment of the potential impacts to the future establishment of a dwelling on Wynette Station is warranted.</p> <p>As a landholder directly impacted by the proposed Project Mining Lease (i.e. MLA 700035), Pembroke proposes to compensate Whitehaven for the direct impacts to Wynette Station in accordance with the <i>Mineral Resources Act 1989</i>.</p>
28.7	Adjacent property impacts	<p>Impact on Wynette Station - Diminution in value of Wynette Station</p> <p>As a result of Pembroke's proposed activities, any prospective buyer of Wynette Station will entirely devalue:</p> <p>(a) the northern portion in proximity to and north of the proposed infrastructure corridor;</p> <p>(b) access that otherwise would have been available to the Isaac River as an agricultural resource; and</p> <p>(c) the prospect of successfully establishing a homestead on</p>	<p>Pembroke has failed to adequately address these impacts, and has failed to properly consider alternative development scenarios that may reduce them.</p>	<p>Refer to response 28.6</p>

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		the property.		
28.8	Adjacent property impacts	<p>Impact on Wynette Station - Agricultural impacts</p> <p>Section 11.110 of the TOR requires an assessment of the impacts of noise and vibration, in accordance with Guideline ESR/2015/1838.</p> <p>The Guideline requires, among other things, a description of how 'the release of sound to the environment from the activity is managed so that adverse effects on environmental values including the health and wellbeing and sensitive ecosystems are prevented or minimised'.</p>	<p>Pembroke has failed to adequately address the likely noise, dust, vibration and operational impacts that will arise for the operation of Wynette Station, directly as a result of its proposed infrastructure. The EIS fails to describe how these likely emissions will be managed to mitigate adverse effects on Wynette Station.</p> <p>Direct impacts on cattle, and on the access that will be available for both cattle and workers, are not adequately addressed.</p>	<p>Section 4.9.2 of the draft EIS describes how the Noise and Vibration Assessment was prepared in accordance with relevant legislation, policies and guidelines:</p> <p><i>Renzo Tonin (2018) has identified a range of legislation, policy, guidelines and standards relevant to identifying values and managing potential noise and vibration impacts of the Project. These include:</i></p> <ul style="list-style-type: none"> <i>the EP Act;</i> <i>the EP Regulation;</i> <i>the Environmental Protection (Noise) Policy 2008 (EPP [Noise]);</i> <i>DES' Model Mining Conditions guideline (DEHP, 2017d);</i> <i>DES' Application requirements for activities with noise impacts guideline (DEHP, 2017e); and</i> <i>EcoAccess Guidelines.</i> <p>The Terrestrial Fauna Assessment (DPM Envirosiences, 2018b) prepared for the Project assesses the potential impacts of noise and vibration on native fauna within the surrounding locality. It was concluded that any potential noise-related impact on fauna residing in surrounding habitat would likely be localised and minor, given fauna often readily habituate to continuous noise, and sudden noises from blasting would only occur in intervals. This conclusion is considered to extend to be relevant to potential impacts on cattle.</p> <p>In addition, the Terrestrial Flora Assessment (DPM Envirosiences, 2018a) prepared for the Project states the following in relation to potential dust impacts on surrounding vegetation:</p> <p><i>The landscape surrounding the Project is already heavily cleared. Dust from the Project is unlikely to significantly degrade surrounding native vegetation given vegetation in the locality is already subjected to dust from exposed soils which have not led to any observed impacts on vegetation. It is also likely that seasonal rainfall in the locality would help wash dust from the vegetation and/or encourage new growth.</i></p> <p>As described in Section 4.9.1 of the draft EIS, and in consideration of the suite of management measures proposed in Section 4.9.4 of the draft EIS:</p> <p><i>The Project would achieve the following performance outcome as identified in Part 3, Schedule 5, Table 1 of the EP Regulation:</i></p> <p>...</p> <p><i>The release of sound to the environment from the activity is managed so that adverse effects on environmental values including health and wellbeing and sensitive ecosystems are prevented or minimised.</i></p> <p>Given the above, it is unlikely that potential impacts from noise, dust and vibration would detrimentally affect cattle grazing on Wynette Station.</p>
28.9	Tenure	<p>Impact on Wynette Station - Restricted land</p> <p>Whitehaven has reviewed the restricted land on Wynette Station. Unfortunately, Pembroke has failed to adequately ground-truth the proposed MLA areas, and it has failed to identify a number of areas of restricted land within their area, including for example a bore located within the proposed rail corridor.</p> <p>Whitehaven has not given its consent to the inclusion of the surface area of any restricted land it owns in the MLs that may result from Pembroke's MLAs. This has implications for the infrastructure corridor and also potentially the out of pit dump.</p>	Nil.	<p>Pembroke is currently engaging in consultation with Whitehaven regarding the identification of restricted lands as per the requirements under Mineral Resources Act 1989.</p>
29. Queensland Ambulance Service				
29.1	Hazards and community safety	Nil.	<p>Formulate and provide a copy of the emergency planning and response plan which should include contact details for key stakeholders in case of any emergency.</p> <p>Consult with QAS in relation to the development of emergency and evacuations planning and response procedures.</p> <p>The QAS may require to fund and expand radio networks in the area. The QAS would request support to piggy back communication technology on planned towers or investigate assisting the QAS to install appropriate technology in the area.</p> <p>Consult with the Queensland Chemical Hazards and Emergency Management Unit and the Medical Director, Officer of the Commissioner, QAS, in relation to treatment plans for injured workers due to chemical process used on site.</p> <p>The QAS to be provided with a copy of the principal hazard management plan.</p> <p>Notification of planned exercises, either practical or tabletop, for attendance and participation by the QAS.</p>	<p>As outlined in Table 6-1 and 6-2 of the draft EIS, Pembroke will prepare an Emergency Response Procedure for the Project in consultation with relevant QAS departments and representatives (as indicated in QAS's comment). The Emergency Response Procedure will include:</p> <ul style="list-style-type: none"> contact details for key stakeholders in case of any emergency. emergency and evacuation planning, maps and response procedures. a description of the proposed communication mechanisms and required infrastructure. treatment plans for injured workers due to chemical process used on site, including proposed consultation. description of notification requirements for planned exercises. fatigue management policy. <p>The Emergency Response Procedure will be provided to the QAS prior to commencement of the Project.</p> <p>Pembroke will request the accommodation camps and villages to be used be the Project workforce provide access and evacuation maps to the QAS, if not already provided.</p> <p>Pembroke acknowledges there may be opportunities for the QAS to 'piggy-back' onto Project communication infrastructure to improve the QAS radio network coverage. Pembroke will discuss these opportunities with the QAS during development of the Emergency Response Procedure.</p>

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			Provide the QAS with the access and evacuation maps for accommodation camps or villages. With a fly in/fly out; drive in/drive out; and bus In/bus out workforce, can you outline your fatigue management policy both in relation to on roster shifts and pre and post shifts.	Pembroke expects to be able to manage fatigue risks such that local employees who live within a one hour drive of the Project would be able to travel between home and the Project daily. As described in Section 6.4.3 of the SIA, Pembroke will investigate and implement best industry practices with respect to DIDO personnel, including safe post-roster driving times and the potential for shared driving arrangements, to support employment of Isaac and Mackay LGA residents who live outside a safe daily driving distance.
30. Private Submission				
30.1	Project Support	I would like to show my support for the project and encourage the government to approve the application. The benefits to the state, blue and white collar workers and services and supplier organisations will be well received by those directly involved in the construction works and the permanent operations.	Nil.	Noted.
31. Private Submission				
31.1	Project Support	I think Olive Downs Project will bring significant economic benefits to Central Queensland area especially for direct and indirect workforce living in the region including suppliers, small businesses, contractors, local business and service providers. The project will provide up to 1000 permanent job opportunities during mine operational life of the mine and up to 500 jobs during construction. The location of the Olive Downs Project is surrounded by other mines in the area thus minimising environmental impacts whilst creating substantial socio-economic benefits to the region and Queensland State. The Project will be producing metallurgical coal which is main component to manufacture steel. The EIS document has been well written and I believe Pembroke is taking all measures to minimise environmental impact to the region. We need to encourage similar projects in future which bring massive economic benefits to the state and country.	Nil.	Noted.
32. Peabody Coppabella Pty Ltd				
32.1	Adjacent property impacts	1.2 Peabody is a participant in the Coppabella and Moorvale Joint Venture, comprising Peabody, CITIC Australia Coppabella Pty Ltd, Mapella Pty Ltd, KC Resources Pty Ltd and NS Coal Pty Ltd (CMJV Participants). 1.3 The CMJV Participants hold: (a) Mining Leases (ML) 70354 and 70355, both granted on 2 April 2009, and related environmental authority (EA) EPML00380113 ; and (b) Exploration Permit Coal (EPC) 649, granted on 28 October 1997, and related EA EPPR01590313. 1.4 These tenements comprise the Moorvale South Project (Moorvale South), which is located approximately two kilometres north of the Project. The tenements were previously known as and are referred to in the EIS as the Olive Downs North Project. 1.5 Moorvale South is a fully approved open-cut coal mine. Coal production and associated activities will take place within ML70354, and associated haul road infrastructure will be established within ML70355. 1.6 The approved mine layout for Moorvale South is shown in Annexure A of this submission. 1.7 Moorvale South is intended to be operated as a satellite operation of the existing Moorvale Mine, which is also owned by the CMJV Participants . Coal mined from Moorvale South will be transported along the haul road to the coal handling and preparation plant and rail-load out at the Moorvale Mine. This will extend the life of this infrastructure, as production at the existing Moorvale Mine ramps down.	Nil.	Noted.
32.2	Cumulative impacts	Interactions between the Project and Moorvale South 1.8 Peabody does not object in principle to the development of the Project. 1.9 However, Peabody has identified some key omissions in	Broadly: (a) there is an insufficient consideration in the EIS of publicly available information on the cumulative impacts of the development of Moorvale South and the Project; and	Pembroke is continuing consultation with Peabody regarding the issues raised in its submissions and the approach to addressing key concerns, such as direct impacts to lands from Project components, indirect impacts such as flooding, and design of infrastructure such as road upgrades.

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		the draft EIS, which require further consideration by Pembroke.	(b) there is insufficient information in the EIS on the direct impacts of the Project on operations at the adjacent Moorvale South, including to allow those impacts to be appropriately considered and conditioned.	Pembroke requested detailed information from Peabody about the Moorvale South Project design (including levee alignments and road upgrade information) to more accurately predict potential cumulative impacts. A Confidentiality Agreement with Peabody was developed for the sharing of information. Peabody has provided some additional information which Pembroke has used to update the Project flood modelling and road upgrade designs (described in further detail in the responses below).
32.3	Cumulative impacts	<p>2 Cumulative impact assessment</p> <p>2.1 Paragraph 7.3 of the Terms of Reference (TOR) states as follows:</p> <p>'To the extent of the information available, the assessment should endeavour to predict the cumulative impact of the project on environmental values over time and in combination with impacts created by the activities of other adjacent and upstream and downstream developments and landholders-as detected by baseline monitoring. This will inform the decision on the final EIS and the setting of conditions.'</p>	2.2 It is evident from the EIS that Pembroke has not fully considered all available information about Moorvale South in conducting this cumulative impact assessment.	
32.4	Cumulative impacts	<p>Cumulative flood impacts - EIS Section 4 and Appendix F</p> <p>2.3 With respect to flooding impacts, the TOR requires Pembroke to:</p> <p>(a) comply with the Information Guidelines for the Independent Expert Scientific Committee advice on coal seam gas and large coal mining development proposals (IESC Information Guidelines); and</p> <p>(b) in accordance with the IESC Information Guidelines, consider the cumulative water- related impact of the Project in the context of past, present, and reasonably foreseeable actions.</p> <p>2.4 In addition, the TOR states that the EIS should aim to 'ensure the risk of, and the adverse impacts from flooding hazards or dam failure are avoided, minimised or mitigated to protect people, property and the environment' (emphasis added).2 In turn, the EIS must 'present feasible alternatives of the project's configuration (including individual elements) that may improve environmental outcomes' (emphasis added).</p> <p>2.5 The flooding assessment for the Project fails to adequately assess, and propose appropriate mitigation measures in response to, the cumulative impacts from the Project, Moorvale South and surrounding land uses</p> <p>2.6 The existing Moorvale South EA requires the construction of temporary flood levees around the southern and eastern boundaries of ML70354, to protect mining pits from potential inundation from flood waters. The Moorvale South levees will be located on the northern side of the Isaac River.</p> <p>2.7 The Project proposes to excise part of the Isaac River floodplain during operation, which the EIS has identified will increase flood levels in areas adjacent to and upstream of the Project. The EIS contemplates the construction of various temporary flood levees at the Olive Downs South domain, including on the southern side of the Isaac River. As these levees are proposed to be retained for the duration of the Project (some 79 years), Peabody understands that the levees will remain in place for the duration of its proposed operations at Moorvale South (which is likely to be operating concurrently with the Project).</p>	Nil.	Pembroke is consulting with Peabody. The draft EIS has been prepared based on the information publicly available within the Moorvale South EMP and the Environmental Authority. Notwithstanding, Pembroke has signed a Confidentiality Agreement with Peabody to allow for sharing of information and modelling. Peabody has supplied their levee alignment which Pembroke has used to conduct more detailed flood modelling. The modelling is being conducted by Peabody's flood consultant and using Peabody's flood model. The modelling has identified where adjustments to the design of the Moorvale South levee are required. Pembroke and Peabody have maintained regular communication regarding the modelling and both parties are working towards resolution of the concerns raised in Peabody's submission.
32.5	Cumulative impacts	<p>2.8 The EIS asserts, though inconsistently, that the construction of the Project, and particularly, the construction of a levee on the opposite side of the Isaac River to Moorvale South, will result in negligible water velocity and power increases in areas adjacent to the approved levee at Moorvale South.4</p> <p>2.9 However, the flood assessment in Appendix F of the EIS asserts that:</p> <p>'For the purposes of flood modelling, a conservative levee was assumed to be located at the most downstream section of Olive Downs North Project area [now Moorvale South]. As a result, the flood levels at the modelled location of the Olive Downs North levee could potentially increase by up to 0.5 m, 0.7 m, and 1.6 m during 2% AEP, 1% AEP and 0.1% AEP flood events respectively at the most southern section, due to</p>	<p>2.10 This reverses the correct position. It would mean that the CMJV Participants would carry costs associated with levee redesign and improved levee construction as a result of the cumulative impacts of the two projects. It also assumes that it will be possible and feasible for the levee at Moorvale South to be adjusted such that it can withstand additional water flow speed and depth caused by Pembroke's later approved Project, without compromising the coal resource at Moorvale South, for example as a result of necessary repositioning or enlargement of the Moorvale South levees.</p> <p>2.11 Further, it demonstrates that Pembroke has failed to adequately consider feasible alternatives and appropriate mitigation measures in relation to the cumulative impacts of its works on the floodplain. Instead, Pembroke is seeking to handball that requirement to the pre-approved upstream coal miner. This is clearly unacceptable.</p> <p>2.12 Peabody holds deep concerns that, if the Project is allowed to</p>	Pembroke is consulting with Peabody. The draft EIS has been prepared based on the information publicly available within the Moorvale South EMP and the Environmental Authority. Notwithstanding, Pembroke has signed a Confidentiality Agreement with Peabody to allow for sharing of information and modelling. Peabody has supplied their levee alignment which Pembroke has used to conduct more detailed flood modelling. The modelling is being conducted by Peabody's flood consultant and using Peabody's flood model. The modelling has identified where adjustments to the design of the Moorvale South levee are required. Pembroke and Peabody have maintained regular communication regarding the modelling and both parties are working towards resolution of the concerns raised in Peabody's submission.

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		the Olive Downs Coking Coal Project. That is, the final design and construction of the Olive Downs North levee (when installed) should be undertaken cognisant of the potential flood level increases/afflux, noting however that the predicted flood level increases may be less subject to the installed levee location' (emphasis added).	proceed on the basis of the underlying assumptions in the EIS, this will result in materially significant additional costs for the CMJV Participants, and possible resource sterilisation, as a result of potential project re-design. 2.13 Based on the above, Peabody submits that Pembroke must review the flooding assessment for the Project in order to properly assess and mitigate the potential risks from the Project on the surrounding people, property and the environment, including by proposing feasible alternatives in light of the cumulative impacts of the Project and Moorvale South.	
32.6	Cumulative impacts	Other cumulative impacts 2.14 The TOR requires that the EIS specifically consider the cumulative impacts of the Project in relation to potential dust ⁵ , noise ⁶ and water ⁷ impacts. 2.15 Further, paragraph 5.1 of the TOR provides that the aim of the EIS is to ensure that 'a// relevant environmental, social and economic impacts of the project are identified and assessed, and to recommend mitigation measures to avoid and minimise adverse impacts' (emphasis added).	Nil.	Noted.
32.7	Surface water impacts	Other cumulative impacts 2.14 The TOR requires that the EIS specifically consider the cumulative impacts of the Project in relation to potential dust ⁵ , noise ⁶ and water ⁷ impacts. 2.15 Further, paragraph 5.1 of the TOR provides that the aim of the EIS is to ensure that 'a// relevant environmental, social and economic impacts of the project are identified and assessed, and to recommend mitigation measures to avoid and minimise adverse impacts' (emphasis added).	Nil.	Noted.
32.8	Groundwater bores	Groundwater- EIS Section 4, Appendix D 2.17 Bore 8 is a private bore, located on the Isaac River between the Project and Moorvale South. The bore is located within CMJV's EPC 649. 2.18 It is possible that both Moorvale South and the Project will have impacts on the groundwater level or yield performance of this bore, and will give rise to an associated 'make good' liability as a result of the cumulative impacts.	2.19 Peabody submits that the EIS has not appropriately considered the cumulative impacts on Bore 8.	Bore 8 intersects the Isaac River alluvium, is equipped with a submersible pump and is used for stock water supply. The predicted decline in groundwater level of 3.6 m at Bore 8 has the potential to impact on groundwater supply from the bore. Based on the mine schedule, alluvial groundwater at Bore 8 is expected to recover to approximately 50% pre-mining levels during the life of the Project (Section 4.3.3 of the draft EIS). Although not provided in the draft EIS, Pembroke's hydrogeologist (HydroSimulations) has confirmed that the predicted drawdown of 3.6 m at Bore 8 is largely attributable to the Project, and that Moorvale South is predicted to result in a negligible impact to this bore. As such, Pembroke would enter into a make-good agreement through consultation with the owner of this bore (e.g. resetting the pump set at an appropriate depth for water supply, accounting for the predicted groundwater drawdown), which would be detailed in the Water Management Plan being prepared for the Project. In addition, Pembroke proposes to establish an appropriate monitoring network to assess the potential impacts from Moorvale South and the Project. Pembroke has engaged with the owner of Bore 8 to discuss the proposed development of the monitoring program and make-good agreement. In addition to the above, Pembroke will consult with Peabody during the development of the Water Management Plan for the Project regarding the proposed groundwater monitoring program.
32.9	Cumulative impacts	Noise, dust and vibration - EIS Section 4, Appendix G, Appendix K 2.20 While the EIS acknowledges the potential for cumulative impacts as a result of the Project and Moorvale South, and in parts, specifically references the Moorvale South Environmental Management Plan (EMP), the EIS does not appear to adequately consider the content of the EMP or the other approvals for Moorvale South in relation to noise, vibration, and dust impacts. 2.21 For example, Appendix G (air quality and greenhouse gas assessment) and Appendix K (noise and vibration assessment) of the EIS fail to identify any of the existing approvals or studies for Moorvale South in relation to the predicted dust, noise and vibration impacts of Moorvale South, which will operate concurrently with the Project. In turn, Pembroke has failed to propose trigger levels to achieve appropriate impact mitigation in light of the likely cumulative impacts of the projects, and instead has focused on localised impacts specific to the Project.	Nil.	The cumulative assessments provided in the draft EIS considered the Moorvale South Project to the extent that project information was available. The level of information within the Moorvale South EMP was insufficient to accurately model the potential air, noise and vibration impacts of the Moorvale South Project (e.g. details such as disturbance areas, coal/waste extraction rates, likely mobile equipment locations in each year and blast designs was unavailable). Despite this, the sensitive receivers in the wider locality are not expected to experience elevated noise/dust levels from the both projects simultaneously. This is because, when winds are blowing from the south-west, a receiver to the north-east of the Project would experience elevated noise/dust levels associated with the Project, however under these conditions the same receiver would experience decreased noise/dust levels from the Moorvale South Project. It is anticipated that the blast scheduling at the Project and the Moorvale South Project would be conducted to prevent simultaneous blasts causing a cumulative impact on sensitive receivers. Notwithstanding, as described in Sections 4.5.4 and 4.9.4 of the draft EIS, the proposed proactive and reactive mitigation and management strategies for air quality and noise are considered robust, and would allow Pembroke to maintain compliance with relevant criteria even with additional dust and noise generating activities in the region. In addition, Pembroke will continue to consult with Peabody during the development of the air quality, and noise management plans for the Project.
32.10	Cumulative impacts	Conclusion 2.22 Unless properly mitigated, the cumulative development has the potential to compromise the ability for Moorvale South to be operated in accordance with its pre-existing approvals.	2.23 Peabody submits that: (a) further assessment is required to enable Pembroke to properly address, in a supplementary EIS, the potential cumulative impacts of its Project when considered together with those of Moorvale South; (b) further measures should be adopted by Pembroke in the EIS to	Refer to responses 32.4, 32.8 and 32.9.

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			<p>minimise the operational impacts on Moorvale South as a result of the cumulative development; and</p> <p>(c) these cumulative impacts should be expressly considered by the Coordinator-General when preparing the draft EA.</p>	
32.11	Adjacent property impacts	<p>3 Direct impacts</p> <p>3.1 It is also evident that the EIS has not adequately addressed the likely direct impacts of the Project on Moorvale South.</p>	3.2 With particular focus on infrastructure interface issues, Peabody considers that changes to the Project are required to mitigate the likely detrimental impacts that the Project may have on the adjacent Moorvale South and other surrounding land uses.	
32.12	Adjacent property impacts	<p>Potential impacts on Moorvale South levee - EIS Section 4 and Appendix F</p> <p>3.3 In addition to the inadequate cumulative impact assessment, Pembroke has failed to assess the potential impacts of Pembroke's proposed works on the Moorvale South levee. When constructed, the Moorvale South levee will be safe and stable. Increased flooding and water flow impacts caused by Pembroke's works may well undermine that stability.</p>	<p>3.4 Pembroke has failed to have any regard to this in the EIS.</p> <p>3.5 As Moorvale South is already an approved development, the CMJV Participants should not be required to vary the design and construction of the Moorvale South levee to accommodate these subsequent changes in the surrounding environment. Accordingly, the grant of any EA for the Project should include appropriate conditions to ensure that this Project does not impact on the effectiveness of the Moorvale South levee.</p>	Pembroke is consulting with Peabody. The draft EIS has been prepared based on the information publicly available within the Moorvale South EMP and the Environmental Authority. Notwithstanding, Pembroke has signed a Confidentiality Agreement with Peabody to allow for sharing of information and modelling. Peabody has supplied their levee alignment which Pembroke has used to conduct more detailed flood modelling. The modelling is being conducted by Peabody's flood consultant and using Peabody's flood model. The modelling has identified where adjustments to the design of the Moorvale South levee are required. Pembroke and Peabody have maintained regular communication regarding the modelling and both parties are working towards resolution of the concerns raised in Peabody's submission.
32.13	Traffic impacts	<p>Use of Annandale Road to access Olive Downs South domain - EIS Section 4 and Appendix J</p> <p>3.6 With respect to transport impacts, the TOR provides that the construction and operation of the Project should aim to:</p> <p>(a) maintain the safety and efficiency of all affected transport modes for the Project workforce and other transport system users;</p> <p>(b) avoid or mitigate impacts on the condition of transport infrastructure; and</p> <p>(c) ensure any required works are compatible with existing infrastructure and future transport corridors.</p>	3.7 For the reasons outlined below, Peabody submits that the EIS fails to adequately assess the traffic impacts of the Project in the context of the surrounding developments and approved land uses.	<p>The draft EIS was prepared on the information publicly available within the Moorvale South EMP and the Environmental Authority. This level of information was insufficient to accurately assess the potential traffic impacts of the Moorvale South Project (e.g. the Moorvale South EMP did not include anticipated traffic movements, the number and frequency of haul trucks utilising the haul road or any management measures for the proposed intersection between the haul road and Annandale Road), and no additional information, to allow the assessment of the Moorvale South Project traffic flow, was provided in Peabody's response on 18 December 2018.</p> <p>Notwithstanding the above, additional information regarding the proposed design of the road upgrades is provided in Section 16 of the Additional Information to the EIS.</p> <p>In addition to the above, Pembroke and Peabody have requested a meeting with the IRC to review the Moorvale South haul road crossing agreement formed between Peabody and the IRC. Pembroke and the IRC are currently developing a detailed upgrade design for the Annandale Road for the Project. As part of these upgrade works, Pembroke, Peabody and the IRC will agree on a design for the Moorvale South haul road intersection such that it can be constructed as part of the Annandale Road upgrade works.</p>
32.14	Traffic impacts	<p>Vehicle interactions with Moorvale South haul road</p> <p>3.8 To access the Olive Downs South domain, Pembroke proposes the use of Daunia Road (from the Peak Downs Highway), connecting to Annandale Road and then a new intersection and private access road to the mine area.</p> <p>3.9 The road transport assessment in Appendix J of the EIS states that there is currently minimal traffic using Annandale Road. Further, it states that, following construction of the access road and upgrade of Annandale Road, the majority, if not all of the traffic utilising Annandale Road would be Project-related traffic.8</p>	<p>3.10 While Pembroke has acknowledged the existence of the MIs at Moorvale South, this statement appears to disregard the approved use of ML70355 as a haul road, which intersects Annandale Road. Information on vehicle movements along the haul road is contained in the EMP, which Pembroke has referenced in other sections of the EIS - but has failed to consider in the road transport assessment.</p> <p>3.11 The EIS does not appropriately assess the interaction of vehicle movements along Pembroke's proposed access road and vehicle movements along the approved haul road within ML70355, particularly at this intersection. These matters should be addressed in a supplementary EIS, with specific details about how these interactions will be minimised and safely managed.</p>	
32.15	Traffic impacts	<p>Upgrades to Annandale Road</p> <p>3.12 Pembroke has proposed to widen and upgrade the road pavement along Annandale Road. Peabody is concerned that insufficient information has been supplied as to the extent of these upgrades, and whether they are appropriate and sufficient having regard to the approved Moorvale South traffic flow.</p>	3.13 Peabody submits that any EA for the Project should require Pembroke to collaborate with the CMJV Participants with respect to road and intersection upgrades in order to ensure that their existing rights for Moorvale South are maintained.	
32.16	Adjacent property impacts	<p>Proposed biodiversity offsets - EIS Section 4 and Appendix A</p> <p>3.14 Pembroke has proposed a staged environmental offset to compensate the impacts arising from the construction of the water pipeline, ETL, rail spur, access road, and approximately the first five years of mining.</p> <p>3.15 The 'Stage One Offset Area' is comprised of three distinct areas located on the eastern side of the Isaac River, and covering an area of approximately 6,065 ha.9</p> <p>3.16 The Stage One Offset Area overlaps EPC 649 held by the CMJV Participants as well as other exploration tenure held by related entities of the CMJV Participants (EPCs 676 and 721).</p> <p>3.17 In this regard, the TOR expressly requires the EIS to consider 'any existing mining, petroleum, geothermal and greenhouse gas storage tenures underlying or adjacent to the project, and any to be applied for as part of this project and the potential for resource sterilisation'.10 The TOR in turn requires a discussion of proposed measures to mitigate those impacts.</p>	<p>3.18 While Pembroke has acknowledged that the Project is located within parts of EPCs 649, 676 and 721, Peabody is concerned that Pembroke has failed to acknowledge that this proposed Stage One Offset Area overlaps potential and identified coal resource areas within exploration tenure held by the CMJV Participants. In doing so, the EIS fails to identify the impacts of the proposed offsets on the CMJV Participant's exploration tenures, or any measures by which to mitigate these impacts in accordance with the TOR.</p> <p>3.19 Accordingly, if this overlap area is allowed to be locked up by Pembroke for land-based biodiversity offsets, it will likely result in the sterilisation of coal resources. No mitigation measures have been proposed in this regard.</p> <p>3.20 The manner in which Pembroke has addressed this aspect of the TOR is therefore inadequate.</p>	Section 2.2.1 of the draft EIS acknowledges that parts of the Project are located within EPC 649, however, Pembroke confirms that the proposed Stage 1 offset area does not overlap EPC 676 or EPC 721. In addition, the Stage 1 Offset Area has been specifically designed to avoid MDL 3023. Notwithstanding, the potential overlap of exploration permits does not restrict Pembroke's rights to secure the area for biodiversity offsets under a legally binding mechanism.

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32.17	Adjacent property impacts	<p>Location of proposed 66kV electricity transmission line - EIS Section 2</p> <p>3.21 The Project proposes construction of a 66kV electricity transmission line (ETL) from the Broadlea substation to the Olive Downs South domain. The ETL will cross ML70355 held by the CMJV Participants and will run along the northern boundary of ML70354.</p> <p>3.22 The approved location of North Pit A on ML70354 sits close to the northern boundary of ML70354, and therefore in close proximity to the ETL.</p> <p>3.23 Again, the TOR expressly requires the EIS to consider the impacts on, and related mitigation measures for, 'any existing mining, petroleum, geothermal and greenhouse gas storage tenures underlying or adjacent to the project, and any to be applied for as part of this project and the potential for resource sterilisation'.¹¹</p>	<p>3.24 Pembroke has asserted that development of the Project will not sterilise any coal resources that would otherwise be accessed by other mining operations.¹² While Section 2 of the EIS acknowledges the existence of ML7035413, the EIS does not adequately address the interaction between mining operations on ML70354 and the location of this proposed ETL adjacent to the mining lease. In particular, Peabody is concerned that Pembroke has not adequately considered the potential impacts of blasting activities on ML70354, and the adverse impact that these activities may have on the structural integrity of the electricity infrastructure.</p> <p>3.25 The proposed ETL also crosses EPC 649 arid MDLA3034 (which was applied for by the CMJV Participants after the preparation of the EIS). Similarly, while Pembroke has acknowledged that parts of the ETL are located within EPC 649, the EIS does not adequately address the interaction between the ETL and activities authorised under these tenements. Peabody is concerned that failure to adequately consider the interaction of Pembroke's ETL on the CMJV Participant's mining and exploration tenements may result in sterilisation of coal resources. No mitigation measures have been subsequently proposed in this regard in accordance with the TOR.</p> <p>3.26 Further, the EIS fails to address the interaction between the approved haul road within ML70355 and Pembroke's proposed ETL, which will run adjacent to that haul road and is unclear on whether it crosses that haul road.</p> <p>3.27 In light of the above, Peabody submits that the proposed ETL must be designed to reduce its impact on activities at Moorvale South and associated haul road activities, and on potential sterilisation of coal resources on the CMJV Participant's exploration tenure.</p> <p>4.1 Peabody submits that the above matters must be addressed by Pembroke in a supplementary EIS and that the draft EA includes appropriate conditions to mitigate impacts.</p>	<p>Yurika (a company associated with Energy Queensland) is managing the development of the proposed ETL. Operations at Moorvale South would be considered by Yurika during the detailed design stages of the ETL and should not be impeded such that there are any constraints on activities associated with mining proposed by Peabody. The ETL was specifically located to the west, and outside of the Moorvale South ML 70354 so as not to impact on the approved operation. The route then continues to follow the western boundary of ML 70354 to the north along the approved Moorvale South haul road. As the ETL is outside the ML 70354, and would be designed in consideration of the Moorvale South approved operations, impacts to the ETL from blasting are not predicted.</p> <p>At the time of the design of the ETL alignment and submission of the draft EIS, no information on mining reserves within Peabody's EPC 649 had been published, nor did MDL 3034 exist. The Project ETL alignment runs along the southern and eastern boundaries of MDL 3034. Pembroke and Peabody are discussing the potential development of the resource within MDL 3034 in consideration of the Project ETL. Given the Project ETL would run along the southern and eastern boundaries, the ETL is not expected to prevent Peabody developing the resource within MDL 3034.</p>
33. Queensland Health				
33.1	Project Description	The Proponent has not described how they will manage the disruptions of utilities (water, electricity and gas) serving health facilities.	<p>Describe how disruptions of utilities (water, electricity and gas) will be managed while serving health facilities.</p> <p>The proponent has identified local health facilities in the area.</p> <p>A 66 kV ETL and switching/substation would be constructed to connect to the existing regional power network at the Broadlea Substation.</p>	Pembroke does not anticipate that there will be any disruptions to utilities (i.e. water, electricity and gas) as a result of the construction and operation of the Project. The utility providers (i.e. SunWater and Yurika) will be responsible for connecting the Project pipeline and ETL to the regional water and power networks, respectively.
33.2	Impact to health services	The Proponent has not described how they will manage the delivery of health services to the construction and operation workforce and or support/strengthen local health services.	<p>Describe how the proponent will manage the delivery of health services to the construction and operation workforce to the construction and operation.</p> <p>Service providers have indicated that population stimulus in Middlesmount and Dysart would be welcomed to increase service provision, support the growth of the allied health model, and potentially improve recruitment options.</p>	<p>A Community Health and Wellbeing Plan is being prepared for the Project which will describe how the level of service provided to the local community by existing social and health services will be maintained during construction and operation of the Project. The Community Health and Wellbeing Plan will be prepared in consultation with the IRC, general practitioners in Moranbah and Dysart, Mackay District Health and Hospital Service, Rural and Mental Health, Northern Queensland Primary Health Network, Queensland Police Service, Queensland Ambulance Service and Queensland Fire and Emergency Service.</p> <p>Measures to manage health service impacts will include ensuring Mackay District Health and Hospital Services, local hospitals and local GPs have sufficient and timely information to plan for increased service capacity. To reduce demands on local services during construction, Pembroke will:</p> <ul style="list-style-type: none"> employ or require its construction contractor to employ an on-site paramedic from the commencement of construction, to manage minor health issues on site, and develop health and wellbeing programs focused on physical and mental health; develop a contract with a medical service provider to provide workplace health services including health promotion programs and access to a GP for employees living in the Civeo Coppabella Village; and ensure personnel are made aware of the need to attend to routine health issues whilst they are off roster; and ensure Project personnel have access to an Employee Assistance Program for support with mental health issues. <p>During the first three years of operations, Pembroke will:</p> <ul style="list-style-type: none"> liaise with Mackay Hospital and Health Services, and Moranbah and Dysart Hospitals to provide advice on workforce numbers, project timeframes, and on-site/ WAV-based service provision; make arrangements with GP clinics to ensure that all operational personnel have health assessments in compliance with Coal Mine Workers' Health Scheme, which requires health assessments when personnel enter the industry and then at least every 5 years while employed in the industry; and

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				<ul style="list-style-type: none"> seek participation from Moranbah and Dysart Hospital on the Project's Community Reference Groups to collectively monitor Project impacts on local health services, and identify any additional mitigations required to mitigate impediments to local service access. <p>In addition, Pembroke will work with local health services to identify opportunities to provide health services and programs which both staff and other community members can benefit. This will include partnerships to increase the availability of e.g. men's health checks, skin cancer checks, breast screening or mental health promotion, and will be identified in liaison with local stakeholders during the first year of operation.</p>
33.3	Water Supply	<p>2.4.9 Water Supply Pipelines and Potable Water Treatment Plants</p> <p>Description of source and storage however no details provided on treatment or monitoring.</p>	<p>A description of how water will be sourced however little information is provided regarding treatment and ongoing monitoring, to ensure its quality and protect it from cross-contamination and other potential contaminants.</p> <p>Drinking water must comply with the Australian Drinking Water Guidelines 2004, published by the National Health and Medical Research Council. A water quality monitoring program should be developed and implemented.</p> <p>Potable water will be regularly tested to ensure it complies with the Australian Drinking Water Guidelines 2004.</p>	<p>It is anticipated that potable water supply would be trucked to site during construction. Once the raw (external supply) water pipeline is constructed and commissioned it would be suitable for potable water supply purposes.</p> <p>In the event of raw (external water) supply being unavailable, a package potable water treatment plant would be utilised to treat water from the Raw Water Dam to produce potable water in accordance with the National Health and Medical Research Council's (NHMRC) Australian Drinking Water Guidelines (NHMRC, 2011), and be developed generally in accordance with the Queensland Water Resources Commission (QWRC), Guidelines for Planning and Design of Urban Water Supply Schemes (QWRC, 1989) and relevant Australian Standards. Pembroke will assess potential risks associated with producing potable water from alternative sources, if required.</p> <p>The potable water treatment plant at the Olive Downs South domain would accommodate a maximum daily volume of approximately 100 kL, and up to approximately 36 ML per year at full development.</p> <p>Potable water would be stored in a potable water tank of 250 kL capacity in the Olive Downs South domain mine infrastructure area, and the reticulation system would distribute potable water to the administration building, bathhouse, covered muster area, maintenance facilities, sewage treatment plant and CHPP buildings.</p> <p>Potable water would be regularly tested to ensure it complies with the Australian Drinking Water Guidelines (NHMRC, 2011).</p> <p>Details on treatment and monitoring of potable water supply is described in Section 2.4.9 of the draft EIS.</p>
33.4	Water Supply	<p>2.4.9 Water Supply Pipelines and Potable Water Treatment Plants</p> <p>No comments are provided regarding backup water supplies risk assessment or contingency plans.</p>	<p>Drinking water may be contaminated from many sources and therefore a separate risk assessment may be provided with a water contingency action plan. Such area of concern could include rainwater harvest, potable water supply from a dam, man aging algae blooms and turbidity.</p> <p>Information lacking regarding a package potable water treatment plant that will be used to treat Raw Dam water. However it is stated that raw water will be treated to ensure it complies with the Australian Drinking Water Guidelines 2004</p>	Refer to response 33.3.
33.5	Community and stakeholder engagement	<p>Stakeholder engagement</p> <p>Stakeholders were invited to provide input through a community survey and community workshops, and follow-up interviews with non-government and State agency representatives on specific issues. A degree of engagement fatigue for residents and organisations was noted, however it is not clear how many of the 153 responses were from traditionally under-represented groups or where population trends are outlined e.g., young or older populations, Aboriginal and Torres Strait Islander people or those with low incomes. Diverse representation is important to ensure potential impacts for these groups are identified and addressed appropriately.</p>	<p>Suggest that specific strategies for continued engagement with these groups are included in the Stakeholder engagement plan in order to identify ongoing impacts as the project progresses. For example on access to education, training and employment opportunities for young and Indigenous people; increases in the cost of living and fresh food; housing affordability and service impacts related to an increasing population of older residents.</p> <p>Local young people and local seniors included in proposes representation on Community Reference Groups</p>	Queensland Health's recommendation for representation on the Community Reference Groups is noted. The Community Reference Groups will be the appropriate platform for maintaining engagement with the local communities, and Pembroke is committed to continue engagement with all relevant groups in the region.
33.6	Social impacts	<p>Government agencies and social infrastructure providers Health</p> <p>Community engagement noted the consistent reference to mental health issues by health agencies, some pressures on health and emergency services, and challenges in attracting and retaining doctors as well as a strong regional focus on the Closing the Gap initiative and a successful Indigenous health promotion initiative.</p> <p>Concerns were reflected by community members with 86% or more survey respondents from each community except Middlemount indicating that their community needed more community and health services.</p>	<p>Suggest stakeholder feedback is better reflected in agreed strategies for example;</p> <p>Monitoring of service provision for mental health and alcohol and other drugs for capacity constraints and options to address project impacts</p> <p>Further detail about outcomes and evidence for potential expansion of the Indigenous health promotion initiative noted page 25</p> <p>6.8.1 Incidence of workers' mental health issues (including alcohol and drug issues), to be monitored in co-operation with local mental health service providers.</p> <p>Indigenous health promotion initiative not addressed</p>	As described above, a Community Health and Wellbeing Plan is being prepared for the Project. A Workforce Housing and Accommodation Plan is also being prepared. Both of these plans are being prepared in consultation with a number of relevant groups. The plans will include the outcomes of stakeholder feedback obtained during their preparation, and during preparation of the EIS.
33.7	Social impacts	<p>4.6.1 Individual characteristics and behaviours 4.10 Summary of baseline indicators</p> <p>Social Health Atlas of Australia (PHIDU) data identified obesity,</p> <p>smoking, high alcohol use, low physical activity levels and lower than state levels of self-reported health for the study area. These risk factors contribute to reduced health and wellbeing, increased chronic disease and significant impacts</p>	<p>Suggest including;</p> <ul style="list-style-type: none"> - A greater focus on the inclusion of specific strategies to enhance wellbeing and prevent ill health across the population. For example, health promotion initiatives that address lifestyle risk factors through increasing physical activity levels, healthy eating and reducing smoking and unhealthy alcohol consumption. - Additional health and wellbeing indicators to provide a baseline and inform monitoring, health service planning and the provision of health 	As described above, a Community Health and Wellbeing Plan is being prepared for the Project. This will include commitments for health promotion initiatives, education and training initiatives, childcare availability, community development funding and monitoring of relevant indicators. The Community Health and Wellbeing Plan is being prepared in consultation with relevant health and community service groups in the region.

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		on productivity due to reduced workforce participation. Table 4-45: Summary of key indicators	<p>promotion programs (e.g. obesity, smoking, physical activity, healthy eating, injury, mental health, alcohol and drug problems)</p> <p>- Additional indicators for:</p> <p>- Workforce profile and labour availability for groups of concern i.e. young and Indigenous people</p> <p>- Education, training and employment pathways available / taken up / attained - including by 15-25 year old's and Indigenous people)</p> <p>- Childcare and early years places available</p> <p>- Community development and investments to develop and maintain social infrastructure. e.g. funding, support, and partnerships noted in section 6.6</p> <p>Potential resources to assist with this include Queensland Health Regional detailed data for adults and children and Chief Health Officer report for current data and trends.</p> <p>Additional indicators include</p> <p>- number of Indigenous people and</p> <p>- number of people 16 – 25 years employed by the Project</p> <p>- Monitoring of childcare places included at 5.5.2, 6.3.3 and 6.4.7</p>	
33.8	Employment	<p>Social impacts and opportunities - 5.2.8 Employment equity</p> <p>Indigenous people - Section 5.2.2 outlines Indigenous labour force participation in 2016 including unemployed adults and young people and children who will reach working age during the Project's operational term. From this it is estimated that at least 50 Indigenous people would be potentially available for work across the Isaac and Mackay Local Government areas.</p> <p>Young people - In the Mackay and Isaac regions, youth unemployment in June 2017 was almost twice the general rate. A combined potential pool of unemployed young people of at least 849 people is estimated.</p>	<p>Suggest increasing the goals for employment of Indigenous people to better address Closing the Gap targets.</p> <p>Suggest establishing goals for the employment of young people aged 16 -24 years to better address identified issues around lack of aspiration, retention and employment of young people in the regions.</p> <p>Goals not increased</p> <p>No goals established but 6.8 includes number of people 16 – 25 years employed by the Project as a performance measure</p>	<p>Pembroke has formed an agreement with the Barada Barna Aboriginal Corporation. As described in Section 5.2.8 of the SIA (Appendix H of the draft EIS), Pembroke and the Barada Barna Aboriginal Corporation have agreed on goals for employment of Indigenous people (not limited to the Barada Barna people):</p> <ul style="list-style-type: none"> • nine Indigenous employees during Years 1-10 of operations; • 14 Indigenous employees during Years 11-15 of operations; and • 28-30 Indigenous employees from Year 16 of operations. <p>Pembroke acknowledges these goals can be exceeded, pending availability of suitably qualified candidates.</p> <p>Further to this, Pembroke has committed to supporting the Barada Barna Aboriginal Corporation to establish and operate a Training Centre at Nebo to develop and offer work readiness and certified qualification programs to Indigenous people (not limited to the Barada Barna people). Pembroke will consider other opportunities to employ Aboriginal and Torres Strait Islander people during future revisions of the Health and Community Wellbeing Plan.</p> <p>Goals for the employment of young people have not been established for the Project, however Pembroke has committed to offering school-based traineeships and apprenticeships to local students and young people, and partnering with schools to assist students with career enhancement (Section 6.4.5 of the SIA Appendix H of the draft EIS).</p>
33.9	Social impacts	<p>5.5.2 Social infrastructure Operations</p> <p>Childcare – while it is noted that there are 13 early childhood education and care services available in the region, the number of places available is not provided. Stakeholder engagement indicated that child care availability was an issue of concern with no service available in Nebo and limited availability in other towns including Moranbah.</p> <p>It is unclear how the capacity of existing facilities to manage numbers of children will be monitored.</p>	<p>Childcare - Suggest including an indication of the number of places available in each location to monitor how capacity may change over time – similar to for school enrolments</p> <p>5.5.2 Operations</p> <p>Through consultation with the IRC, Pembroke will monitor the availability of childcare places in each of the four towns during the first five years of operation. If consultation with IRC and childcare providers indicates that Project demand exceeds capacity, Pembroke would liaise with local childcare providers, the Department of Communities Child Safety and Disability and IRC to identify potential responses.</p> <p>6.3.3 Engagement actions</p> <p>During the pre-approval phase, Pembroke will meet with IRC to discuss: - childcare capacity, Project demand and potential responses if demand is likely to exceed current/planned childcare supply. The outcomes of initial engagement with IRC will include input to refinement of the management strategies, and agreement on the forward program for engagement between IRC and Pembroke.</p> <p>6.4.7 During the construction phase, and as operational workforce numbers are refined, Pembroke will assess childcare capacity in Moranbah, Dysart, Nebo and Middlemount. The results of this assessment will be discussed with IRC and the Department of Communities, Child Safety and Disability Services (DCCSDD), with ongoing engagement potentially required to develop collaborative responses if childcare capacity is not adequate or appropriate to Project demand.</p>	<p>The Community Health and Wellbeing Plan (currently being prepared for the Project) has identified the availability of childcare services in Moranbah was as follows:</p> <ul style="list-style-type: none"> • Excellence in Care Family Day Care Scheme (servicing Moranbah and surrounding towns) had vacancies on all week days for children 6 weeks to 5 years, and for children 5 year to 12 years in out of school hours care; • C&K Moranbah Community Kindergarten had vacancies for children 4 to 5 years on all weekdays; • Bright Kids Afterschool Care had vacancies on all weekdays; • Simply Sunshine Childcare Centre had no vacancies, and a waiting list of approximately six months; and • Moranbah Early Learning Centre had no vacancies in either long daycare or outside school hours care, and an unspecified waiting list. <p>Dysart Daycare had vacancies for all age groups to five years, but there were no vacancies at the Dysart Kindergarten. The C&K Middlemount Community Pre-Schooling Centre had vacancies on some days for all age groups. There is no childcare service located in Nebo.</p> <p>The Project has committed to the following measures to manage operational workforce demands on childcare services:</p> <ul style="list-style-type: none"> • notify childcare services (long day care, out of school hours care and family day care services listed in the SIA) to advise of the workforce ramp-up; • during recruitment for operations, consult with all recruits when they are offered employment to identify any childcare needs, and refer them to local services; and • monitoring the availability of childcare places in during the first five years of operation.
33.10	Social impacts	<p>5.6.3 Mental health</p> <p>Research noted in the report suggests that mental health is an area of concern for the mining workers. Mental health was also raised as an issue of concern through the stakeholder engagement process.</p>	<p>Suggest that the incidence of workers mental health (including alcohol and drug issues) and availability of health promotion and treatment services is closely monitored with the option of additional community support being provided.</p> <p>6.8.1 Incidence of workers' mental health issues (including alcohol and</p>	<p>Pembroke has committed to maximising and fostering employee mental health, wellbeing and safety, and to a suite of strategies which will support mental health, wellbeing and recovery from mental illness. The implementation of the Community Health and Wellbeing Plan will include monitoring of the Project workforce's mental health and the availability of health promotion and treatment services.</p>

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			drug issues), to be monitored in co-operation with local mental health service providers.	
33.11	Impacts to infrastructure and services	5.9 Cumulative impacts If the Project's construction peak coincided with that of other current or proposed projects in the region there could be a substantial increase in the Moranbah area during 2019-2021. The majority of non-local people are likely to be based at WAVs, but would access town facilities, and would be equivalent to an increase of 26% on the 10,580 non-resident workers estimated to be in the Isaac LGA.	Suggest providing further clarity about the mechanism to monitor the capacity of council and social infrastructure and for the project to pro-actively address gaps throughout the life of the project.	The Community Health and Wellbeing Plan will describe the monitoring of impact to council and social infrastructure associated with the Project. This will include regular engagement with the IRC and the community through the Community Reference Groups. The Community Health and Wellbeing Plan will be reviewed regularly and updated as required to respond to identified impacts to the capacity of council and social infrastructure.
33.12	Social impacts	6. Social Impact Management Plan - 6.2 Coordination, delivery and review 6.2 Coordination Committee – may benefit from external representation to facilitate an active role for stakeholders in monitoring the Project's impact management strategies throughout the life of the project. For example, Isaac Regional Council, Community Reference Group.	Suggest explore options for external representation on the Coordination Committee	The IRC and Community Reference Groups will be kept informed on the implementation of the SIMP, and will be informed of any updates to the SIMP, as identified during the annual reviews of the document.
33.13	Social impacts	6.3 Community and Stakeholder Management Strategy 6.3.2 Stakeholders – issues identified around childcare and mental health may be addressed by establishing links with additional stakeholders 6.3.3 Stakeholder engagement actions – the importance of engaging with traditionally under-represented groups or where population trends are outlined is noted 6.3.4 Complaints Management – monitoring trends and seeking stakeholder feedback in addressing these can be an important part of building community trust	Suggest exploring options; - for key stakeholders to include: o representatives from childcare providers to monitor concerns about capacity, and o North Queensland Primary Health Network to support links with Primary Health Care and mental health services - to encourage diverse representation from residents including hard to reach groups (e.g. youth, ageing, those on low income) to ensure unintended impacts are identified and addressed - to clarify the mechanism for monitoring trends in complaints and seeking stakeholder input 6.3.2 includes other organisations who are providing services and programs of relevance to the SIMP 6.6.3, 6.4.7 includes consultation with Primary Health Network 6.3.3 includes Local young people and local seniors included in proposes representation on Community Reference Groups 6.3.4 includes If a trend in complaints is noted, e.g. regular or increasing complaints about any issue, Pembroke will consult with relevant stakeholders (e.g. IRC or Queensland Police) to identify the reason for the trend and any corrective actions required.	Queensland Health's recommendations for stakeholder engagement are noted. Pembroke commits to engaging with the following groups during development of the Project: <ul style="list-style-type: none"> childcare providers, as part of the Community Health and Wellbeing Plan; North Queensland Primary Health Network and other relevant health service groups, as part of the Community Health and Wellbeing Plan; and representatives from the community, through the Community Reference Group.
33.14	Workforce management	6.4 Workforce Management Strategy 6.4.3 Recruitment – Women and Indigenous people are identified as priority groups for employment with proposed employment targets, but not young people despite high youth unemployment rates and community concerns about youth retention in the region. 6.4.7 Healthy workplace The provision of health promotion programs is not clear.	Suggest the inclusion of appropriate targets and engagement strategies for youth employment throughout the project similar to those for women and Indigenous people. Suggest inclusion of a healthy workplace policy that supports smoking reduction, the provision of physical activity opportunities and healthy catering in accommodation villages. Suggest providing more clarity on providing coordinated and planned health promotion programs for behaviour change with regards to increasing physical activity, healthy eating, reduced smoking and alcohol consumption. These programs may be delivered by service providers including health promotion officers, nutritionists, and exercise professionals. A Code of Conduct should be one response amongst others that may include the consideration of an alcohol, tobacco and other drugs workplace policy, provision of information to employees about potential harms of smoking, high risk drinking and drug use as well as the provision of options for support including Quitline (137848) and the Alcohol and Drug Information Service (1800 177 833) 6.4.8 includes - establishing a healthy workforce policy; - encouraging the participation of Queensland Health staff in delivery of workforce health promotion strategies addressing physical activity, healthy eating, mental health and reduced smoking, alcohol and other drug use; - promoting use of Quitline (137848) and the Alcohol and Drug	Goals for the employment of young people have not been established for the Project, however Pembroke has committed to offering school-based traineeships and apprenticeships to local students and young people, and partnering with schools to assist students with career enhancement (Section 6.4.5 of the SIA [Appendix H of the draft EIS]). Pembroke supports Queensland Health's suggestion to encourage smoking reduction, encourage physical activities and healthy catering as part of the development of the health workplace policy. Health promotion programs will be developed as part of the Community Health and Wellbeing Plan. Queensland Health's recommendations for health promotion programs will be considered.

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			Information Service (1800 177 822);	
33.15	Impacts to health services	<p>6.6 Health and Community Wellbeing Management Strategy</p> <p>Given the potential strain and cumulative effects on health and social services from the significant population growth expected during project construction and operation, the importance of planning to deal with these impacts before construction begins is noted. The cost to provide community and social services should be a shared responsibility</p> <p>Queensland Health is an important stakeholder with regards to Emergency response arrangements – for example as a front-line responder in emergency situations at the mine</p>	<p>Suggest amending Action Summary 6.6.7 Preconstruction to include planning to meet service gaps in accessing health services, in addition to advising local services of workforce ramp up.</p> <p>Suggest that Queensland Health is included as a stakeholder involved in this planning</p> <p>5.5.2 includes</p> <p>On the Mackay Health and Hospital Service's advice, population-based funding allocations for Queensland Health are not informed by non-resident worker numbers (as calculated annually by QGSO) and as a result, influxes of non-local personnel strain the capacity of health and hospital services.</p> <p>Pembroke will ensure that the Mackay Health and Hospital Service is made aware of the likely workforce ramp up including numbers of residential and non-residential personal, and maintain regular communication with the Moranbah and Dysart Hospitals to monitor demands by Project personnel on health and hospital services.</p>	Pembroke commits to preparing an Emergency Response Procedure prior to the commencement of the Project in consultation with Queensland Health.
33.16	Social Impacts	<p>6.8 Monitoring Program</p> <p>Suggest including additional performance measures as above e.g.</p> <ul style="list-style-type: none"> - employment of young people i.e. Number and percentage of employees aged 16 -24 years - health statistics and data <p>Performance measures include</p> <ul style="list-style-type: none"> - number of people 16 – 25 years employed by the Project - Health promotion activities reported annually in the SIMP review - number of vacancies in local childcare centres 	Nil.	<p>Goals for the employment of young people have not been established for the Project, however Pembroke has committed to offering school-based traineeships and apprenticeships to local students and young people, and partnering with schools to assist students with career enhancement (Section 6.4.5 of the SIA [Appendix H of the draft EIS]).</p> <p>The implementation of the Community Health and Wellbeing Plan will include monitoring of the Project workforce's mental health and the availability of health promotion and treatment services. The monitoring data will be provided to the Community Reference Groups.</p>
34. Department of Environment and Science				
34.1	Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd	<p>On 21 June 2018 The Department of Environment and Science (DES) provided advice on the preliminary draft EIS. It is noted that the majority of the comments provided have not been incorporated into the draft EIS and associated appendices. Refer to Attachment 1 which outlines the comments provided and which remain outstanding.</p> <p>Any outstanding comments will need to be addressed.</p>	Address the comments provided in DES's advice on the preliminary draft EIS (Attachment 1).	<p>Pembroke originally lodged the draft EIS on 18 May 2018 with the OCG for review. As part of this review, DES was asked to provide comment on the adequacy of the draft EIS. The submissions received on the original draft EIS were addressed by Pembroke and a revised draft EIS was lodged with the OCG on 27 July 2018, along with detailed responses to all comments.</p> <p>The OCG subsequently confirmed that the revised draft EIS was deemed to have adequately addressed all comments, including those provided in Attachment 1 of DES' recent submission.</p>
34.2	General (e.g. Appendix N)	Acronym DEHP, defined as Department of Environment and Heritage is now DES, Department of Environment and Science.	Remove DEHP and replace with DES throughout the draft EIS (excluding reference to documents published under EHP or earlier departments).	The most recent terminology is noted and has been used throughout the Additional Information to the EIS where appropriate.
34.3	Draft EIS	<p>The draft EIS chapters are low on detail and do not adequately summarise the information provided in the technical reports and appendices.</p> <p>The draft EIS must be a stand-alone document (based on specialist reports) stating the identified values, potential impacts, avoidance and proposed mitigation measures. Figures and tables must be included to highlight the findings. This has not been adequately provided in this draft EIS. Potential impacts across different disciplines (e.g. ecology, changes of hydrology, etc.) must be summarised and presented in an EIS. Numerous comments are made below, including comments on how different areas must be linked in the assessment.</p> <p>Furthermore, it is noted that the draft EIS refers to other sections or appendices without provided [sic] the required information. As an example: Table 4-5 in Section 4 refers to Hatch (2018a) assessing the potential flow regime changes to adjacent wetlands. It was stated that potential hydrological changes to wetlands would be negligible. The reference cannot be found.</p>	<ol style="list-style-type: none"> 1. Move pertinent information from the appendices into the draft EIS chapters such that the draft EIS provides a more accurate summary of the technical information and provides a synthesis of matters that are common across the technical chapters (e.g. rehabilitation, ecology, offsets). 2. Provide a draft EIS as a stand-alone document which identifies and describes the relevant environmental values, assesses potential adverse and beneficial environmental impacts of the proposed project. 3. Outline the management, monitoring, planning and other measures proposed to avoid, minimise and/or mitigate any adverse environmental impacts of the proposed project. 	<p>Section 4 of the draft EIS was updated and resubmitted in July 2018 to include further detail regarding the potential environmental impacts associated with the Project as described in the specialist appendices. As outlined in response to comment 1, the OCG confirmed that the revised draft EIS was deemed to have adequately addressed all comments received on the original draft EIS.</p> <p>Pembroke considers that moving further information into the main text of the draft EIS would not have any implications for the proposed EA conditions.</p> <p>Section 6 provides a description of the environmental protection commitments proposed as part of the Project and has been updated to include all commitments throughout the draft EIS and these responses.</p> <p>Pembroke has prepared a separate assessment which consolidates all the information from the draft EIS regarding the potential impacts of the Project on GDEs and wetlands. This includes a discussion on the potential impacts of catchment excision and hydrological changes on wetlands surrounding the Project area and is provided in the Additional Information to the EIS.</p>
34.4	Appendix E- Surface Water Assessment Part B 3.2, p.24	This summary of the assessment and regulation of this project does not include mention of the State Development and Public Works Organisation Act 1971 and the potential inclusion of	Include mention of the assessment of this project through the draft EIS process under the State Development and Public Works Organisation Act 1971 and the potential inclusion of stated conditions in the	Attachment 3 of the draft EIS outlines the assessment process for the Project (including the requirements of the SDPWO Act). In addition, Attachment 3 of the Draft EIS identifies that the Department of Environment and Science (DES) will make a decision on issuing a draft EA for the Project.

Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response																																																																																														
		stated conditions in the Coordinator General’s Evaluation Report for the project that must be included on the EA issued under the Environmental Protection Act 1994.	Coordinator General's Evaluation Report for the project that must be included on the EA issued under the Environmental Protection Act 1994.	The draft EA must include any stated conditions included in the Coordinator General's Evaluation Report.																																																																																														
34.5	Attachment 3 - Regulatory Framework A.3.4.2, p.A3-4	<p>This section of the draft EIS describes the requirements under the Environmental Protection Act 1994 (EP Act) and Environmental Protection Regulation 2008 (EP Regulation).</p> <p>The environmental objectives and performance outcomes specified in schedule 5, part 3, tables 1 and 2 of the EP Regulation have not been addressed.</p>	<p>1. Include in section A3.4.2 a paragraph on the requirement of schedule 5, part 3, tables 1 and 2 of the EP Regulation.</p> <p>2. The draft EIS must include assessment against environmental objectives and performance outcomes as required under the EP Regulation for the following matters:</p> <ul style="list-style-type: none">wetlandsgroundwater (refer to several separate comments made).	<p>Each of the draft EIS Main Text Sections for Flora and Fauna (Section 4.1), Water Quality (Section 4.2), Air Quality (Section 4.5), Noise and Vibration (Section 4.9), Land (Section 4.10) and Waste (Section 4.14) of the draft EIS identify the relevant Environmental Objectives and Performance Outcomes listed in Part 3, Schedule 5, Tables 1 and 2 of the EP Regulation.</p> <p>In addition to the assessment of environmental objectives and performance outcomes for wetlands presented in Section 4.1 of the draft EIS and the Aquatic Ecology Assessment (Appendix C of the draft EIS) Pembroke has prepared a separate assessment which consolidates all the information from the draft EIS regarding the potential impacts of the Project on wetlands. This includes a discussion on the potential impacts of catchment excision and hydrological changes on wetlands surrounding the Project area and is provided in the Additional Information to the EIS.</p> <p>Sections 4.2.1 and 4.3.1 of the draft EIS includes a description of the environmental objectives and performance outcomes relevant to groundwater. An assessment of the potential impacts to groundwater is provided in Sections 4.2.3 and 4.3.3 of the draft EIS.</p>																																																																																														
34.6	Section 6 - General Environmental Protection Commitments and Model Conditions, Table 6-2, p.3 to p.45	<p>Adoption of proposed mitigation measures within the EA</p> <p>A number of commitments have been made with regards to the development of rehabilitation related reports, such as a topsoil management plan and rehabilitation monitoring program.</p> <p>These commitments have not been translated into the proposed conditions.</p>	Ensure commitments identified in Table 6-2 and throughout the draft EIS are translated into the proposed EA conditions for inclusion as stated conditions in the Coordinator General's Evaluation Report.	<p>Pembroke has provided a revised list of Proponent Commitments in Section 22 of the Additional Information to the EIS. These include all commitments made throughout the draft EIS and the Additional Information to the EIS, for consideration in the Coordinator-General's Evaluation Report. The commitment to prepare a Topsoil Management Plan and Rehabilitation Monitoring Program are included in Section 22.</p> <p>A number of commitments have also been added as proposed EA conditions (Appendix B of the Additional Information to the EIS) including a number of management plans.</p>																																																																																														
34.7	Draft EIS	Location co-ordinates do not always have latitude/longitude decimal degrees to a minimum of 5 decimal places.	Location co-ordinates should be provided in latitude/longitude decimal degrees to a minimum of 5 decimal places.	<p>Coordinates included in the Proposed Environmental Authority Conditions (Appendix B to the Additional Information to the EIS) have been presented in Easting and Northing (GDA94 MGA Zone 55) consistent with the Model Mining Conditions.</p> <p>The tables below present latitude/longitude decimal degree coordinates for coordinates that were presented as Eastings and Northings in the draft EIS.</p> <p>Table 5-1 Groundwater Assessment (Appendix D of Olive Downs Coking Coal Project Draft EIS)</p> <p>Project Groundwater Monitoring Network</p> <table><tr><th rowspan="2">Hole</th><th rowspan="2">Site</th><th colspan="2">Revised Coordinates</th></tr><tr><th>Latitude</th><th>Longitude</th></tr><tr><td>IF3839P</td><td>GW01s</td><td>-22.17196</td><td>148.38193</td></tr><tr><td>IF3837P</td><td>GW02s</td><td>-22.18086</td><td>148.36912</td></tr><tr><td>IF3838P</td><td>GW02d</td><td>-22.18095</td><td>148.36902</td></tr><tr><td>IF3841P</td><td>GW04</td><td>-22.19462</td><td>148.39095</td></tr><tr><td>IF3835P</td><td>GW06s</td><td>-22.22176</td><td>148.35184</td></tr><tr><td>VP3833P</td><td>GW08s</td><td>-22.24083</td><td>148.41007</td></tr><tr><td>VP3831P</td><td>GW12s</td><td>-22.30483</td><td>148.37375</td></tr><tr><td>VE3827P</td><td>GW16s</td><td>-22.37084</td><td>148.56213</td></tr><tr><td>VE3829P</td><td>GW18s</td><td>-22.39362</td><td>148.52405</td></tr><tr><td>VE3830P</td><td>GW18d</td><td>-22.39366</td><td>148.52385</td></tr><tr><td>VE3825P</td><td>GW21s</td><td>-22.40359</td><td>148.56982</td></tr><tr><td>VE3826P</td><td>GW21d</td><td>-22.40360</td><td>148.56977</td></tr><tr><td>IF3856P</td><td>S7</td><td>-22.18706</td><td>148.37201</td></tr><tr><td>IF3857P</td><td>S9</td><td>-22.19067</td><td>148.37518</td></tr><tr><td>IF3858P</td><td>S11</td><td>-22.19146</td><td>148.38187</td></tr><tr><td>IF3859P</td><td>S10</td><td>-22.18510</td><td>148.38274</td></tr><tr><td>IF3860P</td><td>S8</td><td>-22.18234</td><td>148.38066</td></tr><tr><td>IF3861P</td><td>S6</td><td>-22.17895</td><td>148.37785</td></tr><tr><td>IF3862P</td><td>S4</td><td>-22.17787</td><td>148.37312</td></tr><tr><td>IF3863P</td><td>S5</td><td>-22.17341</td><td>148.37959</td></tr><tr><td>IF3864P</td><td>S2</td><td>-22.17091</td><td>148.37130</td></tr><tr><td>IF3840P</td><td>GW01d</td><td>-22.17196</td><td>148.38191</td></tr></table>	Hole	Site	Revised Coordinates		Latitude	Longitude	IF3839P	GW01s	-22.17196	148.38193	IF3837P	GW02s	-22.18086	148.36912	IF3838P	GW02d	-22.18095	148.36902	IF3841P	GW04	-22.19462	148.39095	IF3835P	GW06s	-22.22176	148.35184	VP3833P	GW08s	-22.24083	148.41007	VP3831P	GW12s	-22.30483	148.37375	VE3827P	GW16s	-22.37084	148.56213	VE3829P	GW18s	-22.39362	148.52405	VE3830P	GW18d	-22.39366	148.52385	VE3825P	GW21s	-22.40359	148.56982	VE3826P	GW21d	-22.40360	148.56977	IF3856P	S7	-22.18706	148.37201	IF3857P	S9	-22.19067	148.37518	IF3858P	S11	-22.19146	148.38187	IF3859P	S10	-22.18510	148.38274	IF3860P	S8	-22.18234	148.38066	IF3861P	S6	-22.17895	148.37785	IF3862P	S4	-22.17787	148.37312	IF3863P	S5	-22.17341	148.37959	IF3864P	S2	-22.17091	148.37130	IF3840P	GW01d	-22.17196	148.38191
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VP3833P	GW08s	-22.24083	148.41007																																																																																															
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VE3829P	GW18s	-22.39362	148.52405																																																																																															
VE3830P	GW18d	-22.39366	148.52385																																																																																															
VE3825P	GW21s	-22.40359	148.56982																																																																																															
VE3826P	GW21d	-22.40360	148.56977																																																																																															
IF3856P	S7	-22.18706	148.37201																																																																																															
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IF3840P	GW01d	-22.17196	148.38191																																																																																															

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Table 3 Air Quality and Greenhouse Gas Assessment (Appendix G of Olive Downs Coking Coal Project Draft EIS) Nearest Sensitive Receptors to the Project																																																						
<table><tr><th rowspan="2">Receptor ID</th><th colspan="2">Revised Coordinates</th></tr><tr><th>Latitude</th><th>Longitude</th></tr><tr><td>R1</td><td>-22.45814</td><td>148.51930</td></tr><tr><td>R2</td><td>-22.44795</td><td>148.62826</td></tr><tr><td>R3</td><td>-22.32805</td><td>148.62114</td></tr><tr><td>R4</td><td>-22.30677</td><td>148.48256</td></tr><tr><td>R5</td><td>-22.29760</td><td>148.48304</td></tr><tr><td>R6</td><td>-22.25848</td><td>148.42869</td></tr><tr><td>R7</td><td>-22.12259</td><td>148.29735</td></tr></table>					Receptor ID	Revised Coordinates		Latitude	Longitude	R1	-22.45814	148.51930	R2	-22.44795	148.62826	R3	-22.32805	148.62114	R4	-22.30677	148.48256	R5	-22.29760	148.48304	R6	-22.25848	148.42869	R7	-22.12259	148.29735																								
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				<div>Table 1 Noise and Vibration Assessment (Appendix K of Olive Downs Coking Coal Project Draft EIS) Nearest Noise Sensitive Receptors</div> <table><tr><th rowspan="2">Receptor ID</th><th colspan="2">Revised Coordinates</th></tr><tr><th>Latitude</th><th>Longitude</th></tr><tr><td>NSR1</td><td>-22.18293</td><td>148.36586</td></tr><tr><td>NSR2</td><td>-22.19298</td><td>148.37106</td></tr><tr><td>NSR3</td><td>-22.21632</td><td>148.37900</td></tr><tr><td>NSR4</td><td>-22.19927</td><td>148.36244</td></tr><tr><td>NSR5</td><td>-22.19619</td><td>148.36712</td></tr><tr><td>NSR6</td><td>-22.18466</td><td>148.37070</td></tr></table> <div>Table A1 Geochemistry Assessment (Appendix L of Olive Downs Coking Coal Project Draft EIS) Drill-hole Summary Information (Olive Downs South Domain) Revised Coordinates</div> <table><tr><th rowspan="2">Site ID</th><th colspan="2">Revised Coordinates</th></tr><tr><th>Latitude</th><th>Longitude</th></tr><tr><td>CR04</td><td>-22.18293</td><td>148.36586</td></tr><tr><td>CR05</td><td>-22.19298</td><td>148.37106</td></tr><tr><td>CR17</td><td>-22.21632</td><td>148.37900</td></tr><tr><td>CR07</td><td>-22.19927</td><td>148.36244</td></tr><tr><td>CR06</td><td>-22.19619</td><td>148.36712</td></tr><tr><td>CR36</td><td>-22.18466</td><td>148.37070</td></tr><tr><td>CR03</td><td>-22.17976</td><td>148.36649</td></tr></table>	Receptor ID	Revised Coordinates		Latitude	Longitude	NSR1	-22.18293	148.36586	NSR2	-22.19298	148.37106	NSR3	-22.21632	148.37900	NSR4	-22.19927	148.36244	NSR5	-22.19619	148.36712	NSR6	-22.18466	148.37070	Site ID	Revised Coordinates		Latitude	Longitude	CR04	-22.18293	148.36586	CR05	-22.19298	148.37106	CR17	-22.21632	148.37900	CR07	-22.19927	148.36244	CR06	-22.19619	148.36712	CR36	-22.18466	148.37070	CR03	-22.17976	148.36649
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34.8	Section 2 – Project Description, 2.4.4, p.44	Dry weather road crossing to the eastern emplacement The draft EIS provides insufficient detail on the proposed construction, operation, rehabilitation and period of use and mitigation measures for the Isaac River crossing.	<div>1. Provide detail on the detail on the proposed construction, operation, rehabilitation and period of use and mitigation measures for the Isaac River crossing.</div> <div>2. This should include enough detail to determine the scale and intensity of impacts and hence potential environmental harm.</div> <div>3. Update all relevant draft EIS sections and any relevant management plans.</div>	<div>The conceptual design of the dry weather haul road crossing of the Isaac River is shown on Figure 2-25 of the draft EIS. This road would only be used during times when there is no flow in the Isaac River (at the crossing location). When there is flow in the Isaac River, waste rock material would be emplaced within the waste rock emplacements on the western side of the Isaac River.</div> <div>The dry weather haul road would be decommissioned and rehabilitated following completion of construction and rehabilitation of the waste rock emplacement on the eastern side of the Isaac River. Rehabilitation of this emplacement is anticipated to be complete within the first 20 years of the Project.</div> <div>Measures to minimise potential impacts to the Isaac River banks and river bed are described in Section 2.4.4 of the draft EIS, including:</div> <div><div><div></div><div>batters on the river banks would be revegetated following construction;</div></div><div><div></div><div>upstream and downstream faces of the causeway would be protected with geotextile and rock armour; and</div></div><div><div></div><div>the haul road crossing will be watered and maintained to provide a hard surface that minimises dust and sediment generation.</div></div></div> <div>Additional information on the construction, operation and rehabilitation of the dry weather haul road crossing will be included in the Plan of Operations.</div>																																																	
34.9	Section 2 – Project Description 2.5.3 p. 53	<div>The project’s proposed residual voids are located in the existing floodplain of the Isaac River. The draft EIS proposes permanent levee structures to redefine the existing floodplain so the proposed final voids are no longer in the floodplain. This approach to floodplain definition is not acceptable. The status and extent of a floodplain cannot be changed by the construction of constraining landforms, irrespective of the impact they may or may not have on the flow regime of the Isaac River, In addition, the draft EIS does not address the potential environmental risks from possible failure of the levees or the expected maintenance, and hence residual risk payment, to ensure their integrity into perpetuity.</div> <div>DES released its Mined Land Rehabilitation Policy in September 2017. The policy contains the key statement ‘for all new site-specific mines the administering authority will not approve a PRCP that includes a void situated wholly or partially in a floodplain unless the void will be rehabilitated to a safe and stable landform that is able to sustain an approved</div>	<div>The draft EIS should demonstrate that the proposed final landform complies with the Mined Land Rehabilitation Policy, in particular, if final voids are to be located on the Isaac River floodplain, they must be rehabilitated to a safe and stable landform that is able to support an approved post-mining land use.</div> <div>While the outcome of the Mineral and Energy Resources (Financial Provisioning) Bill 2018 is yet to be determined, it is noted that additional rehabilitation requirements will likely apply to the proposed project if the Bill is enacted.</div>	<div>The proposed final landform has been prepared in consideration of the Queensland Government’s <i>Mined Land Rehabilitation Policy</i>.</div> <div>The requirements of the Mined Land Rehabilitation Policy relating to final voids centre on new site-specific mines and a Progressive Rehabilitation and Closure Plan (PRCP). The Olive Downs Coking Coal Project is <u>not</u> a new site specific mine. It is a mining EA applicant to which the <u>pre-amended</u> <i>Environment Protection Act 1994</i> applies.</div> <div>At the time of preparation of the draft EIS and the Additional Information to the EIS there is no legislative requirement (or guidance material) for the preparation of a PRCP.</div> <div>Despite the above, the draft EIS demonstrates that:</div> <div><div><div></div><div>there would be no voids situated wholly or partially in a floodplain; and</div></div><div><div></div><div>voids would be “...<i>rehabilitated to a safe and stable landform that is able to sustain an approved post-mining land use that does not cause environmental harm.</i>”</div></div></div> <div>Section 24 of the Additional Information to the EIS provides a detailed consideration of the Queensland Government’s Mined Land Rehabilitation Policy.</div>																																																	

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		post-mining land use that does not cause environmental harm'. The draft EIS does not demonstrate that the proposed final landform complies with the Mined Land Rehabilitation Policy. While the outcome of the Mineral and Energy Resources (Financial Provisioning) Bill 2018 is yet to be determined, it is noted that additional rehabilitation requirements will likely apply to the proposed project if the Bill is enacted.		
34.10	Section 2 – Project Description, 2.5.6, p.57	Waste rock emplacement The draft EIS does not include detailed mine planning options/alternatives to demonstrate the business need for the eastern emplacement waste rock dump, including the disturbance of the Isaac River crossing haul road.	Provide detailed mine planning options to fully demonstrate that the project outcomes cannot be adequately achieved without the need for the eastern emplacement waste rock dump.	Landform design objectives, location of Pembroke mining tenements, haul distances (vertical and lateral), environmental values (including ecological, hydrological, air quality and noise), flooding frequency, likely access availability and land use objectives were included in the investigations associated with the waste rock emplacement strategy for the Project. The following design objectives were of primary importance during these investigations: <ul style="list-style-type: none"> batter slopes of approximately 7 degrees (1V:8H); contour banks installed on batters (to limit effective slope lengths and reduce the potential for erosion); gently sloped top surfaces shed water; final void highwalls would be laid back to 20° in the alluvium and tertiary clays (known as the Cenozoic overburden) (Figure 5-4b) to achieve a factor of safety of 1.5. GeoTek identified that much of the Cenozoic material consists of Tertiary clay which has a low shear strength, requiring the 20° set back in the final landform. Final void highwalls would have a maximum overall angle of 45° where located within a fault fractured zone, and 55° where they are located away from fault zones. An overall angle of 55° could be achieved by 50 m high batters at 65° incorporating 10 m wide intermediate benches. The toe of out-of-pit waste rock emplacements would stand off the crest of the final voids by at least 50 m. The initial development of the open cut (referred to as the box cut) requires the emplacement of waste rock in out-of-pit emplacement areas until such time that sufficient space is available for in-pit emplacement. To provide sufficient out-of-pit emplacement capacity (in consideration of the design objectives listed above) the eastern out-of-pit emplacement area is required. If this emplacement was not developed, the emplacements to the west of the open cut would need to be developed higher and with steeper slopes which compromise rehabilitation success and landform stability (Section 2.10.2 of the draft EIS).
34.11	Section 3 – Assessment of MNES 3.3.5 p.49 Section 3 – Assessment of MNES 3.3.11.1 p.156	Incorrect labelling of pits The draft EIS states on page 3-49 'Open Cut Extent – Geological data indicates that the coal resource targeted by the Project extends to the north from Pit 1 under the Isaac River. Pembroke defined the northern extent of the open cut to minimise encroachment on the Isaac River floodplain by standing off the river bank by 200 m to 300m. Similarly, in response to preliminary flood modelling results, the eastern extent of Pit 8 was pulled back by approximately 300 m to minimise changes to flood characteristics in the Isaac River and its flood plain'. However, no figure can be found which shows pit 1 and pit 8. It is assumed that the reference to these pits are directly taken from the specialists report (Appendices A-C) but not referred to naming of the pits in the draft EIS (ODS1; Figure 3-13).	1. Update all sections and appendices of the draft EIS (including specialists reports in the appendices) so that the naming of the pits are consistent throughout. 2. Include a figure in Section 3 which shows the pits and the buffer zones proposed close-up. Cross-reference accordingly.	Pit 1 and Pit 8 are the same as ODS1 and ODS8 shown on Figures 2-1 and 2-2 of the draft EIS.
34.12	Section 3 – Assessment of MNES, Table 3.8, p.60	Regional ecosystems (REs) Table 3.8 includes a summary of the area of each RE to be cleared as part of the project, but does not include the percentage this area represents of this RE in the project area.	Amend this table to include the percentage of the total area of each RE proposed to be cleared as part of this project.	The term 'Project Area' within the draft EIS refers to the proposed disturbance footprint. This extent has formed the basis for impact assessment resulting in a conservative assessment. As such, the areas in Table 3-8 need no amendment.
34.13	Section 4 - Assessment of Project Specific Matters 4.1.1 , p.1	Environmental objective assessment: Objectives and performance outcomes The draft EIS has not addressed the environmental objective relevant to wetlands and groundwater as required under Schedule 5 of the Environmental Protection Regulation 2008 (EP Regulation). In particular, the draft EIS failed to show that: <ul style="list-style-type: none"> the activity will be operated in a way that protects the environmental values of wetlands there will be no potential or actual adverse effect on a wetland as part of carrying out the activity the activity will be managed in a way that prevents or minimises adverse effects on wetlands the activity will be operated in a way that protects the environmental values of groundwater and any associated surface ecological systems there will be no direct or indirect release of contaminants 	Provide specific information on what measurable environmental objectives are proposed to comply with the objectives and performance outcomes of not adversely affecting wetlands and groundwater. These measures must be measurable and auditable.	Section 4.1 of the draft EIS states: <i>The environmental objective relevant to wetlands, as described in the Terms of Reference for the Project, is:</i> (b) <i>protects the environmental values of wetlands.</i> <i>The Project would achieve the following performance outcome relevant to wetlands as identified in Part 3, Schedule 5, Table 1 of the EP Regulation:</i> 2 <i>The activity will be managed in a way that prevents or minimises adverse effects on wetlands.</i> Section 4.2 of the draft EIS states: <i>The relevant environmental objectives as stated in the Terms of Reference for water quality are that the Project be operated in a way that:</i> ... (c) <i>protects the environmental values of groundwater and any associated surface ecological systems.</i> Table 4-12 of the draft EIS lists the performance outcomes for water, wetlands and groundwater. In particular, Table 4-12 lists the performance outcome for groundwater as: 2 <i>The activity will be managed to prevent or minimise adverse effects on groundwater or any associated surface ecological systems.</i>

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		<p>to groundwater from the operation of the activity</p> <ul style="list-style-type: none">there will be no actual or potential adverse effect on groundwater from the operation of the activitythe activity will be managed to prevent or minimise adverse effects on groundwater or any associated surface ecological systems.		<p>Table 4-12 also identifies that the performance outcomes for water, wetlands and groundwater are achieved for the Project, and states the sections of the draft EIS where these are described. Table 4-12 is reproduced below:</p> <p style="text-align: center;">Table 4-12 Item 2 Performance Outcomes for Water, Wetlands and Groundwater</p> <table><tr><th colspan="2">Schedule 5, Part 3, Table 1 of the Environmental Protection Regulation 2008</th><th>Project Achieved</th></tr><tr><td colspan="2">Water – Performance Outcomes</td><td></td></tr><tr><td>2</td><td><i>All of the following—</i></td><td>Yes (Section 4.2.4)</td></tr><tr><td>(a)</td><td><i>the storage and handling of contaminants will include effective means of secondary containment to prevent or minimise releases to the environment from spillage or leaks;</i></td><td></td></tr><tr><td>(b)</td><td><i>contingency measures will prevent or minimise adverse effects on the environment due to unplanned releases or discharges of contaminants to water;</i></td><td>Yes (Section 4.2.3)</td></tr><tr><td>(c)</td><td><i>the activity will be managed so that stormwater contaminated by the activity that may cause an adverse effect on an environmental value will not leave the site without prior treatment;</i></td><td>Yes (Section 4.2.3)</td></tr><tr><td>(d)</td><td><i>the disturbance of any acid sulfate soil, or potential acid sulfate soil, will be managed to prevent or minimise adverse effects on environmental values;</i></td><td>Yes (Section 4.10)</td></tr><tr><td>(e)</td><td><i>acid producing rock will be managed to ensure that the production and release of acidic waste is prevented or minimised, including impacts during operation and after the environmental authority has been surrendered;</i></td><td>Yes (Sections 4.2.3, 4.2.4 and 4.10)</td></tr><tr><td>(f)</td><td><i>any discharge to water or a watercourse or wetland will be managed so that there will be no adverse effects due to the altering of existing flow regimes for water or a watercourse or wetland;</i></td><td>Yes (Sections 4.2.3 and 4.2.4)</td></tr><tr><td>(g)</td><td><i>for a petroleum activity, the activity will be managed in a way that is consistent with the coal seam gas water management policy, including the prioritisation hierarchy for managing and using coal seam gas water and the prioritisation hierarchy for managing saline waste;</i></td><td>N/A</td></tr><tr><td>(h)</td><td><i>the activity will be managed so that adverse effects on environmental values are prevented or minimised.</i></td><td>Yes (Section 4.2.4)</td></tr><tr><td colspan="2">Wetlands – Performance Outcomes</td><td></td></tr><tr><td>2</td><td><i>The activity will be managed in a way that prevents or minimises adverse effects on wetlands.</i></td><td>Yes (Section 4.2.3)</td></tr><tr><td colspan="2">Groundwater – Performance Outcomes</td><td></td></tr><tr><td>2</td><td><i>The activity will be managed to prevent or minimise adverse effects on groundwater or any associated surface ecological systems.</i> Note – Some activities involving direct releases to groundwater are prohibited under section 63 of this regulation.</td><td>Yes (Section 4.2.4)</td></tr></table> <p>Notwithstanding, in addition to the design refinements to minimise direct impacts to wetlands, Pembroke has included additional commitments to conduct ongoing monitoring of the ecological characteristics of these wetlands over the life of the Project (i.e. monitoring additional to that described in the draft EIS). The ongoing monitoring will be used to validate the predicted impacts presented in the EIS, and identify whether any measures (such as habitat repair works, revegetation) need to be implemented to minimise any observed impacts. A detailed description of this monitoring program is provided in the Assessment of Potential Impacts to GDEs and Wetlands that is provided in Appendix E of the Additional Information to the EIS.</p> <p>The GDE and Wetland Monitoring Program to be implemented by Pembroke within/adjacent riparian vegetation and HES wetlands not proposed to be cleared by the Project (e.g. HES2, HES3, HES5, HES7 and HES8 as shown in Appendix E of the Additional Information to the EIS) will outline the relevant objectives and performance outcomes required to be complied with. Monitoring will include:</p> <ul style="list-style-type: none">groundwater depth and quality;health of the terrestrial vegetation; andsurface water quantity and quality. <p>Selection of GDE monitoring sites will be undertaken in consideration of the GDE mapping tools recommended in Richardson <i>et al.</i> (2011) and Emelyanova <i>et al.</i> (2017). The GDE and Wetland Monitoring Program will include details of:</p> <ul style="list-style-type: none">the nature and ecological values of each GDE and wetland being monitored;a field validation survey and baseline description of the condition of the GDEs and wetlands prior to any direct or indirect impacts from the project;a map and coordinates of the location of the GDEs and wetlands subject to the monitoring program, including justification for the selected locations;sampling and analysis methodologies for detecting impacts associated with the project;	Schedule 5, Part 3, Table 1 of the Environmental Protection Regulation 2008		Project Achieved	Water – Performance Outcomes			2	<i>All of the following—</i>	Yes (Section 4.2.4)	(a)	<i>the storage and handling of contaminants will include effective means of secondary containment to prevent or minimise releases to the environment from spillage or leaks;</i>		(b)	<i>contingency measures will prevent or minimise adverse effects on the environment due to unplanned releases or discharges of contaminants to water;</i>	Yes (Section 4.2.3)	(c)	<i>the activity will be managed so that stormwater contaminated by the activity that may cause an adverse effect on an environmental value will not leave the site without prior treatment;</i>	Yes (Section 4.2.3)	(d)	<i>the disturbance of any acid sulfate soil, or potential acid sulfate soil, will be managed to prevent or minimise adverse effects on environmental values;</i>	Yes (Section 4.10)	(e)	<i>acid producing rock will be managed to ensure that the production and release of acidic waste is prevented or minimised, including impacts during operation and after the environmental authority has been surrendered;</i>	Yes (Sections 4.2.3, 4.2.4 and 4.10)	(f)	<i>any discharge to water or a watercourse or wetland will be managed so that there will be no adverse effects due to the altering of existing flow regimes for water or a watercourse or wetland;</i>	Yes (Sections 4.2.3 and 4.2.4)	(g)	<i>for a petroleum activity, the activity will be managed in a way that is consistent with the coal seam gas water management policy, including the prioritisation hierarchy for managing and using coal seam gas water and the prioritisation hierarchy for managing saline waste;</i>	N/A	(h)	<i>the activity will be managed so that adverse effects on environmental values are prevented or minimised.</i>	Yes (Section 4.2.4)	Wetlands – Performance Outcomes			2	<i>The activity will be managed in a way that prevents or minimises adverse effects on wetlands.</i>	Yes (Section 4.2.3)	Groundwater – Performance Outcomes			2	<i>The activity will be managed to prevent or minimise adverse effects on groundwater or any associated surface ecological systems.</i> Note – Some activities involving direct releases to groundwater are prohibited under section 63 of this regulation.	Yes (Section 4.2.4)
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				<ul style="list-style-type: none"> environmental quality indicators, impact thresholds and triggers; corrective actions and timing to address impacts associated with the project, should they be detected; and sampling and analysis reporting. <p>The GDE and Wetland Monitoring Program will be prepared prior to commencement of mining.</p>
34.14	Section 4 - Assessment of Project Specific Matters 4.1.2 p. 22 Appendix C- Aquatic Ecology 4.6.3 p. 51	<p>Stygofauna</p> <p>The draft EIS did not undertake surveys and impact assessment for stygofauna according to DES's Background information on sampling bores and stygofauna¹ and the Department of Science, Information Technology, Innovation and the Arts Guideline for the environmental assessment of subterranean aquatic fauna².</p> <p>The potential impacts on stygofauna due to physical disruption to aquifers, drawdown and decrease in groundwater quality were not addressed in the draft EIS (i.e. Section 4).</p> <p>The draft EIS stated that two bores were sampled; however, the results were not presented in Section 4.</p> <p>¹https://www.ehp.qld.gov.au/water/monitoring/sampling-manual/pdf/biological-assessment-background-information-on-sampling-bores-for-stygofauna.pdf</p> <p>²https://publications.qld.gov.au/dataset/subterranean-aquatic-fauna</p>	<ol style="list-style-type: none"> Undertake stygofauna surveys and impact assessment according to DES's Background information on sampling bores and stygofauna and the Department of Science, Information Technology, Innovation and the Arts Guideline for the environmental assessment of subterranean aquatic fauna. Present the results of the stygofauna sampling and assess potential impacts as per the Department of Environment and Science's (DES's) management hierarchy: (a) to avoid; (b) to minimise or mitigate; once (a) and (b) have been applied, (c) if necessary and possible, to offset. This includes discussion on the potential impacts on stygofauna as a result of groundwater modification. Ensure details regarding potential impacts are consistent between Section 4 (Flora and Fauna; Water Quality) and the specialists reports (in the appendices; e.g. Appendix C). 	<p>The draft EIS <u>does</u> include surveys for stygofauna according to DES's <i>Background Information on Sampling Bores and Stygofauna</i>. The DES's <i>Background Information on Sampling Bores and Stygofauna</i> document was recently released by DES in February 2018, after the stygofauna sampling was undertaken for the Project (October 2017). Notwithstanding, the stygofauna sampling methodology used in the <i>Aquatic Ecology Assessment</i> prepared by DPM (Appendix C of the draft EIS) (i.e. netting) was as described in the Background Information on Sampling Bores and Stygofauna (DES, 2018).</p> <p>The draft EIS <u>does include</u> surveys and impact assessment for stygofauna in the <i>Aquatic Ecology Assessment</i> prepared by DPM (Appendix C of the draft EIS) in accordance with the <i>Guideline for the Environmental Assessment of Subterranean Aquatic Fauna</i> (DSITIA 2015) because:</p> <ul style="list-style-type: none"> A desktop review was undertaken considering the suitability of local geological and hydrological conditions for stygofauna and presence of stygofauna based on previous studies. The results of the desktop review are provided in Section 5.10.1 of the Aquatic Ecology Assessment prepared by DPM (Appendix C of the draft EIS). Stygofauna sampling was undertaken. No stygofauna were identified during sampling (as stated in Section 4.1 of the draft EIS). <p>The number of bores sampled (two) was lower than the preferred number described in the guidelines (10) as only two were identified as containing suitable habitat, based on depth to groundwater, salinity, ability to sample (i.e. a large number were capped) and presence of groundwater. Notwithstanding, it was conservatively assumed that stygofauna could potentially occur in the unconsolidated sediments (alluvium) associated with the Isaac River and the potential impacts on stygofauna were addressed in the draft EIS. The <i>Aquatic Ecology Assessment</i> prepared by DPM (Appendix C of the draft EIS) states:</p> <p><i>An assessment is provided here assuming that stygofauna are present within the unconsolidated sediments (alluvium).</i></p> <p><i>The Project would directly intercept groundwater from the unconsolidated sediments (alluvium) and sub-artesian aquifers which could provide potential habitat for stygofauna as identified by 4T (2012). Given this, the Project is expected to result in a drawdown in the unconsolidated sediments associated with the Isaac River of no more than 5 m, predominantly adjacent to the Olive Downs South Domain (HydroSimulations 2018). Drawdown in the unconsolidated sediments adjacent the Willunga Domain would also be less than 5 m and would only occur in a small portion of the alluvium associated with the Isaac River (HydroSimulations 2018).</i></p> <p><i>As indicated by HydroSimulations (2018), the alluvium is not limited to the Project area and appears to be saturated along the Isaac River and lower reaches of the creeks at the confluence with the Isaac River (HydroSimulations 2018). This indicates that the potential habitat for stygofauna (if they were to occur) is much more extensive than the alluvium within the area of influence associated with the Project. Given the extent of the alluvium along the Isaac River, it is considered unlikely that the Project would result in a significant impact to any stygofauna community (if they were to occur).</i></p> <p>The potential impacts on stygofauna due to physical disruption to aquifers and drawdown are described as above.</p> <p>With respect to potential impacts on groundwater quality, Section 4.2 of the draft EIS indicates that leachate analysis of the waste rock material, conducted as part of the draft EIS, found that waste rock material was non-acid forming, fresh (electrical conductivity of 158 µS/cm to 1,050µS/cm) and low in sulfur content (4 mg/L to 92 mg/L) (Appendix D of the draft EIS). The waste rock material exhibits similar water quality compared to water within regolith material (the surficial material that covering much of the Project site), however is generally poorer quality compared to the alluvium (Appendix D of the draft EIS).</p> <p>Where the low permeability surficial clays are present, potential seepage from the waste rock emplacement to the underlying regolith and alluvium would be inhibited which reduces the potential for impacts on groundwater quality. Clay layers are interspersed as lenses throughout the regolith and alluvium. Monitoring of groundwater levels within the alluvium in the Olive Downs South and Willunga domains indicates a lack of response to rainfall trends which indicates the presence of surficial clays restricting groundwater recharge (Appendix D of the draft EIS).</p> <p>Seepage from in-pit emplacements is not expected to migrate to the surrounding alluvium, as the groundwater level that would ultimately equilibrate within the waste rock would be below the base of the alluvium (Appendix D of the draft EIS). In cases where the groundwater level within the in-pit waste rock emplacement could occur above the base of the alluvium (in the fully backfilled Pit ODS1 at the northern end of the Olive Downs South domain and Pit WIL1 in the Willunga domain), examination of paired simulated hydrographs in the waste rock and in the adjacent alluvium shows that there would be no hydraulic gradient from the waste to the alluvium (i.e. groundwater levels in the waste rock would be lower than groundwater levels in the adjacent alluvium) (Appendix D of the draft EIS). Given this, the Project is not expected to have a significant impact on groundwater quality that would lead to any adverse impact on stygofauna.</p> <p>Further to this, as outlined in Section 4.2 of the draft EIS (and further clarified in Appendix E of the Additional Information to the EIS, the final voids would act as groundwater sinks and are therefore not expected to result in any adverse groundwater quality related impacts on stygofauna.</p> <p>Based on the above, no further stygofauna surveys or impact assessment is considered necessary.</p>

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				<p>The Department of Environment and Science's (DES's) general management hierarchy: (a) to avoid; (b) to minimise or mitigate; once (a) and (b) have been applied, (c) if necessary and possible, to offset is not a specific requirement of the stygofauna guidelines. However, DPM (Appendix C of the draft EIS) considers it unlikely that the Project would result in a significant impact to any stygofauna community (if they were to occur), hence there is no requirement to avoid, minimise, mitigate or offset potential impacts on stygofauna.</p> <p>Details regarding potential impacts are consistent between Section 4 (Flora and Fauna; Water Quality) and the specialists reports (in the appendices of the draft EIS; e.g. Appendix C).</p>
34.15	Section 4 - Assessment of Project Specific Matters 4.1.3 p. 24	<p>Indirect impacts on listed threatened species (e.g. koalas and greater gliders)</p> <p>Indirect impacts, such as noise, lighting and road mortality, have not been assessed appropriately in the draft EIS. For example, while the draft EIS refers to temporary impacts of noise and lighting, the impact assessment has not taken into account that these temporary impacts can for the life of mine (79 years excluding closure). A lifespan of a koala is a maximum of 18 years; hence these indirect impacts cannot be defined as temporary.</p> <p>Assessment must include impacts from mining and infrastructure close to species habitats (pits, haul roads, access roads, rail operations, conveyor, construction of the emplacement and levees).</p> <p>No appropriate mitigation and monitoring measures have been proposed and how changes can be identified before populations decline.</p>	<ol style="list-style-type: none"> 1. Include a new and comprehensive impact assessment on indirect impacts, such as noise, lighting and road mortality, on listed threatened species, including but not limited to koalas and greater gliders. 2. Assessment must include impacts from mining and infrastructure close to species habitats (pits, haul roads, conveyor, construction of the emplacement and levees). 3. Clearly outline which impacts may be considered short-term (e.g. construction of levees) and which will be ongoing (in terms of life expectancies for wildlife). 4. Provide commitments and mitigation measures to ensure that the proposed project will not have a permanent and irreversible impacts on listed threatened species. 5. DES recommends thorough pre-impact surveys of the impacted fauna habitat be undertaken during wet and dry conditions to record pre-impact population sizes. 6. Monitoring must be carried out annually once mining/construction commences at defined monitoring points (reference points) in order to show if any changes occur. 7. Road mortality must be recorded in regular intervals (e.g. monthly). 8. Appropriate fauna crossings have to be incorporated into the road and road designs (haul roads and access roads) to avoid impacts of species, especially listed threatened species (e.g. koalas). 9. If any impacts are recorded (e.g. decline of populations or a large number of road kill), these impacts must be managed in accordance with the hierarchy: avoidance, minimisation/mitigation, and if necessary, offsetting. 	<p>Section 6 of the Terrestrial Fauna Assessment prepared by DPM (Appendix B of the draft EIS) provides a detailed assessment of potential indirect impacts on native fauna species (including threatened species). This includes an assessment of proposed mining activities and infrastructure (inclusive of pits, haul roads, access roads, rail operations, conveyor, construction of the emplacement and levees) close to species habitats, including fauna mortality (from vehicle strike), feral animals, hydrological changes, loss in connectivity, noise, fragmentation (and associated edge effects), artificial lighting and cumulative impacts.</p> <p>Specific indirect impacts to individual threatened species (including but not limited to Koala and Greater Glider) are described within the assessment of significance tables provided in Section 3 of the draft EIS (i.e. Tables 3-13, 3-14, 3-30, 3-31, 3-37, 3-38, 3-45 and 3-46). For example, Table 3-13 and 3-14 states that the introduction and spread of invasive weeds and feral animals may occur as a result of the Project. However, threat levels are unlikely to change significantly due to the Project given the current agricultural use of the surrounding area and implementation of mitigation and management measure proposed to be implemented by Pembroke.</p> <p>Section 7 of the Additional Information to the EIS consolidates the assessment of indirect impacts on native flora and fauna due to the Project.</p> <p>In relation to Recommendation 3, although the Project life is 79 years, the full extent of the Project area is not proposed to be cleared upon commencement of the Project. Pembroke proposes a progressive clearing and rehabilitation strategy (as described in Section 5 of the draft EIS), such that only the land proposed to be utilised by the Project in the following year would be cleared. These areas would then be rehabilitated within six months of an area becoming available for rehabilitation. Given this, the discussion in the draft EIS regarding temporary impacts of clearance, noise and lighting has been considered in terms of life expectancies for wildlife.</p> <p>In relation to Recommendation 4, mitigation and management measures proposed to be implemented by Pembroke to avoid the Project having a permanent and irreversible impacts on listed threatened species are detailed in the proponent commitments tables in Section 22 of the Additional Information to the EIS. It should be noted that this includes the development of a Biodiversity Offset Strategy (already prepared by Pembroke and included as Appendix F of the Additional Information to the EIS), Species Management Program, Fauna Species Management Plan and Weed and Pest Management Plan. These plans will outline the detailed measures proposed to be implemented by Pembroke during construction and operation of the Project, including pre-clearance surveys, recording of fauna mortality, development of a monitoring program, annual reporting and contingency measures if impacts are identified in accordance with the hierarchy: avoidance, minimisation/mitigation, and if necessary, offsetting).</p> <p>Section 7 of the Additional Information to the EIS also outlines species-specific mitigation measures proposed to be implemented by Pembroke to manage potential impacts (including indirect impacts) to the Ornamental Snake, Australian Painted Snipe, Squatter Pigeon, Koala and Greater Glider (e.g. pre-clearance surveys, implementation of a Weed and Pest Management Plan, bushfire prevention measures, implementation of fauna crossings of haul roads).</p> <p>In relation to Recommendation 5, detailed flora and fauna surveys have already been undertaken by DPM (Appendices A and B of the draft EIS). Pre-clearance surveys will be undertaken to inform the management of fauna during clearance activities. Pre-impact surveys are not proposed to be undertaken to record pre-impact population sizes.</p> <p>In relation to Recommendation 6, monitoring will be undertaken annually once mining/construction commences at defined monitoring points (reference points) in order to show if any impacts are being identified that were greater than predicted in the draft EIS.</p> <p>In relation to Recommendation 7, Additional vehicular traffic movements associated with construction and operation of the Project have the potential to result in the injury or mortality of some fauna species. In general, the risk of injury or fatality from vehicle strike is greatest where roads cross vegetated corridors or other specific fauna movement corridors (Appendix B of the draft EIS). There are three locations where access and haul roads would cross the Isaac River and associated riparian woodlands, that serves as a movement corridor and refuge habitat for native fauna.</p> <p>The Project rail corridor has been located through areas of relatively low habitat value (i.e. primarily agricultural grasslands and regrowth vegetation). Similarly, the access roads for the Project are located through areas of relatively low habitat value and, for the vast majority, make use of existing roads and previously cleared lands.</p> <p>In consideration of the above, the additional use of the local road network, and construction of the Project rail corridor, the Project poses a low additional risk to fauna from vehicle strike and Pembroke does not propose to record road mortality monthly. Further detail on the management of potential vehicle-fauna interaction would be provided in the Fauna Species management Plan.</p> <p>In relation to Recommendation 8, Table 3-25 of the draft EIS states that Pembroke would maintain fencing and fauna crossings over haul roads (where suitable) to ensure safe fauna movement.</p> <p>In relation to Recommendation 9, if the above monitoring of biodiversity detects an impact, then contingency measures will be investigated, including but not limited to incorporation of additional management measures (e.g. fauna crossings). Any likely significant impacts are already offset as detailed in the Biodiversity Offset Strategy for the Project. Further detail on the potential contingency measures would be provided in the Fauna Species management Plan.</p>

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				Notwithstanding the above, further information on the proposed management and monitoring of potential impacts to threatened species (including recording of road mortality) would be provided in the Fauna Species Management Plan as described in Section 12 of the Additional Information to the EIS.
34.16	Table 3-6 Table 3-15 Section 4 - Assessment of Project Specific Matters 4.1 p. 1 Appendix B – Terrestrial Fauna Assessment	<p>Identification of Nyctophilus corbeni – Corben's long-eared bat</p> <p>The draft EIS concludes that the Corben's long-eared bat was not detected as 'Bat detectors were used at least one night per survey site and at other potential bat habitat areas (at least 32 nights)' (Section 3, Table 3-6).</p> <p>While ultrasonic detection of bat calls is an effective and non-invasive methodology to sample a wide variety of bat species, some bat species cannot be reliably distinguished to species level due to within-species regional variations, call quality, and overlap of calls between species or genera (DEC, 2004). Long-eared Bats (<i>Nyctophilus</i> spp), Broad-nosed bats (<i>Scotorepens</i> spp) or different genera (e.g. <i>Saccolaimus</i>/<i>Mormopterus</i>) are some examples. These species can be identified if caught in traps.</p> <p>As the species was not caught in traps, the conclusion that the 'This species is unlikely to occur within the Mine Site area as it was not recorded during the recent surveys undertaken' (Section 3, Table 3-15) is incorrect.</p> <p>No reference was made in the draft EIS on the potential impacts on the clearing of vegetation on the population of the Corben's long-eared bat.</p>	Revise impact assessment of the proposed project on the Corben's long-eared bat in all documents throughout the draft EIS, including specialist reports.	<p>It should be noted that the EPBC Act Protected Matters Report (provided in Appendix A of the Terrestrial Fauna Assessment) indicates that this species, or species habitat '<u>may</u>' occur within the Project area. It is not 'likely' or 'known' to occur.</p> <p>Table 3-6 of the draft EIS describes that the survey methodology that was employed for the Corben's Long-eared Bat was in accordance with the relevant State and Commonwealth survey guidelines. Methods included anabat detectors, active searches of roosts and harp trapping. The assessment of the likelihood of this species occurring within the Project area was not solely based on the lack of survey records, but also considered the location of the nearest records and the known distribution of this species in Queensland.</p> <p>Records for this species are primarily located in south-east Queensland and throughout NSW. The nearest record for this species is located more than 320 km south of the Project area. The northern-most record for the species within Queensland. As such, it was concluded by DPM Envirosiences that this species is not likely to occur as far north as the Project area.</p> <p>This conclusion was further supported by the lack of records from the targeted survey work which was undertaken in accordance with the relevant State and Commonwealth survey guidelines. It is acknowledged that the lack of call data alone would not be sufficient, however given the species was not identified during active roost searching or harp trapping, it was concluded that this species is unlikely to occur. Although other long-eared bat species were recorded (i.e. the Lesser Long-eared Bat [<i>Nyctophilus geoffroyi</i>]), the identity of these species was confirmed during the harp trap surveys.</p> <p>Given the above, it is unlikely that the Project would involve the clearing of any vegetation likely to be used by the Corben's Long-eared Bat, and as such, is not likely to result in a significant impact to this species in accordance with the <i>Matters of National Significance Significant Impact Guidelines 1.1, Environment Protection and Biodiversity Act 1999</i> (DotE 2013).</p> <p>Notwithstanding the above, further information on the management of potential impacts to bat species would be provided in the Fauna Species Management Plan as described in Section 12 of the Additional Information to the EIS.</p>
34.17	Section 4 - Assessment of Project Specific Matters, 4.1.4 , p.4-37	<p>Buffers to wetland and riparian habitats</p> <p>The draft EIS did not consider appropriate buffer zones to wetlands and riparian habitats.</p> <p>The Queensland Government's WetlandInfo website recommends the following buffers in Part B of the Queensland Wetland Buffer Guideline:</p> <ul style="list-style-type: none"> • maintenance of riparian habitat: between 30m and 500m • pollution protection: 200m • protection of wetlands and streams: minimum of 15m with an actual buffer width of 3-200m, depending on site specific conditions. <p>Wetland protection areas – any development within 500m of a wetland is likely to have an impact, hence, the government has included a 500m trigger area around high ecological significance (HES) wetlands.</p> <p>Buffer zones around wetlands may not be sufficient to account for groundwater drawdown and increases to surface water flows from mining operations. There is a high risk that predictions from the groundwater model regarding groundwater movement in and around the wetlands (including HES wetland the wetlands along the Isaac River) may be underestimated. The draft EIS stated that groundwater levels and associated flow behaviour in areas subject to mining may only stabilise after a decade provided that rehabilitation outcomes are achieved. This may be compounded by the cumulative impacts from the adjacent coal mining projects.</p> <p>The relevant buffer distance between a development and a wetland depends on the nature of the wetlands, the wetland flora and fauna, the role of the wetland and surrounding habitat in fauna lifecycles, the hydrological drivers for the wetland etc. It also depends on the nature of the disturbance.</p> <p>For a development of this scale there should be a detailed buffer design process that looks rigorously at the impacts and stressors (in particular hydrological impacts, impacts on riparian and other wetland flora and impacts on fauna habitat) and does an objective assessment of the necessary buffer widths, buffer elements and buffer management to mitigate these impacts. This has not been undertaken.</p>	<ol style="list-style-type: none"> 1. A 500m buffer for the Isaac River and 200m for the Ripstone Creek may be adequate; however, site-specific justification of this buffer width is required to show that this buffer width is sufficient to maintain riparian habitat, protect against pollution and maintain wetland and stream values. Justification should be provided for any buffer less than 500m to provide sufficient protection from adverse impacts to the Isaac River and Ripstone Creek (and associated fauna habitats) from mining activities. The delineation of the buffer must be described. 2. Provide appropriate buffer zones for wetlands impacted by the proposed project, including mining and infrastructure. 3. Maps should be updated to clearly show that the project footprint is outside of mapped wetlands and their associated buffer. Updated mapping must indicate the separation of wetlands and mining / construction / infrastructure activities. 	<p>In relation to Recommendation 1, Section 2.10 of the draft EIS, geological data indicates that the coal resource extends north of Pit ODS1 beneath the Isaac River and beyond, however, Pembroke has set back the crest of the open cut from the bank of the Isaac River by at least 200 m to minimise impacts on ecological and aquatic values and flood characteristics.</p> <p>Similarly, in response to preliminary flood modelling results, the eastern extent of Pit ODS8 was pulled back by approximately 300 m to minimise changes to flood characteristics of the Isaac River.</p> <p>Given the above, Pembroke do not propose to adopt a 500 m buffer for the Isaac River.</p> <p>Pembroke also do not propose to adopt a 200 m buffer for Ripstone Creek because without diverting the creek, approximately 3 Mt tonnes of coal would be left in situ. The economic benefit of mining the coal in this location out-weighs the cost of the environmental impacts, including the diversion of Ripstone Creek and the rehabilitation works required to replicate the natural hydraulic behaviour of the Ripstone Creek waterway. A net benefit of at least \$11M was calculated when accounting for the value of the coal (i.e. \$36M), the production benefits associated with employment and royalties associated with ODS9 and the cost of the Ripstone Creek diversion (i.e. \$25M).as well as a description of the proposed mitigation measures for the diversion. Pit ODS9 cannot be extended any further to the east to avoid the diversion as it has been designed to cover the extent of the coal resource.</p> <p>The potential impacts on the ecological values of the Isaac River and Ripstone Creek have been assessed through the Terrestrial Flora and Fauna Assessments prepared by DPM (Appendices A and B of the draft EIS) and Geomorphology Assessments prepared by Fluvial Systems (Appendix E of the draft EIS).</p> <p>The Terrestrial Flora and Terrestrial Fauna Assessments (Appendices A and B of the draft EIS) found that there is not predicted to be a significant impact on the vegetation associated with the Isaac River or Ripstone Creek which occurs outside the Project area (i.e. through indirect impacts such as habitat fragmentation and edge effects).</p> <p>The buffer zone is considered to sufficiently protect the Isaac River riparian corridor from changes to flooding characteristics. The risk of erosion of the Isaac River channel and floodplain was assessed by in the Geomorphology Assessment (included as Appendix B to the Surface Water Assessment [Appendix E of the draft EIS]) using the method of maximum permissible bed shear stress and velocity assessment, with the hydraulic variables modelled as part of the Flood Assessment (Appendix F of the draft EIS). The assessment of the most critical areas found that while there could be isolated areas subject to somewhat higher risk of scour compared to the existing situation, the overall risk of rapid and significant geomorphic change in the Isaac River due to the Project was low.</p> <p>In relation to Recommendations 2 and 3, a transport options study was undertaken at the pre-feasibility stage for moving raw coal from Willunga to the Olive Downs South CPP site. For this study, the following transport scenarios were considered:</p> <ul style="list-style-type: none"> • high speed overland conveyor; • slurry pipeline; and • heavy vehicle road haulage of ROM coal. <p>The study showed that the conveyor solution was preferred because:</p> <ul style="list-style-type: none"> • it has a lower operating cost per tonne than a slurry pipeline or road haulage of ROM coal;

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		<p>There are difficulties using default widths, for instance, wetland protection trigger areas extend 500m from HES wetland boundaries in recognition of the potential impacts from development on wetland hydrology. Pits close to the Isaac River should have a minimum buffer of 500m to the defining bank of the Isaac River to reduce disturbance and drawdown impacts on riparian vegetation (that acts as habitat for threatened species) and aquatic habitat. However in highly connected groundwater dependent ecosystems (GDEs), 500m may not be a sufficient buffer from significant impacts. Reference to the Queensland Wetland Buffer Guideline may be helpful but any proposed buffer needs to be adequately justified, without resorting to just proposing the minimum setback that can be found in the documentation.</p> <p>Hence, the amended draft EIS must include a comprehensive assessment of buffer zones taking the points outlined above into consideration.</p>		<ul style="list-style-type: none"> it has a smaller disturbance footprint than a slurry pipeline or a heavy vehicle haul road; slurry pipelines have high water and energy requirements; and a conveyor produces less noise and dust impacts compared to road haulage. <p>Subsequent to the pre-feasibility study a further more detailed conveyor options study was undertaken for the Project feasibility study. Figure 8-1 of the Additional Information to the EIS shows alignment options considered for the overland conveyor during the feasibility stage. The key design constraints for the conveyor corridor are:</p> <ul style="list-style-type: none"> the location of the ROM facility at the Willunga domain; Pembroke's mining tenement boundaries (i.e. the conveyor is confined to the areas within Pembroke's MLA areas); extent of flood prone land; location of the proposed open cut pits; requirement to cross the Isaac River in a perpendicular direction; and potential obstruction to river flow due to infrastructure. <p>Based on the above, construction and operation of the conveyor and access road along the preferred alignment (i.e. through the wetland and associated wetland protection area) is estimated to cost approximately \$35M less than the Southern Option alternative alignment, and approximately \$29M less than the Central Option alternative alignments.</p> <p>Given the significant cost difference Pembroke considers the conveyor and access road alignment presented in the draft EIS to be the preferred option. To minimise impacts of the conveyor on wetland areas, Pembroke has refined the design to include longer conveyor spans through the wetlands thereby reducing the required number of supporting trestles, hence reducing the area of disturbance in the wetlands. It should also be noted that the full extent of the overland conveyor, including where it traverses the wetlands, will be covered (although not enclosed) to reduce potential coal dust emissions to the surrounding environment.</p> <p>With this in mind, the Terrestrial Flora and Terrestrial Fauna Assessments (Appendices A and B of the draft EIS) found that there is not predicted to be a significant impact on the vegetation associated with the HES Wetlands which occur outside the Project area (i.e. through indirect impacts such as habitat fragmentation and edge effects).</p>
34.18	<p>Appendix C – Aquatic Ecology 6.4.2 p.160</p> <p>Appendix C – Aquatic Ecology 6.5.1 p. 151</p> <p>Appendix C - Aquatic Ecology 6.4.2 p.160</p> <p>Section 4 - Assessment of Project Specific Matters 4.1.3 p. 26</p> <p>Appendix E - Surface Water Assessment Part A 10.4.1 p.160</p> <p>Section 5 – Rehabilitation Strategy 5.1.1 p. 2</p>	<p>Impacts due to the proposed diversion of Ripstone Creek</p> <p>There will be significant impacts to terrestrial and aquatic habitats from the proposed diversion of Ripstone Creek. There is insufficient analysis to justify the significant loss of environmental values from the proposal to mine Ripstone Creek.</p> <p>There is inconsistency in information presented in the draft EIS regarding the percentage of Ripstone Creek catchment flows that will be captured. In Appendix C (section 6.4.2, p160), it is stated that flows will be captured by approximately 20%. In contrast, in Section 4 (4.1.3, changes to hydrology, p. 4-26) it is stated that the maximum mine-affected catchment area of Ripstone Creek is approximately 13%.</p> <p>The Ripstone Creek catchment is 286km² in size (Section 5.1.1). The proposal will significantly impact an 8km reach (Appendix E, Section 10.4.1 – Surface water a) (note the creek is approximately 35km total length). The topography of the catchment will be reduced by 7% or 19km².</p> <p>The draft EIS lacked:</p> <ul style="list-style-type: none"> an assessment as to how the reduction of the catchment will alter runoff pathways and flow characteristics Section 6.4.2 of Appendix C states that no measurable impacts on surface water quantity are likely to occur and therefore no adverse impacts are likely to occur on aquatic habitats. However this does not allow for changes to the timing, duration and magnitude of flow which are key drivers of aquatic habitats and aquatic fauna behaviours and life cycles. This level of analysis is too coarse to delineate impacts. <p>No information has been provided in the ecology sections of the draft EIS on the proposed diversion and how the diversion will recreate the environmental values of Ripstone Creek. For example, riparian tree species tend to be mesic and highly dependent on access to in-stream surface water, soil moisture</p>	<ol style="list-style-type: none"> The mine plan should be amended to avoid impacting Ripstone Creek. It is noted that there appears to be space to the east for the existing area of ODS9 to be re-positioned to avoid a diversion. In line with Government policy, a minimum buffer of 200m to the defining bank of Ripstone Creek should be provided to reduce disturbance and drawdown impacts on riparian vegetation and aquatic habitat. Address inconsistencies in the draft EIS in regards to the catchment area associated with Ripstone Creek. Should the diversion not be avoided, impact assessment must include mitigation and management measures and any offset requirements, including but not limited to: <ul style="list-style-type: none"> the loss of existing riparian vegetation; aquatic ecology, MSES and any terrestrial species requiring riparian habitat the reduction of the catchment that will alter runoff pathways successful rehabilitation strategies of the proposed diversion, including how to successfully establish riparian vegetation to avoid bank erosion offset requirements as per Environmental Offsets Policy 2014. An analysis of impacts on the flows at a reach/local scale for Ripstone creek and the Isaac River should be undertaken looking at a daily scale to determine impacts on flow characteristics such as timing, duration and magnitude of flows and retention of aquatic habitat in this ephemeral system. The Ripstone Creek diversion must be designed and constructed in accordance with DNRM's Guideline: Works that interfere with water in a watercourse—watercourse diversions. 	<ol style="list-style-type: none"> Without diverting the creek, approximately 3 Mt tonnes of coal would be left in situ. The economic benefit of mining the coal in this location out-weighs the cost of the environmental impacts, including the diversion of Ripstone Creek and the rehabilitation works required to replicate the natural hydraulic behaviour of the Ripstone Creek waterway. A net benefit of at least \$11M was calculated when accounting for the value of the coal (i.e. \$36M), the production benefits associated with employment and royalties associated with ODS9 and the cost of the Ripstone Creek diversion (i.e. \$25M).as well as a description of the proposed mitigation measures for the diversion. Pit ODS9 cannot be extended any further to the east to avoid the diversion as it has been designed to cover the extent of the coal resource. Figure 2-1 of the draft EIS shows the Project components, including the nominal 'infrastructure area' associated with the Project (grey shading). As shown, the infrastructure area covers the part of Ripstone Creek that is located within 200 m of ODS9. The entire area within the 'infrastructure area' is to be conservatively offset as part of the Project Biodiversity Offset Strategy. Accordingly, the ecological values of this section of Ripstone Creek will be offset (in acknowledgement of the proximity to the Project). Although this area will be offset, the design of the Ripstone Creek diversion will mimic the hydrological and geomorphological characteristics of the section of Ripstone Creek that will be impacted. The construction of the diversion will also include the reinstatement of a riparian corridor along the diversion. Section 6.4.2 of Appendix C of the draft EIS states that the maximum mine-affected catchment area of Ripstone Creek is approximately 13% (not 20% as stated in DES's comment). This is consistent with Section 4.1.3. As described above in response to item 2, the entire area within the 'infrastructure area' shown in grey on Figure 2-1 will be offset through the Biodiversity Offset Strategy. The Biodiversity Offset Strategy is described in Sections 10 and 11 and Appendix F of the Additional Information to the EIS. In accordance with the DNRM (2014) Guideline: Works that interfere with water in a watercourse – watercourse diversion, a Design Plan will be prepared for the diversion and will include a Revegetation and Vegetation Management Plan which will describe rehabilitation strategies of the proposed diversion, including how to successfully establish riparian vegetation to avoid bank erosion. The Design Plan will be prepared in accordance with the Proposed EA Conditions. The Functional Design of the Ripstone Creek diversion has been prepared in accordance with the DNRM (2014) Guideline: Works that interfere with water in a watercourse – watercourse diversion. The Functional Design maintains the existing hydrologic characteristics of the existing reach of Ripstone Creek. The hydraulic assessment of the Function Design was conducted using a one-dimensional HEC-RAS model to demonstrate the suitability of hydraulic parameters and a two-dimensional TUFLOW model to accurately represent out-of-channel flow behaviour and develop spatially distributed hydraulic results. The Functional Design is described in Section 13 of the Flood Assessment (Appendix F of the draft EIS).

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		and shallow groundwater (GDEs). This is particularly so when soil water stores are depleted at the end of the dry season. Hence, the draft EIS should provide enough information on the successful rehabilitation of the proposed diversion. A buffer of 200m to Ripstone Creek should be provided to ameliorate some of the likely impacts. Refer to separate comments made on the requirements of appropriate buffers to wetlands and riparian habitats.		6. Consistent with the Model Mining Conditions, Pembroke is seeking EA conditions (Schedule I of the Proposed EA conditions within Appendix B of the Additional Information to the EIS) which require preparation of a certified Design Plan for the Ripstone Creek diversion. The design of the Ripstone Creek diversion will be in accordance with the DNRM (2014) Guideline: Works that interfere with water in a watercourse – watercourse diversion. The DNRM Guideline requires the preparation of an 'Operation and Monitoring Plan' as part of a Design Plan. As outlined in Table 6-2 of the draft EIS, a monitoring strategy for the Ripstone Creek Diversion has also been developed and includes monitoring prior to construction, during operation and for relinquishment. This monitoring strategy will be developed into the 'Operation and Monitoring Plan' as part of the Design Plan.
34.19	Section 4 – Assessment of project specific matters 4.1.3 P. 28 Section 4 – Assessment of project specific matters Figure 4-15 p. 72 to 73	Impacts of the final voids on GDEs Potential impacts of the final voids on GDEs are not adequately described. This section concluded that the project as a result of final voids will remain permanent sinks but will not have a quality-related impact on GDEs. Figure 4-15 does not include the predicted impacts on groundwater flow for voids that are in the current floodplain and will remain (–3, 7 and 8), it only shows the pits that will be backfilled. There is discrepancy in information relating to the Triassic-Rewan Group. The description of the depth/location of Triassic-Rewan Group on page 73 (section 4) is not consistent with the information presented in Figure 4-15.	1. Address the potential impacts of the final permanent voids, including: <ul style="list-style-type: none"> impacts on the groundwater system Impacts on GDEs impacts relating to quantity/drawdown the relationship of the alluvium with the areas of the permanent voids. 2. Monitoring must be carried out annually once mining commences at defined monitoring points (reference points) in order to show if any changes occur. 3. If any impacts are recorded on the wetland ecosystem and/or any associated vegetation (e.g. GDEs) and fauna, these impacts must be managed in accordance with the hierarchy: avoidance, minimisation/mitigation, and if necessary, offsetting. 4. amend Figure 4-15 to show the predicted impacts on groundwater flow for the voids that will remain in the current floodplain. 5. Amend the discrepancy between page 73 (section 4) and Figure 4-15 in relation to the depth/location of Triassic.	1. Pembroke has prepared a separate assessment of potential impacts to GDEs and wetlands associated with the Project, including a discussion on the potential impacts of the final voids (refer Section 5.1.4 of the report, provided in Appendix E of the Additional Information to the EIS). Further to this, Figures 7 and 8 of Appendix E of the Additional Information to the EIS show the conceptual cross-section of GDEs and wetlands, including the predicted groundwater flow. 2. Pembroke has included additional commitments to conduct ongoing monitoring of the ecological characteristics of potential GDEs over the life of the Project (i.e. additional monitoring to what was committed to in the draft EIS). The ongoing monitoring will be used to validate the predicted impacts presented in the EIS, and identify whether any measures (such as habitat repair works, revegetation) need to be implemented to minimise any observed impacts. The ongoing monitoring is described in Appendix E of the Additional Information to the EIS. 3. The GED monitoring program will enable Pembroke to identify any impacts and implement corrective actions should impacts be identified. 4. Figure 4-15 is a conceptual cross-section (in a <u>specific</u> line/location to truncate the pits) for the purposes of describing the locations of the pits and nearby geology. If the cross-section was to truncate the point at which the unit was thickest (300m) it would have been evident. As such, it is concluded that the description on page 73 (section 4) is not inconsistent with Figure 4-15. 5. Refer to response to item 4 above.
34.20	Appendix C - Aquatic Ecology Assessment, p.25	Field survey results from 54 locations are presented in the Appendix C. Most of these locations are with-in the mining lease despite the terms of reference (TOR) requirements to: ... (b) provide details of the scope, methodology, timing and effort of surveys for each proposed action (including areas outside of each proposed action area which may be impacted by each proposed action.	Consider potential upstream and/or downstream aquatic ecosystem level impacts from mining lease, and include information from other published sources.	As identified by DES, the Aquatic Ecology Assessment prepared by DPM (Appendix C of the draft EIS) included an assessment of 54 locations within the Project area and upstream/downstream waters. Although a large number of the sites are located within the proposed MLA areas, numerous sites are located outside of the proposed disturbance footprint. For example, sites P2, R3 and R8 are all located within the proposed MLA areas, however they are located outside of the Project disturbance footprint, downstream of the Olive Downs South mining area (Figure 9 of the Aquatic Ecology Assessment). Section 6.4 of the Aquatic Ecology Assessment prepared by DPM (Appendix C of the draft EIS) provides an assessment of potential impacts associated with the Project on aquatic ecosystem downstream of the Project area. This includes an assessment of: <ul style="list-style-type: none"> impacts to surface water quality (i.e. erosion and sedimentation, mine water discharge and leaks and spills); and surface water quantity (i.e. reduction in catchment of downstream watercourses, proposed watercourse diversion) As a result of the impact assessment, the Aquatic Ecology Assessment prepared by DPM (Appendix C of the draft EIS) concluded that there would no adverse impacts are likely to occur on aquatic habitats downstream of the Project. Further to this, Section 4.1.4 of the draft EIS describes that the REMP process will provide additional information, including: <ul style="list-style-type: none"> suitable test sites within the receiving waters that are potentially impacted by the release (i.e. downstream sites); suitable control sites where a background or reference condition can be established (i.e. upstream sites); methodologies for assessing the condition of, and impacts to, EVs at test sites using both WQOs and control site data based on appropriate and valid assessment protocols from relevant guideline documents. This methodology for assessing the condition of control sites and test sites would involve the collection of baseline information in relation to GDEs, and where considered appropriate, cognisant of the references (Richardson et al, 2011; and Emelyanova et al, 2017).
34.21	Appendix C - Aquatic Ecology Assessment	The local ecological findings from these studies have not been considered alongside the proposal to discharge mine affected water and other non-point sources in relation to any resultant impacts to sensitive receptors. Appendix C sits as a separate chapter where the findings (including location of semi-permanent waterways) have not been integrated into the overarching draft EIS, in terms of surface water impacts, proposed EA conditions, etc.	1. Incorporate and integrate all the findings from the aquatic ecology aspects of the draft EIS with other relevant aspects of the proposal. 2. Where ecologically valuable habitats have been described or discovered, further discussion, ongoing monitoring/mitigation strategies should be considered for these locations (where there is a potential for mine impacts to encroach these areas). 3. Refer and link to other comments made on potential impacts on aquatic ecology.	In response to Recommendations 1 and 3, the findings of the Aquatic Ecology Assessment have been considered alongside the proposal to discharge. Section 6.4.1 of the Aquatic Ecology Assessment prepared by DPM (Appendix C of the draft EIS) identifies that the Surface Water Assessment (supported by site water balance modelling) prepared by Hatch (Appendix E of the draft EIS) concludes that: <ul style="list-style-type: none"> No uncontrolled spills of mine-affected water from the worked water dams are predicted under normal operating conditions. Some overflow of water from sediment dams (designed in accordance with the Best Practice Erosion and Sediment Control guideline [International Erosion Control Association Australasia 2008]) may occur during wet periods; however, it is unlikely that this would have a measurable impact on receiving water quality. There is a predicted negligible impact on the downstream water quality through releases from the Project.

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				<p>Based on the analysis undertaken by Hatch (2018a), no measurable impacts on surface water quality are likely to occur from discharge of mine-affected waters. If no measurable impacts on surface water quality are likely to occur, no adverse impacts are likely to occur on aquatic habitats.</p> <p>Further to this, the identification of semi-permanent waterways and wetlands throughout the Project area has been acknowledged and considered within the Surface Water Assessment (refer to Sections 4.1 and 10.5 of Appendix E of the draft EIS) and Flood Assessment (refer to Section 15.2 of Appendix F of the draft EIS). A detailed description of the locations and potential impacts to these semi-permanent watercourses and wetlands are also described in Sections 4.1.2, 4.1.3 and 4.1.5 and Figures 4-4 and 4-6 of the draft EIS.</p> <p>In response to Recommendation 2, as outlined in Section 6 of the draft EIS, a number of management plans and strategies are proposed to be developed by Pembroke. A number of these plans/strategies would assist in monitoring potential impacts to aquatic habitats. These includes:</p> <ul style="list-style-type: none"> • REMP (proposed conditions F20 and F22); • Water Management Plan (proposed condition F27); • Surface Water Monitoring Program; • Groundwater Monitoring Program (proposed conditions E1 to E6); • Erosion and Sediment Control Plan (proposed conditions F28 and F29); • Weed and Pest Management Plan; and • Fauna Species Management Plan. <p>Notwithstanding, Pembroke has prepared a stand-alone assessment of potential impacts to GDEs and wetlands (refer to Appendix E of the Additional Information to the EIS).</p> <ul style="list-style-type: none"> • As part of this assessment Pembroke has included additional commitments to conduct ongoing monitoring of the ecological characteristics of these wetlands over the life of the Project (i.e. additional monitoring to what was committed to in the draft EIS). The ongoing monitoring will be used to validate the predicted impacts presented in the EIS, and identify whether any measures (such as habitat repair works, revegetation) need to be implemented to minimise any observed impacts.
34.22	<p>Section 3 – Assessment of MNES 3.3.11.1 Impact Avoidance Measures</p> <p>Appendix C - Aquatic Ecology 6.1.2 p.155</p> <p>Appendix C - Aquatic Ecology Figure 28.4</p> <p>Appendix C - Aquatic Ecology 6.4 p. 159</p> <p>Appendix C - Aquatic Ecology 6.9.1 p. 165</p> <p>Appendix C - Aquatic Ecology 6.1.2 p. 155</p> <p>Appendix C - Aquatic Ecology Figure 28.4 p. 131</p>	<p>Coal conveyor and haul road – potential impacts</p> <p>Coal conveyor and haul road – potential impacts</p> <p>The draft EIS has not demonstrated that the proponent has sought to minimise clearing impacts associated with the construction and operation of the coal conveyor and haul road.</p> <p>Several issues in different parts of the draft EIS were identified:</p> <ol style="list-style-type: none"> 1. A 180m construction corridor width for the conveyor is proposed, however, the proponent has committed to reducing this to 45m within 200m of the defining bank of the watercourse. It is unclear: <ul style="list-style-type: none"> • why the conveyor construction corridor width cannot be reduced across its entire length to further reduce clearing required for the conveyors construction • why the conveyor requires such a wide corridor width compared to the 60m haul road corridor width. 2. The coal conveyor and haul road traverse and impact on a number of HES wetlands but the draft EIS does not demonstrate that the siting of the coal conveyor and haul road avoid and minimise, to the greatest degree practicable, impacts to these MSES. 3. Appendix C, Section 6.4 (Surface water) does not adequately describe the potential indirect impacts of the projects on HES wetlands. For example, potential impacts to water quality and wetland recharge as a result of the construction of the coal conveyor and haul road through the middle of a HES wetland are not discussed. 4. The description in Appendix C, Section 6.9.1 of the impact of the project on HES wetlands does not adequately consider the indirect impacts of the project on wetlands. For example, the discussion of the impact of the coal conveyor construction does not discuss the potential indirect impacts of the construction of the conveyor through the middle of the wetland, although this direct impact will likely result in further longer-term indirect impacts to the remaining non-contiguous sections of the wetland (given the reduction in size and connectivity between the remaining areas of wetland which may result 	<ol style="list-style-type: none"> 1. Reduce the conveyor construction corridor width along its entire length or describe why the conveyor corridor cannot be reduced further to minimise clearing along the conveyors length. Describe why the conveyor corridor width is significantly wider than the haul road corridor width. 2. Describe how the current siting of the coal conveyor and haul road avoid and minimise, to the greatest degree practicable, impacts to HES wetlands and direct and indirect impacts to listed threatened species (e.g. koalas and greater gliders). 3. Describe why alternate siting of this infrastructure is not possible to avoid and minimise impacts to HES wetlands. I.e. the proposed location of the coal conveyor and haul road between the ODS and Willunga domains should be relocated outside of and to the south of the WPA wetlands. A constraints analysis is recommended as justification of the final route, recognising that the current proposal will impact approximately 54ha of Wetland Protection Areas and its associated trigger area. 4. Describe in more detail the potential indirect impacts of the project on all HES wetland downstream of project activities, including potential impacts of the project to water quality and wetland recharge. 5. Provide a more detailed discussion of the potential indirect impacts of operating the coal conveyor and the haul road on HES wetlands in Table 19 of Appendix C. Note for example whether the overland conveyor will be fully covered to reduce coal dust emissions. 6. Address offset requirements under the Environmental Offsets Policy 2014 – refer to separate comments made below. 	<p>Pembroke does not propose to construct a haul road across the Isaac River between the Olive Downs South and Willunga domains. Rather, an access road is required to be constructed along the conveyor alignment for the internal transfer of equipment and personnel between the two mining domains and to provide access to the conveyor for servicing/maintenance.</p> <p>In response to Recommendation 1, the draft EIS conservatively assumes that all vegetation within a 180 m wide corridor would be removed by the Project. This assumes that the overland conveyor and access road would be co-located along the length of the conveyor (i.e. the 180 m width includes the full width of the conveyor and the proposed access road). Although this width has been reduced where the conveyor crosses the Isaac River, this is an onerous commitment which has been made by Pembroke to minimise the potential impacts to the riparian vegetation and aquatic habitat and is not feasible along the full length of the corridor due to the need to accommodate for construction traffic/materials and associated laydown areas.</p> <p>In response to Recommendations 2 and 3, as described in Section 8 of the Additional Information to the EIS, a transport options study was undertaken at the pre-feasibility stage for moving raw coal from Willunga to the Olive Downs South CPP site. For this study, the following transport scenarios were considered:</p> <ul style="list-style-type: none"> • high speed overland conveyor • slurry pipeline; and • heavy vehicle road haulage of ROM coal. <p>The study showed that the conveyor solution was preferred because:</p> <ul style="list-style-type: none"> • it has a lower operating cost per tonne than a slurry pipeline or road haulage of ROM coal; • it has a smaller disturbance footprint than a slurry pipeline or a heavy vehicle haul road; • slurry pipelines have high water and energy requirements; and • a conveyor produces less noise and dust impacts compared to road haulage. <p>Subsequent to the pre-feasibility study a further more detailed conveyor options study was undertaken for the Project feasibility study. Figure 8-1 of the Additional Information to the EIS shows alignment options considered for the overland conveyor during the feasibility stage. The key design constraints for the conveyor corridor are:</p> <ul style="list-style-type: none"> • the location of the ROM facility at the Willunga domain; • Pembroke's mining tenement boundaries (i.e. the conveyor is confined to the areas within Pembroke's MLA areas); • extent of flood prone land; • location of the proposed open cut pits; • requirement to cross the Isaac River in a perpendicular direction; and

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		in a substantial or measurable change in the hydrological regime or recharge zones of the wetland).		<ul style="list-style-type: none"> potential obstruction to river flow due to infrastructure. <p>Based on the above, construction and operation of the conveyor and access road along the preferred alignment is estimated to cost approximately \$35M less than the Southern Option alternative alignment, and approximately \$29M less than the Central Option alternative alignments.</p> <p>Given the significant cost difference Pembroke considers the conveyor and access road alignment presented in the draft EIS to be the preferred option. To minimise impacts of the conveyor on wetland areas, Pembroke has refined the design to include longer conveyor spans through the wetlands thereby reducing the required number of supporting trestles, hence reducing the area of disturbance in the wetlands. It should also be noted that the full extent of the overland conveyor, including where it traverses the wetlands, will be covered (although not enclosed) to reduce potential coal dust emissions to the surrounding environment.</p> <p>In response to Recommendations 3, 4 and 5, Section 6.3 of the stand-alone assessment of potential impacts to wetlands (refer to Appendix E of the Additional Information to the EIS) provides an additional assessment of the potential impacts to each of the HES wetlands associated with catchment excision. These wetlands all act as 'flow-through' systems. That is, once the wetland has reached its maximum storage capacity, any additional input (either from rainfall or overland flow) would cause the wetland to spill, and runoff would continue towards the Isaac River. As the wetlands are very small relative to the size of their existing catchments, it is expected that they would only hold a very small portion of the water captured within these catchments, and the vast majority of water would continue to flow through the wetland.</p> <p>Although the Project would result in the temporary removal of a portion of the catchments of each of seven HES wetlands, the size of the remaining catchments relative to the size of the wetlands is still very large (i.e. the remaining catchment is greater than approximately 4 times the size of the wetland in all cases) and the majority of the catchments for these wetlands would be re-instated once rehabilitation is complete (refer to Appendix E of the Additional Information to the EIS).</p> <p>Further to this, as stated in Section 5.3, the wetland substrate and associated clay layers slow the percolation of surface water (Appendix D of the draft EIS) which allow these wetlands to continue to hold water for extended periods.</p> <p>Given the above, it is expected that potential hydrological changes to these wetlands would be minimal as the wetlands would continue to be inundated during and following rainfall / flood events. Further to this, the Aquatic Ecology Assessment prepared by DPM (Appendix C of the draft EIS) concluded that there would no adverse impacts are likely to occur on wetlands downstream of the Project as a result of potential changes to surface water quality associated with the Project.</p> <p>In order to confirm that this reduction in catchment does not result in an adverse impact to the ecological values of the wetlands, Pembroke would undertake further investigation and monitoring through the installation of shallow piezometers within these wetlands and the development and implementation of a Wetland Monitoring Program.</p> <p>In response to Recommendation 6, it was concluded in Appendix C of the draft EIS, that the removal of 61 ha of HES wetlands associated with the Project would result in a significant impact to wetlands (DPM Envirosiences, 2018c). The impact on these wetlands would be offset in accordance with the <i>Queensland Environmental Offsets Policy (Version 1.6)</i> (DES, 2018) at an offset ratio of 1:4 as detailed in Section 4.1.5 of the draft EIS.</p>
34.23	<p>Section 4 – Assessment of project specific matters Figure 4-26 p. 29</p> <p>Appendix C - Aquatic Ecology Figure 28.2 p. 132</p> <p>Appendix C - Aquatic Ecology 7.1 p. 172</p>	<p>Rail spur and water pipeline - potential impacts</p> <p>It is unclear why a section of the rail spur alignment is located in close proximity to the Isaac River (i.e. within 85m of the bank extending for approximately 2km) as depicted in Section 4, Figure 4-26.</p> <p>The rail spur location shows that it intersects with a range of MSES values (refer to separate comments made), including regulated vegetation endangered and of concern; intersecting with watercourse vegetation; intersecting with a wetland; and essential habitat (ornamental snake). However, the rail corridor description on page 4-29 states that it was located primarily 'through areas of relatively low habitat value'.</p> <p>Appendix C, figure 28.2 shows the riparian corridor that the rail spur passes through as 'high potential for groundwater interaction'. The location is also described as within 85m of the bank of the Isaac River for 1.5km (Appendix C, section 7.1, p.172).</p> <p>No flooding or risk assessment was provided for this section of the alignment. The alignment is located predominantly within the Isaac River floodplain. The potential for flooding of this section of the rail track and associated erosion has not been addressed in regard to an elevated structure design.</p> <p>Appropriate buffer zones have to be incorporated – refer to separate comments made.</p>	<ol style="list-style-type: none"> Describe how the current siting of the rail spur avoids and minimises, to the greatest degree practicable, impacts to MSES. Describe why alternate siting of this infrastructure is not possible to avoid and minimise impacts to MSES. Impacts to MSES values should be tabled (in hectares per infrastructure element and a total impact area provided). A constraints analysis should be provided if the current alignment is retained. If this section is elevated there will still be impacted areas from the location of spans, access clearing and lay-down areas. A risk assessment must be included for the potential flooding and erosion impacts to an elevated rail structure recognising that up to eight product coal trains per day might be affected if the line is closed (e.g. Section 2.4.5, p. 2-45 notes it will only be fully covered traversing the Isaac River). The rail spur corridor should be re-aligned to avoid the mapped MSES values that would require offsetting. Address offset requirements under the Environmental Offsets Policy 2014 – refer to separate comments made below. 	<p>In response to Recommendation 1, 2 and 6 as outlined in Section 4.1.3 of the draft EIS, the Project rail spur and water pipeline have been designed to minimise impacts on MSES, as well as overlapping mining tenements. The proposed rail spur and water pipeline are located adjacent the northern boundary of MDL 183 (owned by Whitehaven) and as such cannot be moved further south without impacting on the tenement. The rail spur and pipeline have been located to maximise the distance from the riparian corridor (i.e. the most suitable habitat for the Koala and the Greater Glider), while also avoiding a small patch of ERE which was mapped within the original rail spur alignment (as described in Section 4.1 of the draft EIS).</p> <p>In response to Recommendation 3, as required by Section 1.1.2 of the <i>Queensland Environmental Offsets Policy</i>, the full extent of potential impacts on prescribed environmental matters from the entire proposal needs to be taken into account as part of the significant residual impact test. As such, the significant residual impacts associated with the Project have not been based on the individual infrastructure elements in isolation of the rest of the Project. Notwithstanding, Table 10 of both the Terrestrial Flora Assessment and Terrestrial Fauna Assessment details the clearance of MSES values associated with each infrastructure element and a total impact area has been provided.</p> <p>In response to Recommendation 4 and 5, Section 9.2.4 of the draft EIS Flood Assessment states that, where the Project rail spur is located near the Isaac River and where it crosses drainage lines, culverts and spans between piers would be used to minimise impacts to the flooding regime. As part of the detailed design of the Project rail spur, a detailed flood study along the rail corridor has been commissioned by Pembroke. In particular, the detailed design and flood study were prepared to integrate the Project rail spur with Aurizon's flood design criteria, and to confirm the sizing for culverts and bridge structures along the length of the rail spur.</p> <p>A number of culverts and a bridge structure have been incorporated into the design to allow Isaac River flood waters to pass under the rail spur and then drain back to the Isaac River as a flood event recedes. The culverts and bridge structure would also allow the existing local catchments to the south of the rail spur to drain to the Isaac River via the existing drainage paths.</p> <p>Further to the above, as outlined in Section 6 of the draft EIS, Pembroke will develop a suite of management plans (some of which would be required through proposed EA conditions) which would be implemented to mitigate potential impacts of the Project on the local biodiversity, including potential flooding impacts associated with the rail spur, if they are identified.</p> <p>In response to Recommendation 7, Pembroke has committed to providing a biodiversity offset for the MSES proposed the be impacted by the rail spur in accordance with the <i>Environmental Offsets Policy 2014</i>.</p>

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34.24	Appendix C - Aquatic Ecology 6.1.2 p. 155 to 156 Appendix C - Aquatic Ecology Tables 22 to 23 p.173 to 179 Appendix C - Aquatic Ecology Figure 28.4 p. 131 Appendix F- Flood Assessment 12.2 p.52 Appendix F- Flood Assessment 15.2 p. 83	<p>Impacts on matters of state environmental significance (MSES)</p> <p>Assessment against the Queensland Environmental Offsets Policy 2014 was not adequate to determine that, before offsets were considered, any impacts to MSES values have first been avoided; then minimised.</p> <p>In particular the following areas require further assessment:</p> <ol style="list-style-type: none"> Pit WIL1, referred to as a 'satellite pit', is depicted in various figures (e.g. Fig 2-2) as being located directly adjacent to the Isaac River. The location of this pit will impact either directly or indirectly with the following MSES: <ul style="list-style-type: none"> four mapped vegetation management wetlands greater glider and koala habitats in the riparian corridor riparian vegetation. Pit ODS9 and the proposed diversion of Ripstone Creek have not taken into account indirect or direct impacts on MSES, including but not limited to: <ul style="list-style-type: none"> riparian vegetation species habitats in the riparian corridors, such as greater gliders and koalas. The proposed locations of the overland conveyor and haul road linking Olive Downs South Domain and Willunga Domain have not shown assessment and avoidance of: <ul style="list-style-type: none"> wetlands (including HES wetlands): The proposed location of the coal conveyor and haul road between the domains traverses three palustrine water bodies mapped as MSES – Wetland Protection Areas (WPA), impacting approximately 54ha of WPA wetland and its associated trigger area riparian vegetation species habitats in the riparian corridors, such as greater gliders and koalas. The proposed rail spur alignment located in close proximity to the Isaac River (i.e. within 85m of the bank extending for approximately 2km) have not shown assessment and avoidance of: <ul style="list-style-type: none"> regulated vegetation endangered and of concern; intersecting with watercourse vegetation intersecting with a wetland essential habitat (ornamental snake) riparian vegetation species habitats in the riparian corridors, such as greater gliders and koalas. <p>No justification has been provided in the draft EIS on the location of abovementioned proposals in regards to avoiding or minimising impacts on MSES.</p> <p>There is insufficient analysis to justify the significant loss of environmental values from the proposal to mine Ripstone Creek.</p> <p>Appropriate buffer areas to wetlands and riparian vegetation have not been incorporated (refer to separate comment made).</p> <p>Indirect impacts, such as noise, lighting and road mortality, have not been included (refer to separate comment made).</p> <p>DES's management hierarchy a) to avoid; (b) to minimise or mitigate; once (a) and (b) have been applied, (c) if necessary and possible, to offset has not been incorporated into the impact assessment.</p>	<ol style="list-style-type: none"> Address requirements under the Environmental Offsets Policy 2014. Impacts on MSES must be appropriately addressed following the Offsets Policy and DES's management hierarchy a) to avoid; (b) to minimise or mitigate; once (a) and (b) have been applied, (c) if necessary and possible, to offset. Assessment must take into account required buffers and impacts to water quality (refer to separate comments made). The Ripstone Creek impacts and diversion should be reconsidered if mining of the south-western corner of pit ODS9 could not justify the indirect and direct impacts on Ripstone Creek, including MSES offset requirements. The proposed location of the overland conveyor and haul road between the two domains should be relocated outside of the WPA wetlands (e.g. to the south of the wetlands). A constraints analysis should be included as justification of the proposed routes. This should take into account the area of WPA wetland and its associated trigger area. Indirect impacts should be included and are not limited to noise, lighting and road mortality (refer to separate comment below). Describe significant residual impacts leading to MSES wetland offset commitments. 	<p>In response to Recommendations 1 and 2, as outlined in Section 4.1 of the draft EIS, the Department of Environment and Science's (DES's) general management hierarchy: (a) to avoid; (b) to minimise or mitigate; once (a) and (b) have been applied, (c) if necessary and possible, to offset has been applied by Pembroke to the Project design and determination of residual impacts associated with the Project.</p> <p>The following measures would be implemented to avoid and / or minimise impacts on terrestrial ecology:</p> <ul style="list-style-type: none"> Mine – Impacts to riparian vegetation along the Isaac River has been minimised in the mine design and a minimum buffer zone of 200 m between the mine pits and Isaac River has been implemented. Overland conveyor – The overland conveyor would run North-west from the Willunga Domain and cross the Isaac River approximately 4.5 km from its origin point. The conveyor would be restricted to a construction corridor of 180 m however this would be minimised when crossing the Isaac River; where, within 200 m of the defining bank, the construction corridor width would be limited to 45 m to minimise impact on the riparian habitat. Access road – the proposed 3.5 km access road would be co-located with existing public and private roads as far as possible to minimise impacts to native vegetation. The access road would be restricted to 40 m at the crossing point to minimise the impact on the riparian habitat. Haul road crossing – The haul road crossing of the Isaac River would provide access to the waste emplacement on Deverill from the Olive Downs South Domain. The crossing would be located approximately 2 km south-south east of the access road where it crosses the Isaac River entering an area ground-truthed as being RE 11.3.25 of Least Concern. The haul road would be restricted to a construction corridor of 60 m. Water pipeline – the proposed water pipeline would connect to the existing Eungella Pipeline west of the Project. The water pipeline would be approximately 23 km long and has been co-located with the rail corridor as far as possible (for a distance of 15 km from the mine site to the existing Norwich Park Branch to minimise native vegetation clearance. All patches of TEC have been avoided and impacts to Endangered and Of Concern REs minimised by minimising the corridor for the water pipeline to 20 m. ETL – the proposed ETL utilises an existing easement between the sub-station on Peak Downs Highway and the rail (Norwich Park Branch), then follows Daunia Road and Annandale Road before heading south for 13 km across predominately cleared land to the MLA. The ETL would be restricted to a construction corridor of 10 m. Rail spur – The final location of the rail spur would maintain a buffer zone of approximately 85 m to the bank of the Isaac River at its closest point (affecting 1.5 km of the rail alignment). It has avoided all areas of TEC and most Endangered RE (with the exception of waterway crossings). <p>Further to this, Section 4.1.5 of the draft EIS provides a details description of the biodiversity offset strategy that would be implemented for the Project to compensate for potential impacts to MSES in accordance with the <i>Environmental Offsets Policy 2014</i>. This includes all MSES that would be significantly impacted by the proposed diversion of Ripstone Creek.</p> <p>In response to Recommendation 3, refer to response 34.17 for a detailed discussion about proposed buffer distances from the Isaac River and Ripstone Creek.</p> <p>In response to Recommendations 4, 5 and 6, refer to response 34.22 for a detailed discussion about the justification for the alignment of the overland conveyor and access road within the HES Wetlands and the associated wetland protection area.</p> <p>Further to this, Section 4.1.4 of the draft EIS provides a detailed description of the proposed buffer distances associated with the mining pits, overland conveyor, access road, haul road, water pipeline, ETL and rail spur. Further to this, Section 2.10 of the draft EIS provides a description of the project justification, including an assessment of Project alternatives, including alternative locations for infrastructure components. Notwithstanding, further information on impact avoidance and minimisation associated with the Project is provided in Sections 8 and 21 of the Additional Information to the EIS. This includes a detailed justification for the Ripstone Creek Diversion and the final alignment of the overland conveyor (relative to the mapped HES wetlands and their associated buffers).</p> <p>In response to Recommendation 7, Section 6 of the Terrestrial Flora Assessment, Terrestrial Fauna Assessment and Aquatic Ecology Assessment provide a detailed assessment of potential indirect impacts on native flora, fauna and aquatic values species. This includes an assessment of impacts from vehicle strike, weeds and feral animals, edge effects, bushfire, impacts to water quality and flow (both surface water and groundwater), loss in connectivity, dust, noise, artificial lighting and cumulative impacts.</p> <p>It was concluded in Appendix C of the draft EIS, that the removal of 61 ha of HES wetlands associated with the Project would result in a significant impact to wetlands (DPM Envirosiences, 2018b). The impact on these wetlands would be offset in accordance with the <i>Queensland Environmental Offsets Policy (Version 1.6)</i> (DES, 2018) at an offset ratio of 1:4.</p>
34.25	Section 4 – Assessment of project specific	<p>Dewatering activities</p> <p>Any groundwater that is pumped from the pit during mine</p>	<ol style="list-style-type: none"> Assess the potential impact from dewatering on aquatic values, including stygofauna and GDEs, due to: 	<p>Hydrogeological investigations conducted for the Project identified that the surficial alluvium along the upper reaches of the tributaries is largely dry, and groundwater levels within the Isaac River alluvium generally being 10 m to 20 m below the ground surface.</p>

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	matters, 4.2.3, p.26	<p>dewatering activities is classed as mine affected water and has the potential to impact on environmental values, including wetlands, aquatic ecology, GDEs and stygofauna.</p> <p>The draft EIS did not assess any potential impacts from dewatering on aquatic values including wetlands, GDEs and stygofauna or discussed management and monitoring measures.</p>	<ul style="list-style-type: none"> groundwater drawdown and redirecting pit water to offset any groundwater drawdown. <p>2. Assess the likelihood of this strategy to achieve the desired objectives.</p>	<p>The alluvium is underlain by low permeability claystone, siltstone and sandstone which likely restricts the rate of downward leakage to the underlying formation.</p> <p>Section 4.1.2 of the draft EIS provides a detailed description of the sampling effort that was undertaken for stygofauna. In summary, a total of 149 bores were assessed for their suitability to provide stygofauna habitat. Of these bores, only two were identified as containing suitable habitat, based on depth to groundwater, salinity, ability to sample (i.e. a large number were capped) and presence of groundwater. No stygofauna were identified during sampling. Refer to response 34.14 for a detailed description of the sampling effort and impact assessment for stygofauna.</p> <p>Despite this, Section 4.1.3 of the draft EIS provides a description of the potential impacts to stygofauna, including a conservative assessment assuming that stygofauna may occur within the groundwater system. This assessment concluded that although the Project may have local impacts on the stygofauna community (if they were to occur), these are likely to be insignificant when placed in the regional context of the whole groundwater system (DPM Envirosciences, 2018c).</p> <p>In addition to the above, Pembroke has prepared a separate assessment of potential impacts to GDEs and wetlands which describes potential impacts from dewatering on aquatic values including wetlands, GDEs and stygofauna or discussed management and monitoring measures (refer to Appendix E of the Additional Information to the EIS).</p> <p>As part of this assessment Pembroke has included additional commitments to conduct ongoing monitoring of the ecological characteristics of these wetlands over the life of the Project (i.e. additional monitoring to what was committed to in the draft EIS). The ongoing monitoring will be used to validate the predicted impacts presented in the EIS, and identify whether any measures (such as habitat repair works, revegetation) need to be implemented to minimise any observed impacts. A detailed description of this monitoring program is provided in the Assessment of Potential Impacts to GDEs and Wetlands that is provided in Appendix E of the Additional Information to the EIS.</p>
34.26	<p>Chapter 4 Assessment of Project Specific Matters 4.1.3 p.24</p> <p>Appendix A - Terrestrial Flora Assessment</p> <p>Appendix E - Surface Water Assessment Part A 7.7.2 p. 96 (This Appendix is referred to in Draft EIS as Hatch 2018)</p>	<p>Impacts from reduced catchments / water flow</p> <p>During active mining operations the mine water management system will capture runoff from areas that would previously have reported to Ripstone Creek (approx. 13% of the Ripstone Creek catchment impacted) and the Isaac River (<1% of the Isaac River catchment impacted).</p> <p>Impacts arising from the final landform will reduce the Ripstone Creek catchment by 19km² (<7% decrease) and 49km² for the Isaac River (<1% decrease).</p> <p>Flows in Ripstone Creek and the Isaacs will be most affected immediately downstream from where runoff from the catchment is diverted away from the creek/river. This impact has not been identified in the draft EIS.</p> <p>No discussion about the subsequent impacts on ecology or adjacent land use, sensitive receptors etc. (e.g. Ripstone Creek) is provided beyond a single statement.</p> <p>Based on the analysis undertaken by Hatch (2018a), no adverse water flow related impacts are likely to occur on habitats surrounding the project, because no measurable impacts on surface water flows are likely to occur (Appendix A).</p> <p>An assessment on the potential impacts of the loss of overland flow to gilgais was not addressed. Gilgais provide important habitat for aquatic and terrestrial fauna and flora during the wet season (e.g. frogs and ornamental snakes; bluegrass).</p>	<p>1. Provide an adequate assessment of the potential impacts of the loss of runoff on the ecology (terrestrial and aquatic). This would include loss of overland flows to gilgais.</p> <p>2. Describe the instream impacts to flows in Ripstone Creek and Isaac Rivers immediately downstream of where runoff is diverted from the catchments (not the total catchment area). Identify any mitigation and management measures that would be applied.</p>	<p>It is important to note that the instream flows in lower reaches of Ripstone Creek immediately adjacent the Project are not necessarily influenced, nor mostly affected by, the adjacent local catchments. As demonstrated by the catchment analysis, 87%-93% of the catchment runoff following rainfall events that reports to Ripstone Creek will remain unchanged. Further, as recognised by the DES, Peak Downs Mine has the authority to release water to Ripstone Creek upstream of the Project. It is also noted that an 'up-catchment water drain' from the CWD to Ripstone Creek is shown on Figure 2-3 of the draft EIS. The drain would provide for the continued conveying of up-catchment local rainfall runoff west of the Project to Ripstone Creek and the Isaac River downstream.</p> <p>The draft EIS also describes that surface runoff from the waste rock emplacements would be directed to dedicated sediment dams. In rainfall events below the design standard, runoff from disturbed areas would be intercepted and treated by sediment dams. Some overflow of water from sediment dams (designed in accordance with the Best Practice Erosion and Sediment Control guideline [International Erosion Control Association Australasia 2008]) may occur during wet periods (that is, in larger events that exceed the design standards, these sediment dams would overflow following a period of settlement treatment); however, it is unlikely that this would have a measurable impact on receiving water quality.</p> <p>Pembroke has also specifically committed to the following:</p> <ul style="list-style-type: none"> The sediment dam monitoring would be used to validate the anticipated quality of water runoff reporting to sediment dams and haul road runoff dams. Initially, the sediment dam monitoring would occur on a regular (e.g. monthly) basis to demonstrate the water quality of stored waters is consistent with the relevant operating parameters to allow releases from sediment dams to occur when required. Subject to demonstrating the water quality objectives can be met, the frequency of monitoring and suite of parameters for the sediment dam monitoring would be reviewed and updated accordingly (e.g. to occur only when releases occur). Sediment dams would be retained until the revegetated surface of the waste rock emplacements are stable and runoff water quality reflects runoff water quality from similar un-mined areas, at which time these controls would be removed and the areas would be free-draining. <p>Given the above, the Surface Water Assessment (Hatch, 2018) concludes that 'no adverse water flow related impacts are likely to occur on habitats surrounding the Project, because no measurable impacts on surface water flows are likely to occur (Appendix A)'.</p> <p>Pembroke has prepared a separate assessment of potential impacts on GDEs and wetlands, including an assessment of the potential loss of catchment (and associated impacts to terrestrial ecology) to each wetland located between the Project disturbance area and the Isaac River (i.e. those that would potentially be impacted by catchment excision). The assessment also describes that Pembroke will implement a program to monitor the potential impacts to groundwater and terrestrial ecology within the wetlands and riparian areas surrounding the Project. Refer to Appendix E of the Additional Information to the EIS.</p>
34.27	Section 4 - Assessment of Project Specific Matters 4.10.2 p.142 Table 10-2	<p>Impacts during low flow/dry periods</p> <p>The draft EIS describes the decreased catchment area in terms of km²; however fails to describe resulting impact on the environment (environmental values and ecology), including evaluation and consideration of the 'take' from the system.</p> <p>It is unclear how this impacts the environment during low flow/dry periods.</p>	<p>1. Provide an impact assessment of the decreased catchment area on the environment (ecology, environmental values, and downstream impacts).</p> <p>2. Provide an impact assessment on the environment including but not limited to the:</p> <ul style="list-style-type: none"> evaluation and consideration of the 'take' from the system, and impacts to the environment (ecology, environmental values, downstream impacts) during low flow/dry periods. 	<p>Section 6.5 of the Terrestrial Flora Assessment and Section 6.4 of the Terrestrial Fauna Assessment provide a detailed assessment of the potential impacts associated with hydrological changes caused by the Project. This includes, impacts from changes in surface water quality, flow regimes (including flooding impacts) and catchment excision</p> <p>In addition, Pembroke has prepared a separate assessment of potential impacts on GDEs and wetlands, including an assessment of the potential loss of catchment (and associated impacts to terrestrial ecology) to each wetland located between the Project disturbance area and the Isaac River (i.e. those that would potentially be impacted by catchment excision). The assessment also describes that Pembroke will implement a program to monitor the potential impacts to groundwater and terrestrial ecology within the wetlands and riparian areas surrounding the Project. Refer to Appendix E of the Additional Information to the EIS.</p>

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34.28	<p>Section 2 – Project Description 2.5.3 p.53</p> <p>Appendix F – Flood Assessment section 12 p.49</p> <p>Appendix F – Flood Assessment Figure 14 -1 p. 80</p> <p>Appendix C- Aquatic Ecology 5.1 p 52.</p>	<p>Impacts on the ecology due to the permanent highwall emplacement, in-pit waste rock emplacement areas, and temporary levees</p> <p>The potential ecological impacts from the proposed permanent highwall emplacement, the in-pit waste rock emplacement areas and the temporary flood levees have not been adequately assessed. It is considered likely that such structures will have a significant impact on the Isaac River floodplain and associated ecology. There is insufficient assessment of the link between the proposed landform changes and resultant hydraulic impacts which have been assessed and the ecological assessment throughout the draft EIS and appendices.</p> <p>The temporary levees are predicted to be in place for up to 79 years. This length of time could be considered permanent as it will have long term impacts on local terrestrial and aquatic ecology (in terms of life cycles and habitat preservation); as well as downstream impacts. After this timeframe a return to the original ecology may not be feasible. For example, floods support diverse aquatic life whose life cycles are adapted to intermittent stream conditions and allow passage of aquatic fauna upstream and downstream (Appendix C, section 5.1, p51).</p> <p>It is noted that a more detailed hydraulic impact assessment is recommended “during the detailed design phase of the project to verify the height of the levee[s]”, Appendix F, section 12, p. 52. The draft EIS is the appropriate detailed design phase of the project to present this information.</p> <p>Impact assessment must be based on DES's managing hierarchy and must focus on avoidance and mitigation. This has not been addressed.</p> <p>Cumulative impacts will need to be addressed as well (refer to separate comment below).</p>	<ol style="list-style-type: none"> 1. An ecohydrological conceptual model should be used to assess potential impacts to the ecology as per the IESC 2015 guideline Modelling water-related ecological responses to coal seam gas extraction and coal mining. 2. A much stronger linkage between the hydraulic and hydrological impact assessment and the ecological assessment is required. This should include: <ul style="list-style-type: none"> • figures and relevant associated tables that show the extent of flooding impacts on MSES values • downstream (off-site) impacts such as the extensive riverine wetlands on the Isaac River to the south of the Willunga domain. 3. Provide a detailed hydraulic and hydrological impact assessment where the dimensions and locations of the emplacement areas and levees must be provided for each domain. A table should be provided with impact areas of any MSES values that will be cleared within the footprint of the levees. The afflux and change in velocity should be determined and the extent of modelled flood levels mapped. 4. Carry out the impact assessment based on DES's managing hierarchy, focusing on avoidance and mitigation measures. 5. Offset requirements as per Environmental Offsets Policy 2014 must be addressed. 6. Address cumulative impacts (refer to separate comment below). 	<p>In response to Recommendations 1 and 2, Pembroke has prepared a separate assessment of potential impacts on GDEs and wetlands cognisant of the IESC 2015 guideline <i>Modelling Water-related Ecological Responses to Coal Seam Gas Extraction and Coal Mining</i>, including an assessment of the potential loss of catchment (and associated impacts to terrestrial ecology) to each wetland located between the Project disturbance area and the Isaac River (i.e. those that would potentially be impacted). The assessment provides a stronger linkage between the hydraulic and hydrological impact assessment (including potential cumulative impacts) and the ecological assessments and a detailed assessment of potential impacts of waste rock emplacements and flood levees and potential flooding impacts.</p> <p>In response to Recommendation 3, the Flood Assessment prepared by Hatch (Appendix F of the draft EIS) for the Project determined that areas that are 'wet now dry' are those behind the temporary levees, permanent highwall emplacements and waste rock emplacements within the disturbance footprint of the Project. That is, the ecological values of these areas have already been considered and offset (where appropriate) during the assessment of impacts of the mining/development activities in Appendices A and B of the draft EIS.</p> <p>Hatch (Appendix F of the draft EIS) concludes that the Project is not considered to result in any significant change to the existing flood risk for surrounding privately-owned properties or infrastructure. Cumulative impacts on flooding are not expected to lead to any significant adverse impacts on environmental values (including MSES located downstream of the Project).</p> <p>Updated flood modelling to reflect the final (detailed) design of the temporary levees and waste rock emplacements would be undertaken prior to construction as part of the detailed design and at regular stages during the life of the Project, as described in the Water Management Plan.</p> <p>In response to Recommendation 4, as outlined in Section 4.1 of the draft EIS, the Department of Environment and Science's (DES's) general management hierarchy: (a) to avoid; (b) to minimise or mitigate; once (a) and (b) have been applied, (c) if necessary and possible, to offset has been applied by Pembroke to the Project design and determination of residual impacts associated with the Project.</p> <p>The following measures would be implemented to avoid and / or minimise impacts on terrestrial ecology (including MSES):</p> <ul style="list-style-type: none"> • Mine – Impacts to riparian vegetation along the Isaac River has been minimised in the mine design and a minimum buffer zone of 200 m between the mine pits and Isaac River has been implemented. • Overland conveyor – The overland conveyor would run North-west from the Willunga Domain and cross the Isaac River approximately 4.5 km from its origin point. The conveyor would be restricted to a construction corridor of 180 m however this would be minimised when crossing the Isaac River; where, within 200 m of the defining bank, the construction corridor width would be limited to 45 m to minimise impact on the riparian habitat. • Access road – the proposed 3.5 km access road would be co-located with existing public and private roads as far as possible to minimise impacts to native vegetation. The access road would be restricted to 40 m at the crossing point to minimise the impact on the riparian habitat. • Haul road crossing – The haul road crossing of the Isaac River would provide access to the waste emplacement on Deverill from the Olive Downs South Domain. The crossing would be located approximately 2 km south-south east of the access road where it crosses the Isaac River entering an area ground-truthed as being RE 11.3.25 of Least Concern. The haul road would be restricted to a construction corridor of 60 m. • Water pipeline – the proposed water pipeline would connect to the existing Eungella Pipeline west of the Project. The water pipeline would be approximately 23 km long and has been co-located with the rail corridor as far as possible (for a distance of 15 km from the mine site to the existing Norwich Park Branch to minimise native vegetation clearance. All patches of TEC have been avoided and impacts to Endangered and Of Concern REs minimised by minimising the corridor for the water pipeline to 20 m. • ETL – the proposed ETL utilises an existing easement between the sub-station on Peak Downs Highway and the rail (Norwich Park Branch), then follows Daunia Road and Annandale Road before heading south for 13 km across predominately cleared land to the MLA. The ETL would be restricted to a construction corridor of 10 m. • Rail spur – The final location of the rail spur would maintain a buffer zone of approximately 85 m to the bank of the Isaac River at its closest point (affecting 1.5 km of the rail alignment). It has avoided all areas of TEC and most Endangered RE (with the exception of waterway crossings). <p>Further to this, response 34.22 provides a detailed discussion about the justification for the alignment of the overland conveyor and access road within the HES Wetlands and the associated wetland protection area.</p> <p>In response to Recommendation 5, it was concluded in Appendix C of the draft EIS, that the removal of 61 ha of HES wetlands associated with the Project would result in a significant impact to wetlands (DPM Envirosciences, 2018b). The impact on these wetlands would be offset in accordance with the <i>Queensland Environmental Offsets Policy (Version 1.6)</i> (DES, 2018) at an offset ratio of 1:4.</p> <p>In response to Recommendation 6, refer to response 34.31 for a detailed description of how the potential cumulative impacts of surface and groundwater impacts to the riparian vegetation, wetlands, stygofauna and GDEs has been incorporated.</p>
34.29	<p>Appendix C - Aquatic Ecology 6.5.2 p. 161</p> <p>Appendix E- Surface Water Assessment part A 6 p. 72</p>	<p>Impacts due to hydrological flows – Isaac River and Ripstone Creek</p> <p>Isaac River catchment flows will be captured by less than 1.8% (Section 6.5.2). 0.5% predicted reduction in flow for the entire section of the Isaac River (SO6). There is no description of the project reach compared to the entire reach of the Isaac River</p>	<ol style="list-style-type: none"> 1. A more specific assessment must be provided for impacts to the Isaac River within the project site; i.e. relative to the ~52km reach spanning the two domains. In particular the assessment should look at changes to flow on a daily and seasonal basis, not just look at overall percentages or means/averages. Changes to the timing, duration and magnitude of flows as a result of the development needs to be provided. The measures that have been used are 	<p>It is important to note that the instream flows in the Isaac River immediately adjacent the Project are not necessarily influenced, nor mostly affected by, the adjacent local catchments. As demonstrated by the catchment analysis, 99% of the catchment runoff following rainfall events that reports to the Isaac River will remain unchanged. Further, as recognised by the DES, numerous existing mines contain catchments (Figure 5-10 in Appendix E of the draft EIS) and have the authority to release water to the Isaac River upstream of the Project. It is also noted that an 'up-catchment water drain' from the NWWD to the Isaac River is shown on Figure 2-3 of the draft EIS. The drain would provide for the continued conveying of up-catchment local rainfall runoff west of the Project to the Isaac River.</p>

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	Appendix E- Surface Water Assessment Part A 8.3.4 p. 122	<p>(AMTD) upstream and downstream of the directly impacted reach.</p> <p>The draft EIS did not predict any adverse impacts from the hydrological change to the Ripstone Creek and Isaac River. There is only one proposed mitigation measure – to implement a water management strategy (Appendix E, Section 6, p. 72). A water management strategy is not considered a mitigation measure.</p>	<p>very coarse and do not provide insight into the nature of the impacts at the reach scale or even locally.</p> <ol style="list-style-type: none"> Impacts on the instream and flood plain ecology of the 52 km reach should be described. An assessment should also be provided on likely downstream impacts especially to the extensive braiding – riverine wetlands just below the Willunga domain. Assess avoidance measures and provide appropriate mitigation measures. 	<p>Pembroke has also specifically committed to the following:</p> <ul style="list-style-type: none"> The sediment dam monitoring would be used to validate the anticipated quality of water runoff reporting to sediment dams and haul road runoff dams. Initially, the sediment dam monitoring would occur on a regular (e.g. monthly) basis to demonstrate the water quality of stored waters is consistent with the relevant operating parameters to allow releases from sediment dams to occur when required. Subject to demonstrating the water quality objectives can be met, the frequency of monitoring and suite of parameters for the sediment dam monitoring would be reviewed and updated accordingly (e.g. to occur only when releases occur). Sediment dams would be retained until the revegetated surface of the waste rock emplacements are stable and runoff water quality reflects runoff water quality from similar un-mined areas, at which time these controls would be removed and the areas would be free-draining. <p>Given the above, the Surface Water Assessment (Hatch, 2018) concludes that 'no adverse water flow related impacts are likely to occur on habitats surrounding the Project, because no measurable impacts on surface water flows are likely to occur (Appendix A of the draft EIS)'. That is, the timing, duration and magnitude of flows in the reach of the Isaac River is determined by rainfall/releases in the greater catchment, as opposed to smaller reach / local scale. This is also demonstrated by the additional analysis provided by Hatch (2018) in Section 8.3.5 of the Surface Water Assessment, analysing the maximum release rates (i.e. up to 5m3/s versus up to 900 m3/s) for a period of 10 days following a flow event (Figure 8-11 of the draft EIS).</p> <p>While recognising that the Isaac River is largely a losing system, with seepage of surface water into the underlying alluvium, changes to water levels induced by mining would increase the hydraulic gradient between the alluvium and Isaac River. The Groundwater Assessment (Appendix D of the draft EIS) therefore conservatively predicts that the rate of seepage from the Isaac River to the alluvium could increase by an average of 2.6 ML/day (total) over the life of the Project. This represents a potential 0.5% reduction in average flow (Appendix D of the draft EIS). The mean monthly flow volume (GL/month) and river height data in the Isaac River is shown graphically in Figure 5-11 of Appendix E of the draft EIS.</p> <p>And in terms of groundwater take, the groundwater modelling results show that the recovered heads in the backfilled waste rock at ODS and Willunga are very similar to and/or below the adjacent alluvium. That is, while there is an overall gradient toward the voids (i.e. as localised sinks) any direct interactions with the alluvium is only a small component of the overall groundwater take at equilibrium post-closure that is predicted from Groundwater Unit 1 of 146 ML per year (i.e. only 0.4 ML/day).</p> <p>Section 6.5 of the Terrestrial Flora Assessment and Section 6.4 of the Terrestrial Fauna Assessment provide a detailed assessment of the potential impacts associated with hydrological changes caused by the Project. This includes, impacts from changes in surface water quality, flow regimes (including flooding impacts) and by catchment excision.</p> <p>It is assumed that the areas of “extensive braiding” referred to by DES are consistent with the area of Strategic Cropping Land to the south of the Willunga domain. The Flood Assessment (Appendix F of the draft EIS) describes that no significant changes to the flooding characteristics of this area are predicted.</p> <p>The risk of erosion of the Isaac River channel and floodplain was assessed by in the Geomorphology Assessment (included as Appendix B to the Surface Water Assessment [Appendix E of the draft EIS]) using the method of maximum permissible bed shear stress and velocity assessment, with the hydraulic variables modelled as part of the Flood Assessment (Appendix F of the draft EIS). The assessment of the most critical areas found that while there could be isolated areas subject to somewhat higher risk of scour compared to the existing situation, the overall risk of rapid and significant geomorphic change in the Isaac River due to the Project was low. the Project and the Isaac River provided the buffer zone is maintained with complete and dense vegetation cover.</p> <p>Further to this, Pembroke has prepared a separate assessment of potential impacts on GDEs and wetlands, including an assessment of the potential loss of catchment (and associated impacts to terrestrial ecology) to each wetland located between the Project disturbance area and the Isaac River (i.e. those that would potentially be impacted by catchment excision). The assessment also describes that Pembroke will implement a program to monitor the potential impacts to groundwater and terrestrial ecology within the wetlands and riparian areas surrounding the Project. Refer to Appendix E of the Additional Information to the EIS.</p>
34.30	<p>Appendix C - Aquatic Ecology 6.5.2 p. 161</p> <p>Appendix E- Surface Water Assessment Part A 6 p. 72</p> <p>Appendix E- Surface Water Assessment Part A 8.3.4 p. 122</p>	<p>Impacts due to external water makeup requirements</p> <p>Inadequate assessment of the impacts of proposed pumping activity. Water from the Isaac River is proposed to be pumped opportunistically so as to minimise the external water requirements (Appendix E, s 8.3.4, p. 122). This will occur primarily during extended dry climatic periods and periods of low groundwater inflows (p. 121).</p>	<p>Further detail is required on the estimated amount of water to be pumped from the Isaac River and when this will occur. Analysis must be provided on any potential impacts to aquatic, instream and floodplain environmental values.</p>	<p>As outlined in Section 2.7 of the draft EIS, subject to availability of flows and obtaining relevant licences, direct pumping of water from the Isaac River may be undertaken opportunistically to minimise the external water supply requirements as required. The pump and associated infrastructure would be located at the access road from Annandale Road. Pumping of water from the Isaac River would be undertaken in a manner as to avoid and minimise potential impacts on aquatic ecology, including:</p> <ul style="list-style-type: none"> starting the pump slowly and then gradually ramping up velocity; installing a suitable self-cleaning screen; and regularly inspecting the pump and screen. <p>To supplement the external supply of raw water, Pembroke has applied to DNRME for licences for take of unallocated general reserve water from the Isaac River under the Water Act.</p> <p>Pembroke has applied for two licences for the take of 65 ML of unallocated general reserve water from the Isaac River, which would serve as a water source for construction activities. Any additional requirement for extraction from the Isaac River would be subject to separate licences to be applied for at a later date (in accordance with the <i>Water Plan (Fitzroy Basin) 2011</i>), to ensure no adverse impacts on water availability for other licensed water users.</p> <p>In addition to the up-catchment water storage, Section 2.7 of the EIS identifies that external supply of raw water would be provided by the water pipeline constructed from the existing Eungella water pipeline network.</p>

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				<p>Day-to-day external water supply requirements would be guided by the capture of incident rainfall and runoff within the mine water management system as it is developed (i.e. stormwater and mine affected water); and capture of overland flow as described in Section 2.4.9 of the draft EIS. Subject to availability of flows and obtaining relevant licences, direct pumping of water from the Isaac River may be undertaken opportunistically to minimise the external water supply requirements as required. For example, if Pembroke's application for 65 ML of unallocated general reserve water from the Isaac River is successful, water from the Isaac River could be pumped and used for Project construction activities, instead of relying on bringing water to site from other sources. If the relevant water licences are obtained, the pump and associated infrastructure would be located at the mine access road Isaac River crossing. Pumping of water from the Isaac River would be undertaken in a manner as to avoid and minimise potential impacts on aquatic ecology, including:</p> <ul style="list-style-type: none"> starting the pump slowly and then gradually ramping up velocity; installing a suitable self-cleaning screen; and regularly inspecting the pump and screen. <p>As outlined in response 29, Section 6.5 of the Terrestrial Flora Assessment and Section 6.4 of the Terrestrial Fauna Assessment provide a detailed assessment of the potential impacts associated with hydrological changes caused by the Project. This includes, impacts from changes in surface water quality, flow regimes (including flooding impacts) and by catchment excision.</p>
34.31	<p>Section 2 – Project Description 2.5.3 p. 53</p> <p>Section 4 – Assessment of project specific matters 4.1.3 p.26</p> <p>Appendix C- Aquatic Ecology Assessment 5.9 p. 130</p> <p>Appendix D – Groundwater Assessment 5.6, p. 72</p> <p>Appendix D – Groundwater Assessment 12.2 p. 52</p>	<p>Quantification and management of potential cumulative impacts to hydrology</p> <p>The cumulative impacts due to changes to the hydrology (groundwater and surface water) have not been addressed in the draft EIS. Yet the proposed cumulative hydrological impacts to the floodplain and beyond are likely to be significant.</p> <p>This includes potential impacts on terrestrial and aquatic flora and fauna, including but not limited to riparian vegetation, wetlands, stygofauna and GDEs because of</p> <ul style="list-style-type: none"> groundwater impacts (e.g. mine dewatering activities and depressurisation), and surface water impacts (changes of catchment areas; changes to topography; temporary levees; and permanent emplacement) the diversion of Ripstone Creek changes to flooding frequencies, velocities and heights. <p>Cumulative impacts from proposed and existing surrounding mines would need to be taken into consideration.</p> <p>The proponent needs to propose how cumulative impacts would be monitored and managed.</p> <p>It is noted that the impact of flooding on wetlands located within the project area is considered to be negligible for the 50% AEP and 2% AEP (Appendix F, section 15.2, p. 83). There was no assessment of the 1% AEP or 0.1% AEP.</p> <p>There is no specific analysis provided of the likely impacts to GDEs from the extent, magnitude and duration of mining impacts. In the draft EIS, it is considered that terrestrial vegetation and aquatic habitat associated with a number of palustrine wetlands have a 'moderate potential to be associated with the surface expression of groundwater' (Appendix C, s5.9, p.130).</p> <p>Specifically, the draft EIS states that the terrestrial riparian vegetation (RE 11.3.25) and aquatic habitats associated with the Isaac River are likely to be GDEs (Appendix C, s5.9, p. 130). The same RE associated with North Creek, Cherwell Creek and the downstream reaches of Ripstone Creek may also be a GDE (ibid).</p>	<ol style="list-style-type: none"> Assess the cumulative impacts of surface and groundwater impacts to the riparian vegetation, wetlands, stygofauna and GDEs. This includes cumulative impacts due to surface and groundwater hydrological changes of the proposed Olive Down mine operations, as well as cumulative impacts from surrounding mines (present and proposed). Propose commitments and mitigation measures to ensure that the proposed Olive Down mine operations will not have a permanent and irreversible impacts on riparian vegetation, wetlands, stygofauna and GDEs. Propose how cumulative impacts will be managed and monitored including what actions will be taken if monitoring indicates an impact has occurred. Describe the success criteria used to assess the health and integrity of riparian vegetation, wetlands, stygofauna and GDEs, the timing and mechanisms for reporting and corrective actions to be taken if success criteria are not met. Propose commitments and mitigation measures to ensure that the proposed project will not have a permanent and irreversible impact on HES wetlands. DES recommends thorough pre-impact surveys of the wetlands during wet and dry conditions to record pre-impact ecosystem health. Monitoring must be carried out annually once mining commences at defined monitoring points (reference points) in order to show if any changes occur. If any impacts are recorded on the wetland ecosystem and/or any associated vegetation (e.g. GDEs) and fauna (including stygofauna), these impacts must be managed in accordance with the hierarchy: avoidance, minimisation/mitigation, and if necessary, offsetting. Provide an analysis of the potential impacts to GDEs from the project, including impacts to both terrestrial and aquatic ecosystems. This must incorporate analysis of the impact to floodplain ecology from the construction of levees and emplacement areas / highwall emplacement that will prevent floodplain flows over the ~52km reach of the Isaac River adjacent to the project footprint. Assess impacts (whether positive or negative) on ecological values due to changes in flooding. <p>Provide monitoring programs of environmental values, such as GDEs (e.g. the GDE Toolbox available from: http://www.bom.gov.au/water/groundwater/gde/GDEToolbox_PartOne_Assessment-Framework.pdf).</p>	<p>In relation to Recommendations 1 and 8, the cumulative impacts due to changes to the hydrology (groundwater and surface water) were addressed in the draft EIS (refer sections 3.3.9, 4.2.3 and 4.3.3). The <i>Aquatic Ecology Assessment</i> prepared by DPM (Appendix C of the draft EIS) specifically addressed potential impacts on aquatic flora and fauna, including but not limited to riparian vegetation, wetlands, stygofauna and GDEs, while the <i>Terrestrial Flora Assessment</i> and <i>Terrestrial Fauna Assessment</i> prepared by DPM (Appendices A and B of the draft EIS) specifically addressed potential impacts on terrestrial flora and fauna.</p> <p>Section 15 of the Additional Information to the EIS provides further information regarding the potential cumulative impacts on hydrology and flooding associated with the Project. Further to this, Pembroke has prepared a separate assessment of potential impacts on GDEs (refer to Appendix E of the Additional Information to the EIS) (including stygofauna, terrestrial and aquatic ecosystems and floodplain ecology) and wetlands. The assessment takes into consideration cumulative impacts due to surface and groundwater hydrological changes of the proposed Olive Down mine operations, as well as cumulative impacts from surrounding mines (present and proposed). It also includes additional figures, depicting potential impacts associated with the Project and draw stronger links between the hydraulic and hydrological and ecology assessments (including potential flooding impacts).</p> <p>The Flooding Assessment (Appendix F of the draft EIS) considered any existing and proposed structures that may affect flood behaviour, as well as structures proposed as part of the mining development. Hatch (2018b) concluded that there are no known projects in the planning or development phase that might result in additional structures on the floodplain in the vicinity of the Project. The Flooding Assessment (Appendix F of the draft EIS) concluded that cumulative impacts on flooding are not expected to lead to any adverse impacts on environmental values.</p> <p>Further to this, the Surface Water Assessment provided in the draft EIS concluded that, when taking into account potential controlled release volumes from the operating mines in accordance with their current release rules (as well as the approved Bowen Gas Project), the overall loss of catchment area and associated stream flow reductions estimated would be further reduced by the controlled releases from the Project. In addition, the development of the proposed controlled release strategy to the Isaac River has been based on the existing release conditions for nearby operating coal mines.</p> <p>Given the above, cumulative hydrological impacts to the floodplain outside of the proposed footprint are not likely to be significant.</p> <p>In relation to Recommendation 2, a permanent and irreversible impact on riparian vegetation, wetlands, stygofauna and GDEs are not likely to occur given the implementation of the management and monitoring measures described below.</p> <p>In relation to Recommendation 3, Pembroke will implement a program to monitor the potential impacts to groundwater and terrestrial ecology within the wetlands and riparian areas surrounding the Project. Refer to Appendix E of the Additional Information to the EIS. Monitoring will include:</p> <ul style="list-style-type: none"> groundwater depth and quality; health of the terrestrial vegetation; and surface water quantity and quality. <p>If monitoring indicates an impact has occurred, corrective actions detailed in GDE and Wetland Monitoring Program will be implemented.</p> <p>In relation to Recommendation 4, the GDE and Wetland Monitoring Program will include details of:</p> <ul style="list-style-type: none"> environmental quality indicators, impact thresholds and triggers; and sampling and analysis reporting. <p>In relation to Recommendation 5, a permanent and irreversible impact on a HES wetland is not likely to occur given the implementation of the abovementioned monitoring program.</p>

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				In relation to Recommendation 6, GDE and Wetland Monitoring Program will include details of the nature and ecological values of each GDE and wetland being monitored and, in response to Recommendation 7, if any impacts are recorded on the wetland ecosystem and/or any associated vegetation (e.g. GDEs) and fauna (including stygofauna), these impacts would be managed in accordance with the hierarchy: avoidance, minimisation/mitigation, and if necessary, offsetting.
34.32	Section 4 – Assessment of project specific matters, 4.1.4, p.39	Relocation of turtles There is limited information provided in relation to dewatering impacts on aquatic species. It is stated that fauna spotter catchers will be used to capture and relocate turtles.	Further information is required as to the locations, time periods, species, and likely numbers of turtles that will be captured and relocated. The proposed relocation areas must also be described in terms of ecological suitability e.g. extant turtle populations and carrying capacity.	Information regarding the proposed relocation of turtles would be provided within the Fauna Species Management Plan which Pembroke has committed to developing for the Project (refer to Section 12 of the Additional Information to the EIS).
34.33	Appendix C - Aquatic Ecology 5.13 p.148 Appendix C - Aquatic Ecology 6.1.2 p. 155	HES wetlands – mapping It is unclear if the field verified HES wetlands displayed in Figures 31.1 – 31.5 represent the extent of the mapped HES wetlands (as per certified maps), or whether field surveys have been used to revise or dispute the extent of HES wetlands within the project area, as per the Queensland Wetland Definition and Delineation Guideline and DERM's 2010 Wetland Definition and Delineation Guideline. The text on page 156, highlighting differences between the mapped and field verified wetland extent, is confusing and does not clarify whether the extent of HES wetlands has been accepted by the Queensland Herbarium.	1. Include text in Section 5.13 to clarify whether the field verified extent of HES wetlands displayed in Figure 31 – Figure 31.5. matches that of the mapped extent of HES wetlands. 2. If the extent of HES wetlands is disputed, based on the results of field surveys, confirm that any proposed changes in the delineation of wetlands for this project has been completed as per the DES 2010 Queensland Wetland Definition and Delineation Guidelines (DERM 2010) and have been accepted by the Queensland Herbarium. 3. Clarify in Section 6.1.2 whether the extent of HES wetlands were accepted by the Queensland Herbarium.	The field surveys resulted in minor adjustments to the boundaries of the HES wetlands in accordance with the DES 2010 Queensland Wetland Definition and Delineation Guidelines (DERM 2010). These minor adjustments to the wetland boundaries have been accepted by the Queensland herbarium.
34.34	Appendix C - Aquatic Ecology 6.1.2 p.155	Direct and indirect impacts to the HES wetland at the north-western edge of the project at the waste rock emplacement could be easily avoided by restricting the north-west extent of the project. This section should justify why development cannot be reconfigured to avoid both direct and indirect impacts to this wetland.	Direct and indirect impacts to the HES wetland at the north-western edge of the project at the waste rock emplacement could be easily avoided by restricting the north-west extent of the project. This section should justify why development cannot be reconfigured to avoid both direct and indirect impacts to this wetland.	Landform design objectives, location of Pembroke mining tenements, haul distances (vertical and lateral), environmental values (including ecological, hydrological, air quality and noise), flooding frequency, likely access availability and land use objectives were included in the investigations associated with the waste rock emplacement strategy for the Project. The following design objectives were of primary importance during these investigations: <ul style="list-style-type: none"> batter slopes of approximately 7 degrees (1V:8H); contour banks installed on batters (to limit effective slope lengths and reduce the potential for erosion); gently sloped top surfaces shed water; final void highwalls would be laid back to 20° in the alluvium and tertiary clays (known as the Cenozoic overburden) (Figure 5-4b) to achieve a factor of safety of 1.5. GeoTek identified that much of the Cenozoic material consists of Tertiary clay which has a low shear strength, requiring the 20° set back in the final landform. Final void highwalls would have a maximum overall angle of 45° where located within a fault fractured zone, and 55° where they are located away from fault zones. An overall angle of 55° could be achieved by 50 m high batters at 65° incorporating 10 m wide intermediate benches. The toe of out-of-pit waste rock emplacements would stand off the crest of the final voids by at least 50 m. The initial development of the open cut (referred to as the box cut) requires the emplacement of waste rock in out-of-pit emplacement areas until such time that sufficient space is available for in-pit emplacement. To provide sufficient out-of-pit emplacement capacity (in consideration of the design objectives listed above) the out-of-pit emplacement area described in the EIS is required. If the footprint of the western out-of-pit emplacement was restricted, the emplacement would need to be developed higher and with steeper slopes which compromise rehabilitation success and landform stability (Section 2.10.2 of the draft EIS).
34.35	Section 4 – Assessment of project specific matters, 4.1.4, p.39	Mitigation measures proposed in the specialist reports The draft EIS has not incorporated many of the recommendations and mitigation measures proposed in the specialist reports of Appendices A-C.	Include in the draft EIS the mitigation and management measures proposed in Appendices A-C.	Section 22 of the Additional Information to the EIS has been updated to include each of the proposed management measures outlined in Appendices A to C.
34.36	Appendix C – Aquatic Ecology, p.171	Mitigation measures for aquatic ecology Requirements for key mitigation measures to reduce impacts from aquatic habitat clearing and reduce potential for increased numbers of feral animals and weeds have not been adopted in the proposed EA conditions for inclusion as stated conditions in the Coordinator General's Evaluation Report. The requirements are to develop and implement numerous management plans, including a Vegetation Clearance Procedure, a Water Management Plan, a Weed and Pest Management Plan and an Erosion and Sediment Control Plan.	1. Amend the proposed EA conditions for inclusion as stated conditions in the Coordinator General's Evaluation Report to include: <ul style="list-style-type: none"> Vegetation Clearance Procedure Water Management Plan Weed and Pest Management Plan Erosion and Sediment Control Plan. 2. Ensure appropriate timeframes for the development, implementation and submission of these plans are included within the proposed conditions.	Pembroke has provided a revised list of Proponent Commitment in Section 22 of the Additional Information to the EIS. These include all commitments made throughout the draft EIS and the Additional Information to the EIS, for consideration in the Coordinator-General's Evaluation Report. The commitment to prepare Vegetation Clearance Procedures, a Water Management Plan, Weed and Pest Management Plan and Erosion and Sediment Control Plan are included in Section 22. The Proposed EA conditions (Appendix B of the Additional Information to the EIS) has been revised to include the preparation of an Erosion and Sediment Control Plan and Water Management Plan. Given it is not common practice for DES to include EA conditions requiring the preparation of a Vegetation Clearance Procedure or a Weed and Pest Management Plan, these have not been proposed in the EA conditions.
34.37	Section 4 – Assessment of project specific matters, 4.1.4, p.39	Species management program The draft EIS states on page 4-39 that 'Pembroke would implement a Fauna Species Management Plan for the Project'. Please be aware that there is a requirement to have a species management program approved under the Nature	To note.	Noted.

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		Conservation Act 1992 before tampering with a protected animal breeding place. This is required to authorise activities that will impact on breeding places of the protected animals that are listed as endangered, vulnerable, near threatened, least concern species, special least concern, and least concern animals that are colonial breeders – i.e. their broader populations are at greater risk from the impacts of events at a single location.																																																																																																																																								
34.38	Section 4 – Assessment of project specific matters 4.1.4 p. 39 Section 4 – Assessment of project specific matters Table 4-8 p.41	While the proponent has proposed adequate offsets for Stage 1 – there is no information with respect to availability of offsets for the impacts of the entire project. Additionally, there is not discussion about the cumulative impact on these MNES.	Provide details of availability of offsets to acquit the entire project impacts in the subregion and bioregion. Detail the project impacts and cumulative impacts (of this and other recent projects) to all MNES and MSES at the subregion and bioregional level.	<p>With respect to cumulative impacts, as described in Section 3.2 of the draft EIS, the Project is located within the Brigalow Belt North Bioregion (as defined by DEE [2018]). In a local context, the Project is located within the Bowen Basin mining area where, in parallel with agricultural activities, open cut (and underground) coal mining is a key land use. As a result, the majority of the Project area comprises agricultural grasslands with tracts of remnant vegetation (DPM Envirosiences, 2018).</p> <p>The REs to be cleared during the life of the Project all occur more widely in surrounding landscapes and subregions (Accad et al., 2017), with clearance associated with the Project representing approximately 0.4% of the remaining remnant vegetation in the Northern Bowen Basin and Isaac-Comet Downs biodiversity sub-regions (Accad et.al., 2017).</p> <p>The table below outlines the area of potential habitat for the relevant threatened species and communities listed under the EPBC Act (using the habitat definitions developed in response to Item 1 above), proposed to be removed by the Project, relative to the area of potential habitat within the broader locality (i.e. within 10 km of the Project area), Isaac River Catchment and Isaac-Comet Subregion.</p> <p>Figures 7-1 to 7-5 of the Additional Information to the EIS show the presence of each of the fauna species within the broader locality.</p> <table><tr><th rowspan="2">Action</th><th rowspan="2">Habitat Type</th><th colspan="6">Habitat Clearance (ha)</th></tr><tr><th>Brigalow EEC</th><th>Ornament al Snake</th><th>Squatter Pigeon (Southern)</th><th>Australian Painted Snipe</th><th>Koala</th><th>Greater Glider</th></tr><tr><td rowspan="3">Mine Site and Access Road</td><td>Remnant</td><td>13</td><td>144</td><td>5,387</td><td>113</td><td>5,500</td><td>5,500</td></tr><tr><td>Grassland</td><td>0</td><td>7,477.5</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Sub-total</td><td>13</td><td>7,621.5</td><td>5,418</td><td>113</td><td>5,500</td><td>5,500</td></tr><tr><td rowspan="3">Water Pipeline</td><td>Remnant</td><td>0</td><td>0</td><td>27.5</td><td>1</td><td>27.5</td><td>27.5</td></tr><tr><td>Grassland</td><td>0</td><td>7</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Sub-total</td><td>0</td><td>7</td><td>27.5</td><td>1</td><td>27.5</td><td>27.5</td></tr><tr><td rowspan="3">Project ETL</td><td>Remnant</td><td>0</td><td>0</td><td>12</td><td>0</td><td>12</td><td>12</td></tr><tr><td>Grassland</td><td>0</td><td>10.5</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Sub-total</td><td>0</td><td>10.5</td><td>12</td><td>0</td><td>12</td><td>12</td></tr><tr><td rowspan="3">Rail Spur and Loop</td><td>Remnant</td><td>0</td><td>0</td><td>37</td><td>6</td><td>43</td><td>43</td></tr><tr><td>Grassland</td><td>0</td><td>27</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Sub-total</td><td>0</td><td>27</td><td>37</td><td>6</td><td>43</td><td>43</td></tr><tr><td colspan="2">Total</td><td>13</td><td>7,666³</td><td>5,494.5⁴</td><td>120⁵</td><td>5,583.5⁶</td><td>5,583.5⁷</td></tr><tr><td colspan="2">Approximate Area of Habitat within the broader locality (i.e. 10 km of the Project boundary)¹</td><td>16,068</td><td>43,178</td><td>62,978</td><td>655</td><td>63,633</td><td>63,633</td></tr><tr><td colspan="2">Approximate Area of Habitat within the Isaac River Catchment²</td><td>41,621</td><td>57,657</td><td>598,855</td><td>271,100</td><td>883,471</td><td>883,471</td></tr><tr><td colspan="2">Approximate Area of Habitat within the Isaac-Comet Downs Subregion²</td><td>81,369</td><td>122,842</td><td>524,567</td><td>174,573</td><td>413,453</td><td>413,453</td></tr></table> <p>¹ Based on the REs identified as potential habitat on DEE (2018a) from the DSITI (2018) regional mapping available over the area. This area does not include dispersal habitat as the identification of potential dispersal habitat requires field validation.</p> <p>² Based on the REs identified as potential habitat on DEE (2018a) from Accad et. al. (2017). This area does not include dispersal habitat as the identification of potential dispersal habitat requires field validation.</p> <p>³ This is comprised entirely of 'Important Habitat' for the Ornamental Snake.</p> <p>⁴ This is comprised of approximately 3,595 ha of breeding habitat, approximately 1,789.5 ha of foraging and approximately 110 ha of dispersal habitat.</p> <p>⁵ This is comprised entirely of potential breeding habitat for the Australian Painted Snipe.</p> <p>⁶ This is comprised entirely of 'Critical Habitat' for the Koala.</p>	Action	Habitat Type	Habitat Clearance (ha)						Brigalow EEC	Ornament al Snake	Squatter Pigeon (Southern)	Australian Painted Snipe	Koala	Greater Glider	Mine Site and Access Road	Remnant	13	144	5,387	113	5,500	5,500	Grassland	0	7,477.5	0	0	0	0	Sub-total	13	7,621.5	5,418	113	5,500	5,500	Water Pipeline	Remnant	0	0	27.5	1	27.5	27.5	Grassland	0	7	0	0	0	0	Sub-total	0	7	27.5	1	27.5	27.5	Project ETL	Remnant	0	0	12	0	12	12	Grassland	0	10.5	0	0	0	0	Sub-total	0	10.5	12	0	12	12	Rail Spur and Loop	Remnant	0	0	37	6	43	43	Grassland	0	27	0	0	0	0	Sub-total	0	27	37	6	43	43	Total		13	7,666 ³	5,494.5 ⁴	120 ⁵	5,583.5 ⁶	5,583.5 ⁷	Approximate Area of Habitat within the broader locality (i.e. 10 km of the Project boundary) ¹		16,068	43,178	62,978	655	63,633	63,633	Approximate Area of Habitat within the Isaac River Catchment ²		41,621	57,657	598,855	271,100	883,471	883,471	Approximate Area of Habitat within the Isaac-Comet Downs Subregion ²		81,369	122,842	524,567	174,573	413,453	413,453
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				<p>⁷ This is comprised entirely of potential breeding/foraging habitat for the Greater Glider.</p> <p>As demonstrated in the table above, although the Project would result in removal of potential habitat for each of these MNES, the area of habitat proposed to be cleared is only a small portion of the habitat available for each of these MNES within the broader locality, catchment and subregion.</p> <p>The Lake Vermont Coal Mine Northern Extension Project (EPBC 2016/7701) (Lake Vermont Project) was approved on 29 June 2018. Although the Lake Vermont Project was not determined to be a Controlled Action for threatened species and communities, the Squatter Pigeon (southern) was recorded during the ecology surveys, and it was determined that suitable habitat for the southern Squatter Pigeon (southern) exists throughout the Lake Vermont Project site (AARC, 2016). The area of habitat of the Squatter Pigeon (southern) within the Lake Vermont Project site is taken into consideration in the table above.</p> <p>As outlined in the table above, the Project would result in the removal of approximately 5,494.5 ha of potential habitat for the Squatter Pigeon, which would, in conjunction with the Lake Vermont Project, further minimise the area of potential habitat for this species in the broader locality.</p> <p>In addition to the progressive rehabilitation of the Project, Pembroke would provide a biodiversity offset for the impacts associated with the Project in accordance with the Queensland Environmental Offsets Policy (Version 1.4) (DEHP, 2017) and EPBC Act Environmental Offsets Policy (SEWPaC, 2012a) (and supporting EPBC Act Offsets Assessment Guide [SEWPaC, 2012b]) (Section 3.8 of the draft EIS). The biodiversity offset area (once established) would provide a beneficial conservation outcome for biodiversity in the broader locality, catchment and region.</p> <p>Pembroke has prepared a separate MNES Biodiversity Offset Strategy (BOS) in Appendix F of the Additional Information to the EIS. The BOS has been prepared to provide detailed information about Stage 1 of the Project's Offset Strategy. This detailed level of information is possible because Pembroke owns the offset property. There is therefore, 100% certainty in Pembroke's ability to commit to the Stage 1 Offset Area.</p> <p>Pembroke proposes to provide an offset for each stage of the Project prior to works commencing for that stage. The BOS contains information relevant to Stages 2 to 4 including broad fauna habitat type mapping. Biodiversity offsets for Stages 2 to 4 will be, at least partly, and likely wholly located on Pembroke's landholdings. Pembroke's ownership of the properties and the known ecological characteristics and values of the properties means future offsetting requirements are highly likely to be located on these properties.</p> <p>Until the Stage 1 offset is approved by the State and Commonwealth Governments, it is difficult to specify the exact details of the offsets for Stages 2 to 4 (i.e. the offsets for each stage will be located on the residual areas of the properties after the preceding stage has been determined). In addition, Pembroke is likely to proceed with other property acquisitions throughout the life of the Project which will provide additional offset opportunities. In instances where assessment of the requirements for future offsets identifies a gap (i.e. relevant offset calculations identify that Pembroke's landholdings do not provide all the required values) alternative methods for provision of those values will be employed (e.g. use of an offset broker).</p> <p>Pembroke also proposes to manage portions of the Iffley, Deverill and Twenty Mile properties outside the Stage 1 Offset Area. Management measures may include (but not be limited to):</p> <ul style="list-style-type: none"> • revegetation activities to increase the proportion of native vegetation; • management of livestock grazing; • feral animal control in accordance with the <i>Biosecurity Act, 2014</i> (particularly cats, foxes and feral pigs); and • management of weeds in accordance with the <i>Biosecurity Act, 2014</i>. <p>The available area of land for potential use as biodiversity offsets for the MNES would be specified prior to the commencement of works for each stage. Of the lands currently available to Pembroke (and excluding the Stage 1 Offset proposal), some 10,000 ha of potential habitat for fauna species listed under the EPBC Act would be available for future offsets.</p> <p>It is likely that the residual significant adverse impacts for Stages 2 to 4 of the Project can be offset given the following:</p> <ul style="list-style-type: none"> • The native vegetation communities / fauna habitats to be cleared during the life of the Project (including the Brigalow EEC) all occur more extensively in the surrounding landscape and subregions, as demonstrated by the availability of broad fauna habitats types shown on Figure 6 of the BOS. • The Ornamental Snake, Squatter Pigeon [southern], Australian Painted Snipe, Greater Glider and Koala (and their habitats) are widely distributed in the surrounding landscape and region, as demonstrated by the availability of broad fauna habitats types shown on Figure 6 of the BOS. • Wetland habitats are mapped as occurring widely in the surrounding locality as shown on Figure 6 of the BOS.
34.39	Offsets / Impacts on protected plants	<p>Authorising impacts on protected plants (endangered, vulnerable and near threatened plants listed in the Nature Conservation (Wildlife) Regulation 2006) and offset conditions</p> <p>All plants that are native to Queensland are protected under the Nature Conservation Act 1992. To clear a protected plant that is listed as endangered, vulnerable or near threatened under the Nature Conservation (Wildlife) Regulation 2006, a protected plant clearing permit must be acquired prior to undertaking the clearing.</p> <p>A protected plant clearing permit is required where the development is located in an area identified as high risk on the</p>	To note.	Noted

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		<p>flora survey trigger map or where a protected plant has been identified in the area. This is regardless of whether a development approval (DA) or the environmental authority (EA) has been issued and includes an offset condition for protected plants.</p> <p>DA/EAs do not negate the need to acquire a protected plant clearing permit, even though it may authorise impacts and require offsets for MSES which include protected plants. Without this permit the proponent will not be able to impact and will not be able to pay a financial settlement offset.</p> <p>More information on the protected plant clearing framework can be found here https://www.ehp.qld.gov.au/licences-permits/plants-animals/protected-plants/.</p>		
34.40	<p>Comments on preliminary draft environmental impact statement (EIS)</p> <p>Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 65</p> <p>Appendix G – Air Quality and Greenhouse Gas Assessment</p> <p>Appendix C Table C1 p. 86</p>	<p>The draft environmental impact statement report does not incorporate the PM₁₀ related comments provided earlier in May 2018 on the preliminary draft EIS (see Comments # 65).</p> <p>Although maximum 24-hour average PM10 ground-level concentrations have been predicted and presented in Appendix C of Appendix G (Table C1, page 86 of Appendix G). However, the modelling results were not presented in the main body of the impact assessment report (Section 4.5 Air Quality).</p> <p>The predicted maximum 24-hour average PM₁₀ concentrations at some of the sensitive receptors may exceed the EPP (Air) and NEPM objective of 50 µg/m³. The predicted maximum 24-hour average PM₁₀ concentrations provided in Appendix G from the project in isolation does not indicate exceedances. However, when the ambient background PM₁₀ concentration of 27.2 µg/m³ is added to the project under standard mitigation measurement conditions, the risk of exceeding the EPP (Air) and NEPM objective at the sensitive receptors is very high.</p> <p>Please note the 5 days exceedances per year as allowed in EPP (Air) are for the natural events such as bushfires and dust storms. EPP (Air) PM10 objective of 50 µg/m³ was adopted from the old version of NEPM. According to NEPM the exceedances in the NEPM were arbitrary. The 5 days exceedances for the PM₁₀ standard were introduced to account for the impact of bushfires, dust storms and fuel reduction burning for fire management purposes. Recently, NEPM removed the 5 days exceedances from the standards. Therefore, when evaluating an impact from a proposed activity the maximum PM₁₀ GLC must be estimated and compared against the criterion of 50 µg/m³.</p> <p>The predicted TSP, PM₁₀, PM_{2.5} and dust depositions are provided in Appendix G of the air impact assessment report. Year 2043 mining operation predicted the highest impact on the receiving environment. The cumulative impact from TSP and PM_{2.5} emissions meet the EPP (Air) objectives. The cumulative dust deposition also meet the criterion of 120 mg/m²/day at the sensitive receptors. However, there is a risk that 24-hour PM₁₀ concentration may exceed the EPP (Air) objective at some of the sensitive receptors under worst meteorological conditions.</p> <p>The proponent is currently undertaking real-time monitoring of PM₁₀ and dust deposition surrounding the proposed mine. This real-time particulate monitoring is considered an appropriate response to the above issue and managing potential particulate matter impacts of the mine at the sensitive receptors.</p> <p>In conclusion, the proposed mining activities have the potential to exceed EPP (Air) objective of 24-hour PM₁₀ concentration at some of the sensitive receptors under worst meteorological conditions.</p>	<ol style="list-style-type: none"> 1. Refer to comments provided by DES on the preliminary draft EIS, dated 21 June 2018 and amend the draft EIS accordingly. 2. A PM₁₀ dust deposition and weather monitoring network must be established to determine the actual impacts on the receiving environment. The monitoring location may include at least one real-time PM₁₀ monitoring equipment, four dust gauges and one weather station located near the sensitive receptors to provide monitoring results representative of receptor's environmental conditions. This particulate monitoring is considered an appropriate response for managing potential particulate matter impacts of the mine at sensitive receptors. 	<p>Section 6 of the draft EIS summarises Pembroke's commitments to air quality monitoring, including the continuation of continuous meteorological and particulate matter (total suspended particulate, PM₁₀ and PM_{2.5}) monitoring and the establishment of a network of dust deposition gauges at locations representative of the closest sensitive receivers. Section 6 also describes that if monitoring indicates any unexpected exceedances of air quality objectives, Pembroke would undertake an investigation that may include additional monitoring if required. As described in Section 6, details of the air quality monitoring system, including the location of all monitors, would be documented in an Air Quality Management Plan to be prepared prior to the commencement of construction.</p> <p>The proposed EA conditions relevant to air quality described in the draft EIS (Section 6.2.2) include the appropriate monitoring methods for each parameter to be monitored (i.e. dust deposition, total suspended particulate, PM₁₀ and PM_{2.5}), consistent with the Model Mining Conditions.</p> <p>Pembroke originally lodged the draft EIS on 18 May 2018 with the OCG for review. As part of this review, DES was asked to provide comment on the adequacy of the draft EIS. The submissions received on the original draft EIS were addressed by Pembroke and a revised draft EIS was lodged with the OCG on 27 July 2018, along with detailed responses to all comments.</p> <p>The OCG subsequently confirmed that the revised draft EIS was deemed to have adequately addressed all comments, including those provided in Attachment 1 of DES' recent submission.</p> <p>As highlighted by the DES, Appendix C of the Air Quality and Greenhouse Gas Assessment (AQGHG Assessment) includes the requested information regarding maximum 24 hour PM₁₀ concentrations. Pembroke considers that moving further information into the main text of the draft EIS would not have any implications for the proposed EA conditions.</p>
34.41	<p>Section 4 – Assessment of project specific matters 4.1.4 p. 39</p> <p>Section 4 – Assessment of</p>	<p>Air quality</p> <p>Maximum 24-hour average PM10 ground-level concentrations (GLC) have been predicted and presented in Appendix C of Appendix G (Table C1, page 86 of Appendix G). However, the modelling results including the maximum 24-hour average PM10 GLC were not provided in the main body of the impact</p>	<ol style="list-style-type: none"> 1. Provide predicted TSP, PM10, PM2.5 and dust deposition results in the main body of the impact assessment report (Section 4.5: Air Quality). The summary results should include the project impacts in isolation and the cumulative impacts. PM10 concentrations must include the maximum 24-hour average values and the 6th highest 24-hour average values. 	<p>As highlighted by the DES, Appendix C of the Air Quality and Greenhouse Gas Assessment (AQGHG Assessment) includes the requested information regarding maximum 24 hour PM₁₀ concentrations. Pembroke considers that moving further information into the main text of the draft EIS would not have any implications for the proposed EA conditions.</p> <p>The AQGHG Assessment does not predict that the 24-hour average PM₁₀ concentrations would exceed 50 micrograms per cubic metre (µg/m³) for any sensitive receivers with the implementation of the proposed proactive and reactive dust mitigation measures.</p>

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	project specific matters 4.5 p. 99 Appendix G – Air Quality and Greenhouse Gas Assessment Appendix C Table C1 p. 86	assessment report (Section 4.5: Air Quality). It is not possible to determine the worst case impacts from 24-hour average PM10 based on 6th highest values.	2. Provide a table showing the number of times (if any) that 24-hour average PM10 concentrations were predicted to exceed 50 micrograms per cubic metre for each operational year.	Section 6 of the draft EIS summarises Pembroke's commitments to air quality monitoring, including the continuation of continuous meteorological and particulate matter monitoring and the establishment of a network of dust deposition gauges
34.42	Section 4 – Assessment of project specific matters 4.5 p.99	Air quality The management of spontaneous combustion, including any mitigation measures that may be required, was not discussed in the report. Spontaneous combustion events at the coal stockpile have the potential to cause environmental nuisance, such as odour emissions and reduced visibility. Prolong inhalation of smoke generated as a result of spontaneous combustion of coal can also create adverse health effects. Spontaneous combustion events can be avoided by properly managing the coal stockpile areas. For example, stockpiling as a large cone increases the surface area which can cause spontaneous combustion.	1. Describe the likelihood of spontaneous combustion of coal at the ROM coal stockpile; coal reject pile and other sites. 2. Provide evidence that the risk will be low and specify coal will be managed to minimise the risk of spontaneous combustion.	Table 5 of the Preliminary Risk Assessment indicates that the following preventative measures would be implemented to maintain a low risk of spontaneous combustion: <ul style="list-style-type: none"> design of ROM pad; fire fighting equipment in appropriate locations; regular inspections and maintenance of fire-fighting equipment; and operator training. As detailed in Section 3.1.2 of the AQGHG Assessment (Appendix G of the draft EIS) and Table 5 of the Preliminary Risk Assessment (Appendix O of the draft EIS), the potential for spontaneous combustion at the Project is considered to be low. Notwithstanding, the Air Quality Management Plan to be prepared for the Project would document spontaneous combustion avoidance and management measures, including periodic testing of the propensity for spontaneous combustion of the various target coal seams.
34.43	Appendix G – Air Quality and Greenhouse Gas Assessment 7.2 Table 14 p. 34 Appendix G – Air Quality and Greenhouse Gas Assessment Appendix C p. 86 Appendix G – Air Quality and Greenhouse Gas Assessment 6.2 Table 5 p. 21 Appendix G – Air Quality and Greenhouse Gas Assessment 6.2 Table 7 p. 26	Air quality and greenhouse gas assessment – PM₁₀ The PM ₁₀ concentrations presented in Table 14 and Appendix C of Appendix G are confusing and lack information. The values do not represent the project's impact in isolation of the additional mitigation measures. A summary of predicted 6th highest and maximum PM ₁₀ concentrations from the project operation in isolation and the cumulative impact are presented in Table 14 and Appendix C of Appendix G. This impact was based on standard dust control measures presented in Table 7 and the background PM ₁₀ concentration of 27.2 µg/m ³ (Table 5). A very high dust control factor of 95% was assumed for wheel generated dust under the standard dust control measures. By adding the project impact in isolation with the background concentration, the cumulative impact will exceed the EPP (Air) objective of 50 µg/m ³ (e.g. at receptor Leichardt, the cumulative PM ₁₀ concentration is = 32.5 µg/m ³ + 27.2 µg/m ³ = 59.2 µg/m ³). Similarly from Table C1, the predicted maximum PM ₁₀ concentration at receptor Leichardt is = 42.4 µg/m ³ + 27.2 µg/m ³ = 69.6 µg/m ³ . According to the note specified in Table 14, the predicted cumulative impact was estimated by considering some proactive mitigation measures. It is not clear what sort of additional mitigation measures and the emission control efficiencies were applied to predict such a precise cumulative GLCs that is just below 50 µg/m ³ .	1. Provide a clear explanation of what additional emission control efficiencies were adopted for the estimated results presented in Table 14 and Appendix C of Appendix G. 2. Explain how the model was able to predict a cumulative impact of just below 50 µg/m ³ at some of the sensitive receptors. 3. Present the modelling results separately for each receptor under the two scenarios: a) considering the standard dust control measures b) considering the additional mitigation measures.	Section 6.3 of the AQGHG Assessment (Appendix G of the draft EIS) provides additional detail regarding the proactive mitigation measures assumed for assessment purposes (i.e. reducing the intensity of night-time waste haulage operations, not adoption of additional controls). The proactive mitigation scenario selected was based on an iterative dispersion modelling assessment of various available mitigative actions. The presentation of potential cumulative impacts includes the implementation of the proposed proactive and reactive dust mitigation measures (i.e. for any 24 hour period, if the predicted concentration without the implementation of proactive and reactive dust mitigation measures was over 50 µg/m ³ , the result with the implementation of the selected mitigation scenario is presented). As cumulative dust levels in the absence of proactive and reactive dust mitigation measures would not occur in practice, this approach is considered reasonable and representative of the proposed Project. Section 6.3 of the AQGHG Assessment (Appendix G of the draft EIS) and Section 4.5.4 of the draft EIS describe how a range of mitigative actions would be available to Pembroke as part of the proactive and reactive dust management system (e.g. increasing the intensity of applied dust controls, reducing the intensity of particular operations [e.g. reducing waste haul distance] or halting particular operations [e.g. pausing dozer operations on a stockpile]). The Air Quality Management Plan to be prepared for the Project would include additional details of the proposed proactive and reactive mitigation system (e.g. relevant triggers for mitigative actions and a hierarchy of proposed mitigative actions). As cumulative dust levels in the absence of proactive and reactive dust mitigation measures would not occur in practice, as described above, Pembroke does not consider it is warranted to present such results, as this would overstate the impacts of the Project. Pembroke also considers that incorporating these results into the main text of the draft EIS or the AQGHG Assessment would not have any implications for the proposed EA conditions.
34.44	Appendix G – Air Quality, Section 6.2, p.25	Air quality and greenhouse gas assessment – mitigation measures, standard There was a lack of information regarding dust control targets. A reduction of 95% in wheel generated dust was estimated for use of a chemical suppressant (see Table 7). This dust emission control factor of 95% is very high. There was no explanation as to how a dust control target of 95% would be achieved in practice. Furthermore, the draft EIS does not explain the reasoning behind the selection of such a high dust control factor.	1. Provide detailed information as to how a dust control target of 95% could be achieved in practice by using a chemical suppressant, including references to supporting publications. 2. Explain the basis for the selection of the dust control factor.	Consistent with air quality assessments for most large mining operations, initial dispersion modelling for the Project indicated hauling of coal and waste would be the most dominant source of particulate matter for the Project. Pembroke has therefore committed to leading practice emission control for this source of emissions. The dust control factor of 95% for chemical suppressants and watering was derived based on results of the NSW Environment Protection Authority's Dust Stop Program. Through this program, all open cut coal mines were required to demonstrate to the NSW Environment Protection Authority that they could achieve greater than 80% control of wheel generated dust emissions. As Pembroke is committed to leading practice emission control for wheel generated dust, the control factor of 95% was selected consistent with the results at a number of the best performing coal mines in NSW (e.g. 95% at Duralie Coal Mine as documented in Duralie Coal Mine PRP U2 Monitoring Plan - Wheel Generated Dust [Pacific Environment Limited, 2013] and 96% at the Werris Creek Coal Mine as documented in Werris Creek Coal PRP U1: monitoring Results - Wheel Generated Dust [Pacific Environment Limited, 2014]).
34.45	Appendix G – Air Quality and Greenhouse Gas Assessment Appendix A p.71	Air quality and greenhouse gas assessment – Appendix A of Appendix G It is not clear what are the soil and coal moisture content and silt content of the site. In Appendix A of Appendix G, a number of emission	1. Discuss the soil and coal moisture content and silt content of the proposed mining site and use them for the estimation of emission rates.	The AQGHG Assessment was prepared based on the information available at the time of assessment. While the use of site-specific moisture content or silt content values would affect the estimated emissions of some activities, this is not the case for all emissions, and it is unlikely the total site emissions would vary considerably if alternate values were adopted.

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		parameters (e.g. soil and coal moisture content and silt content) were adopted from US EPA AP-42 database default values for the estimation of emission factors. The selection of these parameters is critical, as these parameters have major influence on the generation of dust emissions. As a best practice, these must be selected from the proposed mine site-specific data. However, this site-specific data on soil and coal moisture content, and silt content was not provided in the draft EIS.		In addition, the proposed EA conditions are based on the EPP (Air) air quality objectives and not the predicted dust levels. The AQGHG Assessment demonstrates that the adoption of the EPP (Air) objectives would be reasonable and feasible with the implementation of the dust control measures described. Any minor amendments to the emission inventories or dispersion modelling results associated with adopting alternate moisture or silt contents would therefore not have any implications for the proposed EA conditions. As described in Section 4.5.4 of the draft EIS, with the use of the proposed dust management measures, including proactive and reactive dust controls measures that are considered good or best practice, it is reasonable to expect that the air quality objectives would be met during the operation of the Project. Given the flexibility and robustness of the proposed mitigation measures, this would be the case even if some inputs to the emission inventories were to vary slightly.
34.46	Appendix G – Air Quality and Greenhouse Gas Assessment 1 Table A1 p.72 Section 2 – Project Description 2.1.2 p.1	Maximum ROM coal total calculations In Appendix G, the maximum ROM coal total for the predicted mining stages has been calculated as 19.1Mtpa, and the maximum ROM coal from the proposed Olive Downs Project has been calculated as 11.1Mtpa. This is inconsistent with the maximum limits applied for in section 2 (project description), which were stated as 20 Mtpa and 12 Mtpa, respectively.	Amend the calculations to reflect the maximum ROM for the site in total and for the proposed Olive Downs Project, and ensure consistency throughout the draft EIS.	As described in Section 2.1.1 of the AQGHG Assessment and Section 4.5.3 of the draft EIS, the scenarios were selected for dispersion modelling based on the maximum potential impacts at sensitive receivers (i.e. including consideration of ROM coal extraction rates, overburden extraction rates, product coal rates, extent of disturbance and proximity to sensitive receivers). Adoption of the maximum ROM coal extraction rate for the 2043 scenario (i.e. a total of 20 Mtpa instead of 19.1 Mtpa) would not be representative of the proposed Project, and dispersion modelling of a different year with the maximum ROM coal extraction rate would likely result in lower predicted dust levels than those predicted for the 2043 scenario. In addition, the proposed EA conditions are based on the EPP (Air) air quality objectives and not the predicted dust levels, and any minor amendments to the emission inventories or dispersion modelling results would therefore not have any implications for the proposed EA conditions.
34.47	Appendix G – Air Quality and Greenhouse Gas Assessment 1 Table A1 p.72	Life of mine air and dust impacts Calculations of predicted impacts have only be calculated for years 2027, 2043, 2066 and 2085. The draft EIS does not consider air and dust impacts for any other years of the mining sequence. To adequately assess the air and dust impacts on sensitive receptors throughout the entire life of the mine, further modelling must be completed for every 5 years during all stages (construction, operation and rehabilitation).	<ol style="list-style-type: none"> Complete air quality and dust modelling for every 5 years and for all stages (construction, operation and rehabilitation). Modelling must take into account the location of operational pits, mining sequence, equipment schedule, worst case fleet numbers, all fixed and stationary plants (i.e. coal handling preparation plant), mobile equipment, haul routes, trucks under load going up ramps, train loading facilities and the railway line. The modelling must consider worst case scenario (including adverse weather conditions) from the mine and be illustrated with corresponding contour mapping. Where the mine staging involves construction, operation and rehabilitation occurring at the same time period, cumulative air and dust impacts from all stages must be considered. 	<p>The selection of four scenarios for dispersion modelling is consistent with standard practice for air quality assessments for large mining operations.</p> <p>As described in Section 2.1.1 of the AQGHG Assessment and Section 4.5.3 of the draft EIS, the scenarios were selected for dispersion modelling based on the maximum potential impacts at sensitive receivers (i.e. including consideration of ROM coal extraction rates, overburden extraction rates, product coal rates, extent of disturbance and proximity to sensitive receivers).</p> <p>Pembroke therefore considers that additional modelling scenarios (particularly every 5 years) would not be warranted.</p> <p>In addition, the proposed EA conditions are based on the air quality objectives and not the predicted dust levels, and any minor amendments to the emission inventories or dispersion modelling results would therefore not have any implications for the proposed EA conditions.</p>
34.48	Appendix G – Air Quality and Greenhouse Gas Assessment	Unclear terminology Throughout Appendix G, reference has been made to the project area, the project and the project site. It is unclear what each of these terms refers to.	<ol style="list-style-type: none"> Define the terms: the project area, the project and the project site. These labels need to be quantified and mapped to enable a better understanding and interpretation of the data presented, and to show representation of monitoring equipment on- or off site. 	The term 'Project Area' within the draft EIS has been used to refer to the full extent of land within the proposed disturbance footprint.
34.49	Appendix G – Air Quality and Greenhouse Gas Assessment 4 p.12	Baseline weather monitoring There is data available from the Bureau of Meteorology (BoM) weather monitoring station nearest to the project is located at Moranbah Airport, approximately 30 km north-west. This weather station has been in operation since 2012. Long-term climate data (historic data) in the project region, from 1972 to 2012, has been collected from the (now decommissioned) BoM weather monitoring station located at Moranbah Water Treatment Plant. Data from the new weather monitoring station collected since 2012 has not been used in the air quality assessment, nor has it been used to compare it with the historic data.	Provide and include the most recent data (since 2012) to enable an accurate representation and interpretation of data and potential impacts based on current environment.	<p>It is standard practice in air quality assessments to review the climate of an area in the context of long-term averages rather than based on more short-term data sets, as mentioned in the AQGHG Assessment.</p> <p>Notwithstanding, as described in Section 5.2 and Appendix B of the AQGHG Assessment, the meteorological data used in the dispersion modelling was based on a review of the last five years of data available from the Moranbah Airport station at the time of assessment (specifically, 2012 to 2016). A representative year of meteorological data was selected based on the annual frequency distributions of wind direction, wind speed and temperature. The year selected (specifically, year 2015) was determined to be the closest representation of the five-year average for the parameters assessed.</p>
34.50	Appendix G – Air Quality and Greenhouse Gas Assessment 4.5.2 p. 20	Existing ambient air quality monitoring station Section 4.5.2 states that a monitoring station was installed at the project site, however, a map and coordinates detailing the location of the monitoring station have not been provided. Although the limited data collected was not used in the assessment, the location of the monitoring station is still required to inform future baseline monitoring and compliance activities.	Provide a graphical depiction and coordinated of the location of the monitoring station.	<p>Figure 6-1 of the draft EIS includes the location of the particulate matter monitoring site established in 2017. This station is currently operational and continuing to provide baseline data.</p> <p>The Air Quality Management Plan to be prepared for the Project would include details of all existing and proposed monitoring, including monitoring locations and frequencies.</p>
34.51	Appendix G – Air Quality and Greenhouse Gas Assessment, Appendix L – Geochemistry Assessment	Sodic and dispersive soils The Geochemical Assessment of Potential Spoil and Coal Rejects Materials report refers to sodic and dispersive soils. The nature of the soil does not appear to have been specifically addressed in the air assessment.	Ensure the characteristics of sodic and dispersive soils are fully considered in the air and dust assessment. If the soil moisture content and silt content is available then incorporate these values in the estimation dust emission rates.	Refer to response to response 34.45.

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34.52	Appendix G – Air Quality and Greenhouse Gas Assessment, 6.3, p.26	Real-time monitoring Mitigation measures proposed include real-time monitoring of dust levels and meteorological conditions; however, the location of these monitoring points have not been provided.	Provide the proposed locations of the real-time monitoring equipment.	Refer to response to response 34.50.
34.53	Appendix G – Air Quality and Greenhouse Gas Assessment Section 6 - General Environmental Protection Commitments and Model Conditions 6.2.3 p. 26	Vegetation burning The proposed EA conditions allows for the burning of vegetation cleared in the course of carrying out extraction activities; however, this activity has not been included in the air quality assessment modelling. In addition, the proponent must demonstrate that other possible options for waste management of vegetation have been considered in accordance with the waste management hierarchy.	1. Include an assessment of vegetation burning in the air quality assessment. 2. Demonstrate that other possible options for waste management of vegetation have been considered in accordance with the waste management hierarchy.	Vegetation burning, if required, would be minor, undertaken on a short-term basis and located away from the boundary of the mine site. It is therefore expected that there would be minimal off-site impacts of this activity. Pembroke has also provided a Waste Management Program as part of the Additional Information to the EIS which describes possible options for waste management of vegetation have been considered in accordance with the waste management hierarchy. In addition, the proposed EA conditions are based on the air quality objectives and not the predicted dust levels, therefore a quantitative assessment of vegetation burning would not have any implications for the proposed EA conditions. As described in Section 4.5.4 of the draft EIS, with the use of the proposed dust management measures, including proactive and reactive dust controls measures that are considered good or best practice, it is reasonable to expect that the air quality objectives would be met during the operation of the Project. This would include any times when vegetation burning is undertaken.
34.54	Appendix G – Air Quality and Greenhouse Gas, p. 23 to 39	Cumulative impacts to sensitive receptors In relation to Air Quality Assessment Modelling Methodology, Dust Emissions inventory and Air Quality Impact Assessment, data presented indicates definite potential to impact at sensitive receptors, particularly taking into consideration the cumulative impact from other surrounding mining activities. The draft EIS must provide enough evidence that dust mitigation strategies, including real-time monitoring at all sensitive receptor locations, have been applied. Sensitive receptors need to be mapped relative to all proposed mining activities.	1. Provide proactive dust mitigation strategies, including real-time monitoring for all sensitive receptor locations. 2. Map sensitive receptors in relation to all proposed mining activities.	Figures in the draft EIS (e.g. Figure 4-23) include all the relevant sensitive receivers in relation to the proposed mining operations. Section 6 of the draft EIS describes that the Air Quality Management Plan to be prepared for the Project would include additional details of the proposed proactive and reactive mitigation system (e.g. relevant triggers for mitigative actions and a hierarchy of proposed mitigative actions). As described in Section 4 of the draft EIS, the proactive and reactive mitigation system would be in addition to general dust control measures that would be employed at all times, including the use of watering and chemical suppressant on haul roads, dust suppression systems on drills, minimisation of exposed areas (including progressive rehabilitation), water sprays on ROM coal stockpiles, conveyor transfer points and during train loading, and enclosure of crushing infrastructure.
34.55	Appendix G – Air Quality and Greenhouse Gas Assessment p. 51 to 70	The provided contour plates do not contain legends detailing the symbols and colours to aid in interpretation.	Add legends to the contour plates.	The contour diagrams in the AQGHG Assessment use the same layouts as those presented in Figures 16 to 19 of the AQGHG Assessment. Due to the size of the legend in these figures, overlaying the legend onto the contour diagrams would obscure the contours on some figures. As there is no change to layouts in comparison to Figures 16 to 19 of the AQGHG Assessment, a legend was not included on the contour diagrams in order to maximise the visibility of the contours.
34.56	Appendix K – Noise and Vibration Assessment 5.5 p. 24	The sleep disturbance noise analysis assumes partially closed windows. It is however likely that residents will have windows fully open during the evening, particularly during summer months.	Include the assumption of fully open windows in the analysis of noise sleep disturbance, to ensure a conservative approach to the analysis for potential sleep disturbance impacts of the project.	The 7 dBA conversion from indoor to outdoor noise levels used within the AQGHG Assessment, which assumes partially closed or open windows, is standard practice. Additional analysis has not been undertaken and the OCG has agreed with this approach.
34.57	Appendix K – Noise and Vibration 7.2, p.37	For the 2085 scenario, mitigation measures to avoid noise impacts during adverse weather conditions have not been proposed and it is assumed that adverse weather conditions will not occur during the daytime.	Include mitigation measures for the 2085 scenario to ensure that noise criteria are not exceeded should adverse conditions occur during the daytime.	Section 7.2 of the Noise and Vibration Assessment describes that as mining operations in the Olive Downs South domain would be restricted to daytime only in 2085, and adverse weather conditions are not predicted to occur during the daytime, no specific additional mitigation measures would be required in addition to those proposed to be implemented under neutral conditions (i.e. a selection of equipment working in the vicinity of the Vermont Park receiver would be treated with sound suppression under all conditions). Notwithstanding, the proposed proactive and reactive noise management system described in Section 7.3 of the Noise and Vibration Assessment and Section 4.9.4 of the draft EIS would continue to be used in 2085.
34.58	Appendix K – Noise and Vibration Assessment	Life of mine accumulative noise impacts and corresponding noise contour mapping The draft EIS does not consider noise impacts for any other years of the mining sequence. The noise impact assessment references modelling has been conducted for Year 2027, 2043, 2066 and 2085 of the mining operation. The noise modelling does not adequately address worst case scenario accumulative noise impacts (day, evening and night-time periods and adverse weather conditions) from the mine. There are no illustrations of corresponding noise contour mapping for the modelling results. There is insufficient consideration of the impacts on sensitive receptors, including during construction.	1. To adequately assess the noise impacts on sensitive receptors throughout the entire life of the mine, further noise and vibration modelling (including low frequency noise) must be completed for every 5 years. This modelling should take into account <ul style="list-style-type: none"> the location of operational pits mining sequence equipment schedule worst case scenario of fleet numbers all fixed and stationary plant (i.e. coal handling preparation plant) mobile equipment, haul routes trucks under load going up ramps train loading facilities and the railway line cumulative impacts from surrounding approved mining projects (including Olive Downs North Project). 	The selection of four scenarios for noise modelling is consistent with standard practice for noise assessments for large mining operations. As described in Section 6.3.1 of the Noise and Vibration Assessment and Section 4.9.3 of the draft EIS, the scenarios were selected for noise modelling based on the maximum potential impacts at sensitive receivers (i.e. including the scale of mining operations, number of major mobile equipment and proximity to sensitive receivers). Pembroke therefore considers that additional modelling scenarios (particularly every 5 years) would not be warranted and would not have any implications for the proposed EA conditions. Section 4.9.3 of the draft EIS indicates that rail transport noise levels are predicted to comply with the relevant rail noise limit at the closest sensitive receiver (approximately 1.5 km from the rail spur) based on a peak of 16 train movements per day (i.e. 8 unloaded and 8 loaded trains). Further to this, Pembroke will prepare a noise management plan which would provide a detailed description of the proposed management of potential noise impacts (including rail noise), including the real-time monitoring system and proposed contingency measures if impacts are identified. The cumulative noise assessment provided in the draft EIS considered the Olive Downs North Project to the extent that project information was available for consideration. Insufficient information was available to accurately model the potential noise impacts of the Olive Downs North Project (e.g. type and location of mobile equipment in each year).

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			<ol style="list-style-type: none"> The modelling should be amended to include consider worst case scenario accumulative noise impacts (day, evening and night-time periods and include adverse weather conditions) from the mine and be illustrated with corresponding noise contour mapping. Consideration must be given to the sensitive receptor: Olive Downs. Where there are noise impacts on sensitive receptors from the existing railway infrastructure – this must be taken into account with the noise modelling to predict future accumulative noise impacts as a result of the mine. Where the mine staging involves construction / operational and rehabilitation occurring at the same time period – accumulative noise impacts from all stages must be considered. 	<p>With regard to currently operating mines in the region, Section 9.1 of the Noise and Vibration Assessment describes that long-term noise monitoring and site inspections indicated these operations were generally inaudible in the vicinity of the Project and any cumulative noise impact with other industrial (i.e. mining) sources is expected to be insignificant. The noise contours presented in the Noise and Vibration Assessment are therefore representative of the likely maximum-case cumulative noise impacts.</p> <p>Notwithstanding this, as described in Sections 4.5.4 and 4.9.4 of the EIS, the proposed proactive and reactive mitigation and management strategies for air quality and noise are considered robust, and would allow Pembroke to maintain compliance with relevant criteria even with additional dust and noise generating activities in the region (including new or expanded mining operations, including the Olive Downs North Project).</p> <p>The Olive Downs homestead is included in the Noise and Vibration Assessment, particularly in regards to potential rail noise (Section 9.4). Due to the distance from this receiver to the mining operations, and the fact the mining operations move progressively away from the receiver, Renzo Tonin & Associates determined that operational noise levels would be significantly below the noise objectives (i.e. greater than 10 decibels) in all scenarios. Presentation of predicted noise levels of this magnitude is not considered warranted.</p> <p>As the Project would utilise similar train configurations to other mining operations, Project train movements would not result in any additional exceedances, nor exacerbate any existing exceedances, of the Single Event Maximum noise criterion (i.e. the Project's train movements would not be noisier than train movements on the existing rail infrastructure). In addition, as the number of Project train movements in a day would represent up to approximately 12.5% of the rail traffic on the existing rail infrastructure, the Project train movements would be expected to create minimal change to the $L_{eq, 24\text{hour}}$ noise levels at any sensitive receiver in the vicinity of the existing rail infrastructure.</p> <p>As described above, the scenarios selected for modelling include consideration of the maximum potential impacts, including cumulative noise associated with construction activities, operational activities and rehabilitation activities.</p>
34.59	Appendix K – Noise and Vibration Assessment	<p>Contour mapping for proposed noise mitigation measures</p> <p>Contour mapping demonstrating the effectiveness of proposed mitigation measures and compliance with proposed noise limits has not been provided.</p>	Provide an assessment and detailed noise mitigation implementation plan, including contour mapping, demonstrating the predicted noise reduction achieved by proposed mitigation measures throughout the entire life of the mine, i.e. every 5 years.	<p>The Additional Information to the EIS clarifies that the Noise Management Plan to be prepared for the Project would include additional details of the proposed standard and proactive and reactive mitigation system (e.g. timing for the implementation of attenuation on relevant equipment, relevant triggers for proactive and reactive mitigative actions and a hierarchy of proposed mitigative actions).</p> <p>As described in Section 4.9.4 of the draft EIS and Section 7 of the Noise and Vibration Assessment, the proactive and reactive mitigation system would be in addition to general noise mitigation measures that would be implemented progressively throughout the life of the Project.</p> <p>To reduce noise levels at the nearest sensitive receivers throughout the life of the Project, Pembroke would enclose a section of the overland conveyor and utilise low noise idlers.</p> <p>In addition, a selection of equipment working in the vicinity of the Vermont Park receiver in 2066 and 2085 would be treated with sound suppression to reduce noise levels at that receiver (e.g. a water truck, grader and some of the haul truck fleet in 2066 and one dozer, one drill and nine coal haul trucks in 2085).</p> <p>As described in response to Item 58, additional model scenarios (particularly every 5 years) would not be warranted and would not have any implications for the proposed EA conditions.</p>
34.60	Appendix M- Soil and Land Suitability Assessment Table 57 p.98 Section 2 – Project Description 2.2.8 p. 32	<p>Recommendations in Appendix M (p. 98) for procedures to monitor and identify Acid Sulfate Soils (ASS) were not incorporated into environmental management plans.</p> <p>The draft EIS states that no ASS have been identified within the project area. Information detailed on page 98 (Appendix M) indicates a very low field indication of Potential Acid Sulfate Soils (PASS) assessed at a number of sites. There is a recommendation for ongoing monitoring procedures to be incorporated into a management plan.</p>	<ol style="list-style-type: none"> While it is unlikely that AASS and/or PASS are present at the Project site, environmental management plans should include procedures to monitor and identify ASS and PASS during the Project's lifespan. The draft EIS should be updated and steps taken to incorporate the relevant procedures into the Project management plans. 	As outlined in Section 6 of the draft EIS, Pembroke would prepare a Plan of Operations for the Project which would provide information on the management of potential ASS within the Project area.
34.61	Section 2 – Project Description 2.5.3 p. 53 Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 8 Section 5 – Rehabilitation Strategy p.1 to 2 Section 2 – Project Description 2.10.2 p. 75	<p>The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent.</p> <p>Comment 8: 'The preliminary draft EIS states that the permanent highwall emplacement will separate the open cut mining pits and voids, from the Isaac River floodplain. To meet the Mined Land Rehabilitation Policy (https://www.ehp.qld.gov.au/management/pdf/mined-land-rehabilitation-policy.pdf), any voids in the floodplain must be rehabilitated to a safe and stable landform that is able to support an approved post-mining land use. It appears that the proposed voids will not sustain an approved post-mining land use and therefore cannot comply with the Mined Land Rehabilitation Policy.'</p> <p>Recommendation: 'Demonstrate that the proposed highwall emplacement and mining voids will meet the requirements of the Mined Land Rehabilitation Policy.'</p> <p>Note: The Mineral and Energy Resources (Financial Provisioning Bill) 2018, if enacted, may have further requirements in relation to the proposed final landform. '</p>	<ol style="list-style-type: none"> Provide detailed information regarding how the proposed highwall emplacement and mining voids will meet the requirements of the Mined Land Rehabilitation Policy, having regard to the requirement for voids situated wholly or partially in a floodplain to be rehabilitated to a safe and stable landform that is able to sustain an approved post-mining land use that does not cause environmental harm. Ensure that the proposed rehabilitated areas of the project will meet the goals of safe, stable, sustainable and non-polluting. With regards to final voids, demonstrate how the following items will meet the rehabilitation goals: <ul style="list-style-type: none"> fencing on void highwalls to prevent access to humans and livestock (and by inference certain native animals) permanent rock emplacements to surround the final voids and isolate them from flood events installation of perimeter bunds to divert water around final voids and minimise the catchment areas of the final voids permanent changes to the floodplain area and subsequent changes to flood characteristics 	<p>Refer to Section 24 of the Additional Information to the EIS for a detailed description of how the proposed final landform for the Project complies with the Queensland Government's Mined Land Rehabilitation Policy.</p> <p>A revised set of Proposed EA Conditions have been included as Appendix B of the Additional Information to the EIS. Table H1 Rehabilitation Requirements has been updated and includes the following completion criteria for the rehabilitation goals 'Long Term Safety', 'Stable', 'Non-polluting' and 'Sustainable Land Use' for final voids:</p> <ul style="list-style-type: none"> Perimeter bunding formed and security fencing installed. The flood assessment concludes that the final voids are isolated from all flood events, up to and including a PMF event. The groundwater assessment concludes that the final voids are acting as groundwater sinks, preventing the migration of potentially saline water into adjacent aquifers and watercourses. ... monitoring demonstrates sustainable fauna usage (e.g. Strip-faced Dunnart, Hoary Wattled Bat and Australian Grey Teal) of the final voids. <p>As noted by the final bullet point above, the post-mining land use of the final voids is fauna habitat. Section 4 of the Additional Information to the EIS presents additional information on the post-mining land use for the final voids.</p>

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		<p>The draft EIS does not appear to have been amended to sufficiently demonstrate that the proposed highwall emplacement and mining voids will meet the requirements of the Mined Land Rehabilitation Policy (https://www.ehp.qld.gov.au/management/pdf/mined-land-rehabilitation-policy.pdf).</p> <p>The discussion in the draft EIS (Section 5, p. 1 to 2 and Section 2, p. 75 to 75) regarding the PRC Plans in relation to voids and backfilling operations indicate that it is unlikely the affected final voids (ODA3 and ODS7/ODS8) will meet the definition of a post mining land use based upon the values of safety; no environmental harm being caused; and sustainability.</p>	<ul style="list-style-type: none"> final voids acting as groundwater sinks, drawing in groundwater from surrounding geological units, and ultimately, the generation of hypersaline environments with no potential land use. 	
34.62	Section 5 – Rehabilitation Strategy	The draft EIS provides very little detail with regards to the Ripstone Creek Diversion and no information regarding rehabilitation and stabilisation of the areas disturbed to construct the creek diversion is provided in Section 5.	<ol style="list-style-type: none"> The draft EIS should be revised to include relevant details on the Ripstone Creek Diversion, particularly with regards to how the diversion will become a sustainable post-mining land use that meets the rehabilitation goals. The creek diversion should be included in Table 5-2 (Section 5) as a Mine Domain. The Ripstone Creek diversion must be designed and constructed in accordance with DNRm's Guideline: Works that interfere with water in a watercourse—watercourse diversions. 	<p>Pembroke has provided further information on the Project's rehabilitation strategy (refer to Section 4 and Appendix D of the Additional Information to the EIS) including identifying Ripstone Creek Diversion as a separate mine domain.</p> <p>In addition, Table 5-2 of the draft EIS has been updated to include revised rehabilitation goals, objectives, performance indicators and completion criteria specific to the Ripstone Creek Diversion.</p> <p>The Ripstone Creek diversion would be constructed in accordance with DNRm's Guideline: Works that interfere with water in a watercourse—watercourse diversions</p>
34.63	<p>Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 11</p> <p>Section 2 – Project Description 2.7.5 p.69</p>	<p>The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent.</p> <p>Comment 11: 'Within section 2.7.5, it states: "Sediment dams would be maintained until such time as vegetation successfully establishes and where runoff has similar water quality characteristics to areas that are undisturbed by mining activities. Sediment dams may be maintained in rehabilitated areas when site water demand requires it."</p> <p>The last sentence does not identify if or when these sediment dams will be rehabilitated if they are maintained on site.'</p> <p>Recommendation: 'Identify when the sediment dams will be rehabilitated if they are maintained for site water demand.'</p> <p>No update was made to this chapter of the draft EIS based on the advice given. However, there is a statement on page 10 referring to Figures 5-2 and 5-3 which illustrate that all sediment dams are removed in the conceptual final landform design.</p> <p>Table 5-5 (page 5-34) also identifies that a projected 570ha of Water Management Infrastructure will be rehabilitated during decommissioning in 2100.</p>	Provide detailed information as to when the sediment dams will be rehabilitated if they are maintained for site water demand.	<p>The water balance model assumes that once a sediment dam's catchment has been fully rehabilitated, the sediment dam no longer contributes to the site water management system. Accordingly, sediment dams with rehabilitated catchments are not relied upon to supply water to the Project. The sediment dams would therefore only be retained if they are determined to provide a beneficial use for the post-mining land use (e.g. as a stock watering dam).</p> <p>A revised set of Proposed EA Conditions have been included as Appendix B of the Additional Information to the EIS. Table H1 Rehabilitation Requirements includes the rehabilitation goals, objectives, performance indicators and completion criteria for water management infrastructure. Sediment dams are proposed to be rehabilitated in accordance with Table H1.</p>
34.64	Section 2 – Project Description, 2.7.5, p.69	<p>Sodic and dispersive soils</p> <p>The Geochemical Assessment of Potential Spoil and Coal Rejects Materials report refers to sodic and dispersive soils. The nature of the soil does not appear to have been specifically addressed in the air assessment.</p>	<ol style="list-style-type: none"> Provide an amended design for the sediment basins, outlets/spillways, drains that is based on site specific parameters and is carried out by a suitably qualified and experienced practitioner in erosion and sediment control. Please note that in order to capture the design recommendations for long-term soil disturbance at mines, V2 (June 2018) of Appendix B - Sediment basin design and operation, please refer to IECA Best Practice Erosion and Sediment Control as it refers specifically to long term structures located at mine sites. Other design information suitable for long term structures on mine sites is available from Managing Urban Stormwater Soils and Construction, Volume 2E Mines and quarries, State of NSW, 2008. 	<p>The DES comments (and other standards relevant to erosion and sediment control i.e. Managing Urban Stormwater) are noted.</p> <p>Page 4-87 of the draft EIS relevantly states that an Erosion and Sediment Control Plan would be developed and implemented throughout construction and operations for the Project (Section 4.2.4 of the draft EIS). The Erosion and Sediment Control Plan would be reviewed and revised by an appropriately qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to receiving waters and management of stormwater. It is anticipated the Erosion and Sediment Control Plan would be a component of the Water Management Plan. Pembroke has proposed an EA Condition (F28) which requires the preparation of an Erosion and Sediment Control Plan.</p> <p>Section 2.7.5 of the draft EIS also relevantly states that sediment dams would be designed based on <i>Best Practice Sediment and Erosion Control Guideline</i> (International Erosion Control Association [IECA], 2008) for flows with an ARI of between 3 months and 1 year.</p> <p>The draft EIS describes that surface runoff from the waste rock emplacements would be directed to dedicated sediment dams. In rainfall events below the design standard, runoff from disturbed areas would be intercepted and treated by sediment dams. Some overflow of water from sediment dams (designed in accordance with the <i>Best Practice Erosion and Sediment Control Guideline</i> [International Erosion Control Association Australasia 2008]) may occur during wet periods (that is, in larger events that exceed the design standards, these sediment dams would overflow following a period of settlement treatment); however, it is unlikely that this would have a measurable impact on receiving water quality.</p>

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				<p>Nevertheless, Pembroke has specifically committed to the following: The sediment dam monitoring would be used to validate the anticipated quality of water runoff reporting to sediment dams and haul road runoff dams. Initially, the sediment dam monitoring would occur on a regular (e.g. monthly) basis to demonstrate the water quality of stored waters is consistent with the relevant operating parameters to allow releases from sediment dams to occur when required. Subject to demonstrating the water quality objectives can be met, the frequency of monitoring and suite of parameters for the sediment dam monitoring would be reviewed and updated accordingly (e.g. to occur only when releases occur).</p> <p>Sediment dams would be retained until the revegetated surface of the waste rock emplacements are stable and runoff water quality reflects runoff water quality from similar un-mined areas, at which time these controls would be removed and the areas would be free-draining.</p> <p>Once the entire catchment of a sediment dam has been rehabilitated, the sediment dam would no longer be required to operate in its designed function. After this point in time, sediment dams may be decommissioned and rehabilitated. The timing of rehabilitation activities would be presented in the Rehabilitation and Mine Closure Plan (described in Section 5.6 of the draft EIS).</p>
34.65	Section 3 – Assessment of MNES 3.1.4 p. 20 Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 19	<p>The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent.</p> <p>Comment 19: 'This section of the preliminary draft EIS states that Rehabilitation would commence within two years of areas becoming available. Two years is an extended period of time to elapse between cessation of operations in an area and commencement of rehabilitation.'</p> <p>Recommendation: 'Either reduce the period of time proposed for commencement of rehabilitation or provide justification for the two year period.'</p> <p>The proponent has not adequately responded to this comment. No explanation regarding the suitability of the proposed two year period was provided and the proposed timeframe was not reduced.</p> <p>Two years remains an unacceptable period of time to elapse between cessation of operations and commencement of rehabilitation for a specific area. This two year timeframe poses an unacceptable risk of soil erosion and degradation of the prepared final landform surface and opportunistic establishment of weeds.</p> <p>Two years encompasses a number of wet seasons and does not reflect best practice.</p>	<p>Reduce the period proposed for the commencement of rehabilitation or provide justification for the two year period.</p> <p>Note that planting should occur within 3 months (no longer than 6 months) of the completion of landform surface preparation.</p>	<p>Pembroke commits to commencing rehabilitation, in accordance with the following process, within six months of an area becoming available for rehabilitation.</p> <p>Decommissioning</p> <ol style="list-style-type: none"> Project infrastructure is to be decommissioned in accordance with the Mine Closure Plan. Any potentially contaminated areas are to be tested and where required, remediated, in accordance with the EP Act following infrastructure decommissioning. <p>Landform Establishment</p> <ol style="list-style-type: none"> After the completion of bulk materials handling in each domain, finalised landform areas (e.g. backfilled mine voids) are to be re-profiled to final slopes, and drainage structures installed consistent with the Plan of Operations. Final landform elevations and slopes are to be surveyed to determine compliance with the specifications (landform slopes, final elevations, etc.) set out in the Plan of Operations prior to the placement of growth media. <p>Growth Media Development</p> <ol style="list-style-type: none"> Soil application depths, amelioration requirements and soil application equipment on rehabilitated landforms are to be in accordance with the Plan of Operations. Suitable soil preparation on final landforms (e.g. ripping on contour or tilling) is to be undertaken prior to establishment of vegetation. <p>Ecosystem Establishment</p> <ol style="list-style-type: none"> After placement of growth media on profiled landforms, a sterile cover crop is to be sown to stabilise the growth media and minimise soil erosion. The cover crop should be sown immediately after completion of the Growth Media Development stage, and within three months (no longer than six months) of completion of Landform Establishment. Unless in declared drought conditions, after the placement of growth media on profiled landforms, a suitable combination of woodland or mixed woodland/pastures species would be established (i.e. sowing and/or planting of tube-stock) in accordance with the nominated post-mining land use within six months of the Growth Media Development phase being completed. After revegetation establishment in a domain, representative rehabilitation monitoring transects would be established in that domain and in corresponding representative control sites in accordance with the requirements of the Plan of Operations and or Mine Closure Plan. <p>Ecosystem Development</p> <ol style="list-style-type: none"> Monitoring of native vegetation rehabilitation is to be undertaken in accordance with the Plan of Operations and or Mine Closure Plan.
34.66	Section 5 – Rehabilitation Strategy, 5.1.3, Table 5-1, p.4	<p>Table 5-1 states that a Short-term General Rehabilitation Objective is that cover crops will be planted on newly rehabilitated mine landform areas (and stockpiles) within two years of becoming available to minimise the potential for soil erosion.</p> <p>The stated two year period is not acceptable as it poses an unacceptable risk of soil erosion and degradation of the prepared final landform surface and opportunistic establishment of weeds.</p> <p>Two years encompasses a number of wet seasons and does not reflect best practice.</p>	<p>Revise the rehabilitation objective to reflect a more appropriate period of time.</p> <p>Note that planting should occur within 3 months (no longer than 6 months) of the completion of landform surface preparation.</p>	
34.67	Section 5 – Rehabilitation Strategy, 5.1.3, Table 5-1, p.4	<p>No definite timeframe or measurable outcome is given for the placement of soil and seeding is part of the Short-Term General Rehabilitation Objectives.</p> <p>Table 5 -1 only states that a Short-term General Rehabilitation Objective is to stabilise new infrastructure disturbance areas as soon as possible by placement of soil and seeding.</p>	<p>Provide a period of time or descriptor of when action is required with regard to this objective. For example:</p> <p>'new infrastructure areas are stabilised within x Days of disturbance or prior to a forecast rain event of XX mm/year intensity'.</p>	
34.68	Section 5 – Rehabilitation Strategy 5.1.3 Table 5-1 p. 4	There is no measurable outcome stated in regards to the Short-term General Rehabilitation Objective for stabilising areas which interact with the Isaac River and have been affected by mine operations (Table 5 -1)	The rehabilitation objective should be revised to provide a measurable outcome such as a timeframe within which works should be completed.	Pembroke commits to stabilising areas which interact with the Isaac River which have been affected by mine operations prior to the commencement of the subsequent wet season. Works within areas which interact with the Isaac River (e.g. road crossings) would be conducted during the dry season.
34.69	Section 5 – Rehabilitation Strategy 5.1.4 Table 5-2 p. 5 to 9. Appendix M- Soil	The draft EIS acknowledges that the Project rehabilitation strategy has been prepared in consideration of the anticipated Mineral and Energy Resources (Financial Provisioning) Bill 2018 which will require a PRC Plan to be developed. Please note, should the bill be enacted, the PRC Plan will require definitive assignment of post mining land uses to each area of the resource tenure, stating rehabilitation milestones,	<ol style="list-style-type: none"> Develop the rehabilitation land uses for each mine domain to further reflect the intended final land use and provide detailed, specific completion criteria for each domain, sufficient to be incorporated into resultant EA conditions. The Ripstone Creek diversion must be included in Table 5-2 as a Mine Domain. Also, consideration must be given to including 	<ol style="list-style-type: none"> Table 5-2 of the draft EIS has been updated to include revised rehabilitation goals, objectives, performance indicators and completion criteria specific to each rehabilitation domain (including the Ripstone Creek Diversion) and is provided in Section 4 of the Additional Information to the EIS. The revised table is reproduced as Proposed EA Condition Table H1 (within Appendix B to the Additional Information to the EIS). Ripstone Creek has been included as a mine domain in the Table H1 of the Proposed EA Conditions.

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	and Land Suitability Assessment Table 58 p. 100 Section 4 – Assessment of project specific matters Table 4-45 p. 152	associated milestone criteria and completion dates. Preliminary rehabilitation objectives, performance indicators and completion criteria for the Project have been proposed in Table 5 -2 of the draft EIS. It is broadly proposed that areas disturbed by the Project will be rehabilitated to sustain low intensity cattle grazing and native fauna habitat. However, the final land use(s) for each mine domain have not been specifically identified, and as a result the objectives, indicators and completion criteria in Table 5-2 lack sufficient detail/focus. It is noted that there are a number of specific recommendations for rehabilitation provided in Table 58 (Appendix M) and Table 4-45 (Section 4) that should be incorporated into Table 5-2 of Section 2.	separate domains for the ROM Stockpiles, transport corridors and train load out facility. 3. Incorporate the information outlined in Table 4–45 (Section 4) and the recommendations from Table 58 (Appendix M) in Table 5-2 (section 5). Further guidance is available from the guidelines: <ul style="list-style-type: none"> Model Mining Conditions (ESR/2016/1936) https://www.ehp.qld.gov.au/assets/documents/regulation/rs-gl-model-mining-conditions.pdf Rehabilitation requirements for mining projects (EM1122) https://www.ehp.qld.gov.au/assets/documents/regulation/rs-gl-rehabilitation-requirements-mining.pdf 	3. The proposed post-mining land suitability classes from Table 4-45 and the recommendations in Table 58 of Appendix M are reflected in the post-mining land uses and rehabilitation strategy in Table H1 of the Proposed EA Conditions and Section 4 of the Additional Information to the EIS.
34.70	Section 5 – Rehabilitation Strategy 5.1.5 p. 10 Section 5 – Rehabilitation Strategy 5.1.3 p. 2 Section 5 – Rehabilitation Strategy 5.1.5 p. 10 Section 5 – Rehabilitation Strategy 5.1.3 p. 2 (Continued)	The draft EIS states that ‘rehabilitated lands will be considered suitable for relinquishment when the completion criteria have been met’. Considering that the final land uses for each domain have not been identified (Table 5-2), the indicators and completion criteria lack sufficient detail/focus. The conclusions and recommendations provided in Appendix M – Soil and Land Suitability Assessment indicate a number of problematic aspects associated with soils and subsoils in the Project area. For example: <ul style="list-style-type: none"> the majority of soils originate from landscapes with slopes at gradients of 2% or less and therefore are recommended for rehabilitation of flat to sloped areas. Sodosol soils will be vulnerable to erosion. Low fertility is a common attribute and specific targets for the necessary fertility characteristics are required to ensure that the PMLU. These characteristics have not been considered with regard to the completion criteria.	1. Include specific detail of indicators for completion criteria. 2. Criteria for land rehabilitated to a final land-use of grazing should incorporate indicators based around: <ul style="list-style-type: none"> carrying capacity biomass production the presence of 3P grasses. 3. Specific chemical and physical properties with target levels should be incorporated into the completion criteria, including but not limited to: <ul style="list-style-type: none"> nutrient status organic carbon levels sodicity salinity pH cryptogram cover. 4. Develop indicators and completion criteria based upon the particular attributes associated with the soil and its recommended use for rehabilitation purposes. Include detail regarding the final gradient associated with landforms where soils are used, or amelioration strategies / erosion management incorporated for steeper slopes. 5. The inclusion of progressive completion criteria are also recommended to ensure rehabilitated areas are effectively maintained to a suitable level prior to the full rehabilitation and surrender of the mine.	1. Table 5-2 of the draft EIS has been updated to include revised rehabilitation goals, objectives, performance indicators and completion criteria specific to each rehabilitation domain and is provided in Section 4 of the Additional Information to the EIS. The revised table is reproduced as Proposed EA Condition Table H1 (within Appendix B to the Additional Information to the EIS). 2. Completion criteria for the proposed grazing final land use have been added to Table H1 (within Appendix B to the Additional Information to the EIS). 3-4. Table H1 includes Landscape Function Analysis (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring as completion criteria for establishment of a self-sustaining vegetative cover. 5. Completion criteria (in particular the landform design, carrying capacity and LFA monitoring) will be monitored progressively as areas of the Project area rehabilitated.
34.71	Section 4 – Assessment of project specific matters 4.10.3 p. 149 Section 5 – Rehabilitation Strategy 5.2.2 p.17 Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 25	The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent. Comment 25: ‘It is stated that the out-of-pit waste rock emplacements would result in the creation of a number of elevated landforms, which would have elevations of up to 315m AHD.’ Recommendation: ‘Section 11.42 of the TOR requires “For surface mines and projects with activities that disturb the land surface, show how the landform during and post mining will be stable and non-eroding over time (describe how current technologies will be applied)”’. The preliminary draft EIS considers impact to visual amenity of out of pit waste rock emplacements but require further assessment of: <ul style="list-style-type: none"> Slopes – for example, does the proposed slope of 1V:8H support the proposed post mining land use. Erosion potential – designed drainage from mined landforms is a fundamental requirement for ensuring long term landform stability and protection of water quality.’ No update was made to this particular chapter of the draft EIS. Water will be directed off the landforms via gently sloped surfaces on the landform plateau, and as a consequence of the landform shape. No further design detail or discussion	1. A discussion regarding how the proposed 1V:8H slopes of the waste rock emplacements are suitable for the proposed PMLU was provided in Section 2. This information should be incorporated into chapter 5 as it relates to post mining land use and rehabilitation. 2. Provide information as to whether additional drainage features on the landform plateau are required. (Section 5.2.2 p.17) 3. Provide information and a discussion regarding the removal of contour banks following the establishment of groundcover, or a plan as to their long term maintenance. 4. Provide the report undertaken by GeoTek.	1. Table H1 of the Proposed EA Conditions includes a completion criteria of waste rock emplacement final landform slopes are to be approximately 1V:8H or lower to support the proposed post-mining land use. 2-3. Pembroke will prepare a Rehabilitation and Mine Closure Plan for the Project post-approval which would build on the information within the draft EIS, including a detailed description of the proposed final landform drainage features. The design of the final landform drainage features will acknowledge the overall low landform slopes (i.e. 1H:8V), consider the incorporation of features to assist in shedding or retaining water in the drainage design, consideration of the waste rock characteristics and topsoil characteristics described in the draft EIS. The objective of the design of the drainage features on the final landform will be to achieve long terms stability. Pembroke will consider the use of landform evolution modelling to demonstrate the design achieves the objective. 4. All relevant information from the GeoTek report has been included with the draft EIS.

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		<p>regarding whether additional drainage features are required for high volume runoff from intense rain events was provided.</p> <p>There is a lack of discussion as to the management of contour banks that will be installed on side slopes to limit effective slope lengths and reduce the potential for erosion (section 5.2.2 p. 5 -17). Contour banks require ongoing maintenance to ensure their proper function. In the long term and when not properly maintained contour banks frequently cause erosion resulting in the development of tunnelling or gullies.</p> <p>Chapter 5 mentions the following regarding stability 'Landform gradients were based on a preliminary assessment of geotechnical stability, undertaken by GeoTek Solutions' but this report was not provided as part of the draft EIS.</p>		
34.72	Section 4 – Assessment of project specific matters 4.14.3, p.172	<p>More information is needed regarding the discussion of visual amenity impacts arising from the elevated landforms (Section 4.14.3, p. 172).</p>	<ol style="list-style-type: none"> 1. Include to-scale, cross-sectional diagrams from various angles demonstrating how the proposed out-of-pit waste rock emplacements will look against the surrounding landform. 2. Profiles should be provided from a number of viewpoints including sensitive receptors (i.e. homesteads, roads), and represent the landscape over the life of the mine. 	<p>Section 4.10.3 of the draft EIS states that although the highwall emplacement would be constructed within 1 km of the Vermont Park dwelling, visual impacts from this 25 m high landform are not anticipated to be significant given the intervening vegetative screening.</p> <p>The larger out-of-pit waste rock emplacements would be located at least 5 km from the privately owned dwellings. As visual prominence diminishes with distance, and in consideration of intervening vegetation, it is expected that the visual impact of the elevated Project landforms would not be significant at nearby dwellings.</p> <p>The overland conveyor would be located approximately 700 m from the closest privately-owned dwelling (Seloh Nolem 1). The conveyor would generally be 1 m to 2 m above ground level. At a distance of at least 700 m, visual impacts from the overland conveyor are not expected to be significant.</p> <p>The Willunga domain mine infrastructure area would be at least 4 km from the closest dwelling. Infrastructure at the Willunga domain would reach heights of approximately 18 m. At distances of 4 km or greater, visual impacts from the mine infrastructure areas are not expected to be significant.</p> <p>The Olive Downs South domain mine infrastructure area would be at least 8 km from the closet dwelling. Infrastructure at the Olive Downs South domain would reach heights of 20 to 30 m. At distances of 8 km or greater, visual impacts from the mine infrastructure areas are not expected to be significant.</p> <p>Accordingly, Pembroke does not consider it likely that the Project would result in visual amenity impacts as a result of the permanent highwall emplacements.</p>
34.73	<p>Section 4 – Assessment of project specific matters 4.10.3 Table 4 – 45 p. 152</p> <p>Section 5 – Rehabilitation Strategy 5.2.1 p. 10</p> <p>Section 5 – Rehabilitation Strategy Table 5-2 p. 6</p> <p>Section 5 – Rehabilitation Strategy 5.2.3 P,18</p> <p>Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 26</p>	<p>The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent.</p> <p>Comment 26: 'Table 3-29 Proposed post mining land suitability classes for final void landform states 'unsuitable for grazing and cropping.'</p> <p>Recommendation: 'The Queensland Government Mined Land Rehabilitation Policy states that "areas that are not rehabilitated to sustain a post mining land use may require additional on-going management. In these cases any residual risk payment to the administering authority will include provision for this ongoing management".</p> <p>Provide further information on:</p> <ul style="list-style-type: none"> • the proposed final land use(s) for voids • consideration of residual risk payment to deal with ongoing management issues post mining.' <p>No update was made to this particular chapter of the draft EIS. However, Table 5–2 Preliminary Rehabilitation Requirements (p 5-6) and Section 5.2.1 (p. 10) states that the land use for final voids will be to act as a groundwater sink and provide potential habitat for native fauna (including the highwall and waterbody).</p> <p>There is insufficient discussion as to the suitability of this potential habitat.</p> <p>It is noted that the quality of the resultant waterbody is anticipated to increase in salinity throughout its life and will eventually become hypersaline (Section 5, p. 18) and consequently unsuitable for use as a water source and/or habitat for fauna and aquatic organisms. It is also noted that the final void highwalls will be fenced to prevent access by humans and livestock (and by inference certain native fauna) which limits the potential of this area to sustain a Post-Mining Land Use (PMLU) as habitat.</p> <p>It is also proposed that permanent highwall emplacements will be constructed to isolate the final void landforms from flooding,</p>	<ol style="list-style-type: none"> 1. Provide detailed explanation regarding how the final voids will achieve a sustainable post-mining land-use (PMLU) In accordance with the Mined Land Rehabilitation Policy. Note that for new site-specific mines, the administering authority will not approve a PCRP that includes a void situated wholly or partially in a floodplain, unless the void will be rehabilitated to a safe and stable landform that is able to sustain an approved PMLU that does not cause environmental harm. 2. Describe the suitability of the final voids as habitat, taking into consideration the anticipated increased salinity of the proposed groundwater sinks (voids), and accessibility for native animals. 	<p>Pembroke proposes a final void which is a safe and stable landform with a native ecosystem post-mining land use.</p> <p>Section 24 of the Additional Information to the EIS includes a detailed description of how the proposed final landform for the Project complies with the Queensland Government's <i>Mined Land Rehabilitation Policy</i> including the suitability of the final voids for native ecosystem land use considering the water quality characteristics of the final void water bodies.</p> <p>The requirements of the <i>Mined Land Rehabilitation Policy</i> relating to final voids centre on new site-specific mines and a Progressive Rehabilitation and Closure Plan (PRCP). The Olive Downs Coking Coal Project is <u>not</u> a new site specific mine. It is a mining EA applicant to which the <u>pre-amended</u> <i>Environment Protection Act 1994</i> applies.</p> <p>At the time of preparation of the draft EIS and the Additional Information to the EIS there is no legislative requirement (or guidance material) for the preparation of a PRCP.</p> <p>Despite the above, the draft EIS demonstrates that:</p> <ul style="list-style-type: none"> • there would be no voids situated wholly or partially in a floodplain; and • voids would be "...<i>rehabilitated to a safe and stable landform that is able to sustain an approved post-mining land use that does not cause environmental harm.</i>"

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		which will in turn have a permanent impact on localised surface drainage and the flood plain.		
34.74	<p>Section 4 – Assessment of project specific matters 4.14 p. 165 to 171</p> <p>Section 4 – Assessment of project specific matters Table 4-46 p. 166</p> <p>Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 27</p>	<p>The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent.</p> <p>Comment 27: ‘TOR Waste requires:</p> <p>11.117 “Describe the quantity, form (liquid, solid, gas), hazard, and toxicity of each significant waste, as well as any attributes that may affect its likelihood of dispersal in the environment, as well the associated risk of causing environmental harm.”</p> <p>11.120 “Describe how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives would be monitored, audited and managed”.</p> <p>The preliminary draft EIS does not adequately address excavated material and coal rejects as a waste streams.’</p> <p>Recommendation: ‘Provide a revised impact assessment that adequately addresses sections 11.117 and 11.120 of the TOR, particularly in relation to excavated waste and coal rejects.’</p> <p>There is insufficient detail in Table 4-46 (Section 4) on management strategies to manage erosion, saline runoff and potential acid formation from out-of-pit waste rock emplacements and ILF Cells.</p> <p>Rationale is lacking as to why unweathered Permian Sandstone waste rock was identified as the most suitable material for construction.</p> <p>There is a lack of discussion regarding the potential runoff from ILF cells and initial rejects storage facilities that will be used for storing fine and coarse rejects during the initial stages of operation until sufficient storage volume is available in the open cut pit.</p>	<ol style="list-style-type: none"> 1. Provide greater detail in table 4-46 on management strategies to manage erosion, saline runoff and any potential acid formation from the out-of-pit waste rock emplacements and ILF Cells. 2. Include the rationale (e.g. competent, non-saline etc.) behind the identification of unweathered Permian sandstone as the most suitable material for construction. 3. Provide greater details regarding management of erosion or saline runoff from ILF cells and initial rejects storages facilities that will be used for storing fine and coarse rejects during the initial stages of operation. 	<p>The Geochemistry Assessment (Appendix L of the draft EIS) demonstrates that the waste rock material (that will be used to construct the final landforms) will be overwhelmingly non-acid forming (NAF) with excess acid neutralising capacity and have a negligible risk of developing acid conditions. It is also predicted to generate relatively low-salinity surface runoff and seepage with low soluble metal concentrations. Accordingly, significant impacts to the water quality of the receiving environment due to runoff and seepage from the final landforms are not predicted.</p> <p>Runoff from the ILF cells would be captured within the mine affected water dams at the Olive Downs South mine infrastructure area for reuse within the CHPP. No runoff from the ILF cells would report to sediment dams or the clean water management system. Once dry, the ILF cells would be excavated and disposed in-pit. Upon decommissioning, the excavated ILF cells would be assessed for potential land contamination, and remediated if required, before being topsoiled and rehabilitated.</p> <p>As indicated in Section 4.14.4 of the draft EIS, where waste rock is used for construction purposes, this would be limited (as much as practicable) to unweathered Permian sandstone materials, as these materials have been found to be more suitable for construction and for use as embankment covering on final landform surfaces, as they have a higher acid neutralising capacity, and is less sodic and dispersive than the tertiary materials.</p> <p>Where highly sodic and/or dispersive waste rock is identified, the material would be selectively handled so that it does not report to final landform surfaces, where practicable, and would generally not be used in construction activities. In general, tertiary waste rock has been found to be unsuitable for construction use or on final landform surfaces (ACARP, 2004).</p>
34.75	<p>Section 5 – Rehabilitation Strategy Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 29</p>	<p>The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent.</p> <p>Comment 29: ‘Section 10.11 of the TOR requires the draft EIS to provide a detailed progressive rehabilitation schedule and include maps at suitable scales showing the location of disturbance areas, relevant ERA infrastructure and associated disturbance areas and the sequence of mining and progressive rehabilitation (i.e. the method and timing of restoration of areas disturbed during construction), and the proposed schedule of site decommissioning and submission of closure plans. Refer also to 11.56 – 11.60 of TOR – rehabilitation.’</p> <p>Recommendation: ‘Provide a revised impact assessment that adequately addresses sections 10.11, 11.56 and 11.60 of the TOR.’</p> <p>The mapping/scheduling intervals for rehabilitation is not sufficient.</p>	<p>Mapping/scheduling should be revised to 5 year intervals as this is the preferred option to ensure progressive rehabilitation planning and scheduling occurs consistently throughout the mine life at appropriate intervals.</p>	<p>Pembroke has provided further information on the Project's rehabilitation strategy (refer to Section 4 and Appendix D of the Additional Information to the EIS) including progressive rehabilitation snapshots for every 5 years of the Project.</p>
34.76	<p>Section 5 – Rehabilitation Strategy Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 30</p>	<p>The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent.</p> <p>Comment 30: ‘Section 11.47 of the TOR requires the draft EIS to take into account proposed avoidance and/or mitigation measures. The assessment should include but not be limited to the following key elements...</p> <p>Section 11.50 of the TOR requires ...success criteria in relation to natural values that would be used to measure progress [...]’.</p> <p>Recommendation: ‘the draft EIS needs to address the requirements of section 11.47 and 11.50 of the TOR, including by describing how the values of the floodplain have been accounted for pre and post mining, including the values, potential impacts and proposed management.’</p> <p>Section 5 of the draft EIS provides very little information</p>	<ol style="list-style-type: none"> 1. Provide information regarding the natural values (flora and fauna) of the floodplain pre and post mining, and how these will be potentially impacted, mitigated and managed as part of rehabilitation activities. 2. Incorporate these natural values into the rehabilitation success criteria. 3. For example, criteria to measure impacts upon native fauna due to the increasing salinity of water retained in the final voids or impacts upon the integrity of ecological processes on the floodplain arising from the presence of final rehabilitated landforms. 	<p>Table 5-2 of the draft EIS has been updated to include revised rehabilitation goals, objectives, performance indicators and completion criteria specific to each rehabilitation domain and is provided in Section 4 of the Additional Information to the EIS. In particular, the completion criteria have been updated to reflect the commitment to reinstate a self-sustaining nature conservation land use over parts of the waste rock emplacements. The updated table also includes completion criteria for the establishment of fauna habitat within the final voids.</p> <p>Pembroke has prepared a separate assessment of potential impacts on GDEs and wetlands, including an assessment of the potential loss of catchment (and associated impacts to terrestrial ecology) to each wetland located between the Project disturbance area and the Isaac River (i.e. those that would potentially be impacted). The assessment provides a stronger linkage between the hydraulic and hydrological impact assessment (including potential cumulative impacts) and the ecological assessments and a detailed assessment of potential impacts of waste rock emplacements and flood levees and potential flooding impacts.</p> <p>The assessment also describes that Pembroke will implement a program to monitor the potential impacts to groundwater and terrestrial ecology within the wetlands and riparian areas surrounding the Project.</p>

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		regarding the natural values (flora and fauna) of the floodplain pre and post mining, and how these will be potentially impacted, mitigated and managed as part of rehabilitation activities. The rehabilitation success criteria (Table 5-2) do not consider such values.		
34.77	Section 5 – Rehabilitation Strategy Table 5.2 p. 7 to 8 Section 5 – Rehabilitation Strategy 5.3.8 p. 36 Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 31	The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent. Comment 31: ‘Table 4-2 indicates that there will be retained infrastructure, however there is no mention of what this infrastructure will be. Recommendation: ‘Indicate where the retained infrastructure is listed within this section or demonstrate what infrastructure will be retained and the reason for it.’ There is no information regarding the types of infrastructure which may be retained, as mentioned in Section 5.3.8, ‘Infrastructure associated with the Project would be assessed on an individual basis for possible removal or to be retained for future land owners’. Also, one of the rehabilitation objectives is that ‘infrastructure areas are commensurate with the preferred final land use’, which is insufficiently explained.	Describe the potential locations and types of infrastructure that will potentially be retained, as well as reasons why infrastructure will be retained.	As detailed in Section 4 of the Additional Information to the EIS, in consultation with the future land user, Pembroke would selectively retain infrastructure including access roads, hard stand areas and workshops and/or water storages which are considered to provide a beneficial use following mine closure. The Plan of Operations for the Project will describe when particular infrastructure items are to be decommissioned, and the Mine Closure and Rehabilitation Plan will describe the infrastructure items that will be retained. In addition, Table 5-2 of the draft EIS has been updated to include revised rehabilitation goals, objectives, performance indicators and completion criteria specific to each rehabilitation domain including infrastructure areas.
34.78	Section 5 – Rehabilitation Strategy 5.1.5, Table 5-2 p.7 to 8 Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 32	The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent. Comment 32: ‘Table 4-2 indicates that the void rehabilitation goal is to be a stable, sustainable land use. However, the rehabilitation objectives do not evidence the voids in being stable and sustainable land uses, as reflected in the issue below (Chapter 4, section 4.3.4 page 4-19), e.g. needing to fence the area off from humans and livestock.’ Recommendations: ‘Demonstrate that the final land form will be a stable and sustainable land use in accordance with the Mined Land Rehabilitation Policy.’ Table 5 – 2 Preliminary Rehabilitation Requirements (p 5-6) and Section 5.2.1 (p 5-10) states that the sustainable land use for final voids will be to act as a groundwater sink and provide potential habitat for native fauna (including the highwall and waterbody). There is insufficient discussion as to the suitability of this potential habitat as a sustainable and stable land use. It is noted that the quality of the resultant waterbody is anticipated to increase in salinity throughout its life and will eventually become hypersaline (Section 5 p. 18) and consequently unsuitable for use as a water source and/or habitat for fauna and aquatic organisms. It is also noted that the final void highwalls will be fenced to prevent access by humans and livestock (and by inference certain native fauna) which limits the potential of this area to sustain a Post-Mining Land Use (PMLU) as habitat. It is also proposed that permanent highwall emplacements will be constructed to isolate the final void landforms from flooding, which will in turn have a permanent impact on localised surface drainage and the flood plain (refer to a separate comment made).	2. Provide explanation regarding how the final voids will achieve a sustainable post-mining land-use (PMLU) in accordance with the Mined Land Rehabilitation Policy. Note that for new site-specific mines, the administering authority will not approve a PCRCP that includes a void situated wholly or partially in a floodplain, unless the void will be rehabilitated to a safe and stable landform that is able to sustain an approved PMLU that does not cause environmental harm. 3. Provide discussion as to the suitability of the final voids as habitat, taking into consideration the anticipated increased salinity of the proposed groundwater sinks (voids), and accessibility for native animals.	Pembroke proposes a final void which is a safe and stable landform with a native ecosystem post-mining land use. Section 4 of the Additional Information to the EIS provides additional information on the Project final voids, including a revised salinity balance and additional information on the post-mining land use. A summary of the additional information is provided below. The final void rehabilitation domain at the Project would be rehabilitated to a fauna habitat post-mining land use. The final voids would comprise of low wall, highwall and a void water body landform components. Pembroke has investigated the likelihood that the final void would provide suitable native fauna habitat. The final voids would provide suitable habitat for a range of native fauna, including species recorded within the Project site by DPM Envirosciences (2018) such as the Strip-faced Dunnart (<i>Sminthopsis macroura</i>), Hoary Wattled Bat (<i>Chalinolobus nigrogriseus</i>) and Australian Grey Teal (<i>Anas gracilis</i>). The final void salinity balance presented in the draft EIS Surface Water Assessment conservatively assumed that groundwater inflow to the floor of the final voids would be through a coal layer. To improve water quality within the final void water bodies by reducing salinity levels, Pembroke commits to removing basement coal from the floor of the ODS3, ODS7/8 and WIL5 open cut pits at the end of mining. The final void salinity balance presented in the draft EIS has been revised incorporating the commitment to remove basement coal. The results indicate that the rate of salinity increase is significantly lower if all coal is removed from the final void floor at the end of mining. For example, under the revised balance, the salinity of the ODS7/8 and WIL5 final void water bodies are predicted to remain brackish (i.e. <5,000 mg/L TDS) for approximately 300 to 550 years. The ODS3 final void water body is predicted to remain brackish for approximately 150 to 200 years. Water bodies with salinity levels <4,000 mg/L TDS are able to provide habitat for a variety of freshwater aquatic plants and invertebrates. Some ducks, such as the Australian Grey Teal (recorded onsite as part of the EIS Ecology Assessment [DPM, 2018]) are known to use permanent brackish and saline habitats. Although the final void water bodies are not predicted to reach hypersaline conditions (i.e. >35,000 mg/L TDS) for at least the modelling period (i.e. 600 years), it is recognised that some ducks are also known to live in hypersaline environments by also drinking freshwater from elsewhere (Hart et al, 1991). Halophytic plants grow around the edges of water bodies under hypersaline conditions (after Hart et al, 1991). Section 24 of the Additional Information to the EIS includes a detailed description of how the proposed final landform for the Project complies with the Queensland Government’s <i>Mined Land Rehabilitation Policy</i> including the suitability of the final voids for native ecosystem land use considering the water quality characteristics of the final void water bodies. The requirements of the <i>Mined Land Rehabilitation Policy</i> relating to final voids centre on new site-specific mines and a Progressive Rehabilitation and Closure Plan (PRCP). The Olive Downs Coking Coal Project is <u>not</u> a new site specific mine. It is a mining EA applicant to which the <u>pre-amended Environment Protection Act 1994</u> applies. At the time of preparation of the draft EIS and the Additional Information to the EIS there is no legislative requirement (or guidance material) for the preparation of a PRCP. Despite the above, the draft EIS demonstrates that: <ul style="list-style-type: none">there would be no voids situated wholly or partially in a floodplain; and

Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response
				<ul style="list-style-type: none"> voids would be "...rehabilitated to a safe and stable landform that is able to sustain an approved post-mining land use that does not cause environmental harm."
34.79	<p>Section 5 – Rehabilitation Strategy 5.2.3 p.17</p> <p>Section 5 – Rehabilitation Strategy Table 5-4 p. 18</p> <p>Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 34</p>	<p>The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent.</p> <p>Comment 34: 'There are four voids pictured across figures 4-2 to 4-3. Table 4-3 indicates that ODS7 and ODS8 are not two separate voids, but connect as one; however, it has not been explained how this will occur.'</p> <p>Recommendation: 'Demonstrate that all voids have been reduced on site as much as possible through, for example, exploration of alternative mine operations plan.</p> <p>Demonstrate the connection between ODS7 and ODS8 void/s, including the final water level within this void.'</p> <p>No explanation regarding how ODS7 and ODS8 are connected has been added to section 5.2.3 of the draft EIS.</p>	Demonstrate the connection between ODS7 and ODS8 void/s, including the final water level within this void.	<p>Pits ODS7 and ODS8 are separated by a fault structure. As the pits are developed the mining area develops around the fault structure. Once mining is complete, the fault remains between the base of the two pits, but does not extend all the way to the surface. As such, when water accumulates at the base of the open cuts it is separated by the fault structure. At pre-mining ground level, the two open cut areas are connected, but at the base they are separated. Accordingly, this is considered to be one final void, with two water bodies separated by the un-mined fault structure at the base of the void.</p>
34.80	<p>Section 5 – Rehabilitation Strategy, 5.2.3, Figure 5-5b</p> <p>Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 35</p>	<p>The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent.</p> <p>Comment 35: 'Figure 4-4b does not provide the distance between the void and the Isaac River or indicates any potential for the Isaac River to leach into the void.'</p> <p>Recommendation: 'Clearly demonstrate that the void will not have any draw down effects from the Isaac River leaching in through the alluvium and tertiary clays in the ground. Amend figure 4-4b to illustrate the distance from the Isaac River to the void.'</p> <p>There is a lack of discussion as to whether there is an appropriate factor of safety for the buffer area between the levee and permanent highwall emplacement and the Isaac River.</p> <p>There is little information as to whether the voids will have draw-down impacts via leaching through the Isaac River alluvium and tertiary clays.</p>	<ol style="list-style-type: none"> Provide information that demonstrates that the voids will not have draw-down impacts via leaching through the Isaac River alluvium and tertiary clays. Demonstrate that an appropriate factor of safety has been adopted in the buffer area between the levee and permanent highwall emplacement and the Isaac River, taking into account the erosional and flow characteristics of the Isaac River. 	<p>Figure 5-4b shows the distance between the Project and the Isaac River.</p> <p>Section 4.3.3 of the draft EIS states that post-mining, the final landform would retain the final voids. The zone of influence would retract around the final voids as groundwater levels recover. This would then result in a reduction in the long-term average from the Isaac River to the alluvium to 1.9 ML/day (total) at post closure equilibrium (Appendix D of the draft EIS).</p> <p>In addition, the recommendations from the preliminary geotechnical assessment have been adopted as design criteria, including the following:</p> <ul style="list-style-type: none"> Final void highwalls would be laid back to 20° where they pass through the alluvium and tertiary clays (known as the Cenozoic overburden) (Figure 5-4b) to achieve a factor of safety of 1.5. GeoTek identified that much of the Cenozoic material consists of Tertiary clay which has a low shear strength, requiring the 20° set back in the final landform. Final void highwalls would have a maximum overall angle of 45° where located within a fault fractured zone, and 55° where they are located away from fault zones. An overall angle of 55° could be achieved by 50 m high batters at 65° incorporating 10 m wide intermediate benches. The toe of out-of-pit waste rock emplacements would stand off the crest of the final voids by at least 50 m. The slopes of the waste rock emplacements would be approximately 7° and would not pose any geotechnical stability issues. Further investigations (including additional drilling programs) would be conducted, focussing on the Cenozoic overburden, to further characterise the materials and refine the final void design.
34.81	<p>Section 5 – Rehabilitation Strategy Figures 5-5a and 5-5b</p> <p>Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 36</p>	<p>The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent.</p> <p>Comment 36: 'The TOR section 11.57 requires final topography to be included in the draft EIS. Contours are shown on the figures without any numbers. The scale, relative change and areas of disturbance (e.g. waste, dams, and excavations) are unclear. Only the final voids are shown. Timing is not addressed in the table.'</p> <p>Recommendation: 'To satisfy the requirements of the TOR provide information required by section 11.57, including but not limited to:</p> <ul style="list-style-type: none"> Add contour values to the figures so that the final topography in comparison to pre-mining is evident. Show on the figure what areas will be able to be used for the proposed final land use and what areas will be 'non-use' management areas. Show the areas of disturbance and label (e.g. waste, dams, and excavations). <p>Address timing of rehabilitation in the table.'</p> <p>Contours have been removed from Figure 5-5a and no elevations are provided on either figure. Therefore the scale, relative change and areas of disturbance remain unclear.</p> <p>Neither figure indicates the area of disturbance associated with final landforms and the legend that identifies areas for grazing</p>	<p>For Figures 5-5a and 5-5b include the following:</p> <ul style="list-style-type: none"> information regarding elevations and conceptual final land forms that allow comparison between the post-mining and pre-mining topography. the area of disturbance associated with final landforms. a clearer colour selection for each polygon that represents grazing and woodland. 	<p>Figures 5-2 and 5-3 of the draft EIS were previously updated during the adequacy review to show the contour values requested by DES. In addition, new figures are provided in the Appendix D to the Additional Information to the EIS to clearly show the distinction between proposed post-mining land use for each mining domain.</p>

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		and woodland is not clear due to the colour selection for each polygon.		
34.82	Section 5 – Rehabilitation Strategy 5.2.4 p. 18 to 19 Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 37	The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent. Comment 37: 'In reference to TOR section 11.59: the draft EIS does not adequately address how the proposed permanent levees (waste rock dumps) will be capable of being managed and rehabilitated to achieve acceptable land use capabilities/suitability, to be safe, stable, non-polluting and self-sustaining.' Recommendation: 'Amend section 4-17 to address levees/waste rock dumps and how they will satisfy criteria as per TOR section 11.59.' No additional information regarding the geotechnical stability of the levees (permanent highwall emplacements) has been added to section 5.2.4 of the draft EIS.	Provide information demonstrating the geotechnical stability of the levees (permanent highwall emplacements).	The permanent highwall emplacements have been designed with the same criteria as the other out-of-pit waste rock emplacements, specifically batter slopes of approximately 7 degrees (1V:8H). The permanent highwall emplacements have also been located to stand off the crest of the final voids by at least 50 m. The permanent highwall emplacements would generally be approximately 300 m to 400 m wide and approximately 25 m high. As described in Section 12.2 of the Flood Assessment (Appendix F of the draft EIS), specific erosion protection measures on the permanent highwall emplacement outer batters would be required in some localised areas to protect the emplacement against elevated flood velocities, however the areas where protection would be required are generally relatively low, ranging from less than 1 m up to 3 m in height. Rehabilitation requirements for the waste rock emplacements, including the permanent highwall emplacements, are presented in Table H1 of the Proposed EA conditions (Appendix B of the Additional Information to the EIS). Completion criteria to achieve the objective 'waste rock emplacement final landforms that are geotechnically stable' are included in Table H1.
34.83	Section 5 – Rehabilitation Strategy, p.19	The draft EIS did not provide sufficient information to adequately describe the final landform shape and drainage layout. There is insufficient information regarding the shape and elevation of the final excavated ILF cells. There is insufficient information regarding the rehabilitation of Initial Rejects Storage Facilities, including a description of the final landform.	1. Provide Information regarding the shape and elevation of the final excavated ILF cells. 2. Provide information specific to the rehabilitation of Initial Rejects Storage Facilities. This should include a description of the final landform.	Once the ILF cells have been excavated (and the material placed within the in-pit waste rock emplacement, there ILF cells area would return to the pre-mining topography. As shown on Figure 2-3 and 2-4, the initial rejects storage facility is subsumed by the out-of-pit waste rock emplacement between approximately Year 10 and Year 20 of the Project.
34.84	Section 5 – Rehabilitation Strategy	Information is lacking regarding site selection for stockpiles. For example, stockpiles located on flat areas that are not located in drainage lines or flood prone areas, delineated and located to avoid vehicle traffic.	1. Include information regarding site selection for stockpiles. 2. Note that DES recommends that topsoil and subsoil are stockpiled separately, at a preferred height of 2m, rather than the maximum 3m indicated in the draft EIS, and with a working face battered down at an appropriate gradient to prevent erosion. 3. Specify a period of time for actions to revegetate/sow stockpiles. 4. Amend the topsoil inventory to ensure the locations of all topsoil and subsoil stockpiles are surveyed and recorded.	Topsoil stockpiles will be located: <ul style="list-style-type: none">beyond the active mining areas;away from overland flow and drainage paths;where practicable, in locations protected from wind (e.g. adjacent to vegetative screens);away from grazing stock, machinery and vehicles; andclose to future rehabilitation areas. The response to DES comment 34.65 provides a description of the period of time for actions to revegetate/sow stockpiles. The location of all topsoil and subsoil stockpiles will be recorded in the Topsoil Management Plan.
34.85	Section 5 – Rehabilitation Strategy, 5.3.4, p.36	The timeframe for rehabilitating elevated landforms is not specific enough and requires a definitive timeframe that provides a measurable outcome. It is currently listed as, 'As soon as possible' (p. 36). Whilst the draft EIS advised that erosion and sediment control structures will be designed and installed in accordance with best practice guidelines, there is no mention of ongoing maintenance.	1. Provide a specific timeframe for rehabilitating elevated landforms. 2. A period of time or descriptor of when action is required should be articulated. For example: <ul style="list-style-type: none">landform areas are stabilised within x days of completion or prior to a forecast rain event of XX mm/year intensity. 3. Include statement to the effect that erosion and sediment control structures will be maintained in accordance with best practice guidelines.	The response to DES comment 34.65 provides a description of the period of time for rehabilitating elevated landforms.
34.86	Section 5 – Rehabilitation Strategy 5.3.5 p. 36 Comments on preliminary draft environmental impact statement (EIS) Proposed Olive Downs Coking Coal Project – Pembroke Olive Downs Pty Ltd Comment 41	The below adequacy advice was previously provided to the proponent by DES in relation to the preliminary draft EIS. The advice given requires further consideration by the proponent. Comment 41: 'Refer to above regarding seeds for rehabilitation (potential for erosion to occur if seed bank does not come through).'	1. Provide specific time descriptors for the exclusion of cattle and planting/seeding for the erosion prone areas between the mining area and the Isaac River (Including the river bank). 2. Provide information on the reasons for choosing stabilisation methods. 3. Consider other methods– such as the application of temporary soil binder products to exposed surfaces during periods of high erosion hazard, increased surface roughness to encourage water infiltration etc.	Pembroke would prepare a Plan of Operations for the Project post-approval which would build on the information within the draft EIS and provide additional detail regarding the timing for exclusion of cattle and planting/seeding for the erosion prone areas between the mining area and the Isaac River. The Plan of Operations would also include a description of (including justification for) the chosen stabilisation methods through consultation with DES.
34.87	Section 5 – Rehabilitation Strategy, 5.3.5, p.5-35	The grass species listed for use in revegetating grazing land did not appear appropriate for the context. For example wiregrass (Aristida sp) is a low value grass for grazing, is not preferred by cattle and may be difficult/expensive to source.	1. Justify the selection of grass species listed for use in revegetating to grazing land. 2. Consider stoloniferous species (to discourage erosion), legumes	Pembroke has provided further information on the Project's rehabilitation strategy (refer to Section 4 and Appendix D of the Additional Information to the EIS).

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		The woodland vegetation species chosen for revegetation did not represent best practice for this type of ecosystem. Broad-leaved Ironbark (Eucalyptus fibrosa) is listed as one of the species that will be used to establish Eucalypt woodland areas, however it is noted that Table 4-1 refers to silver leaved ironbark and narrow-leaved ironbark as being present in the ground-truthed remnant ecosystems.	(for example desmanthus or stylosanthes spp.) and grasses which meet the 3P criteria (palatable, perennial and productive https://www.daf.qld.gov.au/business-priorities/plants/field-crops-and-pastures/pastures/grazing-land-management). 3. Consider incorporating Silver Leafed Ironbark and Narrow-leaved Ironbark species in the revegetation species list for woodland vegetation.	This additional information outlines that the rehabilitation in the native vegetation (woodland) post-mining land use areas would target the establishment of ecosystems similar to the Regional Ecosystems (REs) which were found to occur in the Project area during baseline surveys, including RE 11.5.3 (Poplar Box [Eucalyptus populnea] +/- Silver-leaved Ironbark [E. melanophloia] +/- Clarkson’s Bloodwood [Corymbia clarksoniana] woodland on Cainozoic sand plains and / or remnant surfaces) and RE 11.3.2 (Poplar box [Eucalyptus populnea] woodland on alluvial plains) through the establishment of Poplar Box, Silver-leaved Ironbark and Clarkson’s Bloodwood.																																															
34.88	Section 5 – Rehabilitation Strategy	Mine staging Mine staging mapping indicating disturbance and progressive rehabilitation has been provided for roughly every 20 years of the life of the mine. It is generally accepted that mine staging maps are provided for every 5 years of the life of the mine.	Provide mine stage mapping for every 5 years of operation. Alternatively, choose appropriate site-specific mine stages with justification and explanation of the different stages. Mapping should also identify changes to domains at the different stages of mine life. These domains should correlate to the domains provided in the rehabilitation strategy (or vice versa).	Pembroke has provided further information on the Project’s rehabilitation strategy (refer to Section 4 and Appendix D of the Additional Information to the EIS) including progressive rehabilitation snapshots for every 5 years of the Project.																																															
34.89	Section 5 – Rehabilitation Strategy 5.2.3 p.3 Section 5 – Rehabilitation Strategy 5.1.5 p.10 Appendix I – Economic Assessment 3.4.1 p. 12	Residual risk A cost for initial rehabilitation is discussed in Appendix I – Economic Assessment; however, there does not appear to be consideration of ongoing maintenance of long term rehabilitation. Long term rehabilitation would include maintenance and management strategies to be employed throughout the life of the mine to maintain progressive rehabilitation areas (such as long term maintenance of fencing and final landforms).	Provide in the economic assessment the cost of ongoing maintenance and management of progressive rehabilitation to cover the cost of the longer term costs of maintaining progressively rehabilitated areas.	The cost benefit analysis component of the Economic Assessment (Gillespie Economics, 2018) considered rehabilitation costs during the Project operational phase (Section 3.4.1 of the draft EIS): ... It is noted the rehabilitation would be undertaken progressively over the Project life and these costs are included in the Project operating costs. These rehabilitation costs include the costs associated with all operational phase rehabilitation activities including ongoing rehabilitation maintenance and management. In addition, the cost benefit analysis component of the Economic Assessment (Gillespie Economics, 2018) considered decommissioning and rehabilitation costs at the end of the Project life (i.e. at the end of 2098) (Section 3.4.1 of the draft EIS): At the end of the Project life, the mine site would be decommissioned and rehabilitated at an estimated cost of \$40M. ... The cost benefit analysis also included a sensitivity analysis on the decommissioning and rehabilitation costs (Section 3.8 of the draft EIS). The sensitivity analysis indicated that the cost benefit analysis results would not change relative to the central analysis as a result of a ±20% change in decommissioning and rehabilitation costs (Tables 3.9 and 3.10 of the draft EIS). For example, the present value of benefits to Queensland under the central analysis and for the ±20% change in decommissioning and rehabilitation costs is \$1,400 Million (7% discount rate) (Table 3.10 of the draft EIS). The cost benefit analysis results were not sensitive to the changes to the decommissioning and rehabilitation costs as these costs occur in approximately 80 years and therefore once discounted have a present value of \$0. Given the above, the inclusion of ongoing rehabilitation costs beyond the end of the Project (i.e. after 2098) in the cost benefit analysis would not change the conclusions, including: <ul style="list-style-type: none">the estimated net social benefits of the Project to Queensland are \$1,400M;the estimated net social benefits to Australia of the Project are \$2,239M; andtherefore the Project is desirable and justified from an economic efficiency perspective.																																															
34.90	Section 5 – Rehabilitation Strategy Figures 5-6 to 5-19 p.20 to 33	Maximum disturbance limits Maximum disturbance limits throughout the stages of the life of the mine have been indicated in Figures 5-6 to 5-19; however, they have not been clearly quantified. It is assumed these maximum disturbance limits have been used to calculate predicted environmental impacts provided in the draft EIS appendices.	1. Ensure the proposed operations will be carried out in accordance with what has been approved and assessed by DES, maximum disturbance limits for the project are to be provided. To satisfy this requirement, it is recommended the following table (or similar) is provided. 2. It is also recommended that watercourse diversions are included as a domain. <table><tr><th>Mine Domain</th><th>Description</th><th>Location</th><th>Maxim Disturban (ha)</th></tr><tr><td>Watercourse Diversion</td><td>XXX</td><td rowspan="14">Refer to Figure A1 – Project Location</td><td>XXX</td></tr><tr><td>Waste rock dump</td><td>XXX</td><td>XXX</td></tr><tr><td>Mine Infrastructure Area including internal roads</td><td>XXX</td><td>XXX</td></tr><tr><td>ROM Stockpile</td><td>XXX</td><td>XXX</td></tr><tr><td>Product Stockpile</td><td>XXX</td><td>XXX</td></tr><tr><td>Water infrastructure</td><td>XXX</td><td>XXX</td></tr><tr><td>Transport Corridor</td><td>XXX</td><td>XXX</td></tr><tr><td>Train Loadout Facility</td><td>XXX</td><td>XXX</td></tr><tr><td>Open Cut Put ODS1</td><td>XXX</td><td>XXX</td></tr><tr><td>Open Cut Put ODS2</td><td>XXX</td><td>XXX</td></tr><tr><td>Open Cut Put ODS3</td><td>XXX</td><td>XXX</td></tr><tr><td>Open Cut Put ODS4</td><td>XXX</td><td>XXX</td></tr><tr><td>Open Cut Put ODS5</td><td>XXX</td><td>XXX</td></tr><tr><td>Open Cut Put ODS6</td><td>XXX</td><td>XXX</td></tr></table>	Mine Domain	Description	Location	Maxim Disturban (ha)	Watercourse Diversion	XXX	Refer to Figure A1 – Project Location	XXX	Waste rock dump	XXX	XXX	Mine Infrastructure Area including internal roads	XXX	XXX	ROM Stockpile	XXX	XXX	Product Stockpile	XXX	XXX	Water infrastructure	XXX	XXX	Transport Corridor	XXX	XXX	Train Loadout Facility	XXX	XXX	Open Cut Put ODS1	XXX	XXX	Open Cut Put ODS2	XXX	XXX	Open Cut Put ODS3	XXX	XXX	Open Cut Put ODS4	XXX	XXX	Open Cut Put ODS5	XXX	XXX	Open Cut Put ODS6	XXX	XXX	Pembroke has prepared an additional figure for inclusion in the draft EA (refer to Figure 1 of Appendix B of the Additional Information to the EIS), which clearly depicts the areas of land proposed to be disturbed by the Project, and the areas which would be avoided. As stated in response to DES’s comment 34.62, Section 4 of the Additional Information to the EIS includes the Ripstone Creek Diversion as a separate mine domain.
Mine Domain	Description	Location	Maxim Disturban (ha)																																																
Watercourse Diversion	XXX	Refer to Figure A1 – Project Location	XXX																																																
Waste rock dump	XXX		XXX																																																
Mine Infrastructure Area including internal roads	XXX		XXX																																																
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			Open Cut Put ODS7	XXX		XXX																		
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			Open Cut Put ODS9	XXX		XXX																		
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			WIL3	XXX		XXX																		
			WIL4	XXX		XXX																		
			WIL5	XXX		XXX																		
34.91	Section 6 - General Environmental Protection Commitments and Model Conditions Table H1 p. 39 Section 5 – Rehabilitation Strategy Figures 5-5a, Figure 5-5b Appendix M – Soil and Land Suitability Table 58 p. 100	Post mining land use for final voids Table H1 'rehabilitation requirements, final voids, (d) sustainable land use', indicates the final land use for final voids will be limited to a groundwater sink. This conflicts with Appendix M (Table 58), which indicates class 5 – cropping/grazing, and Figures 5-5a and 5-5b which indicate 'Equilibrated Void Water Body' and woodland.	1. Update the report to ensure that a clear and consistent final land use for final voids is reflected throughout the draft EIS and in the proposed EA conditions for inclusion as stated conditions in the Coordinator General's Evaluation Report. 2. Ensure that the PMLU considers the modelled final void water quality and its suitability of use (e.g. stock watering, fauna habitat etc.).				Pembroke proposes a final void which is a safe and stable landform with a native ecosystem post-mining land use. This is reflected in Table H1 of the Proposed EA Conditions (Appendix B of the Additional Information to the EIS). Section 24 of the Additional Information to the EIS provides a detailed description of how the proposed final landform for the Project complies with the Queensland Government's Mined Land Rehabilitation Policy.																	
34.92	Appendix M – Soil and Land Suitability	Alternative PMLU assessment An assessment of alternative viable post mining land uses (PMLUs), particularly for final voids, is not detailed.	1. Please report on the alternative viable PMLUs considered. 2. PMLUs options are to consider local, State and/or Commonwealth strategies or planning, and outcomes from stakeholder engagement.				Pembroke has provided further information on the Project's rehabilitation strategy (refer to Section 4 and Appendix D of the Additional Information to the EIS) including a detailed description of the post-mining land uses for each mining domain. Consideration of backfilling the final voids to reinstate grazing land has been given in Section 2.10.2.																	
34.93	Section 5 – Rehabilitation Strategy Figures 5-6 to 5-19 p.20	Progressive completion criteria for ongoing rehabilitation Progressive rehabilitation commitments have been made for as early as 2030. In order to ensure these rehabilitated areas are effectively maintained to a suitable level during the life of the mine, enabling the final completion criteria to be easily achieved when mine closure occurs, DES recommends the adoption of progressive completion criteria for areas progressively rehabilitated in in accordance with Figures 5-6 to 5-19.	1. A clear and consistent final land use for final voids should be reflected throughout the draft EIS report and reflected in the EA conditions. 2. The PMLU must consider the modelled final void water quality and its suitability of use (e.g. stock watering, fauna habitat etc.). 3. It is recommended that progressive completion criteria tables are provided as the example below. <table><tr><td>Domain Progressive Completion Criteria</td><td>Domain Progressive Completion Criteria</td></tr><tr><td>Waste rock emplacement</td><td>Example:<ul style="list-style-type: none">• Final landform reshaping completed in accordance with the rehabilitation management plan (condition H8) and the relevant completion criteria identified in Table H1.• Areas are free draining, with no ponding.• All surface cracking has been addressed in accordance with the subsidence management plan and rehabilitation management plan.• Erosion and sediment controls installed as per the certified by the erosion and sediment control plan, as required by condition F27.• Monitoring locations established at the rehabilitation area, as identified within the rehabilitation management plan (condition H8).</td></tr><tr><td>Mine Infrastructure Area including internal roads</td><td></td></tr><tr><td>Product stockpile</td><td></td></tr><tr><td>Water Management Infrastructure</td><td></td></tr><tr><td>ILF Cells</td><td></td></tr><tr><td>Train Loadout Facility</td><td></td></tr><tr><td>Open cut pits</td><td></td></tr></table>				Domain Progressive Completion Criteria	Domain Progressive Completion Criteria	Waste rock emplacement	Example: <ul style="list-style-type: none">• Final landform reshaping completed in accordance with the rehabilitation management plan (condition H8) and the relevant completion criteria identified in Table H1.• Areas are free draining, with no ponding.• All surface cracking has been addressed in accordance with the subsidence management plan and rehabilitation management plan.• Erosion and sediment controls installed as per the certified by the erosion and sediment control plan, as required by condition F27.• Monitoring locations established at the rehabilitation area, as identified within the rehabilitation management plan (condition H8).	Mine Infrastructure Area including internal roads		Product stockpile		Water Management Infrastructure		ILF Cells		Train Loadout Facility		Open cut pits		Pembroke proposes a final void which is a safe and stable landform with a native ecosystem post-mining land use. This is reflected in Table H1 of the Proposed EA Conditions (Appendix B of the Additional Information to the EIS) which includes completion criteria for the development of the post-mining land use. Section 4 of the Additional Information to the EIS provides additional information on the Project final voids, including a revised salinity balance and additional information on the post-mining land use. Section 24 of the Additional Information to the EIS provides a detailed description of how the proposed final landform for the Project complies with the Queensland Government's Mined Land Rehabilitation Policy.	
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34.94	Section 5 – Rehabilitation Strategy, Figure 5-5a and 5-5b, p.15 to p.16	PMLU for woodlands The colours used to indicate PMLU of grazing and woodland in Figures 5-5a and 5-5b (Conceptual Final Land Use) are very difficult to tell apart, making these figures difficult to interpret.	Provide maps that clearly define the final land use for the mining lease.				Pembroke has provided further information on the Project's rehabilitation strategy (refer to Section 4 and Appendix D of the Additional Information to the EIS) including new figures to clearly show the distinction between proposed post-mining land use for each mining domain.																	

Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response
34.95	Section 5 – Rehabilitation Strategy, Table 5-2, p.5 to p.9	Mine domains Mine domains listed in Table 5-2 include waste rock emplacements, final voids, infrastructure area, water management infrastructure and ILF cells. However, other domains are not included.	Consider additional domains, including separate domains for the creek diversion, permanent highwall emplacement, ROM stockpiles, transport corridors and train load out facility.	The Additional Information to the EIS identifies the Ripstone Creek Diversion as a separate mining domain as requested by DES.
34.96	Section 4 – Assessment of project specific matters 4.10.3 p.149	Landform Section 4.10.3 states that 'The out-of-pit waste rock emplacements would result in the creation of a number of elevated landforms, which would have elevations of up to 315 m AHD'. Apart from a brief description of nearby elevated landforms and distance from sensitive receptors, no assessment has been provided with regards to the potential significant visual amenity impacts on sensitive receptors, including roadway users and distant sensitive receptors how may still have a line of site to the proposed landform disturbances.	Complete an impact assessment of the impacts to environmental values (with regards to visual/public amenity) as a result of the significant landform disturbance. At a minimum, the impact assessment should include: <ul style="list-style-type: none"> • Identification of all sensitive receptors, including nearby residents, distant residents, commercial activities and roadway users. • Consideration of how the project will prevent or minimise adverse effects on the environmental values of the land. • Consideration of how the landform will be safe, stable, non-polluting and able to sustain a final land use. • Cross-sectional and/or 3D diagrams clearly demonstrating how the proposed out-of-pit waste rock emplacements and other disturbed landforms will look against the existing surrounding landforms. These diagrams are to: <ul style="list-style-type: none"> – include perspectives/angles from the identified sensitive receptions; – represent impacts over different stages of the life of the mine, including the final landform. • An analysis of these impacts on sensitive receptors. 	Section 4.10.3 of the draft EIS states that although the highwall emplacement would be constructed within 1 km of the Vermont Park dwelling, visual impacts from this 25 m high landform are not anticipated to be significant given the intervening vegetative screening. The larger out-of-pit waste rock emplacements would be located at least 5 km from the privately owned dwellings. As visual prominence diminishes with distance, and in consideration of intervening vegetation, it is expected that the visual impact of the elevated Project landforms would not be significant at nearby dwellings. The overland conveyor would be located approximately 700 m from the closest privately-owned dwelling (Seloh Nolem 1). The conveyor would generally be 1 m to 2 m above ground level. At a distance of at least 700 m, visual impacts from the overland conveyor are not expected to be significant. The Willunga domain mine infrastructure area would be at least 4 km from the closest dwelling. Infrastructure at the Willunga domain would reach heights of approximately 18 m. At distances of 4 km or greater, visual impacts from the mine infrastructure areas are not expected to be significant. The Olive Downs South domain mine infrastructure area would be at least 8 km from the closet dwelling. Infrastructure at the Olive Downs South domain would reach heights of 20 to 30 m. At distances of 8 km or greater, visual impacts from the mine infrastructure areas are not expected to be significant. Accordingly, Pembroke does not consider it likely that the Project would result in visual amenity impacts as a result of the permanent highwall emplacements.
34.97	Appendix E - Surface Water Assessment Part B Table 5.6, p.49	The TOR requirement 11.62 Detail the chemical and physical characteristics of surface waters within the area that may be affected by the project in accordance with Department of Environment and Heritage Protection's TOR guideline – Water has not been adequately met. It appears that the proposal is to discharge to creeks and smaller waterway which then drain to the Isaac River. Only 2 samples have been monitored for a range of indicators from Ripstone Creek (on one date only:27/7/2017) as part of the background monitoring program (Table 5-6 Water Quality Data Monitoring Locations). No information is presented regarding whether this limited data set was under the influence of other mine discharges at the time, however, from observation of the WaTERS database it does not appear to have been. It was stated, however, that the majority of water quality sampling at sites SW1, SW2, SW3, SW4, SW6, SW8, SW11 and SW12 were collected during periods of no stream flows, which is also problematic for the assessment of local water quality.	1. Provide the background data that is essential for the establishment of the conditions for release, otherwise current Fitzroy Model Conditions, triggers and EPP scheduled water quality objectives will become default conditions. 2. Where possible, include a greater number of water quality samples (i.e. a minimum of 8 per site for interim values but preferably 18 samples over 12-24 months) to define background water quality at the local scale, in particular within local creeks in the vicinity of the mine. 3. Ensure future surface water quality sampling is undertaken during periods of stream flow, wherever possible. In some instances, the opportunity to collect samples during periods of stream flow can be limited. However, as the guidelines are defined using samples collected during stream flows, it is appropriate to compare them with like data, rather than with non-flowing results.	1. The draft water quality objectives for the Project are presented in Table 4-13 of the draft EIS. Where there remains substantial ambiguity, the lowest WQO has been adopted as the default, until such time as ongoing baseline datasets are available to derive an alternative WQO. It is worth noting that additional water quality analysis results from August 2017 to May 2018 was included in the Surface Water Assessment, as well as extending the continuous flow and water quality data at ISDS gauge. 2. Baseline surface water quality sampling will continue to be undertaken to define background water quality at the local scale in the vicinity of the mine in accordance with the Queensland Water Quality Guidelines (2009). 3. This point is noted. In the absence of site personnel presence during the development of the draft EIS, and limited access during and immediately following rainfall events (i.e. access across the Isaac River), the collection of samples 'during stream flow' has been a constraint. Once a site presence is established, the opportunity for surface water quality sampling events will be greater. It is anticipated the EA Conditions will require the water quality monitoring to occur, and will be reflected in the Water Management Plan.
34.98	Section 6 – General Environmental Protection Commitments and Model Conditions Table F1 p.29 Appendix E- Surface Water Assessment Part B	The proposed release monitoring listed in Table F1 list the Isaac River as the receiving waters, while certain release points appear to release to local creeks first. The risk assessment undertaken in terms of potential impacts to receiving waters has omitted the waterways (and wetlands) in close proximity to mine impacted areas, water storages, mine-affected water storages.	1. Correct the table that state all these release points report directly to the Isaac River within Table F1 and clarify the precise locations and names of the direct receiving waters. 2. Assess potential impacts to waterways and wetlands in close proximity to mine impacted areas, water storages, mine-affected water storages and downstream of release locations.	1. As stated in the Surface Water Assessment, controlled release of water from the water management system will occur directly to the Isaac River from a number of mine affected water dams directly to the Isaac River through a gravity discharge arrangement. Four controlled release points are located in the Olive Downs South Domain and on in the Willunga domain. All the release points would drain directly to the Isaac River. No controlled release points are proposed to drain to Ripstone Creek. 2. The proposed water management system (including the controlled release system) has been designed to have no interaction with the wetland areas. Therefore, the proposed water management system will have no impact on the wetland areas. Notwithstanding a separate Assessment of GDEs and Wetlands has been provided in Appendix E of the Additional Information to the EIS.
34.99	Section 6 - General Environmental Protection Commitments and Model Conditions Table F1 p. 29 Section 6 - General Environmental Protection Commitments and Model Conditions	The proposed release monitoring listed in Table F1 lists that downstream monitoring (at ISDS) will be the surrogate for any end of pipe compliance monitoring. It is not clear if this is a typographical error. If not, this approach may represent a significant risk to receiving environment. The proposed release compliance strategy is considered high risk given that limits of between 1000>10,000 µS/cm (from Table F4) are currently listed as applying >25 kms downstream of actual release locations (within the Isaac River). The salinity impacts modelling presented in Section 8.3.5.2 assumes that these limits apply end of pipe but this is not reflected in the	End of pipe monitoring and compliance will be required for each nominated/approved release point of mine-affected water.	As described in Appendix E Table 10-7 of the draft EIS (Proposed Surface Water Monitoring Program), it is proposed that dam/end-of-pipe monitoring will be undertaken at all release points (RP1-RP7). This includes all controlled release dams (P9, P20, P33, P46, WROM) as well as any dams which can potentially overflow mine affected water to the receiving environment (P44, WROM and WMIA). Table F1 of the Proposed EA Conditions (Appendix B to the Additional Information to the EIS) has been revised to clarify that end of pipe monitoring is proposed for each release point.

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	Table F4 p. 32	proposed conditions. This does not align with the Fitzroy Model Conditions.		
34.100	Section 6 - General Environmental Protection Commitments and Model Conditions Table F4 p. 32 Appendix E- Surface Water Assessment Part A	<p>The calculations used to derive the EC discharge conditions (Table F4 Mine Affected Water Release during Flow Events) have not been presented, justified or adequately detailed. Ephemeral local creeks (e.g. Ripstone Creek) proposed for direct discharge do not appear to have been assessed in terms of impacts/potential impacts. It is unclear what near or mid field impacts are predicted for local waterways.</p> <p>Justification for the risk assessment and EA conditions proposed seems to be mostly related to and supported by an assessment of neighbouring mine EA conditions. A site specific risk assessment for the proposed discharges should not rely on simply assessing what other sites have currently listed on their EAs. The TOR requirement 11.64 Assess the potential impacts of any discharges on the quality and quantity of receiving waters taking into consideration the assimilative capacity of the receiving environment and the practices and procedures that would be used to avoid or minimise impacts has not been met.</p> <p>The neighbouring mines have a requirement of flow in both the local streams and Isaac River before releases are allowed (3 cumecs in Isaac, 0.1 cumecs in Hughes/One Mile/Spring/Phillips/Boomerang Creeks). Yet this draft EIS suggests no minimum requirement for flow in the local creeks before discharge is allowed. This may pose significant risk to the local waterways, and this has not been adequately considered or assessed.</p> <p>Any proposal for discharge should be accompanied with an assessment of whether the water quality limits are likely to be achievable, and will adequately satisfy the need to discharge (water balance model) on a worse-case basis.</p>	<ol style="list-style-type: none"> 1. Assess the potential impacts of any discharges on the quality of all receiving waters and interconnected wetlands. All relevant environmental values and water quality objectives need to be assessed within near-field receiving environments including aquatic ecosystems, stock drinking water etc. 2. Present detailed modelling inputs, assumptions and results of dilution assessment for the local creeks where a discharge is proposed (under median and worse case scenarios). Given salinity (EC) is the main indicator of potential concern, the discharge risk assessment should primarily focus on impacts to downstream salinity within Ripstone Creek and other relevant local waterways (but should also consider flow, turbidity and sulfate). 3. Provide detailed maps with the location of any intermittent pools, the paleochannel lake, wetlands or any other relevant environmental values concurrent with the proposed release locations and latest charted creek mapping (Page 47/213 of Appendix E needs to be mapped with proposed release locations). These are currently mapped separately which makes the assessment more difficult. 4. Identify whether mine water releases may influence water quality in wetlands. 5. Provide an assessment of whether the water quality limits are likely to be achievable/necessary, and whether they will adequately satisfy the need to discharge (water balance model) on a worse-case basis. 6. Local minimum flow triggers are required and should be developed based on what the measured/estimated flows are in local receiving creeks (e.g. Ripstone Creek) as well as flow within the Isaac River. The draft EIS only suggests minimum flow triggers for ISDS (a gauging station in the Isaac River). 7. Provide flow gauging hydrographs or flow estimates for local creeks where discharge point/s are proposed to be located. This information is required and should be used to estimate near-filed dilution and risk assessments for relevant environmental values based on the proposed release conditions (discharge quality and quantity. Neighbouring mines have flow gauging set-up for local creeks and this information may be useful in this regards. 	<p>Recommendations 1-2 and 6-7:</p> <p>As described in Section 7.11 and shown in Figure 10-3 of the Surface Water Assessment (Appendix E of the draft EIS), there are no proposed release points which discharge to Ripstone Creek. An 'up-catchment water drain' from the CWD to Ripstone Creek is shown on Figure 2-3 of the draft EIS. The drain would provide for the continued conveying of rainfall runoff west of the Project to Ripstone Creek and the Isaac River downstream.</p> <p>All release points discharge directly to the Isaac River via gravity discharge. As such, there is no requirement to assess the assimilative capacity, minimum flow criteria or cumulative impacts in Ripstone Creek or any 'interconnected wetlands'.</p> <p>The proposed release strategy has been developed with the aim of minimising the impacts of releases on Isaac River salinity by applying conservative dilution ratios. As shown in Surface Water Assessment (Appendix E of the draft EIS) Section 8.3.5.2.1, even under "worst case" release conditions (where the discharge quality is up to 9,600 µs/cm), the Isaac River EC only reaches around 200 µs/cm.</p> <ol style="list-style-type: none"> 3. The Geomorphology Assessment (included as Appendix A to the Surface Water Assessment [Appendix E of the draft EIS]) provides detailed mapping of the Isaac River and Ripstone Creek. Release locations are shown on Figures 6-1 to 6-12 of the draft EIS on the detailed water management plans over the life of the Project. 4. The proposed controlled releases system has been designed to have no interaction with wetland areas. Notwithstanding this, a separate assessment of project impacts on wetlands is currently being prepared. 5. The assessment of whether the water quality limits are likely to be achievable/necessary, and whether they will adequately satisfy the need to discharge (water balance model) on a worse-case basis is provided in Section 8 of the Surface Water Assessment (Appendix E of the draft EIS) (the water balance modelling results).
34.101	Section 6 - General Environmental Protection Commitments and Model Conditions Appendix E - Surface Water Assessment Part A	Ripstone Creek has limited to no assimilative capacity during releases currently authorised for the Peak Downs Coal Mine (EPML00318213). The Peak Downs EOP limit of 10,000 µS/cm has no prescribed discharge volume restrictions. Compliance is based on real time monitoring on Ripstone Creek approximately a few kilometres upstream of the proposed Olive Downs mine site discharges. Non-compliance is triggered at an 80th percentile of 2000 µS/cm. This may mean that there is limited to no assimilative capacity available within Ripstone Creek during periods where both mines wish to undertake controlled discharges. No consideration, risk assessment or mitigation strategies have been presented in relation to this risk.	Complete a risk assessment and propose mitigation/management strategies for the cumulative impacts of multiple mines discharging to similar waterways (e.g. Ripstone Creek) in terms of downstream salinity, flow, turbidity and sulfate.	<p>All release points discharge directly to the Isaac River via gravity discharge. As such, there is no requirement to assess the cumulative impacts in Ripstone Creek.</p> <p>An 'up-catchment water drain' from the CWD to Ripstone Creek is shown on Figure 2-3 of the draft EIS. The drain would provide for the continued conveying of up-catchment rainfall runoff west of the Project to Ripstone Creek and the Isaac River downstream.</p>
34.102	Appendix E- Surface Water Assessment Part A, 1.2 p.3	Advance dewatering of the Olive Downs South and Willunga domain open cut pits is mentioned in the early parts of Appendix E; however, there are no further discussion in regards to the potential impacts, mitigation or management measures proposed for these discharges.	Provide the predicted volumes, timing, quality, and potential impacts of the proposed advance dewatering of the Olive Downs South and Willunga domain open cut pits, including the mitigation and management mechanisms proposed.	<p>The mitigation/management measures for releases would remain unchanged from those described in the draft EIS. Advanced dewatering activities would typically only be undertaken if the Project was operating in a water deficit and the use of such groundwater sources was necessary for the purposes of water supply for the Project. Some, albeit limited, advance dewatering may also occur when mining development occurs in the proximity of the saturated alluvium (i.e. to manage/buffer inflow volumes). The take of water would however be within the total volumetric take/allowance for the Project (and modelled), but simply occurring at a different (advanced) time.</p> <p>As demonstrated in the site water balance results (Table 8-1 in the Surface Water Assessment), the total groundwater inflows predicted during each stage when compared to the rainfall/runoff volumes is between 2-7% for the first 4 stages and then less than 1% for the last 3 stages.</p>
34.103	Appendix L – Geochemistry Assessment Appendix A, Table B5	<p>Geochemical analysis of potential overburden and interburden (collectively called spoil) and potential coal reject materials are presented in Appendix L. According to this, spoil and reject materials will be managed by a combination of out-of-pit and in-pit emplacements during the project life-cycle.</p> <p>Excavated spoil and reject materials could introduce non-point</p>	<ol style="list-style-type: none"> 1. Risks presented from the water extracts data should be considered in a risk based approach for spoil and rejects sourced metals/metalloids in potential to impact on receiving waters environmental values (Table B5, Appendix A). 2. Discuss potential impacts (or lack thereof) of metals/metalloids from leaching during various stages of project implementation. 	<ol style="list-style-type: none"> 1. It is important to note that the results from the geochemical assessment represent an 'assumed worst case' scenario as the samples are pulverised prior to testing, and therefore have a very high surface area compared to materials in the field and do not account for mixing during emplacement.

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		<p>source metals/metalloid contaminants of coal origin into the surrounding environment.</p> <p>It is not clear which standard method was implemented for metal/metalloid extraction. Apparently, assessment of element solubility was performed on ‘water extracts’ without acid digestion of spoil and/or coal rejects. Therefore, soluble metal/metalloid fractions will vary highly depending upon the sample pH, salinity, interactions with organic matter and other factors affecting sorption of metals into the aquatic fractions during sample preparations.</p>	<p>Water type classification of waste rock leachate as non-mine impacted water requires clarification and assessment, in terms of contaminant potential for metals/metalloids and nitrates (blasting proposed).</p>	<p>Nevertheless, the draft EIS describes that a Mineral Waste Management Plan would be developed prior to the commencement of mining for the handling and disposal of fine reject and coarse reject material for the Project. Pembroke would undertake validation testwork of actual coal reject materials from the CHPP during development of the Project – particularly during the first two years of CHPP operation following commissioning and following commencement of mining and coal processing at the Willunga domain.</p> <p>Testwork would comprise a broad suite of environmental geochemical parameters, such as pH, EC (salinity), acid-base account parameters, total metals and soluble metals.</p> <p>2. The assessment of soluble metals/metalloids was undertaken through the use of a 1:5 solid:water extract solution, as explained in Section 2.3 of Geochemistry Assessment (Appendix L of the draft EIS). The assessment of total metals/metalloids was undertaken following an aggressive four-acid (near total) digestion, as also explained in Section 2.3 of the Geochemistry Assessment (Appendix L of the draft EIS).</p> <p>Whilst it is true that soluble metal/metalloid concentrations can be affected by pH (primarily low pH), salinity and organic matter, these factors are relatively insignificant for this ‘potential spoil’ type at Olive Downs – as the pH of the materials is naturally high, the organic content of potential spoil is low (as a bulk spoil material, with minor exceptions) and the salinity is also generally low and consistent throughout the sampling. Furthermore, the ‘water extract’ methodology applied was designed to encourage solubility and dissolution through the use of highly pulverised (pulped) samples, thus providing a very high surface area to solution ratio. Under the naturally pH-neutral to pH-alkaline conditions of the leach the solubility of some elements such as manganese and selenium (and even arsenic) would be encouraged and potentially exaggerated (ie. forced solubility). This was evident in some of the results for a small number of samples – however the large majority of the samples had very low soluble element concentrations under these leaching conditions.</p> <p>For clarification, Terrenus could have undertaken the leaching using an Australian Standard leach procedure, however in their significant experience undertaking a large variety of Australian Standard, USEPA and ASTM leaching methods on mining waste materials Terrenus have found that the Australian Standard leaching procedures are inferior (for the materials in question at Olive Downs) than the method applied. The Australian Standard leaching procedures, like many similar TCLP and ASTM leaches, is a 1:20 water extract solution (ie. significantly more diluted than 1:5) and on a much coarser sample material – which would have almost certainly provided leachate solutions that were much less concentrated than the applied method.</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
34.104	Appendix L – Geochemistry Assessment Appendix A Table B5	<p>As per Table B6, dissolved metals and metalloids in the water extracts of the samples are compared with livestock drinking water quality guidelines and ANZECC, 2000 guideline values for the protection of 95% species in the freshwater ecosystems. Accordingly, at least 50% of aluminium and arsenic samples are exceeding the ANZECC, 2000 guideline values of 0.055 and 0.013 mg/L respectively. Similarly, up to 4 times exceedances for selenium could be noted in few samples. Since total metal/metalloid concentrations in aquatic fractions are not reported in the current EIS, screening results could not reliably compared with livestock drinking water quality guidelines (Section 4.3.4, ANZECC, 2000).</p>	<p>The identified potential risks with higher concentrations of aluminium, arsenic and selenium should be discussed further in terms of risks to surface waters and aquatic ecosystems</p> <p>Note that usually total metal/metalloid concentrations are compared against livestock drinking water guidelines considering the possible route of exposure.</p>	<p>Table B6 of the Geochemistry Assessment (Appendix L of the draft EIS) presents the results of the soluble multi-element concentrations from waste rock and potential coal reject material against the livestock drinking water quality guidelines. The table demonstrates that no waste rock samples exceeded the livestock drinking water quality guideline and only one potential coal reject sample exceeded the livestock drinking water quality guideline for selenium (i.e. a result of 0.04 mg/L compared to the guideline value of 0.02 mg/L).</p> <p>Table B6. Soluble Multi-Element Concentrations in 1:5 Water Extracts from Potential Spoil and Coal Reject</p> <table><tr><th></th><th></th><th></th><th></th><th></th><th>Al</th><th>As</th><th>Ba</th><th>Be</th><th>B</th><th>Cd</th><th>Co</th><th>Cr</th><th>Cu</th><th>Fe</th><th>Hg</th><th>Mn</th><th>Ni</th><th>Pb</th><th>Se</th><th>V</th><th>Zn</th></tr><tr><td colspan="5">Aquatic ecosystems trigger value¹</td><td>0.055</td><td>0.013</td><td>-</td><td>-</td><td>0.37</td><td>0.0002</td><td>0.0014</td><td>0.001</td><td>0.0014</td><td>0.3</td><td>6E-05</td><td>1.9</td><td>0.011</td><td>0.0034</td><td>0.005</td><td>-</td><td>0.008</td></tr><tr><td colspan="5">Livestock drinking water quality²</td><td>5</td><td>0.5</td><td>-</td><td>-</td><td>5</td><td>0.01</td><td>1</td><td>1</td><td>0.5</td><td>-</td><td>0.002</td><td>-</td><td>1</td><td>0.1</td><td>0.02</td><td>-</td><td>20</td></tr><tr><td>Sample ID</td><td>Drill-hole</td><td>Depth (m)</td><td>Weath.</td><td>Description</td><td>Type</td><td colspan="16">all units mg/L</td></tr><tr><td>4502</td><td>IF3845PQ</td><td>15 - 20</td><td>Extreme</td><td>Claystone</td><td>spoil</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>5003</td><td>IF3850PQ</td><td>9 - 14</td><td>Extreme</td><td>FF.Sand</td><td>spoil</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4203</td><td>IF3842PQ</td><td>19 - 25</td><td>Highly</td><td>Siltst., some Clayst.</td><td>spoil</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4802</td><td>IF3848PQ</td><td>7 - 10</td><td>Highly</td><td>Clay & MC.Sand</td><td>spoil</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>5105</td><td>IF3851PQ</td><td>36 - 39</td><td>Mod.</td><td>FF.Sandst. & Siltst.</td><td>spoil</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4304</td><td>IF3843PQ</td><td>22 - 29</td><td>Mod.</td><td>FM.Sandst. & Siltst.</td><td>spoil</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>5112</td><td>IF3851PQ</td><td>91.9 - 92</td><td>Fresh</td><td>VF.Sandst. & Siltst.</td><td>spoil</td><td>0.4</td><td>0.50</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td>0.02</td><td><0.02</td></tr><tr><td>5119</td><td>IF3851PQ</td><td>122.45 - 122.55</td><td>Fresh</td><td>Carb.Siltstone</td><td>spoil</td><td>0.2</td><td>0.24</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td>0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>5120</td><td>IF3851PQ</td><td>125.5 - 125.6</td><td>Fresh</td><td>VF.Sandst. & Siltst.</td><td>spoil</td><td>0.4</td><td>0.10</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>5129</td><td>IF3851PQ</td><td>156 - 156.1</td><td>Fresh</td><td>Tuff</td><td>spoil</td><td>0.4</td><td>0.20</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4211</td><td>IF3842PQ</td><td>78.9 - 79</td><td>Fresh</td><td>FF.Sandst. & Siltst.</td><td>spoil</td><td>0.4</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4220</td><td>IF3842PQ</td><td>105 - 105.1</td><td>Fresh</td><td>Claystone</td><td>spoil</td><td>0.2</td><td>0.04</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td>0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4229</td><td>IF3842PQ</td><td>144.39 - 144.49</td><td>Fresh</td><td>FF.Sandst. & Siltst.</td><td>spoil</td><td>0.4</td><td>0.50</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td>0.04</td><td><0.02</td></tr><tr><td>4307</td><td>IF3843PQ</td><td>51 - 51.1</td><td>Fresh</td><td>FM.Sandst. & Siltst.</td><td>spoil</td><td>0.4</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4316</td><td>IF3843PQ</td><td>101.77 - 101.87</td><td>Fresh</td><td>FF.Sandst. & Siltst.</td><td>spoil</td><td>0.6</td><td>0.28</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4319</td><td>IF3843PQ</td><td>110.5 - 110.6</td><td>Fresh</td><td>Claystone</td><td>spoil</td><td>0.4</td><td>0.04</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4325</td><td>IF3843PQ</td><td>130.45 - 130.55</td><td>Fresh</td><td>Carb.Claystone</td><td>spoil</td><td>0.2</td><td>0.36</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td>0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4809</td><td>IF3848PQ</td><td>41.6 - 41.7</td><td>Fresh</td><td>Claystone</td><td>spoil</td><td><0.2</td><td>0.06</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4813</td><td>IF3848PQ</td><td>49.8 - 49.9</td><td>Fresh</td><td>FF.Sandst. & Siltst.</td><td>spoil</td><td><0.2</td><td>0.12</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4709</td><td>IF3847PQ</td><td>49.4 - 49.5</td><td>Fresh</td><td>FM.Sandstone</td><td>spoil</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4507</td><td>IF3845PQ</td><td>65 - 65.1</td><td>Fresh</td><td>FM.Sandstone</td><td>spoil</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4511</td><td>IF3845PQ</td><td>89.8 - 89.9</td><td>Fresh</td><td>Siltstone</td><td>spoil</td><td><0.2</td><td>0.16</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td>0.04</td><td><0.02</td></tr><tr><td>4512</td><td>IF3845PQ</td><td>97.75 - 97.85</td><td>Fresh</td><td>FF.Sandst. & Siltst.</td><td>spoil</td><td>0.4</td><td>0.28</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td>0.04</td><td><0.02</td></tr><tr><td>4522</td><td>IF3845PQ</td><td>125.06 - 125.14</td><td>Fresh</td><td>Carb.Clayst. (LL3 spoil)</td><td>spoil</td><td>0.2</td><td>0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>5011</td><td>IF3850PQ</td><td>69 - 72</td><td>Fresh</td><td>VF.Sandst., Siltst. & Clayst.</td><td>spoil</td><td>0.6</td><td>0.04</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>5016</td><td>IF3850PQ</td><td>107.65 - 107.75</td><td>Fresh</td><td>Siltstone</td><td>spoil</td><td>1.0</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>5033</td><td>IF3850PQ</td><td>151.02 - 151.12</td><td>Fresh</td><td>Claystone (LL3 spoil)</td><td>spoil</td><td>0.2</td><td>0.12</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4313</td><td>IF3843PQ</td><td>95.9 - 96</td><td>Fresh</td><td>FM.Sandstone (LL1T roof)</td><td>pot. reject</td><td>0.4</td><td>0.16</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td>0.04</td><td><0.02</td></tr><tr><td>4315</td><td>IF3843PQ</td><td>97.85 - 97.95</td><td>Fresh</td><td>Siltstone (LL1B floor)</td><td>pot. reject</td><td>1.0</td><td>0.22</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td>0.04</td><td><0.02</td></tr><tr><td>4317</td><td>IF3843PQ</td><td>104.84 - 104.94</td><td>Fresh</td><td>Carb.Claystone (LL2T roof)</td><td>pot. reject</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4318</td><td>IF3843PQ</td><td>108.6 - 108.7</td><td>Fresh</td><td>Claystone (LL2B floor)</td><td>pot. reject</td><td>0.4</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td>0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4222</td><td>IF3842PQ</td><td>115.6 - 115.7</td><td>Fresh</td><td>Carb.Clayst., Coal & Tuff (LL3B roof)</td><td>pot. reject</td><td><0.2</td><td>0.04</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td></tr><tr><td>4323</td><td>IF3843PQ</td><td>124.6 - 124.7</td><td>Fresh</td><td>Claystone (LL3B floor)</td><td>pot. reject</td><td>0.8</td><td>0.06</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.2</td><td><0.0001</td><td><0.02</td><td><0.02</td><td><0.02</td><td><0.02</td><td>0.02</td><td><0.02</td></tr><tr><td>4712</td><td>IF3847PQ</td><td>52.4 - 52.5</td><td>Fresh</td><td>Carb.Claystone (VU roof?)</td><td>pot. reject</td><td><0.2</td><td>0.02</td><td><0.2</td><td><0.02</td><td><0.2</td><td><0.02</td><td><0.02</td><td><0.0</td></tr></table>						Al	As	Ba	Be	B	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Se	V	Zn	Aquatic ecosystems trigger value ¹					0.055	0.013	-	-	0.37	0.0002	0.0014	0.001	0.0014	0.3	6E-05	1.9	0.011	0.0034	0.005	-	0.008	Livestock drinking water quality ²					5	0.5	-	-	5	0.01	1	1	0.5	-	0.002	-	1	0.1	0.02	-	20	Sample ID	Drill-hole	Depth (m)	Weath.	Description	Type	all units mg/L																4502	IF3845PQ	15 - 20	Extreme	Claystone	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	5003	IF3850PQ	9 - 14	Extreme	FF.Sand	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4203	IF3842PQ	19 - 25	Highly	Siltst., some Clayst.	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4802	IF3848PQ	7 - 10	Highly	Clay & MC.Sand	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	5105	IF3851PQ	36 - 39	Mod.	FF.Sandst. & Siltst.	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4304	IF3843PQ	22 - 29	Mod.	FM.Sandst. & Siltst.	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	5112	IF3851PQ	91.9 - 92	Fresh	VF.Sandst. & Siltst.	spoil	0.4	0.50	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	5119	IF3851PQ	122.45 - 122.55	Fresh	Carb.Siltstone	spoil	0.2	0.24	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	5120	IF3851PQ	125.5 - 125.6	Fresh	VF.Sandst. & Siltst.	spoil	0.4	0.10	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	5129	IF3851PQ	156 - 156.1	Fresh	Tuff	spoil	0.4	0.20	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4211	IF3842PQ	78.9 - 79	Fresh	FF.Sandst. & Siltst.	spoil	0.4	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4220	IF3842PQ	105 - 105.1	Fresh	Claystone	spoil	0.2	0.04	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	4229	IF3842PQ	144.39 - 144.49	Fresh	FF.Sandst. & Siltst.	spoil	0.4	0.50	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	4307	IF3843PQ	51 - 51.1	Fresh	FM.Sandst. & Siltst.	spoil	0.4	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4316	IF3843PQ	101.77 - 101.87	Fresh	FF.Sandst. & Siltst.	spoil	0.6	0.28	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4319	IF3843PQ	110.5 - 110.6	Fresh	Claystone	spoil	0.4	0.04	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4325	IF3843PQ	130.45 - 130.55	Fresh	Carb.Claystone	spoil	0.2	0.36	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	4809	IF3848PQ	41.6 - 41.7	Fresh	Claystone	spoil	<0.2	0.06	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4813	IF3848PQ	49.8 - 49.9	Fresh	FF.Sandst. & Siltst.	spoil	<0.2	0.12	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4709	IF3847PQ	49.4 - 49.5	Fresh	FM.Sandstone	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4507	IF3845PQ	65 - 65.1	Fresh	FM.Sandstone	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4511	IF3845PQ	89.8 - 89.9	Fresh	Siltstone	spoil	<0.2	0.16	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	4512	IF3845PQ	97.75 - 97.85	Fresh	FF.Sandst. & Siltst.	spoil	0.4	0.28	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	4522	IF3845PQ	125.06 - 125.14	Fresh	Carb.Clayst. (LL3 spoil)	spoil	0.2	0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	5011	IF3850PQ	69 - 72	Fresh	VF.Sandst., Siltst. & Clayst.	spoil	0.6	0.04	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	5016	IF3850PQ	107.65 - 107.75	Fresh	Siltstone	spoil	1.0	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	5033	IF3850PQ	151.02 - 151.12	Fresh	Claystone (LL3 spoil)	spoil	0.2	0.12	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4313	IF3843PQ	95.9 - 96	Fresh	FM.Sandstone (LL1T roof)	pot. reject	0.4	0.16	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	4315	IF3843PQ	97.85 - 97.95	Fresh	Siltstone (LL1B floor)	pot. reject	1.0	0.22	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	4317	IF3843PQ	104.84 - 104.94	Fresh	Carb.Claystone (LL2T roof)	pot. reject	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4318	IF3843PQ	108.6 - 108.7	Fresh	Claystone (LL2B floor)	pot. reject	0.4	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	4222	IF3842PQ	115.6 - 115.7	Fresh	Carb.Clayst., Coal & Tuff (LL3B roof)	pot. reject	<0.2	0.04	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	4323	IF3843PQ	124.6 - 124.7	Fresh	Claystone (LL3B floor)	pot. reject	0.8	0.06	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	4712	IF3847PQ	52.4 - 52.5	Fresh	Carb.Claystone (VU roof?)	pot. reject	<0.2	0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.0
					Al	As	Ba	Be	B	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Se	V	Zn																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Aquatic ecosystems trigger value ¹					0.055	0.013	-	-	0.37	0.0002	0.0014	0.001	0.0014	0.3	6E-05	1.9	0.011	0.0034	0.005	-	0.008																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Livestock drinking water quality ²					5	0.5	-	-	5	0.01	1	1	0.5	-	0.002	-	1	0.1	0.02	-	20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Sample ID	Drill-hole	Depth (m)	Weath.	Description	Type	all units mg/L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
4502	IF3845PQ	15 - 20	Extreme	Claystone	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
5003	IF3850PQ	9 - 14	Extreme	FF.Sand	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4203	IF3842PQ	19 - 25	Highly	Siltst., some Clayst.	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4802	IF3848PQ	7 - 10	Highly	Clay & MC.Sand	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
5105	IF3851PQ	36 - 39	Mod.	FF.Sandst. & Siltst.	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4304	IF3843PQ	22 - 29	Mod.	FM.Sandst. & Siltst.	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
5112	IF3851PQ	91.9 - 92	Fresh	VF.Sandst. & Siltst.	spoil	0.4	0.50	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
5119	IF3851PQ	122.45 - 122.55	Fresh	Carb.Siltstone	spoil	0.2	0.24	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
5120	IF3851PQ	125.5 - 125.6	Fresh	VF.Sandst. & Siltst.	spoil	0.4	0.10	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
5129	IF3851PQ	156 - 156.1	Fresh	Tuff	spoil	0.4	0.20	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4211	IF3842PQ	78.9 - 79	Fresh	FF.Sandst. & Siltst.	spoil	0.4	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4220	IF3842PQ	105 - 105.1	Fresh	Claystone	spoil	0.2	0.04	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4229	IF3842PQ	144.39 - 144.49	Fresh	FF.Sandst. & Siltst.	spoil	0.4	0.50	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.04	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4307	IF3843PQ	51 - 51.1	Fresh	FM.Sandst. & Siltst.	spoil	0.4	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4316	IF3843PQ	101.77 - 101.87	Fresh	FF.Sandst. & Siltst.	spoil	0.6	0.28	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4319	IF3843PQ	110.5 - 110.6	Fresh	Claystone	spoil	0.4	0.04	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4325	IF3843PQ	130.45 - 130.55	Fresh	Carb.Claystone	spoil	0.2	0.36	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4809	IF3848PQ	41.6 - 41.7	Fresh	Claystone	spoil	<0.2	0.06	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4813	IF3848PQ	49.8 - 49.9	Fresh	FF.Sandst. & Siltst.	spoil	<0.2	0.12	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4709	IF3847PQ	49.4 - 49.5	Fresh	FM.Sandstone	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4507	IF3845PQ	65 - 65.1	Fresh	FM.Sandstone	spoil	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4511	IF3845PQ	89.8 - 89.9	Fresh	Siltstone	spoil	<0.2	0.16	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.04	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4512	IF3845PQ	97.75 - 97.85	Fresh	FF.Sandst. & Siltst.	spoil	0.4	0.28	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.04	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4522	IF3845PQ	125.06 - 125.14	Fresh	Carb.Clayst. (LL3 spoil)	spoil	0.2	0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
5011	IF3850PQ	69 - 72	Fresh	VF.Sandst., Siltst. & Clayst.	spoil	0.6	0.04	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
5016	IF3850PQ	107.65 - 107.75	Fresh	Siltstone	spoil	1.0	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
5033	IF3850PQ	151.02 - 151.12	Fresh	Claystone (LL3 spoil)	spoil	0.2	0.12	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4313	IF3843PQ	95.9 - 96	Fresh	FM.Sandstone (LL1T roof)	pot. reject	0.4	0.16	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.04	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4315	IF3843PQ	97.85 - 97.95	Fresh	Siltstone (LL1B floor)	pot. reject	1.0	0.22	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.04	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4317	IF3843PQ	104.84 - 104.94	Fresh	Carb.Claystone (LL2T roof)	pot. reject	<0.2	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4318	IF3843PQ	108.6 - 108.7	Fresh	Claystone (LL2B floor)	pot. reject	0.4	<0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4222	IF3842PQ	115.6 - 115.7	Fresh	Carb.Clayst., Coal & Tuff (LL3B roof)	pot. reject	<0.2	0.04	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4323	IF3843PQ	124.6 - 124.7	Fresh	Claystone (LL3B floor)	pot. reject	0.8	0.06	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.2	<0.0001	<0.02	<0.02	<0.02	<0.02	0.02	<0.02																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4712	IF3847PQ	52.4 - 52.5	Fresh	Carb.Claystone (VU roof?)	pot. reject	<0.2	0.02	<0.2	<0.02	<0.2	<0.02	<0.02	<0.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

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				<p>Testwork would comprise a broad suite of environmental geochemical parameters, such as pH, EC (salinity), acid-base account parameters, total metals and soluble metals.</p> <p>As explained in Section 2.3 of Geochemistry Assessment (Appendix L of the draft EIS) the comparison of bottle leachate results with applied 'receiving water' water quality guidelines is for context only. Concentrations of elements in leachate above an applied water quality guideline value does not mean that the receiving water will end up with leachate at this concentration. The bottle leachate (based on the leaching methodology applied) represents a realistic 'assumed worst case' point source undiluted solution. It does not represent seepage or leachate concentration likely to enter receiving water environments. Such concentrations would be expected to be much less.</p> <p>With regard to 'total' soluble concentrations versus 'dissolved' soluble concentrations: The water extract procedure undertaken, using a highly pulped sample, produces a slurry – a muddy turbid solution. This solution undergoes a centrifuge process to remove the majority of the 'fines', then the opaque liquor is filtered prior to analysis.</p> <p>Filtration is necessary to prevent damage to the analytical instrumentation and minimise matrix interferences – which increase the analytical errors. Therefore, in effect, even though the liquor is filtered it is essentially equivalent to a 'total' metal solution result that one would achieve from a 'dirty' water sample. If the opaque solution (post centrifuge) was analysed as a 'total' solution (i.e. not filtered), the laboratory limit of reporting (LOR) would have needed to be raised to take into account the increased errors due to matrix interferences.</p> <p>The draft EIS relevantly includes in the suite of water quality parameters Aluminium, Arsenic and Selenium (Page 4-64 of Section 4.2.4). Again, these monitoring parameters and water quality objectives will be described in a Water Management Plan.</p>
34.105	Appendix E Surface – Water Assessment Section 8.3.5.2	<p>Two release scenarios have been modelled in Appendix E with the following potential issues noted:</p> <ul style="list-style-type: none"> Scenario 1: "Worst case EC" modelling only models EC at worst as 9600 µS/cm despite the proposed conditions listing 10000 µS/cm as maximum release limit. Scenario 1: "Worst case EC" modelling only inputs a discharge quality of 9600 µS/cm for less than one day even though the discharge window for this discharge types persists for 7 days according to the modelling input assumptions (>300m3/s). Much of the modelled worst case EC scenario is undertaken assuming less than 3000 µS/cm end of pipe, despite proposed conditions of 6000 and 10,000 µS/cm. Scenario 1: "Worst case EC" modelling assumes that little to no discharge volume occurs for the majority of the 10 day model run, far below the "allowable release rate" requested as part of the conditions. Scenario 1: "Worst case EC" modelling assumes a relatively large natural stream flow within the Isaac River and does not present information regarding the likelihood of this dilution availability (frequency of these sized events) Scenario 2: "Worst case discharge rate" modelling does not use the maximum allowable release rate within the modelling, and assumes relatively low discharge EC for the entire modelling window. Scenario 2: "Worst case discharge rate" modelling listed as 5.0 m3/s however, the proposed conditions only suggest 3 m3/s. The graphed "Typical Receiving Water EC Criteria" for both Scenarios has also been modelled as consistently as 720 µS/cm when rather this should alter according to the concurrent stream flow (High-flow, Low-flow water quality objectives). 	<ol style="list-style-type: none"> If a modelling scenario is named 'worst case' modelling then the input parameters and assumptions should be worst case and based on the highest risk conditions requested. It is also recommended that worse case water quality and quantity is modelled concurrently rather than separately (as it currently has been presented). Modelling these two aspects separately vastly underestimates the likely predicted salinity impacts within the receiving environment during worst case discharges. Check the accuracy of the model input parameters and detail all assumptions made and the reasons for these assumptions. Various modelling scenarios are valuable to this EIS and should be presented, and model inputs reflecting "likely-case" as well as "worse-case" are important for a balanced risk assessment. 	<p>The information provided in Section 8.3.5 provides individual sets of results which are a subset of the overall water balance modelling results, to demonstrate that the model is successfully simulating the proposed controlled release strategy. It is showing actual model results for the various "worst case" scenarios.</p> <p>All of the inputs and assumptions which are modelled to generate these "worst case" scenarios are provided in Section 7 of Appendix E. The quantity and quality are not modelled "separately", and the results shown in Section 8.3.5 are samples from the overall suite of model results. The model input parameters are considered accurate.</p> <p>The water balance model has used stochastically generated rainfall, which provides 100 sets of 79-year climate sequences based on 129 years of historical rainfall data. In addition, we have also undertaken various sensitivity assessments of key model parameters (5 in total) has been undertaken, and a climate change assessment.</p>
34.106	Section 6 - General Environmental Protection Commitments and Model Conditions 6.2.5 to 6.2.7, p. 27 to p.35	<p>WaTERS reporting</p> <p>There is no Inclusion of water quality monitoring data reporting to WaTERS.</p>	DES will seek to require water quality monitoring data reporting to WaTERS in line with contemporary approvals.	Noted. Schedule F of the Proposed EA Conditions (Appendix B to the Additional Information to the EIS) has been revised to refer to submission of monitoring data via WaTERS.
34.107	Section 6 - General Environmental Protection Commitments and Model Conditions 6.1.3.1 p. 15 Appendix E- Surface	<p>Environmental value assessment</p> <p>There is insufficient description of environmental values in relation to the receiving environments.</p> <p>The EPP (Water) 2009 (Isaac River Sub-basin environmental values and water quality objectives) lists aquatic ecosystem, irrigation, farm supply/use, stock water, aquaculture, human</p>	<ol style="list-style-type: none"> Provide a description/assessment of the environmental values applicable to the receiving environment for irrigation, farm supply/use, stock water, aquaculture, human consumer, primary recreation, secondary recreation, visual recreation, drinking water, industrial use and cultural and spiritual values. Provide a map showing the location of sites applicable to the environmental values and distance from potential pollution 	<p>The sub-catchments in the EPP (Water) 2009 (Isaac River Sub-basin) which are specifically relevant to the Project are the Isaac northern tributaries, Isaac and lower Connors River main channel and Isaac western upland tributaries. The environmental values for the sub-catchments are listed in the EPP (Water) as:</p> <ul style="list-style-type: none"> aquatic ecosystems; irrigation; farm supply/use;

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	Water Assessment Part A p. 30 to 32	consumer, primary recreation, secondary recreation, visual recreation, drinking water, industrial use and cultural and spiritual values as environmental values for the relevant receiving environments (Isaac western upland tributaries - developed areas; Isaac northern tributaries - developed areas; and Isaac and lower Conner River main channel – developed areas). Section 4 of the Surface Water Assessment only describes the environmental values for aquatic ecosystems.	source(s) would be beneficial to assist in describing the potential impacts (or lack of impacts) on environmental values.	<ul style="list-style-type: none"> stock water; human consumption; primary recreation; secondary recreation; visual recreation; drinking water; industrial use; and cultural and spiritual values. <p>Only the Isaac western upland tributaries mapped areas have 'aquaculture' nominated as an environmental value.</p> <p>Each of these environmental values have been considered in the identification of the WQOs which presented in Table 4-13 of the draft EIS (and relevantly reflected in the proposed draft EA conditions).</p> <p>The WQOs for 'farm supply/use' environmental values are consistent with the WQOs for 'stock watering' (which are included in Table 4-13). The remaining environmental values (i.e. aquaculture, human consumer, primary recreation, secondary recreation, visual recreation, industrial use and cultural and spiritual values) are either considered not relevant in the vicinity of the Project (e.g. human consumption and aquaculture from/within the surface waters in the vicinity and immediately downstream of the Project is not conducted) or are less stringent than the WQOs already adopted. Impacts to cultural and spiritual values are considered to be managed through the Cultural Heritage Management plan and Indigenous Land Use Agreement with the Barada Barna People.</p> <p>Accordingly, the adopted WQOs are considered to be the most stringent, relevant WQOs for the Project.</p>
34.108	Section 6 - General Environmental Protection Commitments and Model Conditions 6.1.3.1 p. 15 Appendix E- Surface Water Assessment Part A Table 4-1 p. 27 to 31	Water quality objectives Table 4-1 of Surface Water Assessment outlines water quality objectives with regards to aquatic ecosystems, stock watering, drinking water, and irrigation. The remaining environmental values (farm supply/use, aquaculture, human consumer, primary recreation, secondary recreation, visual recreation, industrial use and cultural and spiritual values) do not appear to be considered.	Taking the environmental value assessment recommended in the previous suggestion into account, please include the relevant water quality objectives for all relevant environmental values.	<p>Sections 4.2.2 and 4.2.4 of the draft EIS discuss the environmental values and Figure 4-8 shows the Environmental Values - Water Quality (Isaac River Sub-basin). Each of these have been considered in the identification of the WQOs which are then tabulated in Table 4-13 (and relevantly reflected in the proposed draft EA conditions).</p> <p>The WQOs for 'farm supply/use' environmental values are consistent with the WQOs for 'stock watering' (which are included in Table 4-1). The remaining environmental values (i.e. aquaculture, human consumer, primary recreation, secondary recreation, visual recreation, industrial use and cultural and spiritual values) are either considered not relevant to the region (e.g. human consumer) or are less stringent than the WQOs already adopted. Impacts to cultural and spiritual values are considered to be managed through the Cultural Heritage Management plan and Indigenous Land Use Agreement with the Barada Barna People.</p>
34.109	Section 6 - General Environmental Protection Commitments and Model Conditions 6.1.3.1 p. 30 Appendix E- Surface Water Assessment Part A 3.2.2 p. 27 to 31	Mine affected water release limits Section 6 – Table F2 (p. 30) proposes the use of Mine Affected Water Release Limits outlined in the Fitzroy Basin model mining conditions. Based on the baseline water quality assessment provided in Appendix E, these standard levels would not be deemed suitable. Site specific surface values are likely to be required for this site. The Surface Water Assessment also does not outline suitable mine affected water release limits for this site.	Update the Surface Water Assessment (Appendix E) to include recommended mine affected water release limits, taking into account the site specific environment, impacts, pollution sources and mitigation strategies of the proposed operations.	<p>In consideration of the baseline water quality assessment presented in the Surface Water Assessment (which cumulatively considers other operating mines and proposed mines in the region), and the proposed Project water management system, the Fitzroy Basin model mining conditions are considered to be suitable, based on the Surface Water Assessment presented in the draft EIS.</p> <p>As described in the draft EIS, monitoring of surface water quality both within and external to the mine site would form a key component of the surface water management system. Monitoring of upstream, onsite and downstream water quality would assist in demonstrating that the site water management system is effective in meeting its objective to protect the integrity of local and regional water resources and allow for early detection of any impacts and appropriate corrective action.</p>
34.110	Section 6 - General Environmental Protection Commitments and Model Conditions Table F3 p. 31 Section 6 - General Environmental Protection Commitments and Model Conditions 6.1.3.1 p. 15 Appendix E- Surface Water Assessment Part A 3.2.2 p. 27 to 31	Release contaminant trigger investigation levels, potential contaminants Section 6 –Table F3 (p.31) proposes the use of Release Contaminant Trigger Investigation Levels, Potential Contaminants outlined in the Fitzroy Basin model mining conditions. However it would appear that site specific surface water trigger values may be required for this site. It is noted the explanatory notes within the model mining conditions state, 'the quality characteristics listed in Table F3 should be assessed on a site by site basis by each mine...the assessment should take into account such characteristics as the geology and chemical characteristics of the land to be disturbed, the types of contaminants likely to be found in processing and quality characteristics of receiving waters.' The Surface Water Assessment also does not outline suitable release contaminant trigger investigation levels for this site.	Update the Surface Water Assessment (Appendix E) to include recommended release contaminant trigger investigation levels for potential contaminants, taking into account the site specific environment, including the HES wetlands within and downstream of the project area, and baseline monitoring quality characteristics.	<p>The release contaminant trigger investigation levels presented in the Fitzroy Basin Model Mining Conditions (for metals, ammonia, nitrate, hydrocarbons and fluoride) are considered appropriate for the Project given:</p> <ul style="list-style-type: none"> The Project is located in the Fitzroy Basin, in close proximity to existing mining operations. The Fitzroy Basin Model Mining Conditions were developed in relation to coal mines located within the Fitzroy Basin, with an emphasis on improving management of cumulative effects from multiple mine releases. The Geochemistry Assessment (Appendix L of the draft EIS) concluded that total metal and metalloid concentrations in spoil samples are very low compared to average element abundance in soil. Soluble multi-element results indicate that some spoil materials may produce leachate containing slightly elevated concentrations of some soluble elements, however in practice, the concentrations of soluble elements in leachate is expected to be lower given the mixing of the overburden material and the material having a lower surface area compared to the pulverised samples analysed in the laboratory. As stated in the Geochemistry Assessment, 'any direct comparison of soluble multi-element concentrations from spoil is strictly not valid and should be used with caution'.
34.111	Section 6 - General Environmental Protection Commitments and Model Conditions 6.1.3.1 p. 15 Section 6 - General Environmental	Gauging station for water release monitoring Appendix E, Surface Water Assessment, Table 7-13 Proposed Mine Affected Water Release Limits (During Flow Events) recommends the gauging station at Deverill be used to identify flow rates, however, Section 6, Table F4 proposes Gauging Station ISDS/SW12 be used to identify flow rates. DES notes ISDS is located downstream of the site.	<ol style="list-style-type: none"> Provide an explanation as to why ISDS is proposed, as opposed to Deverill station, in the Surface Water Assessment. Should the inclusion of ISDS be an error please amend any relevant assessment, calculations and recommendations in the report as appropriate using the gauging station at Deverill. 	<p>The ISDS gauging station was installed by Pembroke downstream of the Project in a suitable location closest to the Project that provides safe access during wet weather events. No other suitable sites for construction of a reliable gauging between ISDS and the Project were identified that were safely and reliably accessible during wet weather.</p> <p>During the operational and post-mining phases, the proposed out-of-pit emplacement near the Deverill Gauge could cause changes to the gauging station's rating curve. Therefore, the rating curve would either be adjusted regularly in consultation with DNRME or otherwise the gauging station would be relocated further upstream (i.e. 5 km upstream) to the next best confined flow path which is relatively free of Project influence.</p>

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	Protection Commitments and Model Conditions Table F4 p. 32	<p>As per the explanatory notes of the model mining conditions, the intent of gauging stations is to ensure every release point is associated with a gauging station that measures flow upstream of the discharge point. More than one discharge point may be associated with the same gauging station. The gauging station should be at a minimum distance from the discharge point such that water flow under trigger flow events will not significantly diminish by the time it reaches the discharge point.</p> <p>Under certain circumstances it may be appropriate to have a downstream gauging station in addition to or in replacement of an upstream gauging station. The location should ideally not be affected by the discharge (for example, be measured off the main waterway). The need for this must be demonstrated on a case by case basis to show why an upstream gauging station is insufficient.</p>		<p>Table F4 of the Proposed EA Conditions (Appendix B to the Additional Information to the EIS) has been revised to include the Deverill Gauging Station as the relevant gauging station for mine affected releases for release points 1 and 2.</p> <p>Use of the ISDS will also provide continuity in the event such influences were to occur at the Deverill Station.</p>
34.112	<p>Section 6 - General Environmental Protection Commitments and Model Conditions 6.1.3.1 p. 15</p> <p>Section 6 - General Environmental Protection Commitments and Model Conditions Table F5 p. 33</p> <p>Appendix E- Surface Water Assessment Part A 3.2.2 p. 27 to 31</p>	<p>Receiving waters contaminant trigger levels</p> <p>Section 6 –Table F5 proposes the use of Receiving Waters Contaminant Trigger Investigation Levels outlined in the model mining conditions. Based on the baseline assessment provided in Appendix E, these standard Fitzroy Basin model mining trigger values may not be suitable values. Site specific surface water trigger values appear to be required for this site. The Surface Water Assessment also fails to outline suitable receiving waters contaminant trigger levels for this site.</p>	The Surface Water Assessment (Appendix E) must include recommended receiving waters contaminant trigger investigation levels, taking into account the site specific environment, impacts, pollution sources and mitigation strategies of the proposed operations.	<p>Receiving waters contaminant trigger investigation levels have been proposed in Table F5 of the Proposed EA Conditions (Appendix B to the Additional Information to the EIS).</p> <p>The trigger investigation level for pH is consistent with the Fitzroy Basin model mining conditions (as identified by DES) is considered appropriate for the Project, given its location in the Fitzroy Basin.</p> <p>The Electrical Conductivity level (1,000 µS/cm) is proposed based on the modelling conducted for the EIS Surface Water Assessment and is consistent with trigger investigation levels for nearby mine sites (as described in Table 10-5 of the Surface Water Assessment).</p> <p>The trigger level for sulfate (770 mg/L) has been proposed for 95% species protection (as described in the ACARP Report C18033 Development of Ecosystem Protection Trigger Values for Sodium Sulfate in Seasonally Flowing Streams of the Fitzroy River Basin). This level is below the trigger level of 1,000 mg/L that applies to a number of mines upstream of the Project (including the Isaac Plains Coal Mine, Millennium Coal Mine, Daunia Coal Mine, Caval Ridge Coal Mine).</p>
34.113	Section 2 – Project Description Figure 2-3 Section 2.7.6 p. 69	<p>It is not clear if the drains (shown as arrows) in Figure 2-3 are for clean water or mine affected water.</p> <p>It is further unclear in the descriptions and figures how ‘clean’ water will be diverted to minimise and manage the impacts of mine affected water.</p>	<ol style="list-style-type: none"> 1. Provide clear information regarding the drainage system represented in Figure 2-3. 2. Provide clear information as to how “clean” water will be diverted to minimise and manage the impacts of mine affected water. 	The drains shown as arrows on Figures 2-3 to 2-9 are for clean up-catchment water which reports to and from the CWD and NWWD. Clean up-catchment water is diverted around mine affected areas (as shown by the arrows on Figures 2-3 to 2-9) and is <u>not</u> captured and stored for water supply purposes. Clean water diversions have been designed to have long-term stability and sized to convey flows from a 1:100 year rainfall event. A description of the clean water management system is included in Section 7.7 of the Surface Water Assessment (Appendix E of the draft EIS).
34.114	Section 2 – Project Description	<p>There is no discussion of analyses / cost-benefit analyses for the site chosen for the waste rock dump across the river on the floodplain at MLA700036.</p> <p>This site creates a variety of challenges:</p> <ul style="list-style-type: none"> • it creates choke in the Isaac River • it will be restricted in terms of access • it requires clearing the floodplain for the sole purpose of a waste rock dump • it proposes placement of a structure to be rehabilitated in an area subject to flooding. <p>Modelling indicates that stream velocity may exceed 4.5 m/s at the base of the waste rock dumps, which could not be considered a safe, stable or self-sustaining result.</p>	<ol style="list-style-type: none"> 1. Provide a thorough options analyses for the proposed location of the waste rock dump across the river on the floodplain at MLA700036. This discussion should addresses the immediate environmental values and associated long-term impacts. 2. Evidence should be provided to clearly demonstrate that the design of waste rock dump will result in a structure that is safe, stable or self sustaining. 	<p>Landform design objectives, location of Pembroke mining tenements, haul distances (vertical and lateral), environmental values (including ecological, hydrological, air quality and noise), flooding frequency, likely access availability and land use objectives were included in the investigations associated with the waste rock emplacement strategy for the Project. The following design objectives were of primary importance during these investigations:</p> <ul style="list-style-type: none"> • batter slopes of approximately 7 degrees (1V:8H); • contour banks installed on batters (to limit effective slope lengths and reduce the potential for erosion); • gently sloped top surfaces shed water; • final void highwalls would be laid back to 20° in the alluvium and tertiary clays (known as the Cenozoic overburden) (Figure 5-4b) to achieve a factor of safety of 1.5. GeoTek identified that much of the Cenozoic material consists of Tertiary clay which has a low shear strength, requiring the 20° set back in the final landform. • Final void highwalls would have a maximum overall angle of 45° where located within a fault fractured zone, and 55° where they are located away from fault zones. An overall angle of 55° could be achieved by 50 m high batters at 65° incorporating 10 m wide intermediate benches. • The toe of out-of-pit waste rock emplacements would stand off the crest of the final voids by at least 50 m. <p>The above design objectives will allow for the construction of a landform that is safe, stable and self-sustaining.</p> <p>The initial development of the open cut (referred to as the box cut) requires the emplacement of waste rock in out-of-pit emplacement areas until such time that sufficient space is available for in-pit emplacement. To provide sufficient out-of-pit emplacement capacity (in consideration of the design objectives listed above) the eastern out-of-pit emplacement area is required. If this emplacement was not developed, the emplacements to the west of the open cut would need to be developed higher and with steeper slopes which compromise rehabilitation success and landform stability (Section 2.10.2 of the draft EIS).</p> <p>The Flood Assessment (and associated Geomorphology Assessment) (Appendix F of the draft EIS) identifies that where velocities are predicted to be high along the toe of the constructed landforms (including the out-of-pit waste rock emplacement in MLA 700036) some works to protect against erosion would be required. As shown in the Flood Assessment, the areas along the waste rock emplacement where flood velocities >4.5 m/s during a 1:1,000 year event are very localised, with velocities generally <2.5 m/s.</p>

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34.115	Section 2 – Project Description, 2.5.3, p.53	<p>From the way the temporary (flood) levees are described in section 2.5.3 it appears that appropriate study-planning-design has not progressed to a stage that allows a clear understanding of the flooding and impacts of the project in the short and long term. For example, it is written 'by way of example, the temporary flood levees... could range from 0.5 to 4.7m', which does not clearly indicate impacts nor what mitigation measures would be required.</p> <p>There is some contradiction as to whether the levees will be temporary. While overall this section indicates they are temporary, the 4th paragraph indicates that the levee would be 'removed or reshaped once the waste rock emplacements are rehabilitated.'</p>	<ol style="list-style-type: none"> 1. Provide clear information if the levees would be removed or reshaped once the waste rock emplacements are rehabilitated. 2. Provide an appropriate assessment that describes impacts of the waste rock emplacements and how appropriate management/mitigation measures will be applied to ensure the structures remain safe, stable and provide a sustainable land use. 3. Update flood modelling to reflect the final design of the proposed closure design of the levees. 	<ol style="list-style-type: none"> 1. All temporary levees (described in Section 2.5.3 and shown as yellow lines on Figures 2-1 and 2-2 of the draft EIS) would be removed once the areas they are protecting from flood waters have been rehabilitated. 2. The Flood Assessment (Appendix F of the draft EIS) included flood modelling of the final landform which reflected the removal of the temporary levees. As described in the Flooding Assessment, in addition to establishing vegetation on rehabilitated mining landforms, vegetation would also be encouraged to grow (e.g. through exclusion of grazing) or actively seeded/planted between the mining area and the Isaac River and along the river banks where localised areas of increased velocity are predicted during flood events. This would assist in stabilising these areas to resist erosion during flood events (Fluvial Systems, 2018). Where velocities are predicted to be high along the toe of the final landforms some works to protect against erosion would be required. As shown in the Flood Assessment, predicted velocities along the final landforms are generally <2.5 m/s. 3. Updated flood modelling to reflect the final (detailed) design of the temporary levees and waste rock emplacements would be undertaken during the life of the mine and results reported in the Water Management Plan.
34.116	Section 2 – Project Description 2.7 p.63	<p>There is insufficient information regarding the impacts of taking water from the Isaac River opportunistically as required, for which it was indicated a permit has been applied for from the Department of Natural Resources, Mining and Energy (DNRME).</p> <p>It is anticipated that the majority of required take would be during the drier periods and may have the potential for greater impacts for downstream users as well as for environmental values depending on water (including but not limited to GDEs).</p> <p>Refer also to comments made on the draw-down of water from the Isaac River.</p>	<ol style="list-style-type: none"> 1. Provide an assessment of the impacts of taking water from the Isaac River on surface water, groundwater system and environmental values depending on water (e.g. GDEs), including but not limited to: <ul style="list-style-type: none"> • projected times • projected frequency • season (e.g. drier periods) • projected volumes. 2. Ensure that all relevant draft EIS sections and any relevant management plans will be updated with the new information. 	<p>Section 8.3.4 of the Surface Water Assessment (Appendix E of the draft EIS) states that in the unlikely event additional external water is required, additional water allocation from the Eungella or Burdekin networks operated by SunWater could be sought by Pembroke over the life of the Project to meet raw water demands. It is also noted that Pembroke has applied for two licences for the take of 65 ML of unallocated general reserve water from the Isaac River, which would serve as a water source for construction activities. Any additional requirement for extraction from the Isaac River would be subject to separate licences to be applied for at a later date (in accordance with the <i>Water Plan (Fitzroy Basin) 2011</i>), to ensure no adverse impacts on water availability for other licensed water users.</p> <p>The Isaac River is a 'losing' stream and as demonstrated in the analysis in the Groundwater Assessment. That is, surface water extraction does not 'drawdown' on the regional groundwater table.</p> <p>In addition to the up-catchment water storage, Section 2.7 of the draft EIS identifies that external supply of raw water would be provided by the water pipeline constructed from the existing Eungella water pipeline network. Day-to-day external water supply requirements would be guided by the capture of incident rainfall and runoff within the mine water management system as it is developed (i.e. stormwater and mine affected water); and capture of overland flow as described in Section 2.4.9 of the draft EIS.</p> <p>Subject to availability of flows and obtaining relevant licences, direct pumping of water from the Isaac River prior to the commissioning of the water supply pipeline may be undertaken opportunistically to minimise the external water supply requirements as required. For example, if Pembroke's application for 65 ML of unallocated general reserve water from the Isaac River is successful, water from the Isaac River could be pumped and used for Project construction activities, instead of relying on bringing water to site from other sources. It is expected that the water would be pumped intermittently throughout the construction period and stored in tanks in the infrastructure area or pumped into tanker trucks.</p> <p>If the relevant water licences are obtained, the pump and associated infrastructure would be located at the mine access road Isaac River crossing. Pumping of water from the Isaac River would be undertaken in a manner as to avoid and minimise potential impacts on aquatic ecology, including:</p> <ul style="list-style-type: none"> • starting the pump slowly and then gradually ramping up velocity; • installing a suitable self-cleaning screen; and • regularly inspecting the pump and screen.
34.117	Section 4 – Assessment of project specific matters, 413, p.26	<p>Section 4.1.3, <i>Changes to Hydrology</i>, only addresses the period during mining operations and does not provide an assessment of the permanent changes to surface water flow; including impacts to the aquatic and terrestrial ecology.</p>	<ol style="list-style-type: none"> 1. Provide an assessment of the permanent changes to surface water flow for pre-mining (e.g. during construction), mining and post-mining. 2. Update all relevant draft EIS sections and any relevant management plans. 	<p>Permanent changes to surface water flow during construction will be less significant than those during and following the completion of mining. The analysis of the during and post-mining are therefore considered in the EIS.</p> <p>Instream flows in lower reaches of Ripstone Creek immediately adjacent the Project are not necessarily influenced, nor mostly affected by, the adjacent local catchments. As demonstrated by the catchment analysis, 87%-93% of the catchment runoff following rainfall events that reports to Ripstone Creek will remain unchanged. Further, as recognised by the DES, Peak Downs Mine has the authority to release water to Ripstone Creek upstream of the Project. It is also noted that an 'up-catchment water drain' from the CWD to Ripstone Creek is shown on Figure 2-3 of the draft EIS. The drain would provide for the continued conveying of up-catchment local rainfall runoff west of the Project to Ripstone Creek and the Isaac River downstream.</p> <p>Instream flows in the Isaac River immediately adjacent the Project are not necessarily influenced, nor mostly affected by, the adjacent local catchments. As demonstrated by the catchment analysis in Section 10.4 of the Surface Water Assessment (Appendix E to the draft EIS), less than 1% of the Isaac River catchment, downstream of the Project, will be captured within the Project mining area at any one time during the Project life. This is based on the Isaac River catchment at the ISDS gauging station being 7,782 km² and the maximum Isaac River catchment area that is captured within the Project water management system at any one time being 51 km². Following completion of mining when runoff from rehabilitated areas reports to the Isaac River, only the areas that report to the final voids would contribute to Isaac River catchment excision.</p> <p>Given the above, the Surface Water Assessment concludes that 'no adverse water flow related impacts are likely to occur on habitats surrounding the Project, because no measurable impacts on surface water flows are likely to occur'.</p>

Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response
34.118	Appendix D – Groundwater Assessment 10 p.113 Section 4 – Assessment of project specific matters 4.3.2 p. 74	<p>Impacts of the operations and residual voids on the water supply and environmental values</p> <p>There is no evaluation of the impacts of the operations and residual voids on the water supply and environmental values of the area in the short and long term.</p> <p>There are groundwater bores within 5km of the proposed operations installed in the shallow alluvium and used for stock and/or domestic water purposes. Page 75 (section 4) states drawdown in up to 5 of these bores in alluvium (2) and Permian coal measures (3), however the impacts, management and mitigation measures were not discussed.</p> <p>It is predicted in the draft EIS that drawdown impacts will not affect the ability to extract water (p. 79 section 4). Appendix D (p. 113) recommends developing a site specific trigger levels once sufficient data is collected.</p> <p>There is no link in the discussion between draw-down trigger levels and the impact assessment. The draft EIS does not provide information on the management/mitigation measures including any make good provisions.</p>	<ol style="list-style-type: none"> 1. Provide evaluation of the impact of the operations and residual voids on the groundwater water supply and environmental values of the area in the short and long term. 2. Include discussion on draw-down impacts on groundwater bores, including impacts, management and mitigation measures. 3. Base draw-down trigger levels on the impact assessment and management/mitigation measures. 4. Provide information on the management/mitigation measures including any make good provisions. 5. Include assessment against environmental objectives and performance outcomes as required under the EP Regulation. 	<p>1-2. Table 7-1 in the Groundwater Assessment specifically describes the maximum predicted drawdown on the nearest landholder bores, as well as predicted recovery (and impacts of the residual voids) (i.e. short and long term).</p> <p>Section 8.1.2 of the Groundwater Assessment (Appendix D of the draft EIS) describes the use of make good measures to ensure the bore owner has access to a similar quantity and quality of water for the water bore's authorised purpose. This may include lowering pump sets, deepening a bore to maintain access to water, constructing a new water supply bore, providing water from an alternative source, or financial compensation. Of the five bores that are predicted to experience more than 1 metre of drawdown, maintenance works at four of the bores (i.e. lowering of the pump and/or deepening of the bore) is expected to result in providing access to a similar quantity and quality of water for the water bore's authorised purpose. For the other bore (Bore 8 on the Olive Downs property), lowering of the pump and/or deepening of the bore may not result in a reliable ongoing supply of water, until such time as groundwater levels recover (after approximately 2044) (Section 7.2.1 of the Groundwater Assessment, Appendix D of the draft EIS). If maintenance works do not result in a reliable water supply, Pembroke could provide an alternative water supply (e.g. from Pembroke's Eungella pipeline allocation or from its onsite water sources) or financial compensation to the landholder. The appropriate make good measure will be determined in consultation with each relevant land holder.</p> <p>3. Trigger levels for monitoring groundwater drawdown at private groundwater bores will be determined as part of the Water Management Plan.</p> <p>4. Refer to response to item 2 above.</p> <p>5. Section 4.2 of the draft EIS states:</p> <p style="padding-left: 40px;"><i>The relevant environmental objectives as stated in the Terms of Reference for water quality are that the Project be operated in a way that:</i></p> <p style="padding-left: 80px;">...</p> <p style="padding-left: 40px;"><i>(d) protects the environmental values of groundwater and any associated surface ecological systems.</i></p> <p>Table 4-12 of the draft EIS lists the performance outcomes for water, wetlands and groundwater. In particular, Table 4-12 lists the performance outcome for groundwater as:</p> <p style="padding-left: 40px;"><i>2 The activity will be managed to prevent or minimise adverse effects on groundwater or any associated surface ecological systems.</i></p> <p>An assessment against the environmental objective and performance outcome is provided in Section 4.2.4 of the draft EIS.</p>
34.119	Section 4 – Assessment of project specific matters, 4.3.3, p.77	<p>Impacts of increased draw-down on the Isaac River</p> <p>The impacts of increased draw-down on the Isaac River have not been clearly identified or described.</p> <p>Section 4 (p.77) notes that there are impacts to groundwater during and post mining due to residual voids. The 'take' or drawdown of groundwater will result in an additional take from the Isaac River as this is a losing system. It is estimated that the rate of seepage during operations will be an average of 2.6 ML/day over the life of the project – 0.5% reduction in average flow. The peak (page 4-78) is estimated as 4.5 ML/day.</p> <p>This is an ephemeral system. It is unclear what impacts during periods of low flow (the majority of the year) will be and how this compares with the system as a whole.</p> <p>Similarly, there is a figure for post mining long-term average take of 1.9ML/day at post closure equilibrium. It is unclear how this equates during periods of low flow.</p> <p>There is also not discussion/assessment as to the positional for greater subsequent impacts to GDEs.</p> <p>Refer also to comments made on potential impacts of taking water from the Isaac River opportunistically as required.</p>	<ol style="list-style-type: none"> 1. Assess how changes to draw-down flow will impact the system during periods of low flow. Consider both the operational and post mining impacts, as well as potential impacts to groundwater dependent vegetation during low flow periods. 2. Include cumulative impacts from draw-down on the Isaac River and opportunistically taking water from the Isaac River. 3. Consider management strategies for these impacts. 4. Monitoring along the affected stretches of the Isaac River must be carried out annually once mining commences at defined monitoring points (reference points) in order to show if any changes occur. 5. If any impacts are recorded on the wetland ecosystem and/or any associated vegetation and fauna (e.g. GDEs and stygofauna) and fauna, these impacts must be managed to avoid, minimise/mitigate impacts, and if necessary, offset these impacts. 	<ol style="list-style-type: none"> 1. Surface water extraction does not 'drawdown' on the regional groundwater table. The 4.5 ML/day value is the total peak inflow due to the Project - not the 'take' from the Isaac River. <p>Relevantly, the Groundwater Assessment states that interference of the alluvial groundwater largely relates to increased leakage to the underlying Permian coal measures that are depressurised as a result of the Project, which is distinct from direct interception of alluvial groundwater within the proposed pit.</p> <ol style="list-style-type: none"> 2. Direct pumping of any water from the Isaac River would only be in accordance with Pembroke obtaining relevant licences and would be subject to availability of flows. As described in response to DES comment 34.116 above, the direct pumping from the Isaac River will not drawdown on the regional groundwater table. 3. The groundwater monitoring network established for the Project will monitor drawdown of alluvial groundwater as a result of the Project. <p>4-5. Monitoring of the Isaac River will be conducted in accordance with the Water Management Plan, Receiving Environment Monitoring Program and the GDE and Wetland Monitoring Program. This will include visual inspections of the Isaac River and wetlands as well as regular surface water and groundwater monitoring. The monitoring will assess the condition of and any impacts to relevant environmental values, and will be used to guide the implementation of measures required to mitigate any identified impacts.</p>
34.120	Section 4 – Assessment of project specific matters, 4.3.3, p.79 Appendix D – Groundwater Assessment 3.3.1, p.26	There is insufficient information to assess whether cumulative draw-down impacts are acceptable. Any consideration of the cumulative impacts on groundwater should take into account projected and actual impacts from the Bowen Gas Project.	Include information regarding the timeframe around impacts from draw down of groundwater in strata down to the mined seams, noting that voids in this project will have a permanent impact on localised groundwater flow and surface water take from the system.	<p>Cumulative impacts associated with approved and foreseeable open cut and underground coal mines surrounding the Project was modelled. The surrounding mines within the model include Poitrel, Daunia, Peak Downs, Lake Vermont, Eagle Downs and Saraji (Section 6.5 of the Groundwater Assessment).</p> <p>Assessment of cumulative impacts associated with the approved Bowen Gas Project was undertaken as a sensitivity analysis as it directly overlaps with the Study Area. Results from this assessment are presented in the sensitivity analysis (Appendix B of the Groundwater Assessment). Based on the modelling results, cumulative groundwater drawdown extents from the Bowen Gas Project are predicted to be greater than impacts produced by the Project alone.</p> <p>Point 48 in the IESC Advice for the Project states:</p> <p>"The proponent has provided an appropriate assessment of potential cumulative groundwater impacts for the project, through incorporation of information from neighbouring mines and the proposed coal seam gas project into the numerical model."</p>

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34.121	Section 4 – Assessment of project specific matters, 4.3.4, p.82	<p>There is a no assessment of the proposed residual voids that account for impacts on environmental values in the short and long term. Considering that the residual voids will take 100-200 year to reach equilibrium and will result in hypersaline water in 550-600 years.</p> <p>This is important due to the predicted impacts of the voids on the surrounding environment, which have included:</p> <ul style="list-style-type: none"> increased freshwater take from the Isaac River year round permanent alteration of the floodplain 3 residual voids with saline/hypersaline water that appear to become non-use management areas ongoing maintenance required for the levees ongoing degradation of water quality as a result of voids acting as a long-term groundwater sink. 	Provide an options assessment for the planned use of residual voids that accounts for the predicted impacts of the voids on environmental values in the short and long term.	<p>Section 4 of the Additional Information to the EIS provides additional information on the Project final voids, including a revised salinity balance and additional information on the post-mining land use. A summary of the additional information is provided below.</p> <p>The final void rehabilitation domain at the Project would be rehabilitated to a fauna habitat post-mining land use.</p> <p>The final voids would comprise of low wall, highwall and a void water body landform components. Pembroke has investigated the likelihood that the final void would provide suitable native fauna habitat. The final voids would provide suitable habitat for a range of native fauna, including species recorded within the Project site by DPM Envirosiences (2018) such as the Strip-faced Dunnart (<i>Sminthopsis macroura</i>), Hoary Wattled Bat (<i>Chalinolobus nigrogriseus</i>) and Australian Grey Teal (<i>Anas gracilis</i>).</p> <p>The final void salinity balance presented in the draft EIS Surface Water Assessment conservatively assumed that groundwater inflow to the floor of the final voids would be through a coal layer. To improve water quality within the final void water bodies by reducing salinity levels, Pembroke commits to removing basement coal from the floor of the ODS3, ODS7/8 and WIL5 open cut pits at the end of mining.</p> <p>The final void salinity balance presented in the draft EIS has been revised incorporating the commitment to remove basement coal. The results indicate that the rate of salinity increase is significantly lower if all coal is removed from the final void floor at the end of mining. For example, under the revised balance, the salinity of the ODS7/8 and WIL5 final void water bodies are predicted to remain brackish (i.e. <5,000 mg/L TDS) for approximately 300 to 550 years. The ODS3 final void water body is predicted to remain brackish for approximately 150 to 200 years.</p> <p>Water bodies with salinity levels <4,000 mg/L TDS are able to provide habitat for a variety of freshwater aquatic plants and invertebrates. Some ducks, such as the Australian Grey Teal (recorded onsite as part of the EIS Ecology Assessment [DPM, 2018]) are known to use permanent brackish and saline habitats.</p> <p>Although the final void water bodies are not predicted to reach hypersaline conditions (i.e. >35,000 mg/L TDS) for at least the modelling period (i.e. 600 years), it is recognised that some ducks are also known to live in hypersaline environments by also drinking freshwater from elsewhere (Hart et al, 1991). Halophytic plants grow around the edges of water bodies under hypersaline conditions (after Hart et al, 1991).</p> <p>Evaporation from the lake surface would concentrate salts in the final void water bodies slowly over time. This gradually increasing salinity would not pose a risk to the surrounding groundwater regime as the final voids remain permanent sinks (Appendix D of the draft EIS).</p> <p>The final voids will not take freshwater from the Isaac River. The final voids are disconnected from the Isaac River, and beyond the extent of the saturated alluvium associated with the Isaac River.</p> <p>Changes to flood characteristics were modelled for the final landform and presented in the Flood Assessment.</p> <p>All temporary levees would be removed once they are no longer required for flood protection. The permanent waste rock emplacements have been designed to be stable and able to support a post-mining land use into the long-term.</p>
34.122	Section 4 – Assessment of project specific matters, 4.3.4, p.86	<p>Section 4 commits to developing a UWIR upon commencement of mining that would manage the impacts of underground water extraction by the project.</p> <p>It is unclear how any management methods can be implemented once the mine has begun operations given the drawdown and timeframes associated with the impacts.</p>	<ol style="list-style-type: none"> Detail management methods that will be included in the UWIR and how they will be applied. Describe the expected effectiveness of this management in keeping impacts within predicted and acceptable limits. 	<p>Make good measures would be implemented to ensure owner of a bore impacted by the Project has access to a similar quantity and quality of water for the water bore's authorised purpose. This may include lowering pump sets, deepening a bore to maintain access to water, constructing a new water supply bore, providing water from an alternative source, or financial compensation. Of the five bores that are predicted to experience more than 1 metre of drawdown, maintenance works at four of the bores (i.e. lowering of the pump and/or deepening of the bore) is expected to result in providing access to a similar quantity and quality of water for the water bore's authorised purpose. For the other bore (Bore 8 on the Olive Downs property), lowering of the pump and/or deepening of the bore may not result in a reliable ongoing supply of water, until such time as groundwater levels recover (after approximately 2044) (Section 7.2.1 of the Groundwater Assessment, Appendix D of the draft EIS). If maintenance works do not result in a reliable water supply, Pembroke could provide an alternative water supply (e.g. from Pembroke's Eungella pipeline allocation or from its onsite water sources) or financial compensation to the landholder. The appropriate make good measure will be determined in consultation with each relevant land holder.</p>
34.123	<p>Appendix A - Terrestrial Flora Assessment</p> <p>Appendix E - Surface Water Assessment Part A 7.7.2 p. 96</p> <p>(This Appendix is referred to in Draft EIS as Hatch 2018)</p>	<p>Impacts from constructed landforms in the floodplain</p> <p>Based on site water balance modelling undertaken by Hatch there is a predicted negligible impact on downstream water quality and no measurable impacts on surface water quantity and therefore, no measurable impact on surrounding habitats.</p> <p>These statements are based on the assumption that appropriate erosion and sediment control management is implemented through the life of mine, in conjunction with the progressive rehabilitation of constructed landforms, and so discharges of sediment and other contaminants remain at levels which the receiving environment can cope with.</p> <p>Consideration has only been given to sediment discharges from the mine. There is no discussion regarding the physical presence of the constructed landforms in the floodplain, or the</p>	<ol style="list-style-type: none"> Provide evidence that the constructed landforms in the floodplains (levees, highwall emplacements, pit walls, etc) will be safe, stable, non-polluting and able to sustain a final land use. Provide evidence that the flow velocities will not erode the constructed landforms in the floodplain and that they are designed to withstand such flows. Demonstrate that the constructed landforms in the floodplains will not impact on the water quality of affected waterways and/or other environmental values. 	<p>1-2. During rehabilitation of the Project, vegetation would be established as soon as practicable on the outer batters of the temporary flood levees and permanent highwall emplacements to prevent slope face degradation. In addition to establishing vegetation on rehabilitated mining landforms, vegetation would also be encouraged to grow (e.g. through exclusion of grazing) or actively seeded/planted between the mining area and the Isaac River and along the river banks where localised areas of increased velocity are predicted during flood events. This would assist in stabilising these areas to resist erosion during flood events.</p> <p>The Flood Assessment modelled the potential changes to flood characteristics associated with the construction of the final landform. The Flood Assessment (and associated Geomorphology Assessment) (Appendix F of the draft EIS) identifies that where velocities are predicted to be high along the toe of the constructed landforms (including the out-of-pit waste rock emplacement in MLA 700036) some works to protect against erosion would be required. As shown in the Flood Assessment, the areas along the waste rock emplacement where flood velocities >4.5 m/s during a 1:1,000 year event are very localised, with velocities generally <2.5 m/s.</p>

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		<p>reduced catchment areas of the affected watercourses and how that impacts on environmental values of the receiving environment.</p> <p>The AEP flood modelling results indicate the flow velocities may exceed 4m/s at the base of these structures but no information has been provided on how the constructed landforms in the floodplain be designed to withstand such flows as to be self-sustaining and not impact on the surrounding environment.</p>		<p>Project flood management infrastructure would be inspected by a suitably qualified and experienced person once per year between the months of May and October (inclusive) (i.e. in advance of the wet season). In addition, a visual inspection of the flood management infrastructure would be carried out following major flood events (e.g. 10% AEP or greater) to identify any potential issues with erosion, settlement or slumping. Geomorphic monitoring would include topographic survey of the Isaac River channel and floodplain, repeated every year for 3 years, and then either every 5 years, or after every flood event exceeding the 5 year ARI event (e.g. 20% AEP or greater). This would be done using LiDAR technology, flown when the flow is very low. A Before-After, Control-Intervention (BACI) monitoring design would be used, with tolerable limits of change in the intervention reaches set by the observed degree of change in control reaches. Mitigation measures would be triggered by unexpectedly large changes in channel morphology identified through monitoring along the Isaac River. The most appropriate response would need to be assessed at the time.</p> <p>The monitoring design would be developed and included in the Water Management Plan.</p> <p>3. The Geochemistry Assessment (Appendix L of the draft EIS) demonstrates that the waste rock material (that will be used to construct the final landforms) will be overwhelmingly non-acid forming (NAF) with excess acid neutralising capacity and have a negligible risk of developing acid conditions. It is also predicted to generate relatively low-salinity surface runoff and seepage with low soluble metal concentrations. Accordingly, significant impacts to the water quality of the receiving environment due to runoff and seepage from the final landforms are not predicted.</p>
34.124	<p>Appendix E - Surface Water Assessment Part A, 10.1, p.159</p> <p>(This appendix is referred to in Draft EIS as Hatch 2018)</p>	<p>Appendix E states that ‘<i>Certain aspects of the project, such as changes to landforms due to construction of out-of-pit waste rock emplacements or mine subsidence, will create impacts that are irreversible, although this does not mean that any such impacts are necessarily detrimental to the environmental values of receiving waters.</i>’</p> <p>However, no explanation has been provided to substantiate this conclusion.</p>	<p>Provide evidence to justify the conclusion that ‘<i>changes to landforms due to construction of out-of-pit waste rock emplacements or mine subsidence, will create impacts that are irreversible, although this does not mean that any such impacts are necessarily detrimental to the environmental values of receiving waters.</i>’</p>	<p>As stated in the responses to comment DES 34.123 above, the final landforms are proposed to be rehabilitated to be safe, stable and self-sustaining. A number of measures are in place to demonstrate the landforms are designed and constructed to achieve these outcomes. Further detail is provided in the above response.</p>
34.125	<p>Appendix E - Surface Water Assessment Part A 7.7.2 p. 96</p> <p>(This Appendix is referred to in Draft EIS as Hatch 2018)</p>	<p>Impacts arising from changes to surface water flows on the receiving environment</p> <p>7.7.2 Highwall Clean Water Management states that ‘<i>During the Project development, there is a large clean water catchment located between the pit highwall and the temporary flood levees and permanent highwall emplacement (which acts as a levee). Between Stage 1 and Stage 3 of the Project, this catchment will be managed by directing the runoff south via a series of clean water drains. This runoff will ultimately drain to Ripstone Creek via an unnamed drainage feature. By Stage 4 (when Pit ODS8 begins development), the south-eastern section of the proposed Ripstone Creek levee will be constructed, cutting off the unnamed drainage feature. From Stage 4 onwards, the highwall catchment (which reduces in area over the life of the Project) will be captured within a system of clean water drains and dams, which will be pumped directly to either Ripstone Creek or the Isaac River following rainfall. Design of the highwall clean water management system will be undertaken during the detailed design process.</i>’</p> <p>The draft EIs does not discuss how these changes to surface water flows will impact on the receiving environment (e.g. erosion, timing of flows, inundation of previously unaffected areas, resilience of vegetation, loss of habitat).</p>	<p>Provide evidence how the proposed changes to surface water flows will not impact on the receiving environment (e.g. erosion, timing of flows, inundation of previously unaffected areas, resilience of vegetation, loss of habitat).</p>	<p>The impacts of the maximum extent of the Project have been assessed in the Surface Water Assessment, that is, the impacts of the reduction in surface water flows to the receiving environment. Nevertheless the assessments recognise that 'clean water drains and dams' may be utilised and that the detailed design would be undertaken during the detailed design process as it would be largely guided by the actual sequencing and advancing of the mine pits. The equivalent erosion protection measures (for controlled releases) would be applied. The timing of flows would typically be following a rainfall event and that any such releases would occur in such a way to have negligible loss of habitat or inundation of previously unaffected areas.</p> <p>Instream flows in lower reaches of Ripstone Creek immediately adjacent the Project are not necessarily influenced, nor mostly affected by, the adjacent local catchments. As demonstrated by the catchment analysis, 87%-93% of the catchment runoff following rainfall events that reports to Ripstone Creek will remain unchanged. Further, as recognised by the DES, Peak Downs Mine has the authority to release water to Ripstone Creek upstream of the Project. It is also noted that an 'up-catchment water drain' from the CWD to Ripstone Creek is shown on Figure 2-3 of the draft EIS. The drain would provide for the continued conveying of up-catchment local rainfall runoff west of the Project to Ripstone Creek and the Isaac River downstream.</p> <p>Instream flows in the Isaac River immediately adjacent the Project are not necessarily influenced, nor mostly affected by, the adjacent local catchments. As demonstrated by the catchment analysis in Section 10.4 of the Surface Water Assessment (Appendix E to the draft EIS), less than 1% of the Isaac River catchment, downstream of the Project, will be captured within the Project mining area at any one time during the Project life. This is based on the Isaac River catchment at the ISDS gauging station being 7,782 km² and the maximum Isaac River catchment area that is captured within the Project water management system at any one time being 51 km². Following completion of mining when runoff from rehabilitated areas reports to the Isaac River, only the areas that report to the final voids would contribute to Isaac River catchment excision.</p>
34.126	<p>Appendix E - Surface Water Assessment Part A 11 p. 184</p> <p>(This Appendix is referred to in Draft EIS as Hatch 2018)</p>	<p>The Hatch report (page 184) concludes that ‘the potential impacts of the project on surface water resources will be mitigated through the implementation of a mine site water management plan...and a site water monitoring program will be implemented to continually assess environmental impacts’.</p> <p>The summary of findings for impacts upon surface water resources concludes that:</p> <ul style="list-style-type: none"> The performance of the mine water management system will ensure a very small risk of uncontrolled spills of mine affected water That there will be limited impacts upon the downstream water quality arising from controlled releases The loss of catchment to Ripstone Creek only affects the furthest downstream reach of the creek adjacent to the project and within the tenement area Changed topography will have some impacts via long-term 	<ol style="list-style-type: none"> Provide detailed cumulative impact assessment on surface water resources (taking into account comments made throughout this submission on similar issues). Provide evidence to support the conclusions that: <ul style="list-style-type: none"> there will be limited impacts upon the downstream water quality arising from controlled releases the loss of catchment to Ripstone Creek will only affects the furthest downstream reach of the creek adjacent to the project and within the tenement area the changed topography will have minor impacts via long-term reduction in catchment runoff to the Isaac River and Ripstone Creek cumulative impacts from the project will be low due to the low risk of off-site releases and the regulatory structure imposed upon all mines in the area 	<ol style="list-style-type: none"> 2, 4. Section 10.6 of the draft EIS Surface Water Assessment (Appendix E) specifically assesses cumulative impacts. The evidence to support each of the conclusions are demonstrated by: <ul style="list-style-type: none"> Modelling the receiving water quality (with releases from the Project and using baseline data that includes releases from existing mines), and further commitment for monitoring of runoff reporting to sediment dams (as part of the Water Management Plan). Section 10.4.2 of the Surface Water Assessment describes and tabulates the change in catchment in the Ripstone Creek Catchment. Figure 10.1 shows the maximum extent captured, whereas Figure 9.1 shows the final void catchment configuration. Section 10.6.3.2 of the Surface Water Assessment identifies the loss of Isaac River catchment from the existing mines in the region. Table 10.3 in the Surface Water Assessment tabulates all the mines cumulatively assessed. Avoidance, Mitigation and Management of Impacts on Water Resources are described in the draft EIS (Section 3.3.11 - Pages 3-159 to 3-166). Section 3.3.15 also includes a conclusion summarising the alternatives considered.

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		<p>reduction in catchment runoff to the Isaac River and Ripstone Creek (but not considered to be at significant levels)</p> <ul style="list-style-type: none"> Final voids will act as a groundwater sink Cumulative impacts from the project will be low due to the low risk of off-site releases and the regulatory structure imposed upon all mines in the area. <p>The cumulative impacts due to changes to the surface water resources have not been addressed as the draft EIS has not provided evidence that there will be limited impacts (as cited above). At this stage, potential impacts are discussed in several technical appendices but have not been summarised in the draft EIS.</p> <p>The draft EIS has not provided evidence that avoidance and mitigation measures have been used to minimise environmental harm. Mine site water management plans and site water monitoring programs are not considered avoidance and mitigation measures; they are part of the regular monitoring requirements of a project.</p>	<ul style="list-style-type: none"> controlled releases will have limited impacts on water quality there is limited flow impacts on the Isaac River and Ripstone Creek as a result of changes in the landscape and water take and the resulting impacts on surface water resources that the rehabilitated structures (levees) in the floodplain will not impact on surface water resources; the take of groundwater from the surface water system as a result of final voids and impact on surface water system. <ol style="list-style-type: none"> The assessment must include DES's management hierarchy, focusing on avoidance and mitigation measures. Provide the assessment on cumulative impacts on surface water resources in one dedicated section of the draft EIS. 	<p>Avoidance examples:</p> <ul style="list-style-type: none"> No aquatic habitats supporting aquatic species of conservation significance listed under the NC Act or EPBC Act are expected to be removed by the Project. (Page 4-24). The detailed design of the ETL would implement aerial crossings over waterways (including the Isaac River) and thereby avoid clearing of riparian vegetation or instream aquatic habitat. (Page 4-25). Where possible, riparian vegetation along the Isaac River has been avoided in the mine design and a minimum buffer zone of 200 m between the mine pits and Isaac River has been implemented. (Page 4-37). If, during operations, there was a risk that the licence allocation could be exceeded, the site water demands could be adjusted accordingly (e.g. reduce dust suppression demand) or alternative water harvesting measures on-site could be implemented, to avoid and/or minimise any impacts on regional water availability. (Page 4-85). <p>Mitigation examples:</p> <ul style="list-style-type: none"> Surface water runoff control practices to prevent up-catchment runoff water from entering the open cut mining areas would be generally adopted for the Project. (Page 4-82). Sediment dams would be designed based on Best Practice Sediment and Erosion Control Guideline (IECA, 2008) for flows with an ARI of between 3 months and 1 year. (Page 4-82). The conveyor and access road would be restricted to a construction corridor of 180 m width, however this would be reduced when crossing the Isaac River where, within 200 m of the defining bank, the construction corridor width would be limited to 45 m to reduce impacts on aquatic habitat. (Page 4-25). The Olive Downs South Domain access road would require one crossing of the Isaac River and a crossing of an ephemeral drainage line, limited to a 40 m wide disturbance corridor. The crossing of the Isaac River would result in the removal of aquatic habitat and the riparian vegetation along the banks of the Isaac River. The crossing would be constructed using selected materials for the pavement with low flow culverts laid under the pavement at the lowest point in the river bed to convey low river flows beneath the access road. (Page 4-25).
34.127	Appendix E – Surface Water Assessment Part B. 4.1, p.33	<p>Impact assessment for the Ripstone Creek diversion</p> <p>Diversion of Ripstone Creek is mentioned in the Geomorphology Report (page 33): 'Open cut mining would likely directly impact a portion of lower Ripstone Creek catchment (Figure 9), so consideration would need to be given to diversion of the flow from this stream channel around the pit'.</p> <p>The geomorphology report does not include a dedicated impact assessment for the Ripstone Creek diversion (there is one for the Isaac River).</p> <p>The draft EIS does not discuss the impacts of the Ripstone Creek diversion upon the environmental values of the receiving environment (where the creek is constructed), and on the loss/degradation of environmental values associated with the removal of this portion of Ripstone Creek.</p> <p>Discussion appears limited to Section 4, Table 4-6, page 4-34 which cites negligible impacts on the extent, frequency and duration of fish passage.</p>	<ol style="list-style-type: none"> Include an impact assessment for the Ripstone Creek diversion in accordance with DES's management hierarchy. Discuss impacts of the Ripstone Creek diversion on environmental values of the receiving environment (where the creek is constructed), and on the loss/degradation of environmental values associated with the removal of this portion of Ripstone Creek. 	Section 13 of the Flood Assessment (Appendix F of the draft EIS) includes a detailed assessment of impacts to environmental values associated with the Ripstone Creek Diversion, including a Function Diversion Design and Monitoring Strategy.
34.128	Appendix E – Surface Water Assessment Part B 5.2 p.80 Appendix E – Surface Water Assessment Part B 7 p.91	<p>Appendix E (page 91) concludes that 'while there could be isolated areas subject to somewhat higher risk of scour compared to the existing situation, the overall risk of rapid and significant geomorphic change in the Isaac River due to the proposed mining activity was low'.</p> <p>Specifically for the Isaac River, the report states (page 80), 'Overall, the impact of the development on hydraulic variables would be small enough that a rapid catastrophic geomorphic response would not be expected. However, the channel will slowly adjust to the altered hydraulic conditions through minor changes in bed and floodplain levels or channel widths. The greatest risk to rapid catastrophic geomorphic change is loss of structural integrity and coverage of the channel bank and floodplain vegetation.</p> <p>Further detail should be provided regarding how the risk associated with loss of structural integrity and coverage of the channel bank and floodplain vegetation (to the Isaac River and other impacted watercourses) will be managed.</p>	<ol style="list-style-type: none"> Provide details regarding how the risk associated with loss of structural integrity and coverage of the channel bank and floodplain vegetation (to the Isaac River and other impacted watercourses) will be managed. Monitoring must be carried out annually once impacts commence at defined monitoring points along impacted areas along the Isaac River (reference points) in order to show if any changes occur. If any impacts are recorded on the wetland ecosystem and/or any associated vegetation (e.g. GDEs) and fauna, these impacts must be managed in accordance with the hierarchy: avoidance, minimisation/mitigation, and if necessary, offsetting. 	<ol style="list-style-type: none"> The draft EIS describes that during rehabilitation of the Project, vegetation would be established as soon as practicable on the outer batters of the temporary flood levees and permanent highwall emplacements to prevent slope face degradation. In addition to establishing vegetation on rehabilitated mining landforms, vegetation would also be encouraged to grow (e.g. through exclusion of grazing) or actively seeded/planted between the mining area and the Isaac River and along the river banks where localised areas of increased velocity are predicted during flood events. This would assist in stabilising these areas to resist erosion during flood events. The draft EIS states that the Project flood management infrastructure would be inspected by a suitably qualified and experienced person once per year between the months of May and October (inclusive) (i.e. in advance of the wet season). In addition, a visual inspection of the flood management infrastructure would be carried out following major flood events (e.g. 10% AEP or greater) to identify any potential issues with erosion, settlement or slumping. Geomorphic monitoring would include topographic survey of the Isaac River channel and floodplain, repeated every year for 3 years, and then either every 5 years, or after every flood event exceeding the 5 year ARI event (e.g. 20% AEP or greater). This would be done using LiDAR technology, flown when the flow is very low. A Before-After, Control-Intervention (BACI) monitoring design would be used, with tolerable limits of change in the intervention reaches set by the observed degree of change in control reaches. Mitigation measures would be triggered by unexpectedly large changes in channel morphology identified through monitoring along the Isaac River. The most appropriate response would need to be assessed at the time. Pembroke has prepared a separate assessment which outlines the potential impacts of the Project on GDEs and Wetlands and proposed management measures.

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34.129	Chapter 4 Assessment of Project Specific Matters, 4.4, p.87	<p>Figure 4-21 shows 'dry now wet' impacts on peripheral areas associated with afflux during flood events.</p> <p>Table 4-18 summarises impacts on neighbouring/private properties in terms of predicted afflux (in metres) during modelled events.</p> <p>The distribution (length and location) of the permanent highwall emplacement indicated on Figure 4-21 is different to the closure highwall mapped on Figure 4-22b. It is unclear in the draft EIS if the changes of the different highwall designs been assessed and conclusions have been drawn for the respective modelling.</p> <p>A comment is made (page 4-91) that there is 'no significant change to the existing flood risk to infrastructure for surrounding privately-owned properties. This is based on the knowledge that these properties are already located within existing flood prone areas'. However, it does not acknowledge the new impacts arising from higher flood levels at these properties. Further consideration of these impacts should be provided.</p> <p>The draft EIS did not include a scenario of impacts from flooding should the Olive Downs North levees not be constructed or their design and location changed (page 4 -88). However, this must be included in the impact assessment.</p>	<ol style="list-style-type: none"> 1. Confirm if there are two different highwalls proposed (permanent highwall emplacement indicated on Figure 4-21 and the closure highwall mapped on Figure 4-22b). 2. Finalise the modelling based on the final design(s) (taking into account the length and locations of the two highwalls). 3. Undertake a flood impact assessment on surrounding properties based on the final design of the highwall(s). If several scenarios are proposed, impact assessment must be carried out for each of these. 4. Provide flooding modelling for the Olive Downs site, including impacts of the Olive Downs North levees. 5. Assess all potential impacts and how impacts can be avoided. 6. Follow DES's management hierarchy. 	<p>The highwall emplacement will be constructed as one continuous landform to protect the operational open cuts. Once mining within Pits ODS4, ODS5 and ODS6 is complete, the central part of the highwall emplacement will be rehandled to surround the final voids which will be created in Pits ODS3 and ODS7/8. This will create a gap in the highwall emplacement to allow runoff from rehabilitated parts of the final landform to drain towards the Isaac River and minimise the final void catchment areas. As such, the highwall designs shown on Figures 2-1 and 5-2 of the draft EIS show the configuration of the highwall emplacement during operations (Figure 2-1) and post-mining (Figure 5-2).</p> <p>The Flood Assessment has modelled the potential impacts to flood characteristics on surrounding properties for both permanent highwall emplacement configurations, referred to as the 'Developed Case' (during operations) and 'Final Landform' (post-mining).</p> <p>Updated flood modelling to reflect the final (detailed) design of the temporary levees and waste rock emplacements would be undertaken during the life of the mine and results reported in the Water Management Plan.</p> <p>Pembroke has signed a Confidentiality Agreement with Peabody to allow for sharing of information and modelling. Peabody has supplied their levee alignment which Pembroke has used to conduct more detailed flood modelling. The modelling is being conducted by Peabody's flood consultant and using Peabody's flood model. The modelling has identified where adjustments to the design of the Moorvale South levee are required. Pembroke and Peabody have maintained regular communication regarding the modelling and both parties are working towards resolution of the concerns raised in Peabody's submission.</p>
34.130	Appendix F- Flood Assessment Figures Appendix B, F, C, D	<p>Similar to the abovementioned comment, Appendix F refers to different levees.</p> <p>The permanent, post mining landform levees ('closure highwall' or 'permanent highwall') are drawn differently in the figures for C-02 AEP Flood velocity and extent vs figures Appendix B Developed Case Design Flood Results and Appendix D Impact Assessment – difference maps.</p> <p>It is unclear if the final proposed landform been modelled in the draft EIS and if the conclusions presented in the draft EIS accurately represent the final outcomes.</p> <p>Given that the structure vary on the figures throughout the draft EIS and appendices, the reliability of the modelling results and impact assessment presented in the draft EIS is questionable.</p>	<ol style="list-style-type: none"> 1. The draft EIS, including all appendices, must be updated to reflect the same scenario(s). 2. If the final designs are not known at this stage, the draft EIS must present an impact assessment based on all preferred options/ scenarios. 3. Assess all potential impacts as DES's management hierarchy. 	<p>As described above, the highwall emplacement will be constructed as one continuous landform to protect the operational open cuts. Once mining within Pits ODS4, ODS5 and ODS6 is complete, the central part of the highwall emplacement will be rehandled to surround the final voids which will be created in Pits ODS3 and ODS7/8. This will create a gap in the highwall emplacement to allow runoff from rehabilitated parts of the final landform to drain towards the Isaac River and minimise the final void catchment areas. As such, the highwall designs shown on Figures 2-1 and 5-2 of the draft EIS show the configuration of the highwall emplacement during operations (Figure 2-1) and post-mining (Figure 5-2).</p> <p>The Flood Assessment has modelled the potential impacts to flood characteristics on surrounding properties for both permanent highwall emplacement configurations, referred to as the 'Developed Case' (during operations) and 'Final Landform' (post-mining).</p>
34.131	Appendix F- Flood Assessment, 14, p.79	<p>Appendix F states 'where estimated velocity near highwall emplacements is high, then some structural works may be required on degraded stream to control stream bed level, stabilise stream meanders and protect stream banks'.</p> <p>This comment indicates that the complete impacts of the proposal are not well understood and no management measures are planned.</p> <p>Structural works in the waterway requires major management measures with a large cost and potential environmental impact associated with it. Additional assessment of the options, impacts and management/mitigation measures are required.</p>	<ol style="list-style-type: none"> 1. Include an impact assessment in accordance with DES's management hierarchy in regards to the predicted high velocities near highwalls. 2. Provide appropriate mitigation and management measures with auditable outcomes to the receiving environment (refer to comments made on ecological reference points and ongoing monitoring programs). 	<p>Under the modelled developed case, some locations were predicted to have higher values of bed shear stress on the areas of the floodplain impacted by confinement, reaching 50 N/m² for the 2% AEP design flood event. The maximum permissible shear stress method suggests that these floodplain surfaces, if maintained with complete and dense vegetation cover should remain stable (Appendix F of the draft EIS).</p> <p>Based on the outcomes of the Flood Assessment, more detailed assessment of stream power and bed shear stress has been provided in the geomorphology assessment (Fluvial Systems, 2018) (Attachment A to Appendix E of the draft EIS).</p> <p>The risk of erosion of the Isaac River channel and floodplain was assessed by Fluvial Systems (2018) using the method of maximum permissible bed shear stress and velocity assessment, with the hydraulic variables modelled as part of the Flood Assessment. The assessment of the most critical areas found that while there could be isolated areas subject to somewhat higher risk of scour compared to the existing situation, the overall risk of rapid and significant geomorphic change in the Isaac River due to the Project was low.</p> <p>The draft EIS describes that during rehabilitation of the Project, vegetation would be established as soon as practicable on the outer batters of the temporary flood levees and permanent highwall emplacements to prevent slope face degradation. In addition to establishing vegetation on rehabilitated mining landforms, vegetation would also be encouraged to grow (e.g. through exclusion of grazing) or actively seeded/planted between the mining area and the Isaac River and along the river banks where localised areas of increased velocity are predicted during flood events. This would assist in stabilising these areas to resist erosion during flood events.</p> <p>As explained in response to DES Issue 148, updated flood modelling to reflect the final (detailed) design of the temporary levees and waste rock emplacements would be undertaken during the life of the mine and results reported in the Water Management Plan.</p>
34.132	Appendix F- Flood Assessment Appendix D Appendix E - Surface Water Assessment Part A (This appendix is	<p>Maps in Appendices F and D show the areas that were 'wet and are not dry' and the areas that were 'dry now wet', predicted differences in the floodplain as a result of the project.</p> <p>The draft EIS and the appendices do not address the values associated with these areas (wet now dry / dry now wet) and do not provide the impacts of the project on their environmental values as a result of changes to the floodplain.</p>	<p>Address the values associated with these areas (wet now dry / dry now wet) and provide an impact assessment on their environmental values as a result of changes to the floodplain.</p>	<p>Areas that are shown as 'wet now dry' are those behind the temporary levees, permanent highwall emplacements and waste rock emplacements within the disturbance footprint of the Project. That is, the values of these areas have already been considered (and biodiversity offsets proposed, where relevant) as part of the assessment of impacts of the mining/development activities.</p> <p>Appendix D also demonstrates that the peripheral areas shown as 'dry now wet' is for relative comparisons only and specific to the modelled flood event. That is, for a 50% AEP event, small areas adjacent the emplacement (near Deverill) and Ripstone Creek may be subject to inundation more frequently, however as demonstrated in the 2% AEP event, is wholly within the flood extent.</p>

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	referred to in Draft EIS as Hatch 2018)			<p>Similarly, areas along the Isaac River near Vermont Park are shown as "dry now wet" for the 2% and 1% AEP events, however is wholly within the 0.1% AEP event.</p> <p>As shown for the 0.1% AEP event the other residual areas are near Ripstone Creek, North Creek and east of the waste rock emplacement near Deverill. None of these areas are subject to inundation in a 50% AEP event.</p> <p>The Flood Assessment relevantly concludes that the Project is not considered to result in any significant change to the existing flood risk for surrounding privately-owned properties or infrastructure. Cumulative impacts on flooding are not expected to lead to any significant adverse impacts on human populations, property or other environmental or social values.</p>
34.133	Appendix F- Flood Assessment, Appendix C	<p>Figure C-02 shows PMF for final landform and Figure A-05 PMF for base case. In some instances, the stream velocity in the base case is reduced by the project but no impact assessment has been provided.</p> <p>In particular the following areas have been identified:</p> <ul style="list-style-type: none"> Northern project area at the base of the 'external levee' near reporting location 12. There is reduced flow as a result of the project. Northwest of monitoring point 4 near the marker for 'Vermont park'. Base case shows high velocity in this area, it is anticipated this would be maintained if not increased as a result of the project however this is not shown on figure C-02. Southern project area, east of 'ML boundary'. The Willunga project area in base case shows areas subject to flooding near WIL5. These areas do not exist on the 'final landform' C02 modelling results. 	<p>Provide an impact assessment where the stream velocity is reduced in the base case, in particular in the:</p> <ul style="list-style-type: none"> Northern project area at the base of the 'external levee' near reporting location 12. Northwest of monitoring point 4 near the marker for 'Vermont park'. Southern project area, east of 'ML boundary'. The Willunga project area in base case shows areas subject to flooding near WIL5. 	<p>The 'external levee' referred to is the approved (yet to be constructed) Moorvale South levee. The levee was conservatively retained for the purposes of flood modelling.</p> <p>As the flood modelling demonstrates, flood levels and velocities are re-distributed and therefore some areas will result in reduced velocities due to the Project. That is, such areas may be less susceptible to the potential impacts of erosion during a natural flood event in the Isaac River, when compared to the base case.</p>
34.134	Appendix D – Groundwater Assessment Figure 4-4 p. 33 Appendix D – Groundwater Assessment Figure 5-1 page 46	<p>The boundaries of the alluvium in relation to the residual voids (pits ODS 3, 7, 8 and WIL5) are unclear. E.g. Figure 4-4 (page 33) shows the mapped extent of alluvium based on the TEM survey. It is unclear whether alluvium may overlap with the pits' area of excavation, and what impacts this may have.</p> <p>Furthermore, there are an absence of groundwater monitoring bores in MLA700033, particularly:</p> <ul style="list-style-type: none"> in the vicinity of pits ODS7 and ODS8 in the alluvium in between ODS3 and ODS8 between the proposed residual voids (pits ODS 3, 7, 8 and WIL5) and the Isaac River to the east. <p>The proposed residual voids may intersect the alluvium where saturated thickness of alluvium is approximately 10-20m (Figure 5-5).</p> <p>There is a lack of discussion regarding the applicability of the current impact assessment of the residual void in terms of groundwater (alluvium) and surface water (Isaac River) in absence of this groundwater bore data to validate.</p>	<ol style="list-style-type: none"> Confirm the boundary of the alluvium in relation to pits ODS 3, 7, 8 and WIL5, and the anticipated impacts on alluvium flow as a result of the residual voids. For MLA70003, comment on the accuracy of the current impact assessment of the residual void in terms of groundwater (alluvium) and surface water (Isaac River) given the lack of groundwater monitoring bores. Comment on the applicability of the current impact assessment of the residual void in terms of groundwater (alluvium) and surface water (Isaac River) in absence of this data. 	<p>The groundwater modelling results show that the recovered heads in the backfilled waste rock at Olive Downs South and Willunga are very similar to and/or below the adjacent alluvium. That is, while there is an overall gradient toward the voids (i.e. as localised sinks) any direct interactions with the alluvium is only a small component of the overall groundwater take at equilibrium post-closure that is predicted from Groundwater Unit 1 of 146 ML per year (i.e. only 0.4 ML/day).</p> <p>Relevantly, the Groundwater Assessment states that interference of the alluvial groundwater largely relates to increased leakage to the underlying Permian coal measures that are depressurised as a result of the Project, which is distinct from direct interception of alluvial groundwater within the proposed pit.</p> <p>DES's reference to "MLA 70003" is assumed to be a reference to MLA 700034 (i.e. the Willunga domain). There are three groundwater monitoring bores that have been installed within the Willunga domain, and this area was also covered during the TEM survey. Accordingly, there is considered to be an adequate understanding of the hydrogeological regime in this area to inform the groundwater assessment.</p>
34.135	Appendix C-02 Section 2 – Project Description Figure 2-1	<p>The final design of the permanent highwall emplacement is not clear.</p> <p>Figure in Appendix C-02 shows 2 separate 'closure highwalls', which is not consistent with figure 2-1 of the draft EIS that shows one continuous structure.</p>	<ol style="list-style-type: none"> Provide clarification to the final design of the permanent highwall emplacement. Discuss the appropriateness of the design that has been used for modelling. Carry out the impact assessment based on DES's managing hierarchy, focusing on avoidance and mitigation measures. Update draft EIS and specialist reports accordingly. 	Refer to response to DES comment 34.129.
34.136	Appendix D – Groundwater Assessment, Table 8-1, p.106	<p>Proposed site monitoring program</p> <p>Insufficient detail on bore locations was provided in Appendix D, Table 8-1, and there was not an indicative timeframe for installation that linked to the project development/mine stage.</p>	<ol style="list-style-type: none"> The proposed site monitoring program as detailed in Table 8-1 must be included in the draft EA, together with a figure(s) showing the location of the monitoring bores (similar to Figure 8-1 but of a higher resolution and more zoomed in). Bore locations must be provided in latitude/longitude in decimal degrees format to 5 decimal places. The proposed bores must have an indicative timeframe for installation linked to the project development/mine stage. 	<p>Pembroke has updated the proposed EA conditions (groundwater monitoring locations and triggers). The revised proposed EA conditions have been provided as Appendix B to the Additional Information to the EIS.</p> <p>A figure showing the groundwater monitoring sites and their labels has been included as Figure 2 in the revised proposed EA conditions.</p> <p>All proposed bores have been included in the draft EA conditions. A footnote has been added as follows: "Approximate location only, to be confirmed. Indicative timeframes for installation of bores provided in the Water Management Plan."</p> <p>The coordinates for the bore groundwater monitoring locations within the proposed EA conditions (Appendix B to the Additional Information to the EIS) have been presented as Eastings and Northings, consistent with the requirements of the Model Mining Conditions. The response to DES comment 34.7 includes the latitude and longitude coordinates of all sites in the draft EIS that were presented as Eastings and Northings.</p>

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34.137	Appendix D – Groundwater Assessment 8.2.1 p.109	There is no Sb (Antimony) included in the metals/metalloids that are proposed to be tested for laboratory analysis as part of groundwater quality monitoring. Antimony is a trace element often associated with sulfides in coal.	Include of Sb (Antimony) to the analysis suite.	Antimony is not included in the DES Baseline Assessments Guideline, nor is it included in the model mine conditions. The proposed groundwater monitoring suite of parameters have been developed by HydroSimulations and the proposed monitoring program was subject to peer review by Dr Frans Kalf. Recommendations for the water quality monitoring suite were also made by Terrenus (geochemistry).
34.138	Appendix D – Groundwater, Figure 8-1, p.110	Proponent commitment to be included in draft EA Figure 8-1 in the draft EIS should be included in the EA. It is important to show the proposed bore monitoring network with similar figures as in Figure 8-1 but with greater detail: i.e. showing the MB/VWP in each aquifer, e.g. a figure for the alluvium network, the Vermont Upper network etc. The monitoring bores which state 'Regolith' as the aquifer must be better defined in terms of weathered tertiary/weathered quaternary deposits etc., so that results are more comparable to other mines in the region.	1. Figure 8-1 should be included in the proposed draft EA but at increased resolution to see the bore names. 2. The draft EIS commitment(s) should be included in draft EA for inclusion as stated conditions in the Coordinator General's Evaluation Report. 3. Include in the draft EIS the proposed bore monitoring network with similar figures as in Figure 8-1 but with greater detail: i.e. showing the MB/VWP in each aquifer, e.g. a figure for the alluvium network, the Vermont Upper network etc. 4. Include in the draft EIS and the draft EA the monitoring bores which state 'Regolith' as the aquifer must be better defined in terms of weathered tertiary/weathered quaternary deposits etc., so that results are more comparable to other mines in the region.	1, 3. A figure showing the groundwater monitoring sites and their labels has been included as Figure 2 in the revised proposed EA conditions. The revised proposed EA conditions include the details of the monitoring network. 2. Pembroke has provided a revised list of Proponent Commitment in Section 22 of the Additional Information to the EIS. These include all commitments made throughout the draft EIS and the Additional Information to the EIS, for consideration in the Coordinator-General's Evaluation Report. The commitment to prepare Vegetation Clearance Procedures, a Water Management Plan, Weed and Pest Management Plan and Erosion and Sediment Control Plan are included in Section 22. 4. 'Regolith' is differentiated from 'Alluvium' in the tables. The terminology is used to also be consistent with the findings of the TEM survey that reports that Alluvium of >20m thickness occurs only in a narrow corridor along the existing path of the Isaac River. Beyond the defined thick Alluvium extents, the weathered sediments (of Tertiary or Quaternary age) become less defined and therefore is referred as "Regolith".
34.139	Appendix D – Groundwater, 8.2.2, p.111	Groundwater quality trigger values No timeframe is specified for establishing groundwater quality trigger values. Whilst it is stated, 'The trigger levels will be established once 12 to 24 months of data have been collected from the site monitoring network' (p.111), there is no indication of when this process will begin or be finalised. It is of high importance that trigger values are included in the draft EA and not TBA values. DES recommends that interim trigger values are included for existing bores prior to the finalisation of the draft EIS and as part of the Coordinator-General's stated (draft EA) conditions.	Include interim groundwater quality trigger values in the proposed EA conditions.	Groundwater quality trigger values have been included as Table E2 in the revised proposed EA conditions (Appendix B of the Additional Information to the EIS).
34.140	Appendix D – Groundwater Assessment. 8.2.2, p.111	The groundwater assessment states that 'Every five years the validity of the model predictions would be assessed and if the data indicate significant divergence from the model predictions, the groundwater model would be updated for simulation of mining.' The plan to assess and update (recalibrate) the groundwater model every five years will not be sufficient given the limited dataset used in the model construction. Given the model calibration data is based on a limited monitoring dataset at the time of model construction, DES recommends including a condition in the Coordinator-General's stated (draft EA) conditions requiring that the model is recalibrated within two years of operation ,and then assessed every five years until the end of life of operations.	1. Amend the timeframe of the assessments to include an initial assessment and recalibration of the groundwater model within two years of operation; followed by regular assessments every five years, or a longer timeframe as approved by the administering authority, until the end of operations. 2. Include a condition stating this commitment for inclusion as stated condition in the Coordinator General's Evaluation Report.	Pembroke accepts this condition (initially 2 years and then 5 years or longer).
34.141	Appendix 5 Groundwater Attachment 5 Landholder Bore Census Section 4.9.3, p.7	Attachment 5 in Appendix 5 states 'Where further chemical sampling was conducted...' There was insufficient explanation as to why metal/metalloid analysis was not conducted at all available sites.	Explain why metals/metalloid analysis was not conducted at all available sites to establish a comprehensive baseline dataset of the off-site bores.	Field measurements were conducted for the key parameters (i.e. pH, EC, temperature, DO) during the bore census. The bore census involved sampling for water quality using a grab sample from a bailer which did not provide representative samples that would be required for laboratory analysis. Groundwater quality monitoring of the Project monitoring bores will continue to be undertaken on a quarterly basis. As part of the full water quality monitoring, in addition to collecting field parameters (EC and pH), water samples will be submitted to a NATA accredited laboratory (ALS) for analysis of: <ul style="list-style-type: none"> • Physio-chemical indicators (total dissolved solids (TDS) and total suspended solids (TSS). • Major Ions (calcium, fluoride, magnesium, potassium, sodium, chloride, sulphate), hardness and ionic balance (total anions/cations). • Total alkalinity as CaCO3, HCO3, CO3. • Total and dissolved metals: (Ag, Al, As, B, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, U, V and Zn). It is also proposed that quarterly groundwater level and quality monitoring be conducted on accessible landholder bores predicted be impacted by the Project, if permitted by the landholders.
34.142	Section 6 - General Environmental Protection Commitments and Model Conditions, 6.1.1, Figure 5.1, p.6-2	Figure 6-1 indicates that no groundwater monitoring is proposed to be undertaken outside of the project area as part of the proposed conditions for the draft EA. It is unclear why groundwater monitoring will not continue to incorporate the monitoring of bores outside of the project area, as was done for the baseline studies (Section 4, Figure 4-13), to monitor drawdown and ensure make good agreements are complied with.	Include groundwater monitoring outside of the project area where needed.	Pembroke has updated the draft EA conditions to include the details of the groundwater monitoring locations, including adding a figure showing the location of the monitoring sites. All the monitoring bores installed by Pembroke are located within the mining tenements (including a number of bores located outside the Project disturbance area), and a number of private landholder bores located beyond Pembroke's mining tenements are also proposed to be monitored.

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		<p>Off-tenure investigations would be required where the on-tenure bore results showed a greater than expected drop in groundwater levels.</p> <p>As much of the land outside the project area is owned for the project proponent, there should not be any substantive reasons why monitoring bores could not be established and serviced off the mine site.</p>		<p>Although the monitoring program is considered to be adequate for the Project (as determined by the Peer Reviewer), the groundwater monitoring programs will evolve during the life of the mine and the EA conditions and Water Management Plan can be amended accordingly. It is agreed that consideration of off-tenure investigations could be undertaken if on-tenure bore results showed a greater than expected drop in groundwater levels, at that time.</p>
34.143	Appendix F- Flood Assessment, 15.4, p.84	<p>Flooding impact on Olive Downs North Coal Mine</p> <p>The flood assessment states that the 'Olive Downs North levee (Peabody) could potentially increase by up to 0.5m, 0.7m and 1.6m ... due to the Olive Downs Coking Coal Project. That is, the final design and construction of the Olive Downs North (ODN) levee (when installed) should be undertaken cognisant of the potential flood level increases/afflux, noting however that the predicted flood level increases may be less subject to the installed levee location.'</p> <p>This implies that the activities of the proposed project, particularly the Olive Downs South domain, may result in flood waters overflowing the approved temporary levees of Olive Downs North, and flow into active mining pits of Olive Downs North if the sites levees are not increased.</p> <p>In this regard, the draft EIS does not adequately assess the level of impact the proposal will have on the existing environment, and does not appear to take into account pre-existing approvals, such as the Olive Downs North EA.</p>	<ol style="list-style-type: none"> 1. Provide appropriate level of confidence that the activities of the proposed project, particularly the Olive Downs South domain, will not result in a potential for flood waters to enter into active mining pits of Olive Downs North. 2. Take into account any pre-existing approvals, such as the Olive Downs North EA. 	<p>Pembroke has signed a Confidentiality Agreement with Peabody to allow for sharing of information and modelling. Peabody has supplied their levee alignment which Pembroke has used to conduct more detailed flood modelling. The modelling is being conducted by Peabody's flood consultant and using Peabody's flood model. The modelling has identified where adjustments to the design of the Moorvale South levee are required. Pembroke and Peabody have maintained regular communication regarding the modelling and both parties are working towards resolution of the concerns raised in Peabody's submission.</p>
34.144	Appendix F- Flood Assessment	<p>Temporary levee buffer from waterway</p> <p>The proposed temporary levees do not appear to have been located in such a way as will make them safe, stable and non-polluting. Rather, they appear to be located directly adjacent the Isaac River.</p> <p>Refer to comments made on appropriate buffer zones to riparian vegetation and wetlands.</p>	<ol style="list-style-type: none"> 1. Provide the minimum distance the temporary levees will be located from the Isaac River. A 500m buffer for the Isaac River may be adequate; however, further justification of this buffer width is required to show that this buffer width is sufficient to maintain riparian habitat, protect against pollution and maintain wetland and stream values. Justification should be provided for any buffer less than 500m. The delineation of the buffer must be described and shown on maps. 2. When determining the minimum distance, ensure that flow, erosion and other appropriate characteristics of the Isaac River are described and accounted for. 3. Ensure that the distance of levees from the Isaac River will be safe, stable and non-polluting. 	<p>Pembroke considers that appropriate buffer distances between the temporary levees and the Isaac River have been proposed to manage potential impacts on the riparian corridor. Section 4.1.4 of the draft EIS provides a detailed description of the proposed buffer distances associated with the mining pits, overland conveyor, access road, haul road, water pipeline, ETL and rail spur. Further to this, Section 2.10 of the draft EIS provides a description of the project justification, including an assessment of Project alternatives, including alternative locations for infrastructure components.</p> <p>The draft EIS describes that during rehabilitation of the Project, vegetation would be established as soon as practicable on the outer batters of the temporary flood levees and permanent highwall emplacements to prevent slope face degradation. In addition to establishing vegetation on rehabilitated mining landforms, vegetation would also be encouraged to grow (e.g. through exclusion of grazing) or actively seeded/planted between the mining area and the Isaac River and along the river banks where localised areas of increased velocity are predicted during flood events. This would assist in stabilising these areas to resist erosion during flood events.</p> <p>Project flood management infrastructure would be inspected by a suitably qualified and experienced person once per year between the months of May and October (inclusive) (i.e. in advance of the wet season). In addition, a visual inspection of the flood management infrastructure would be carried out following major flood events (e.g. 10% AEP or greater) to identify any potential issues with erosion, settlement or slumping. Geomorphic monitoring would include topographic survey of the Isaac River channel and floodplain, repeated every year for 3 years, and then either every 5 years, or after every flood event exceeding the 5 year ARI event (e.g. 20% AEP or greater). This would be done using LiDAR technology, flown when the flow is very low. A Before-After, Control-Intervention (BACI) monitoring design would be used, with tolerable limits of change in the intervention reaches set by the observed degree of change in control reaches. Mitigation measures would be triggered by unexpectedly large changes in channel morphology identified through monitoring along the Isaac River. The most appropriate response would need to be assessed at the time.</p> <p>Additional mitigation measures would be triggered by unexpectedly large change in channel morphology identified through monitoring. The most appropriate response would need to be assessed at the time.</p>
34.145	Appendix F- Flood Assessment 12.2, p.52	<p>Permanent highwall emplacement buffer from waterway</p> <p>The proposed permanent highwall emplacement does not appear to have been located in such a way as will make them safe, stable and non-polluting. Rather, they appear to be located directly adjacent the Isaac River.</p>	<ol style="list-style-type: none"> 1. Provide the minimum distance the permanent highwall emplacement will be located from the Isaac River. A 500m buffer for the Isaac River may be adequate; however, further justification of this buffer width is required to show that this buffer width is sufficient to maintain riparian habitat, protect against pollution and maintain wetland and stream values. Justification should be provided for any buffer less than 500m. The delineation of the buffer must be described and shown on maps. 2. When determining the minimum distance, ensure that flow, erosion and other appropriate characteristics of the Isaac River are described and accounted for. 3. Ensure that the distance of the proposed permanent highwall emplacement from the Isaac River will be safe, stable and non-polluting. 	<p>Pembroke considers that appropriate buffer distances between the permanent highwall emplacements and the Isaac River have been proposed as part of the Project to manage potential impacts on the riparian corridor. Section 4.1.4 of the draft EIS provides a detailed description of the proposed buffer distances associated with the mining pits, overland conveyor, access road, haul road, water pipeline, ETL and rail spur. Further to this, Section 2.10 of the draft EIS provides a description of the project justification, including an assessment of Project alternatives, including alternative locations for infrastructure components.</p> <p>The draft EIS describes that during rehabilitation of the Project, vegetation would be established as soon as practicable on the outer batters of the temporary flood levees and permanent highwall emplacements to prevent slope face degradation. In addition to establishing vegetation on rehabilitated mining landforms, vegetation would also be encouraged to grow (e.g. through exclusion of grazing) or actively seeded/planted between the mining area and the Isaac River and along the river banks where localised areas of increased velocity are predicted during flood events. This would assist in stabilising these areas to resist erosion during flood events.</p> <p>Project flood management infrastructure would be inspected by a suitably qualified and experienced person once per year between the months of May and October (inclusive) (i.e. in advance of the wet season). In addition, a visual inspection of the flood management infrastructure would be carried out following major flood events (e.g. 10% AEP or greater) to identify any potential issues with erosion, settlement or slumping.</p>

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				<p>Geomorphic monitoring would include topographic survey of the Isaac River channel and floodplain, repeated every year for 3 years, and then either every 5 years, or after every flood event exceeding the 5 year ARI event (e.g. 20% AEP or greater). This would be done using LiDAR technology, flown when the flow is very low. A Before-After, Control-Intervention (BACI) monitoring design would be used, with tolerable limits of change in the intervention reaches set by the observed degree of change in control reaches. Mitigation measures would be triggered by unexpectedly large changes in channel morphology identified through monitoring along the Isaac River. The most appropriate response would need to be assessed at the time.</p> <p>Additional mitigation measures would be triggered by unexpectedly large change in channel morphology identified through monitoring. The most appropriate response would need to be assessed at the time.</p>
34.146	Appendix F- Flood Assessment, 12.2, p.52	<p>Permanent highwall emplacement timeframe</p> <p>Insufficient information has been provided with regards to construction and rehabilitation timeframes for the permanent highwall emplacement.</p>	Provide details regarding when the construction of the proposed permanent highwall emplacement would likely commence, and when rehabilitation would be complete to ensure it is safe, stable and non-polluting as soon as possible.	Figures 2-3, 2-4, 2-6 and 2-8 of the draft EIS show the progressive development and rehabilitation of the permanent highwall emplacement during the life of the Project. Rehabilitation would commence within six months of sections of the permanent highwall emplacements becoming available for rehabilitation. Rehabilitation of the permanent highwall emplacement would be complete prior to the landform being required for flood protection of the active open cut pits.
34.147	Section 4 - Assessment of Project Specific Matters 4.4 p. 87 Appendix F – Flood Assessment, 15.3.1, p. 84	<p>The temporary and permanent levee (highwall) structures are shown to exacerbate flooding at neighbouring locations and private properties adjacent to the Isaac River in the vicinity of the project. The most seriously affected is Vermont Park where Table 4-18 indicates that the flood level is increased by 2.0 metres during a 1% AEP flood event.</p> <p>Impacts on homesteads / privately-owned properties downstream of the waste rock emplacements have not been addressed sufficiently in the draft EIS – Section 4.4.</p>	Indicate how the adverse flooding impacts on privately-owned properties and associated private infrastructure is addressed during the life of the mine and after closure of the mine.	<p>While the afflux change may (for example) be increased by 2.0 metres during a 1% AEP flood event on the Vermont Park property, it is within existing flood prone areas on the property (note the asterisk and footnote in Table 4-18 of the draft EIS). Each impact assessment difference map figure presented in Appendix D of the Flood Assessment also relevantly shows the few areas that the model predicts are currently dry that would consequently become wet (depending on the event).</p> <p>For clarification purposes, the Predicted/Afflux Changes at Neighbouring/Private Properties presented in Table 4-18 of the draft EIS are for the predicted maximum values (i.e. during the life of the mine and after mine closure) for those within/adjacent the Project area.</p> <p>As shown in Table 4-18, some homesteads / properties in closer proximity (Winchester Downs, Leichardt and Old Bombandy) to other downstream homestead / properties further afield are predicted to have negligible impacts (i.e. less than 0.1m). That is, other homesteads / privately-owned properties downstream of the waste rock emplacement that are not listed in Table 4-18 would be expected to have negligible to no impacts (i.e. lesser downstream with distance).</p> <p>In terms of scale, it is also noted that the cumulative flood modelling showed that the downstream effects of the approved Olive Downs North levees alone would be immeasurable at the Deverill gauging station (located 3 km downstream).</p> <p>Furthermore, as stated in Section 4.4.3 of the draft EIS:</p> <p><i>‘The changes in flow velocity up to and including the 0.1% AEP event are therefore predicted to be relatively small in most areas adjacent the Project, with absolute flow velocities similar to areas downstream in the natural section of the stream (Figures 4-22a and 4-22b).’</i></p> <p>The final landform 0.1% AEP flood velocity and extents figure presented in Appendix C of the Flood Assessment has been prepared to allow comparison to the developed case 0.1% AEP flood velocity and extents figure presented in Appendix B of the Flood Assessment. In general, the predicted maximum values occur during the life of the mine (i.e. when the extent of temporary levees and permanent highwall emplacements are the largest). Relevantly, an afflux map (existing versus developed) is also presented in Appendix D of the Flood Assessment to allow direct comparison of the extent of the predicted changes.</p> <p>Finally, as concluded in the Flood Assessment:</p> <p><i>‘Cumulative impacts on flooding are not expected to lead to any significant adverse impacts on human populations, property or other environmental or social values.’</i></p>
34.148	Appendix F – Flood Assessment Appendix B	The Base Case Design Flood Results included figures showing Flood Levels, Velocities and Extents for the 50%, 2%, 1%, and 0.1% AEP floods, but not for the probable maximum flood.	<p>Update the Base Case Design Flood Figure to include the probably maximum flood, so that changes in flood levels can be assessed in the later figures showing Afflux.</p> <p>Figures in both Appendix B and Appendix D (in Appendix F- Flood Assessment) should be updated.</p>	<p>The Base Case PMF levels are presented Appendix A of the Flood Assessment.</p> <p>The Final Landform PMF levels are presented in Appendix C of the Flood Assessment to demonstrate the final voids would remain outside the Isaac River in a PMF event.</p> <p>The Developed Case PMF levels are not shown in Appendices B or D as active mining areas only require protection from flood events up to a 1:1,000 year ARI event.</p>
34.149	Section 4 – Assessment of project specific matters 4.4 p.87 Appendix F- Flood Assessment 12.1 p. 52 Appendix F- Flood Assessment 13.4.2 p. 57	<p>The draft EIS in section 4.4 states that ‘Identification of potential flood protection works for the Project was based on the following key criteria:</p> <ul style="list-style-type: none"> 0.1% AEP design event flood protection for open cut pits in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures [‘The Manual’] (DEHP, 2016b)’ and that ‘Construction of temporary flood levees (or sufficiently robust waste rock emplacements) (Figures 2-3 to 2-9) is required to provide immunity for infrastructure and mining operations to flood levels during a 0.1% AEP flood event’. [...] ‘The construction of permanent highwall emplacements to the east and south-east of the proposed Olive Downs South domain open cut pits adjacent to the Isaac River floodplain are required to provide immunity to flood levels up to at least a 0.1% AEP flood event’. Furthermore, the draft EIS states that temporary levees constructed will not be 	<ol style="list-style-type: none"> The draft EIS must be updated to be compliant with the requirements of The Manual, i.e. that all levees and waste rock emplacements, which are protecting mining pits from the ingress of flood water, are defined as regulated structures. All regulated structures must be designed and constructed by RPEQ engineers – suitably qualified and experienced persons. ‘Design Plans’ and ‘As Constructed Plan’s for regulated structures must be submitted to the administering authority. Corresponding clarifications and redrafting of content should also be undertaken in sections 12.1 and 13.4.2 of Appendix F. 	Pembroke acknowledges that all levees proposed for the Project are defined as regulated structures. All regulated structures will be designed and constructed by RPEQ engineers – suitably qualified and experienced persons. ‘Design Plans’ and ‘As Constructed Plan’s for regulated structures will be submitted to the administering authority, consistent with the proposed EA conditions for the Project.

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		<p><i>engineered but will be constructed as waste drop dumps ('waste rock emplacements'). This approach is not in accordance with requirements of the Manual.</i></p> <p>From this description it can be assumed that the construction of both temporary and permanent structures are necessary to prevent the 0.1% AEP flood events entering the pits during mining operations.</p> <p>Version 5 of The Manual states in section 2.3.1 that 'Where a levee is designed to prevent ingress of non-mine affected flood water into an operational area, or catchment of a containment system, the suitably qualified and experienced person conducting and certifying the assessment and construction would declare that the levee is a regulated structure where the flood modelling shows that the pit would be encroached by a flood event with a probability more likely than or equal to 1:1000 AEP.' Table 7 of The Manual requires that these levees must be constructed to a level which excludes the 0.1% AEP Flood Event from the pits.</p> <p>Therefore both temporary and permanent structures preventing ingress of flood waters into the pits are categorised as regulated structures, and are subject to the engineering design, construction, and certification requirements of The Manual. This is notwithstanding a notional assessment presented in this EIS that classifies the levees as of "low" consequence category.</p> <p>These regulated structures must be designed and constructed by RPEQ engineers – suitably qualified and experienced persons, and that 'Design Plans' and 'As Constructed Plans' for these regulated structures will need to be submitted to the administering authority.</p>		
34.150	Appendix M- Soil and Land Suitability Assessment Attachment 1 p.112 Section 4 – Assessment of project specific matters 4.10.3 p.153	<p>It is unclear whether the assessment of a contaminated site must be undertaken by a suitably qualified person (SQP).</p> <p>Note that as per the draft EIS information Guideline – Contaminated Land, 'The assessment of a contaminated site must be undertaken by a suitably qualified person (SQP) to ensure that risks associated with any contamination on site are assessed and managed appropriately, and that a considered recommendation can be made to EHP regarding the status of land on the EMR or CLR'.</p> <p>There was insufficient explanation as to why part of MLA700034, the Old Bombandy property, was excluded from the assessment.</p> <p>It is recommended by the specialist that it be assessed prior to disturbance. This is required under the TOR.</p> <p>On p. 153 or Section 4 it is proposed that contaminated land would be 'adequately remediated by appropriately qualified specialists'. As per the EP Act this work must be completed by an SQP.</p>	<ol style="list-style-type: none"> 1. Confirm that the person who carried out the assessment of the contaminated site is a SQP. 5. Ensure that any further assessment of a contaminated site will be undertaken by a SQP. 	<p>The initial site assessment was carried out by GT Environmental under the supervision of a suitably qualified person. In addition, the Land Contamination Assessment was reviewed and signed-off by a suitably qualified person.</p> <p>Section 22 of the Additional Information to the EIS describes that any future assessments would be conducted by a suitably qualified person.</p>
34.151	Section 2 – Project Description 2.1.6 - Workforce p. 19	<p>The draft EIS stated that there will be 'approximately 1300 on-site personnel... an average of 1,000 over the life of the Project'. At the same time the draft EIS stated that there will be 2 x 50 kL/day sewage treatment plants which would treat 500 persons (100 kL/day)/(200 L/ep/day) = 500 ep).</p> <p>No explanation has been given as to how the sewage from the remaining 500-800 operational workforce will be treated.</p>	Explain why only 2 x 50kL/day sewage treatment plants are proposed to be installed and operated at mine site and how the sewage from the remaining 500-800 operational workforce will be treated.	<p>Pembroke has undertaken MEDLI modelling of the proposed irrigation of treated effluent to land. The MEDLI modelling report is provided in Appendix C (attached).</p> <p>The MEDLI modelling confirms the irrigation areas shown on Figure 2-28 of the draft EIS are required to be increased in size to a total of 5.5 ha between the two mining domains to cater for the maximum expected irrigation volume when the Project workforce reaches its maximum during the 20 Mtpa mining scenario. As such, a revised version of Figure 2-28 from the draft EIS is provided as Figure 3-1 of the Additional Information to the EIS, showing the larger effluent irrigation areas at Olive Downs South and Willunga domains (i.e. approximately 4 ha at Olive Downs South and approximately 2 ha at Willunga).</p> <p>A revised EA Condition G8 has been included in the revised draft EA conditions (Appendix B of the Additional Information to the EIS) which requires a minimum area of 5.5 ha of land, excluding any necessary buffer zones, must be utilised for the irrigation and/or beneficial reuse of treated sewage effluent, consistent with the MEDLI modelling outcome.</p>
34.152	Section 2 – Project Description 2.6.4 p. 62 Section 6 - General Environmental Protection Commitments and Model Conditions 6.2.7 p. 35	<p>The draft EIS stated that there will be 2 x 50kL/day sewage treatment plants, each with a minimum irrigation area of 2.5ha. But proposed licence condition G8 (Page 6-35) only refers to a total of 2.5ha and not 5.0ha.</p>	<p>Provide an updated total irrigation area that is in line with the proposed licence condition.</p> <p>If the sewage treatment plants have to be increased to account for the remaining 500-800 operational workforce (see previous issue), amend the proposed total irrigation areas accordingly.</p>	
34.153	Section 6 - General Environmental	Condition G2b incorrectly approves the use of treated sewage effluent for the purpose of dust suppression and/or firefighting.	Delete Condition G2b.	The proposed EA conditions have been updated to delete this condition as requested.

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	Protection Commitments and Model Conditions 6.2.7 p.35	Please note that DES has revised the Model Mining Conditions for ERA 63 (sewage treatment) and has removed this condition. Currently, only Class A+ recycled water is to be used for fire-fighting and dust suppression (see Table 6.3, Page 50 of 2005 EPA Queensland Water Recycling Guidelines).		
34.154	Section 6 - General Environmental Protection Commitments and Model Conditions 6.2.7, p.35	Table G1 – Contaminant Release Limits to Land does not contain a maximum total dissolved salt (TDS) concentration (in mg/L) and electrical conductivity (EC) maximum limit (µS/cm). These value affect whether effluent irrigation will be justifiable.	Provide maximum TDS and EC values using MEDLI modelling for treated sewage wastes that will be irrigated.	Pembroke prepared the draft Table G1 – Contaminant Release Limits (as presented in the draft EIS) in accordance with the Model Mining Conditions. The Model Mining Conditions do no stipulate TDS and EC as release limits for treated sewage effluent. As such, Pembroke does not propose to include these parameters in Table G1. Notwithstanding, the MEDLI modelling prepared for the Project (Appendix C attached) was prepared with a maximum TDS of 650 mg/L.
34.155	Section 4 – Assessment of project specific matters, 4.14.4, p.173	There is a high risk that, if run automatically, the treatment plants proposed for the Olive Downs project will not produce effluent in accordance with effluent quality specified in the proposed EA. The draft EIS stated, 'The sewage treatment plants would be operated automatically...'. A Moving Bed Biofilm Reactor (MBBR) sewage treatment plant is a sophisticated system that requires active process control by a qualified person. These plants should be operated by staff who have been trained to operate such facilities.	Provide further explanation on how the proposed 2 x "MBBR" package treatment plants could be operated without trained staff. For example, provide reasons as to why an appropriately qualified person (e.g. with a Certificated III in Water Operations (Sewage Treatment)) will not be required to operate this system.	The proponent commitments tables in Section 22 of the Additional Information to the draft EIS has been updated to identify that an appropriately qualified person would be engaged to operate the sewage treatment plant.
34.156	Section 2 – Project Description, 2.6.4, p.62	There is insufficient modelling proposed in the draft EIS, which states '...As part of the detailed design phase, modelling will be conducted to confirm the design of the effluent irrigation system and wet weather storage tank capacities, using the Model for Effluent Disposal Using Land Irrigation (MEDLI) software...'. Assessment should include the local groundwater and its environmental values at the disposal site. Furthermore, there is currently no irrigation management plan. Refer to Attachment 2 of this submission on further information on this component of the MEDLI modelling system. Without this information, DES is unable to recommend draft conditions for ERA 63 to the Coordinator-General.	Undertake MEDLI modelling and submit to DES for review. The MEDLI modelling for the proposed irrigation of treated sewage wastes should address the parameters outlined in Attachment 2. The assessment in the draft EIS should also include an assessment on the local groundwater and its environmental values at the disposal site. It recommended that an irrigation management plan need to be prepared prior any irrigation practises.	Refer to responses 151 and 152.
35. Isaac Regional Council				
35.1	SIA - 2.2 Study area	Acknowledged that the proponent has taken into account feedback regarding the inclusion of Moranbah, Middlemount, Dysart, Coppabella and Nebo as potentially affected communities in accordance with its obligations pursuant to the SSRC Act.	The definition of Nebo should be amended to reflect that Nebo is a smaller community (when compared with Moranbah) with a lower level of social infrastructure provision, but with a relevant skills base and significant potential for growth.	Pembroke acknowledges that Nebo is a smaller community compared to Moranbah with a lower level of social infrastructure provision, but with a relevant skills base and significant potential for growth. Pembroke will acknowledge this through future revisions of the SIMP.
35.2	SIA - 2.2 Study area	Figure 2-2 'Potentially Affected Communities within SIA Study Area' does not mark Dysart as an SIA Local Community of Interest.	IRC requests that this omission be corrected.	A revised version of Figure 2-2 is provided at the end of this section, showing Dysart as a 'Potentially Affected Community within the SIA Study Area'.
35.3	SIA - 2.2 Study area	The comment which states "the Project intends that Isaac LGA communities will be integral to its supply chain, as a source of employees, including both existing residents and new residents attracted by the Project; construction services, labour and equipment; supply of goods and services to the operation; and social infrastructure for employees and families" is acknowledged.	Nil.	Noted.
35.4	SIA - 2.3 Methodology	It is noted that the SIA Engagement Program outlined in Table 2-3 is comprehensive, however clarification is required.	IRC seeks clarification as to whether local doctors surgeries were consulted as part of consultation with 'social and health infrastructure providers'. If local doctors were not included in the stakeholder engagement it is recommended that the Social Impact Assessment be revised to account for their respective views to ensure that the SIA meets the 'participatory' key SIA principle.	Pembroke can confirm that local doctors were consulted as part of the SIA consultation process.
35.5	SIA - 2.3 Methodology	In relation to section 2.3.4, IRC remains concerned for impacts where there are fewer valid metrics. The reference to "professional experience applied" is only validated by the SIA community survey and workshop inputs. It is noted the SIA community survey received 153 responses and was noted to be "insufficient to provide statistically valid survey results"	IRC should be consulted in assessing the impacts of the Project on areas for which there are fewer valid metrics, noting its past experience in areas such as 'community cohesion'.	Pembroke continues to consult with the IRC, including through the formation of a working group to coordinate the development of infrastructure and through consultation regarding the development of the Workforce Housing and Accommodation Plan and a Health and Community Wellbeing Plan.

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35.6	SIA - 2.3 Methodology	It is noted that whilst the community survey was completed 16 to 17 months ago (June/July 2017), which is acknowledged to be a small period of time in consultancy terms, IRC is concerned given the significant economic change which has occurred over that period as well as the low response rate to the survey (which is admitted to be insufficient to rely upon by the Proponent) that the survey results are unreliable and do not foster to 'rigorous' SIA key principle. It is recommended that the SIA be re-conducted to ensure that up to date data has informed the SIA, with a specific focus on communities who did not have a large enough sample size to validate results.	Nil.	Pembroke acknowledges that community surveys were completed in 2017, however Pembroke continued to update the SIA with relevant baseline data as it was prepared and ultimately submitted to the Office of the Coordinator-General in August 2018. Pembroke considers that significant efforts were made in promoting community participation in the surveys, and that the low response rate to the surveys is reflective of the community's views on the development of a new mining project in the region (i.e. only a relatively small proportion of people in the region have strong views on mining development). Notwithstanding the above, the SIMP will be reviewed annually and updated with contemporary monitoring data, as committed to in Section 6.2 of the SIA.
35.7	SIA - 3.3 Engagement mechanisms and results	Council notes that most matters raised in previous discussion with the Proponent in relation to the Social Impact Assessment have been canvassed at 3.3.1.	However in the interest of completeness requires all matters identified by Council be adequately covered in this section. Such matters include, but are not limited to, IRC's identification of the following: <ul style="list-style-type: none"> The need for the Social Impact Assessment to be reviewed and updated at varying stages during the Project's life; and The need for commitment from the Proponent that they are an active partner with Council and other proponents in monitoring housing availability and affordability and implementing housing strategies where necessary to ensure community cohesion. 	Pembroke has committed to annual review and update (where required) of the SIMP. In particular, the SIMP will be updated prior to the commencement of construction. Pembroke commits to continuing to actively engage with the IRC on all matters relating to potential impacts on the community associated with the Project. In particular, Pembroke will consult with the IRC during development of the Workforce Housing and Accommodation Plan prior to the commencement of construction. The majority of the construction workforce will be accommodated within the existing workforce accommodation villages or will be existing local residents. Accordingly, the construction workforce is not predicted to impact on housing availability. 12 months prior to the commencement of operations, Pembroke will review the housing availability in consultation with the IRC. A similar exercise will be conducted 12 months prior to the commencement of operations in the Willunga domain. These reviews will be used to inform the measures Pembroke's will take ensure housing is available to new residents whilst avoiding impacts on housing availability.
35.8	SIA - 3.3 Engagement mechanisms and results	In relation to the section on 'Employment, labour supply and employment' it is requested the word "resident" be included after the word "firm".	Nil.	Pembroke acknowledges the IRC's comment, and acknowledges its employment profile requires firm <u>resident</u> workforce numbers to support Government service planning, where possible. This wording will be reflected in the Project Workforce Housing and Accommodation Plan.
35.9	SIA -3.3 Engagement mechanisms and results	In relation to the section on 'Housing', despite the Proponent's comments that "on the advice provided by ELAM and IAHT, demand for affordable and social housing in the local area is being met", the Isaac Affordable Housing Trust (IAHT) has not been consulted in the preparation of the Social Impact Assessment.	It is therefore suggested that this statement is incorrect and it is recommended the consultation with IAHT occur, to ensure that the SIA comprehensively addresses local social housing challenges. IRC does acknowledge that IAHT has been included in the Stakeholder Strategy. IAHT Board Members are well versed in the cyclical nature of the local resources economy and are well placed to provide feedback in this regard.	Pembroke commits to consulting with the IAHT during preparation of the Project Workforce Housing and Accommodation Plan.
35.10	SIA -3.3 Engagement mechanisms and results	In order to mitigate "rapid changes to housing availability", IRC seeks the following sentence to be included at the end of the paragraph: "IRC confirmed that it holds residential land which is capable of development, namely "Belyando Estate" which is intended to be developed in partnership with resource companies to ensure ongoing availability and affordability of housing".	Nil.	Pembroke acknowledges the IRC holds the "Belyando Estate" that has been identified as an option for a future residential development. Pembroke will consider the development of new housing as an option for workforce accommodation during development of the Workforce Housing and Accommodation Plan. This option, in particular the development of the Belyando Estate will be discussed with the IRC during development of the Workforce Housing and Accommodation Plan.
35.11	SIA - 3.3 Engagement mechanisms and results	IRC also highlights to the Proponent that following land is capable of development in Moranbah: <ul style="list-style-type: none"> Land banked by BHP or Anglo American; Land not yet released to the public market by private developers or investor (including vacant land within the Moranbah township, which IRC estimates to be in excess of 100 vacant lots and significant tracts of land owned by); Land owned by IAHT; Land owned by Economic Development Queensland (EDQ); or Land owned by IRC. 	There is latent stock easily developable in partnership within the abovementioned list, which will be highlighted in further detail in reference to section 4.9.	Pembroke notes these land development options. These options will be considered during development of the Workforce Housing and Accommodation Plan. The Workforce Housing and Accommodation Plan will be developed in consultation with the IRC's Land and Housing Advisory Committee.
35.12	SIA -3.3 Engagement mechanisms and results	In relation to the section on 'Local businesses and supply chains', whilst it is acknowledged that Moranbah Traders Association and Nebo Community Development Group have been consulted as part of this process, IRC recommends that the Proponent also works with such groups in addition to the Department of State Development's Regional Economic development team in the development of the local business engagement strategy for the Project to determine the appropriateness of ICN Gateway as a suitable tool for local procurement.	Nil.	Pembroke will consult with the Moranbah Traders Association and Nebo Community Development Group during development of the local business engagement strategy.

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35.13	SIA - 3.4 Summary of engagement findings	As a suggestion to mitigate impacts and maximise Project benefits under the 'Employment and workforce' section, IRC requests the Proponent ensures (through contractual, KPI and other means) EPCM Tier 1 and 2 contractors also honour local employment and procurement commitments.	Nil.	Pembroke is requiring all contractors to honour commitments being made in the EIS, including commitments regarding local employment and procurement. Monitoring of these commitments will be conducted as part of the SIMP, as described in Section 6.8 of the SIA. Monitoring data will be regularly reported to the Community Reference Groups.
35.14	SIA - 3.4 Summary of engagement findings	In 'Education and training', IRC wishes to include the following comment: 'IRC suggested that the Proponent consider funding tertiary bonded scholarships for local students'.	Nil.	Pembroke acknowledges the IRC's suggestion during the consultation process. Pembroke has committed to community development and investment initiatives, including the establishment of a Community Development Fund to support community projects and programs in the Isaac LGA, and the establishment of Community Partnerships, including the financial support of the Barada Barna Aboriginal Corporation to establish and operate a Training Centre at Nebo to develop and offer work readiness and certified qualification programs to Indigenous people. This is described in Section 6.6.6 of the SIA.
35.15	SIA - 3.4 Summary of engagement findings	In relation to the section titled 'Local business and trade', IRC wishes to include suggestions for how the project could maximise benefits for local business as follows: <ul style="list-style-type: none"> Ensuring payment terms for businesses do not exceed 30 days; Ensuring EPCM Tier 1 and 2 contractors and WAV accommodation providers are bound by the payment terms and local content requirements; and Streamlining procurement pathways. 	IRC requests that the above suggestions are built into the Proponent's Local Content and Industry Content Strategy at section 6.7 in line with the 'effective management' key principle of the SIA Guidelines.	Pembroke acknowledges the IRC's suggestions, and will consider them during development of the Local Business and Industry Content Management Strategy.
35.16	SIA - 4.1 Settlement pattern – PDAs	Section 4.1.5 of the Social Impact Assessment contains commentary on 'Local Towns' in Moranbah and refers to PDAs enabling further urban development to accommodate growth.	IRC wishes to note two matters. Firstly, IRC foreshadows that there is likely to be change to the PDAs in light of the new Planning Scheme but it will be in communication with the Proponent in relation to this matter. Secondly, IRC wishes to note that at present the land available to housing development is as follows: <ul style="list-style-type: none"> Land banked by BHP or Anglo American; Land not yet released to the public market by private developers or investor (including vacant land within the Moranbah township, which IRC estimates to be in excess of 100 vacant lots and significant tracts of land); Land owned by IAHT; Land owned by Economic Development Queensland (EDQ); or Land owned by IRC. There is latent stock easily developable within abovementioned list and this matter has been further expanded upon in IRC's comments regarding 4.9. One of IRC's primary priorities is to ensure that the SIA sees the Proponent committing to investing in its own housing stock to ensure sustainability of supply for its resident workforce and to ensure that the SIA is consistent with the 'lifecycle-focused' key principle.	Pembroke notes these land development options. These options will be considered during development of the Workforce Housing and Accommodation Plan.
35.17	SIA - 4.1 Settlement pattern – PDAs	Section 4.1.5 also makes reference to the resident population in Moranbah however the non-resident population should also be referenced to illustrate the impact the non-resident population has on the town's housing and infrastructure supply. It is noted that the impact of the non-resident population is also canvassed elsewhere in the SIA and in comments in the submission.	Nil.	Pembroke acknowledges the impact the non-resident population has on Moranbah's housing and infrastructure supply (e.g. demands on temporary housing, health and emergency services etc.), as noted throughout the SIA.
35.18	SIA - 4.2 Community values	IRC considers the community values section of the SIA has been comprehensively addressed and reflects most issues in each of the impacted towns.	Nil.	Noted.
35.19	SIA - 4.2 Community values	IRC wishes to reiterate in this section that lower income families and residents are forced to leave Moranbah during upcycles and this results in a shortage of workers traditionally employed in retail, hospitality and other service delivery sectors who could not compete with the wages on offer in the mining sector. IRC acknowledges that this comment has been included in the SIA in detail below.	Nil.	Noted.
35.20	SIA - 4.2 Community values	On page 51, it is noted that "tourism development is also a recent priority" however IRC's preference is for this to instead state "tourism development is a recent and secondary priority". It is noted that servicing the mining, renewable energy and agriculture sectors remains the priority of IRC and the Isaac region more broadly.	Nil.	Pembroke acknowledges the IRC's position that tourism development is a recent and secondary priority, and that servicing the mining, renewable energy and agriculture sectors remains the priority of IRC and the Isaac region more broadly.

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35.21	SIA - 4.3 Population	IRC notes the comments that “broad hectare land available in the Isaac LGA had a theoretical dwelling yield of approximately 4,500 dwellings”. IRC notes the Proponent’s commitment to “identifying the potential need for Project support or investment to increase housing availability, in Moranbah, Dysart, Nebo and Middlesmunt, as determined” and considers that the broad hectare land available in the Isaac LGA, particularly in Moranbah, will need to be invested in and developed by the Proponent to ensure that the Proponent has a sustainable housing stock, as a matter of priority.	It is recommended a targeted housing analysis and mitigation strategy for Moranbah be developed based on the Bowen Basin Population Report and Bowen and Galilee Basins’ non-resident population projections, this is canvassed in further detail below and it is noted that the Proponent has made a commitment to working in consultation with IRC in developing a housing strategy. IRC acknowledges that data from the Bowen Basin Population Report has been consulted in the population analysis and confirms that this is the most accurate data source, to its knowledge.	Pembroke notes IRC’s recommendation and will use data from the Bowen Basin Population Report and Bowen and Galilee Basins’ non-resident population projections in the development of the Project Workforce Housing and Accommodation Plan, in consultation with the IRC. The majority of the construction workforce will be accommodated within the existing workforce accommodation villages or will be existing local residents. Accordingly, the construction workforce is not predicted to impact on housing availability. 12 months prior to the commencement of operations, Pembroke will review the housing availability in consultation with the IRC. A similar exercise will be conducted 12 months prior to the commencement of operations in the Willunga domain. These reviews will be used to inform the measures Pembroke’s will take ensure housing is available to new residents whilst avoiding impacts on housing availability.
35.22	SIA - 4.3 Population	In section 4.3.9 it is noted that “only 8.1% of the Indigenous student population in the LGA was undertaking a higher education course, compared to 13.2% of the LGA’s non-Indigenous student population, both of which were below the Queensland averages for higher education”.	IRC would like to see the Proponent provide scholarships to Isaac LGA school students in an effort to bring the participation in tertiary education to the state average and to commit to engaging with the indigenous leaders to determine opportunities to address the imbalance between indigenous and non-indigenous students undertaking tertiary studies. IRC highlights potential for the Proponent to partner with CAP-ED.	Pembroke acknowledges the IRC’s suggestion regarding scholarships. As described above, Pembroke has committed to supporting the Barada Barna Aboriginal Corporation to establish and operate a Training Centre at Nebo to develop and offer work readiness and certified qualification programs to Indigenous people. Pembroke will consider other opportunities to support education during future revisions of the Health and Community Wellbeing Plan. Pembroke has also committed to offering apprenticeships and traineeships and mentoring to support young people in Project employment (Section 6.4.5 of the SIA).
35.23	SIA - 4.4 Housing and accommodation	IRC notes the Proponent’s statement in its Training and Workforce Development Strategy at section 6.4.5 that “the Project will also investigate the feasibility of creating a local training bond for young people – incentivising the pathway from training in regional centres, with a commitment to return for the Project’s operations phase”.	IRC is concerned with the Proponent’s use of the word ‘investigate’. IRC’s position is that it is the Proponent’s responsibility in accordance with the ‘effective management’ key principle in the SIA Guidelines to invest in local training bonds for young people and recommends that the Proponent should consult with universities, the Moranbah High School and other training providers to ensure that there is a commitment for an appropriate number of locally bonded scholarships to be rolled out.	As described above, Pembroke has committed to supporting the Barada Barna Aboriginal Corporation to establish and operate a Training Centre at Nebo to develop and offer work readiness and certified qualification programs to Indigenous people. Pembroke will consider other opportunities to support education during future revisions of the Health and Community Wellbeing Plan. Pembroke has also committed to offering apprenticeships and traineeships and mentoring to support young people in Project employment (Section 6.4.5 of the SIA).
35.24	SIA - 4.4 Housing and accommodation	The Social Impact Assessment notes “Moranbah had the largest number of private dwellings at 3,659, of which 29.2% were unoccupied on the Census day”. IRC notes the later comment that “a large number of homes owned by mining companies which is currently not in use” seemingly recognises that there is some correlation between unoccupied residences and that such residences are not necessarily available to the public. In any event, IRC would like to highlight that there is a need for caution by the Proponent around equating unoccupied dwellings with available dwellings. It is IRC’s experience that most unoccupied dwellings are owned by BHP or Anglo American exclusively for their workforces and are not available to the general population, such findings are confirmed in the recent stocktake IRC has undertaken in relation to the rental market in Moranbah. IRC expects the same observation will be true with respect to the number of unoccupied dwellings in Dysart and Middlesmunt.	Nil.	Pembroke acknowledges IRC’s comments regarding housing availability and mine-owned accommodation. Pembroke will consult with other mining companies and the IRC during development of the Project Workforce Housing and Accommodation Plan to gain a better understanding of available housing in consideration of unoccupied mine-owned accommodation. The majority of the construction workforce will be accommodated within the existing workforce accommodation villages or will be existing local residents. Accordingly, the construction workforce is not predicted to impact on housing availability. 12 months prior to the commencement of operations, Pembroke will review the housing availability in consultation with the IRC. A similar exercise will be conducted 12 months prior to the commencement of operations in the Willunga domain. These reviews will be used to inform the measures Pembroke’s will take ensure housing is available to new residents whilst avoiding impacts on housing availability.
35.25	SIA - 4.4 Housing and accommodation	In relation to 4.4.8, the sentence “the number of WAV beds which are non-mine specific and potentially available to the Project” is misleading. Current anecdotal evidence from the camps suggests that many WAV operations are experiencing rapidly growing occupancy rates for existing beds and caution in relation to the data is recommended. It is noted under section 6.5.6 that the Proponent will “consult with all WAV operators in the Moranbah and Coppabella area to ascertain their likely capacity during 2019-2021”. It is suggested that such consultation should have occurred during the SIA preparation and accordingly, IRC considers that the Proponent’s analysis of the WAV component of its SIA is lacking in rigour and fails to meet the ‘rigorous’ key principle required under the SIA Guidelines. WAV capacity is further expanded upon below.	Nil.	Pembroke maintains it position that it expects sufficient capacity within the existing WAVs will be available for the Project construction workforce. This is based on Pembroke’s engagement with the WAVs directly, and the lack of significant development in the near future that could be expected to result in the uptake of existing capacity, such that the required capacity for the Project would be unavailable. Notwithstanding, Pembroke will continue to consult with the WAV operators and the IRC during development of the Project Workforce Housing and Accommodation Plan and intends to enter into an agreement with particular WAV operators to secure accommodation for the Project construction workforce.
35.26	SIA - 4.5 Disadvantage, income and cost of living	It is noted in Table 4-24, the index score for health does not capture the cost of Moranbah residents accessing specialist and birthing services in Mackay as is the norm and therefore is not representative of the true disparity between Moranbah, Mackay and by extension, Brisbane. It is also noted lower scores for expenses such as clothing and footwear may be representative of the limited and lower cost outlets for such goods in the Isaac LGA when compared with major centres with a greater number of high end retail outlets.	Nil.	Pembroke notes that the data presented in Table 4-24 is sourced from the <i>Index of Retail Prices in Queensland Regional Centres</i> (2015) and has not been developed by Pembroke itself. Pembroke does however acknowledge IRC’s comments regarding the limitations of the data. Pembroke has committed to community development and investment initiatives, including the establishment of a Community Development Fund to support community projects and programs in the Isaac LGA (described in Section 6.6.6 of the SIA). Investment in community projects and programs would be agreed in consultation with the Project’s Community Reference Group.

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		As a result of these matters, residents in the Isaac LGA are more disadvantaged than their counterparts in regional centres and cities and a level of commitment is required from the Proponent to enter into community partnerships in accordance with the 'effective management' key principles of the SIA Guidelines. IRC discusses this matter in further detail in its comments regarding 6.6 below.		
35.27	SIA - 4.6 Health	It is noted that the funding methodology for health care services does not account for non-resident populations meaning that health services in the Isaac LGA are underfunded. At the mining peak in 2012, the Isaac LGA hosted 17,125 non-resident workers and a base resident population of 23,755, this is a staggering impost on health and emergency services who are not funded to cope with almost double the population. At present the non-resident population makes up approximately a third of the Isaac LGA's total population (10,580 non-resident workers/21,199 resident workers). IRC are not recommending that the mining companies seek to mitigate that impact. IRC believe that it is the responsibility of State Government to adequately fund the provision of service to all residents and acknowledges the commitment made by the Proponent to partner with IRC in its advocacy efforts in relation to same. IRC considers that this partnership will foster a 'Lifecycle-focused' and 'reasonable' outcome in accordance with the key principles of the SIA Guidelines.	Nil.	Pembroke acknowledges the IRC comments.
35.28	SIA - 4.7 Employment and labour	It is noted that the SIA refers to there being a higher instance of youth unemployment and a skilled labour shortage. IRC highlights that the Isaac Region has a consistently and significantly lower unemployment rate than the rest of Queensland and as a result, IRC is concerned that reference to "skilled labour shortage" is misleading. Mining companies have always traditionally recruited from further afield. The fundamental change with a move to workforces being composed of high proportion non-resident numbers over the past 8 years, has been the removal of the opportunity to relocate locally once workers are employed. There is an expectation that the Proponent commits to providing a genuine choice to relocate and reside in the Isaac region and it is noted that the Proponent has made some commitment in this regard. IRC's experience is that mining companies have in the past said that they are offering genuine choice to relocate locally yet they have done nothing to drive affordability of housing (ie. by investing in housing). As a result the mining companies have resorted to FIFO workforces.	IRC would like to see this firm commitment reflected in the housing strategy and notes that the employment component is interlinked with this fundamental aspect.	Pembroke will reiterate the commitment regarding providing opportunities for its workforce to relocate and reside in the Isaac region in the Project Workforce Housing and Accommodation Plan.
35.29	SIA - 4.7 Employment and labour	IRC believes an extensive apprenticeship program in labour shortage areas identified in Table 4-32 could alleviate this issue and notes that the Proponent has made a commitment in that regard. However IRC does not consider that the Proponent's commitment to offering "apprenticeships and traineeships (initiating four of each during the first two years of operations, subject to renewal for subsequent years)" is adequate. It is IRC's position that when considering a workforce of up to 1,300 for the First Stage of the Project alone, the commitment to providing 8 total traineeships and apprenticeships for the first two years of operations is disproportionately low when compared to other mining companies. IRC requires a significantly higher yearly intake commitment from the Proponent in this regard, with conditioning of EPCM Tier 1 and 2 Contractors regarding apprentice and trainee intake, in light of the Project's total workforce. IRC highlights that offering an extensive apprenticeship program will attract people to reside in the Isaac LGA which is consistent with the SIA Guideline principles and will mitigate issues associated with skilled labour shortage in the area, particularly when considering the 79 year life of the mine.	Nil.	Pembroke considers the apprenticeship and traineeship offer to be appropriate for a greenfield operation with an entirely new workforce. Once the workforce has established and more experienced employees are working on the site, Pembroke will consider offering more apprenticeships/traineeships under the more experienced operational workforce.

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35.30	SIA - 4.7 Employment and labour	IRC highlights potential for the Proponent to partner with QMEA in its offering of apprenticeships. Furthermore, it is noted that as part of its Training and Workforce Development Strategy, “the Project will also investigate the feasibility of creating a local training bond for young people – incentivising the pathway from training in regional centres, with a commitment to return for the Project’s operations phase”. IRC seeks more than a commitment to investigate local training bonds but rather a commitment to providing a quantified number of such training bonds. IRC also highlights the partners of mine workers have traditionally been a source of recruitment for skilled workers and seeks that the Proponent take this into account in its Training and Workforce Development Strategy.	Nil.	As described above, Pembroke has committed to a number of programs to encourage young people and underqualified people to enter into the Project workforce, including offering apprenticeships, traineeships and funding for the Barada Barna Aboriginal Corporation to establish and operate a Training Centre at Nebo to develop and offer work readiness and certified qualification programs to Indigenous people. Pembroke will consider the option of a local training bond and opportunities for recruitment of partners of mine workers as part of the ongoing implementation of the Training and Workforce Development Strategy.
35.31	SIA - 4.7 Employment and labour	IRC notes the Proponent’s comment regarding Building our Regions having in the past funded critical infrastructure. It is noted the Building our Regions Program has changed rapidly in that the last Round 4 expressions of interest have excluded funding for critical infrastructure which was previously eligible as stated in the SIA. IRC cautions that such funding programs should not be taken into account when considering the Proponent’s obligations regarding its impact on local government infrastructure.	Nil.	Pembroke notes the recent changes to the Building our Regions funding program and will consider these changes when investment in community projects and programs is being considered as part of the Project Community Development Fund.
35.32	SIA - 4.8 Businesses	It is noted that Section 4.8.1 does not include the Isaac region’s burgeoning renewables industry (wind and solar) and it is recommended that reference to same be included in this section to ensure a rigorous analysis required under the key principles to the SIA Guidelines.	Nil.	Pembroke acknowledges a number of wind and solar renewable energy projects are proposed to be developed within the Isaac Region, and acknowledges that once construction and operation of the projects commence, they will contribute to the economic strength of the region. As these projects were not developed at the time of preparation of the SIA they were not considered in the assessment. Notwithstanding, regular updates of the SIMP will acknowledge the development of other major projects in the region as they occur.
35.33	SIA - 4.8 Businesses	It is noted that a supply chain consideration at Section 4.8.4 includes “access to equipment, consumables, professional services, maintenance providers and technical and trades sectors within the Isaac LGA, MIW region and other Queensland regions”. It is requested that the words “in that order of preference” be included at the end of the dot point to underpin a genuinely local procurement strategy as required pursuant to the ‘effective management’ key principles of the SIA Guidelines..	Nil.	Pembroke confirms that the order of preference for regional procurement of equipment and services is consistent with the order in Section 4.8.4, i.e. Pembroke would seek to procure equipment and services from within the Isaac LGA ahead of other regions, where practicable.
35.34	SIA - 4.8 Businesses	<p>The section titled ‘Regional capacity’ highlights the need for capacity building with local businesses to service the mining sector in relation to ICN Gateway. The section relevantly states:</p> <p><i>A search of suppliers on the ICN Gateway that have registered as servicing the Central Queensland region identified 35 businesses registered under the construction category and 48 businesses registered under the mining category. Of the 35 businesses registered under the construction category for the region, only one business listed a local address (Moranbah), while 13 listed a regional business address (Emerald, Mackay, Rockhampton, Gladstone).</i></p> <p>IRC finds the abovementioned statement particularly concerning, in that it fails to capture SMEs. IRC is aware that the ICN Gateway is targeted at higher tier operators and therefore does not in fact capture SMEs. For example, IRC are aware that there are a significant number of SMEs in the area currently registered with C-Res and IRC recommends the Proponent make contact with C-Res in order to reach out to its database of local businesses to ensure that its local procurement strategy is effective. To highlight the failure in local business capture by the ICN Gateway, the 2017-2018 Annual Summary produced by C-Res illustrated the following numbers of approved suppliers in the Isaac and neighbouring regions:</p> <ul style="list-style-type: none"> Isaac Region: 183 approved suppliers; Mackay Region: 423 approved suppliers; and Central Highlands Region: 166 approved suppliers. 	In summary, IRC is concerned that the Proponent is only suggesting that they will use ICN Gateway, which as highlighted, will not actually capture any local businesses. IRC considers that the Proponent’s procurement strategy and portal needs to be reviewed to ensure that it results in genuine local procurement.	<p>Pembroke acknowledges the limitation with the ICN Gateway raised by the IRC. Pembroke commits to using other services, in addition to the ICN Gateway, to identify local small to medium service providers in the Isaac LGA.</p> <p>Pembroke will consult with the Moranbah Traders Association, Clermont Business Group and Nebo Community Development Group during development of the local business engagement strategy.</p> <p>As described in Section 6.7.1 of the SIA, Pembroke is committed to providing full, fair and reasonable opportunity for capable local businesses to compete and participate in the Project’s supply chains.</p>

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		IRC therefore considers that the Proponent's analysis of local business Regional Capacity is limited in rigour and does meet the requirement for 'rigorousness' as outlined in the key principles to the SIA Guidelines. In addition to consulting with C-Res, IRC also suggests that the Proponent makes contact with local business groups such as Moranbah Traders Association and Clermont Business Group.		
35.35	SIA -4.9 Social infrastructure	<p>It is requested that the words "since eased" in relation to the inadequate supply of land for housing development be removed. At present the land available to housing development is:</p> <ul style="list-style-type: none"> Land banked by BHP or Anglo American; Land not yet released to the public market by private developers or investor (including vacant land within the Moranbah township, which IRC estimates to be in excess of 100 vacant lots and significant tracts of land owned by); Land owned by IAHT; Land owned by Economic Development Queensland (EDQ); or Land owned by IRC. <p>There is latent stock easily developable within abovementioned list as illustrated in the graphic below, however it is noted that the below map does not include the latent vacant land supply available and Bushlark Grove: REFER TO FIGURE IN SUBMISSION</p> <p>In total, a previous study commissioned by IRC indicated the following land available for development which the Proponent should investigate, in partnership with the respective landholder, for development of its housing stock:</p> <ul style="list-style-type: none"> Bushlark Grove Estate land holding: estimated 10 lots remaining of Stage 1 and 75 lots in Stage 2 Grosvenor Estate land holding: estimated 300 lots BMA Estate: estimated 90 lots BMA and Golf Course: estimated 200 lots Civeo: estimated 450 lots Belyando Estate: over 2000 lots <p>The above figures do not include vacant land also available within the Moranbah township footprint, which is estimated to be in excess of 100 vacant lots.</p>	It is suggested that the land highlighted in green is capable of almost immediate development, with the land highlighted in orange requiring higher levels of capital investment in trunk infrastructure upgrades, whilst also still being capable of development.	<p>Pembroke acknowledges that, as identified by the IRC, there are a number housing development options available in the Isaac LGA. These options will be considered during development of the Workforce Housing and Accommodation Plan. The Workforce Housing and Accommodation Plan will be developed in consultation with the IRC's Land and Housing Advisory Committee.</p> <p>The majority of the construction workforce will be accommodated within the existing workforce accommodation villages or will be existing local residents. Accordingly, the construction workforce is not predicted to impact on housing availability. 12 months prior to the commencement of operations, Pembroke will review the housing availability in consultation with the IRC. A similar exercise will be conducted 12 months prior to the commencement of operations in the Willunga domain. These reviews will be used to inform the measures Pembroke's will take ensure housing is available to new residents whilst avoiding impacts on housing availability.</p>
35.36	SIA -4.9 Social infrastructure	<p>In relation to child care facilities, it should be noted that all facilities are at or nearing capacity and are unable to keep pace with demand for such services. Currently 9.66% of the population of the Isaac LGA is between the ages of 0 and 4, compared to a Queensland State average of 6.3%. Significant waiting lists have existed in the downturn and IRC holds grave concerns regarding what will occur in a mining upswing. Evidence from child care centres in Moranbah alone suggests that currently 34 children have been unable access kindergarten services in preparation for Prep for the 2019 year, which undoubtedly has already had a significant impacts on early learning outcomes for those children. IRC was itself required to invest as a sole shareholder in Moranbah Early Learning Centre to ensure continuity of community service, which alone has 142 children on the waitlist. Another child care centre, Simply Sunshine has a waitlist of 173. Investment by the Proponent, potentially in partnership a private entity, will be required in child care (and should be conditioned accordingly) and IRC notes that this has been acknowledged by the Proponent at 6.4.7 wherein the Proponent states:</p> <p>"Staff may have difficulty accessing childcare which enables them to work overnight shifts. If necessary, Pembroke will collaborate with IRC, other mining companies and DCCSDS to identify and support possible partnership solutions. These may include registered and supported 'shared care' options</p>	Nil.	Pembroke acknowledges the limited availability of childcare services in the Isaac LGA and is committed to collaborating with the IRC and other mining companies to identify and support possible partnership solutions.

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		involving employee families, or overnight family or centre-based care options."		
35.37	SIA -4.9 Social infrastructure	In relation to GP services, it is suggested that a numerical analysis of the Australian Department of Health's doctor to patient ratio also be undertaken with the addition of the non-resident population. It is suggested that GP services are below the ratio required taking into account non-resident workers. Furthermore, it is noted that there is no reference in this section to local GP practices being consulted as part of the Social Impact Assessment process. It is recommended that such consultation occur to enable a comprehensive analysis of GP health care services in the Isaac LGA. It is suggested that reference to IAHT and associated findings be included at 4.9.8.	Nil.	As described in Section 5.5.2, non-resident workers are predicted to make a small additional demand on general practitioner's services, as most routine health services would be accessed by the non-resident workers in the home towns. Pembroke will continue to consult with health service providers, including general practitioners, as well as the IAHT during development of the Health and Community Wellbeing Plan.
35.38	SIA -5 Social impacts and opportunities	IRC considers that the views of Moranbah residents are accurate in relation to the impacts of the Project on housing affordability and availability with respect to the township of Moranbah and anticipates that the Project will have positive impacts in the short term in terms of housing in Dysart and Nebo. The analysis of impacts on housing in particular which has been identified by the Proponent requires 'effective management' in accordance with the SIA Guidelines and the housing analysis in this submission has been explored through this lens.	Nil.	Noted.
35.39	SIA -5.2 Workforce arrangements	It is noted that under Section 5.2.1, it is stated "it is expected that the Proponent would contract a construction company to manage Project construction". IRC requests that the Proponent ensure local content and local employment requirements are extended, imposed and enforced on construction company/is (both Tier 1 and 2 EPCM Contractors). IRC requires the same conditions in relation to the statement below regarding the Proponent's intent to contract mine operations. IRC considers that these requests are in fitting with a number of the SIA Guideline key principles.	Nil.	Pembroke is requiring all contractors to honour commitments being made in the EIS, including commitments regarding local employment and procurement. Monitoring of these commitments will be conducted as part of the SIMP, as described in Section 6.8 of the SIA. Monitoring data will be regularly reported to the Community Reference Groups.
35.40	SIA -5.2 Workforce arrangements	It is also noted that under Section 5.2.1, that the following statements are made: <ul style="list-style-type: none"> "Some construction activities would occur 24 hours a day seven days a week. Shifts of 12 hours are expected, with rosters likely to be 21 days on and seven days off or as agreed by the construction companies in consultation with Pembroke and the relevant workers' unions". "Non-local construction personnel would stay in WAVs in Coppabella, Dysart or Moranbah, or in rental accommodation in Moranbah and/or Dysart, subject to availability as discussed in Section 5.4". 	Nil.	Noted.
35.41	SIA -5.2 Workforce arrangements	For the operational component of the Project, IRC notes that the Proponent expects: <ul style="list-style-type: none"> mining operations would be on a 12.5 hour shift cycle roster, working seven days on, seven days off; and senior management and staff would work a five days on (Monday to Friday), two days off roster. IRC has long advocated that shift lengths are not such that through fatigue management, preclude workers from returning to their place of residence, assuming that place of residence is Moranbah, Nebo or Dysart.	Nil.	Pembroke expects to be able to manage fatigue risks such that local employees who live within a one hour drive of the Project would be able to travel between home and the Project daily. As described in Section 6.4.3 of the SIA, Pembroke will investigate and implement best industry practices with respect to DIDO personnel, including safe post-roster driving times and the potential for shared driving arrangements, to support employment of Isaac and Mackay LGA residents who live outside a safe daily driving distance.
35.42	SIA -5.2 Workforce arrangements	IRC acknowledges the statement that all local employees within a one hour drive would be able to travel between home and the project daily. IRC also acknowledges the Proponents comments that drive-in, drive-out personnel are likely to be based in other more distant towns in the Isaac LGA.	Nil.	Noted.
35.43	SIA -5.2 Workforce arrangements	In relation to Section 5.2.2 titled 'Potential labour availability', IRC extends thanks to the Proponent for its thorough examination of previous construction workforces in the Isaac region. IRC notes the comments of the Proponent specifically as follows: "As 79% of construction jobs located in the LGA were heavy and civil engineering construction and construction	Nil.	Noted.

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		<p>services, it could be assumed that approximately 270 of the LGA's construction workers were in this category. The number of construction jobs located in the Isaac LGA decreased by more than 1,100 during 2011-2016, including 728 heavy, civil engineering and construction services jobs. In the Mackay LGA, 686 heavy, civil engineering and construction services jobs were lost.</p> <p>Construction workers are highly mobile, and the short term nature of contracts means that labour availability fluctuates so it is difficult to estimate availability, however many of the people in the two LGAs who were previously employed in construction may still be living locally and available to the Project. The Isaac and Mackay LGAs have significant strengths in construction for the mining industry and as such it is expected that a proportion of the construction workforce could be drawn from the two LGAs, particularly if advance notice is provided to local construction business. This may lead to greater competition for construction labour (see Section 5.8.2) but is unlikely to disadvantage businesses in the local study area."</p> <p>The above statement by the Proponent indicates there is the potential for the construction workforce to be sourced almost exclusively from the Isaac LGA and Mackay LGA in that order of priority and notes that the Proponent's recruitment strategy will be reviewed in this light. Of course, this needs to be balanced against housing capacity which is also discussed in more detail below.</p>		
35.44	SIA -5.2 Workforce arrangements	IRC is supportive of and heartened by the Proponents' attitude to local procurement (both indigenous and non-indigenous) expressed in this section which indicates that the Proponent is taking its obligations under the SSRC Act seriously. IRC is aware of anecdotal evidence which would suggest mining companies such as Peabody have recently rolled out redundancies which would not be identified in the data, as the Proponent has correctly identified and the Proponent may consider sourcing its employees from that skilled and unskilled workforce.	Nil.	Noted. Pembroke acknowledges that people who have been made redundant from other mining operations may be suitable candidates for employment at the Project.
35.45	SIA -5.2 Workforce arrangements	IRC is also supportive of the staged approach to the mine development adopted by the Proponent which is likely to see sustained employment within the Isaac LGA. IRC acknowledges after recruiting locally, the proponent has committed to source its remaining workforce from the Rockhampton and Mackay areas, IRC's neighbouring regions. IRC also suggests the inclusion of Central Highlands herein.	Nil.	Noted. Pembroke will also consider candidates who reside within the Central Highlands LGA.
35.46	SIA -5.2 Workforce arrangements	IRC requests that the Proponent adopt a local/non-local workforce scenario which is underpinned by a sound and deliverable housing strategy and the Key Principles of the Social Impact Assessment Guidelines. Furthermore, ultimately any proportional approach to labour draw, again, needs to be underpinned by a sound and deliverable housing strategy and the Key Principles of the Social Impact Assessment Guidelines.	Nil.	Pembroke will prepare its Workforce Housing and Accommodation Plan to reflect the anticipated local/non-local workforce scenario. The Workforce Housing and Accommodation Plan will be updated regularly to reflect changes to the workforce scenario over the life of the Project.
35.47	SIA -5.2 Workforce arrangements	IRC agrees a review of the cumulative demands and impacts of the Project will need to be progressively undertaken and requires that the timeframes be in accordance with IRC's recommendation above to ensure that the SIA is underpinned by adaptive review and adjustment mechanisms to ensure efficacy in accordance with the 'adaptive' key principles of the SIA Guidelines.	Nil.	Pembroke has committed to regular review and update of the SIMP (as well as the Workforce Housing and Accommodation Plan) in consultation with the IRC. The review process will be conducted in accordance with the 'adaptive' key principles of the SIA Guideline, as described in Section 6 of the SIA.
35.48	SIA -5.2 Workforce arrangements	IRC supports the Proponent's commitment to regularly engage with the Barada Barna people and notes such mechanisms will be adequately dealt with in the ILUA and associated negotiations.	Nil.	Noted.
35.49	SIA -5.2 Workforce arrangements	IRC is also acknowledges of the Proponent's commitment to employing women as an integral part of the proponent's work force.	Nil.	Noted.

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35.50	SIA -5.2 Workforce arrangements	Furthermore, as noted above, the Proponent's commitment to providing apprenticeships and traineeships to young people in the Isaac LGA is acknowledged and it is noted that providing apprenticeships/traineeships is also critical to ensuring that the youth un/underemployment problem is addressed, however it is considered that the Proponent's commitment is too low as outlined in comments above regarding section 4.7. It is also acknowledged that the Proponent is making efforts to employ disabled job seekers.	Nil.	As described above, Pembroke considers the apprenticeship and traineeship offer to be appropriate for a greenfield operation with an entirely new workforce. Once the workforce has established and more experienced employees are working on the site, Pembroke will consider offering more apprenticeships/traineeships under the more experience operational workforce.
35.51	5.3 Population	IRC again reiterates that it is critical that the Proponent assess WAV availability for its proposed construction workforce as part of the SIA process to ensure the SIA is underpinned with sufficient 'rigour' in accordance with the SIA Guidelines.	Nil.	Pembroke maintains its position that it expects sufficient capacity within the existing WAVs will be available for the Project construction workforce. This is based on Pembroke's engagement with the WAVs directly, and the lack of significant development in the near future that could be expected to result in the uptake of existing capacity, such that the required capacity for the Project would be unavailable. Notwithstanding, Pembroke will continue to consult with the WAV operators and the IRC during development of the Project Workforce Housing and Accommodation Plan and intends to enter into an agreement with particular WAV operators to secure accommodation for the Project construction workforce.
35.52	5.3 Population	In relation to Section 5.3.2 titled 'Effects on demographic characteristics', IRC notes the statement that as "the Project aims to employ a 20% female workforce (as a minimum), and most 'new local' employees would bring families with them" and acknowledges that this provides some generalisation that the female workforce has a family. It is suggested that the male/female demographic impacts may need to be revised. IRC does not make this comment either in support or opposition of the gender employment target but rather in the context of ensuring sufficient 'rigour' in the SIA.	Nil.	Pembroke acknowledges there is some uncertainty in the male/female demographic generalisation, however considers that the assumptions used are reasonable for the purposes of the assessment.
35.53	5.3 Population	In relation to Section 5.3.3 titled 'Potential for social change due to non-local workers', it is considered that assessing such impacts is an enormous task. IRC again cautions it is necessary for the Proponent to make enquiries of each of the camps in relation to their bed vacancy to properly assess whether there is supply in WAVs to accommodate the non-resident workforce accommodation, adjusted with respect to Council's recommendation above. It is suggested that the results of such enquiries with WAVs be incorporated into the assessment of the social change with respect to non-resident workers.	Nil.	Pembroke will continue to consult with the WAV operators and the IRC during development of the Project Workforce Housing and Accommodation Plan and intends to enter into an agreement with particular WAV operators to secure accommodation for the Project construction workforce.
35.54	5.3 Population	IRC acknowledges the Proponent has identified some impacts of non-resident workers on the road network but highlights that the Proponent has not taken into account reports by RACQ that the Peak Downs Highway is a high risk road and that further traffic impact on this road generated by the Project will only worsen such risks. IRC recommends that DTMR be consulted in relation to this matter to ensure that outcomes from the SIA lead to 'effective management' of safety risks in accordance with the key principles of the SIA Guidelines. To this end, it is noted that the impacts of non-local workers who reside in WAVs on the Peak Downs Highways and Moranbah township roads should be appropriately provided for in Traffic Impact Assessments and corresponding outcome (with potential for Infrastructure Agreements with IRC and TMR respectively to be determined on the basis of the Traffic Impact Assessment to accommodate increased traffic volumes). More detailed comments in relation to the road component of the Project are made regarding the section 4.8.2 of the EIS.	Nil.	Pembroke is currently preparing a Road Use Management Plan in consultation with DTMR for the Project which will include further information regarding road safety management measures. Pembroke will provide DTMR with a copy of the Road Use Management Plan once it is finalised. Pembroke proposes to use busses to transport the workforce residing in the WAVs to the Project site. This measure will minimise the number of vehicle movements on the road network and minimise safety risks.
35.55	5.4 Housing and accommodation	IRC reiterates its view that the Proponent needs to undertake an audit of available existing beds in WAVs in relation to its workforce accommodation intentions for construction and operational non-resident workers.	Nil.	Pembroke will continue to consult with the WAV operators and the IRC during development of the Project Workforce Housing and Accommodation Plan and intends to enter into an agreement with particular WAV operators to secure accommodation for the Project construction workforce.
35.56	5.4 Housing and accommodation	Given the immediate impact of the construction resident workforce will be on Moranbah, Council is prioritising development of its land development strategy. A recent analysis of the Moranbah housing market is listed in the market analysis below. REFER TO SUBMISSION FOR TABLE	Nil.	Noted.
35.57	5.4 Housing and accommodation	It is noted there has been a significant decrease in the number of houses and units available for rent between October 2017 (as reported by the Proponent) and September 2018 and a	Nil.	Noted. Pembroke will consider this updated information during the development of the Project Workforce Housing and Accommodation Plan.

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		slight decrease in the number of houses available for sale over the same time period, with units for sale remaining steady, as follows: REFER TO SUBMISSION FOR TABLE		
35.58	5.4 Housing and accommodation	<p>Anecdotal evidence suggests that this has led to a \$150 to \$200 increase in rental prices over the recent few months alone, with further increases highly likely before the Proponent even enters the housing market in Moranbah. IRC has already started to lose employees due to the increase in rent prices.</p> <p>On the basis of current figures, the construction workforce would cause an uptake of approximately 50% of the available rentals and it is expected that this level of demand would reduce the vacancy rate to 1.2% and would cause a medium to significant increase in rental prices.</p> <p>IRC notes the Proponent's comments that "Offsetting this, with 1,069 unoccupied private dwellings in of Moranbah and 574 in Dysart in 2016, it is likely that houses which are currently vacant for lack of adequate rental returns will come back to the market and mitigate the potential impact on rental costs as further discussed below". IRC cautions that this is an overly optimistic assumption. IRC's analysis of the Australian Bureau of Statistics 2016 Census of Population and Housing, REMPLAN Community data indicates that over 56% of Isaac's landlord types are employers (government and other). For Moranbah specifically, this figure is 54.9% of landlord types which are employers (government and other). This represents the high number of industry-provided housing associated with the region's mining industry.</p>	It is clear that further residential housing stock will therefore need to be developed by 2027 to supply the additional 20 dwellings required.	<p>Pembroke will consider appropriate measures to manage impacts to the local rental market associated with the Project workforce as part of the Project Workforce Housing and Accommodation Plan, to be prepared in consultation with the IRC.</p> <p>The majority of the construction workforce will be accommodated within the existing workforce accommodation villages or will be existing local residents. Accordingly, the construction workforce is not predicted to impact on housing availability. 12 months prior to the commencement of operations, Pembroke will review the housing availability in consultation with the IRC. A similar exercise will be conducted 12 months prior to the commencement of operations in the Willunga domain. These reviews will be used to inform the measures Pembroke's will take ensure housing is available to new residents whilst avoiding impacts on housing availability.</p>
35.60	5.4 Housing and accommodation	<p>IRC agrees with the Proponent's statement that whilst the Proponent's labour draw ratios from Isaac towns are honourable, "In reality, people's choice of town will be influenced by housing availability, housing cost, distance to work and suitability to their needs".</p> <p>IRC notes the Proponent's comments:</p> <p><i>"the range of potential housing demands which could result in 2020-2021 (rounded to the nearest whole number) in comparison to stock as available at October 2017. The results indicate that if 25% of the Project personnel settle locally from outside the LGA in 2020:</i></p> <ul style="list-style-type: none"> <i>housing purchase requirements may be equivalent to approximately 35% of Moranbah listed dwellings for sale (at October 2017), 45% of Dysart's stock, 74% of Middlesbrough's stock and 23.5% of Nebo's stock; and</i> <i>rental housing requirements may be equivalent to approximately 29% of Moranbah's currently listed rental dwellings, 35% of Dysart's rental dwellings, and 58% of Middlesbrough's and 49% of Nebo's stock".</i> 	Nil.	Noted.
35.61	SIA -5.4 Housing and accommodation	For the reasons expressed above, it is likely the rental housing requirements of the Project, when compared with vacancy rates are likely to have a significantly higher impact on Moranbah and Middlesbrough than anticipated by the Proponent (noting that residential vacancy rates have significantly dropped in both Moranbah and Middlesbrough), with potentially higher residential rental vacancies available in Nebo and Dysart than anticipated by the Proponent (as illustrated in the SQM research compiled below): REFER TO SUBMISSION FOR GRAPHS ON RENTAL VACANCY RATES	Nil.	Pembroke will consider appropriate measures to manage impacts to the local rental market associated with the Project workforce as part of the Project Workforce Housing and Accommodation Plan, to be prepared in consultation with the IRC.
35.62	SIA -5.4 Housing and accommodation	Based on the above analysis, IRC predicts tighter small to medium increases in prices in Moranbah and Middlesbrough and lesser price increases in Dysart and Nebo. Rent increases in Moranbah and Middlesbrough are likely to have higher impacts on low income household's housing choices than originally anticipated by the Proponent. Whilst residential rental vacancy rates have risen in Dysart and Nebo, IRC cautions a need for continuous monitoring of all towns and will work collaboratively with the Proponent in relation to IRC's land development strategy.	Nil.	Pembroke welcomes the IRC's input to the development of the Workforce Housing and Accommodation Plan.
35.63	SIA -5.4 Housing and accommodation	IRC notes the comments of the Proponent as follows:	Nil.	Noted.

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		In 2021, personnel numbers would double, and if 25% of new locals were maintained, this would require more than 58% of currently available rental stock in Moranbah and more than 69% in Dysart, whilst allocating 15% of the total demand to Middlemount and 10% of demand to Nebo would exceed their current rental availability. This level of demand would lead to substantial rent increases and impacts on affordability, with the potential for displacement of low income households (typically key workers, unemployed or under-employed people and older people).		
35.64	SIA - 5.4 Housing and accommodation	Based on current residential rental vacancy rates, IRC anticipates the Project will in fact cause an uptake of 79% of available stock in Moranbah and approximately 50% of housing in Dysart. It is agreed that the demand allocated to Middlemount would exceed current rental availability. Conversely, It is anticipated the Project would reduce Nebo's rental availability to almost nil however it is likely to be able to manage the increase. It is noted this analysis does not take into account cumulative impacts of other developments and they may have the potential to change this analysis. IRC is currently in the process of commissioning a consultant to work on the Land Development Strategy to better inform and respond to population and housing projection needs in the future.	Nil.	Pembroke notes the work proposed to be conducted on the IRC's Land Development Strategy. The outcomes of this will be considered by Pembroke in the development of the Workforce Housing and Accommodation Plan, if available.
35.65	SIA - 5.4 Housing and accommodation	The study will also attempt to audit the amount of unoccupied dwellings in the Isaac LGA to determine whether those dwellings are owned by private investors and therefore available to the Project or are being 'banked' by other resource companies.	Nil.	Noted.
35.66	SIA - 5.4 Housing and accommodation	IRC acknowledges the Proponent's commitment to developing a housing strategy for its personnel, in consultation with IRC. IRC notes the Proponent's comments that: If just 10% of the vacant dwellings were made available to the rental market, an additional 217 dwellings would be available, more than doubling the current (October 2017) listed rental pool in the four towns. This would offset the Project's potential housing impacts and mitigate increases in rents, but will require provision of accurate information about workforce ramp-up, the labour force profile and housing preferences to dwelling owners, to provide confidence in the Project's labour force as potential tenants and purchasers. Again, IRC expects that the findings of its consultant, coupled with advocacy to mining companies will be able to shed more light on the dynamic of the Isaac housing market.	Nil.	Noted.
35.67	SIA - 5.4 Housing and accommodation	IRC further notes the comments of the Proponent as follows: <i>"A further option to expand the housing pool exists in Bushlark Grove, Economic Development Queensland 's (EDQ) residential estate in Moranbah. At October 2017, there were 57 lots (either house and land or land only) of the original 75 lots in Stage 1 listed as available. When developed, Stage 2 will have a similar yield, and with both at full development (and sale), up to 100 lots (some with housing already constructed) could be available.</i> <i>Whilst little to no other residential land is currently advertised for sale in the local towns, there are scattered vacant blocks (and others where the dwellings could be removed) which represent additional stocks which would become available as prices rise. Again, liaison with EDQ and IRC will be required ahead of time to ensure housing is available for in-migrating workers and families".</i> In addition to Bushlark Grove, IRC again reiterate its comments made at 4.9 regarding land available for development. Whilst IRC acknowledges that the SIA has gone some way to auditing vacant land availability, IRC seeks a firm commitment by the Proponent that is will develop tracts of the outlined vacant land to ensure that it has access to a sustainable housing stock.	Nil.	Pembroke notes there are a number of land development options in the vicinity of the Project. These options will be considered during development of the Workforce Housing and Accommodation Plan. The Workforce Housing and Accommodation Plan will be developed in consultation with the IRC's Land and Housing Advisory Committee.

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35.66	SIA - 5.4 Housing and accommodation	IRC agrees with comments of the Proponent that the “Project personnel’s potential demand for housing purchase may increase housing purchase prices over time. This would be experienced as a negative impact for local people who wish to enter the housing market.” It is noted this is a function of supply/demand nature market dynamics. It is also agreed the Project will likely ease some of the market pain for ratepayers with higher mortgages.	Nil.	Noted.
35.67	SIA - 5.4 Housing and accommodation	IRC notes that the comments of the Proponent under Section 5.4.4 titled ‘Workforce Accommodation’ that it “will have access to sufficient WAV capacity to meet the needs of the construction and operations phases.”	IRC respectfully suggests this assumption is flawed because it does not encompass an audit of the actual vacancy of the beds (and rather is an audit of existing beds built and beds approved but not yet built). Anecdotal evidence from at least two other mining companies indicates there is limited availability in WAVs. IRC cannot stress highly enough the need to conduct a thorough audit of bed availability as part of the SIA and again suggests that the requisite rigour pursuant to the key principles of the SIA Guidelines is lacking in this regard.	Civeo has confirmed that it will have adequate capacity to provide accommodation for the Project’s workforce at Coppabella Village, from the commencement of construction (anticipated late 2019) until at least 2025. Pembroke will continue to consult with the WAV operators and the IRC during development of the Project Workforce Housing and Accommodation Plan. An audit of WAV bed availability will be conducted as part of the development of the Workforce Housing and Accommodation Plan. Pembroke intends to enter into an agreement with particular WAV operators to secure accommodation for the Project construction workforce.
35.68	SIA - 5.4 Housing and accommodation	IRC is also concerned that the housing analysis is limited in terms of its examination as to how housing in mining towns is impacted by externalities such as coal price fluctuations and contractor non-compliance with local recruitment conditions. To some extent, the latter risk can be engineered out through well drafted contracts and such controls should be put in place by the Proponent as a minimum.	Nil.	The Project Workforce Housing and Accommodation Plan will consider the impact of externalities such as the cyclical nature of the mining industry and contractor behaviour.
35.69	SIA - 5.5 Social infrastructure	In relation to the section titled ‘Health Services’, IRC highlights the following statement of the Proponent and again seeks the Proponent take a collaborative approach with local GPs, as key stakeholders, to ensure they are able to keep up with demand and ensure continuity of health service levels: Whilst they will access their primary health care at home, non-residential workers will make regular demands on local GPs and the Moranbah Hospital, most commonly for minor illnesses, injuries and prescription renewals. At an average of approximately 440 FTE people over the two years, this may be experienced as an appreciable (if temporary) increase in demand for services.	IRC requires that local GPs be included in the Community and Stakeholder engagement strategy.	Pembroke will prepare a Health and Community Wellbeing Plan in consultation with the IRC and general practitioners in the Isaac LGA. The Health and Community Wellbeing Plan will further consider the impact of the non-resident workforce on health services.
35.70	SIA - 5.5 Social infrastructure	IRC again refers the Proponent to the GP ratio analysis undertaken in Section 4.9 and notes that the GP ratio analysis should take into account non-resident populations. It is noted some statements in Section 5.6 are inconsistent with the abovementioned statement and it is recommended those inconsistencies are addressed in favour of this statement.		Pembroke will prepare a Health and Community Wellbeing Plan in consultation with the IRC and general practitioners in the Isaac LGA. The Health and Community Wellbeing Plan will further consider the impact of the non-resident workforce on health services. Section 5.6.2 acknowledges that there is potential for demand for general practitioner services to increase until supply increases. This is predicted to be due to the workforce that would reside in the Isaac LGA, and to a lesser extent due to non-resident workforce. As described in Section 5.5.1, non-residential workers will make regular demands on local GPs and the Moranbah Hospital, most commonly for minor illnesses, injuries and prescription renewals.
35.71	SIA - 5.5 Social infrastructure	IRC also notes the following comments made by the Proponent: As noted by IRC during SIA consultation, there is a responsibility to provide an adequate level of health and emergency service provision for all community members, whether temporary or permanent, however Government service planning does not seem to account for non-resident numbers. Pembroke will ensure that local and district police and emergency services officers are aware of the Project’s workforce ramp-up, and will support advocacy by IRC to the Queensland Government with respect to adequate police and emergency services capacity in local towns. IRC acknowledges the collaborative approach taken by the Proponent and considers the abovementioned statements indicate the Proponent has listened and is aware of community social infrastructure needs and related policy issues. It is highlighted that such a collaborative approach is essential to any EIS approval as an ‘effective management’ tool under the key principles for the SIA Guidelines to address the significant impact of non-resident workers on community essential services (ie. health, police, fire).	Nil.	Noted.
35.72	SIA - 5.6 Community health and safety	In relation to Section 5.6.1 titled ‘Air quality and noise’ IRC acknowledges the Proponent has taken early steps to undertake an air quality assessment. It is recommended however that the need to conduct air quality assessments is ongoing and should occur at least monthly (or with real time	IRC recommends feedback is required from those landowners in relation to whether the noise control measures proposed by the Proponent are adequate and a ‘Near Neighbours dust, light and noise response procedure’ is implemented by the Proponent to mitigate affected landholders.	Real time air quality and noise monitoring is proposed to be conducted as part of the Project to monitor air quality and noise levels at the nearest sensitive receivers.

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		monitoring of dust conditions) with courtesy reports provided to IRC or alternatively made available publicly via an online portal (however we acknowledge that DES has the primary regulatory responsibility in relation to same). With respect to noise generated by the Project, IRC notes that the main stakeholders which will be effected are surrounding rural/agricultural landowners.		As outlined in Section 6 of the draft EIS, Pembroke will prepare an Air Quality Management Plan and a Noise Management Plan which would provide a detailed description of the monitoring and ongoing management of potential air quality and noise impacts, including contingency measures to be implemented if impacts are identified.
35.73	SIA - 5.6 Community health and safety	In relation to Section 5.6.2 titled 'Access to health services', IRC agrees with the comments of the Proponent that the Project will increase demand for health services. IRC has made comments in commentary regarding 6.6 in relation to same.	Nil.	Noted.
35.74	SIA - 5.6 Community health and safety	In relation to Section 5.6.5 titled 'Community safety', IRC acknowledges the Proponent's early identification of behavioural issues associated with non-resident construction workforces and acknowledges the Proponent implementing and enforcing a Code of Practice. IRC cautions the Code should be also made applicable to employees of EPCM Tier 1 and 2 contractors to ensure compliance and its efficacy should be monitored, reviewed and adjusted in consultation with stakeholders to ensure its ongoing efficacy. Such review is consistent to the 'adaptive' key principle of the SIA Guidelines.	Nil.	Pembroke will require its contractors to comply with the Code of Practice, and compliance with the Code of Practice will be monitored. Monitoring data will be reported to the Community Reference Groups on a regular basis. Where considered necessary, the Code of Practice would be revised in response to feedback from the Community Reference Groups.
35.75	SIA - 5.6 Community health and safety	IRC notes comments made by the Proponent with respect to Road Safety that "the site inspection conducted by GTA Consultants on 10 January 2018 did not indicate any existing road safety issues on Peak Downs Highway or Fitzroy Developmental Road". IRC considers this is flawed based on reports from RACQ. IRC considers that an analysis of the impacts of the Project on highway blackspots is necessary in consultation with DTMR.	Nil.	<p>Pembroke acknowledges the feedback IRC has received from RACQ regarding road safety, however considers the findings from its specialist consultants (GTA) relevant to the Project.</p> <p>Although the Project is expected to increase traffic flow along these roads, it is not expected to exacerbate any current road safety issues (the majority of which are believed to be associated with driver behaviour) along Peak Downs Highway and Fitzroy Developmental Road proximal to the site (Appendix J of the draft EIS).</p> <p>The Project is not predicted to result in any changes to the type and rate of road accidents on the road network (Section 4.8.2 of the draft EIS).</p> <p>Consistent with the commitment made in the draft EIS, Pembroke is currently preparing a RUMP in consultation with DTMR for the Project which will include further information regarding road safety management measures and will assess road safety on the road network, including the Peak Downs Highway and Fitzroy Developmental Road.</p> <p>The RUMP is being prepared in accordance with the <i>Queensland Department of Transport and Main Roads Guideline for Preparing a Road-use Management Plan</i> (2018).</p>
35.76	SIA - 5.7 Community values	In relation to Section 5.7.4 titled 'Community cohesion and resilience', IRC is supportive of an encouraged by the Proponent's focus on recruiting local employees and encouraging employees from other regions to live locally and agrees that it will ensure a positive contribution to social resilience provided this is based upon a sound Housing Strategy underpinned by investment in housing to ensure that the Project does not have adverse impacts on housing affordability.	Nil.	Noted.
35.77	SIA - 5.8 Business and industry	<p>IRC acknowledges the Proponent's stated commitment to local content and the indirect benefits that the Project will have for the local business community. IRC notes the comments of the Proponent that "Construction personnel staying in Moranbah and potentially Coppabella are also likely to make occasional use of local businesses including food, retail, hospitality and entertainment which will result in a welcome increase in demand during the two to three year period". It is noted that the benefits to local businesses in terms of non-resident populations can also be delivered via workforce camps. The majority of WAVs currently source their goods and services from non-local and regional suppliers, despite local and regional suppliers (ie. Isaac LGA suppliers and Mackay suppliers) being willing to price match. Such practices result in a loss of value for local businesses. It is suggested that the Proponent also targets its local procurement strategy in its contracts with WAV providers.</p> <p>In relation to Table 5-8, IRC notes that the Hillalong Coal Project is also proposed within the Isaac LGA and is likely to have a cumulative impact on Glenden.</p>	Nil.	Pembroke will consider IRC's comments when forming agreements with the WAV providers for its workforce accommodation, but can make no comment on where or how the WAV providers source their supplies and services. Pembroke considers this is a matter for the IRC to raise with the WAV providers.

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35.78	SIA - 5.9 Cumulative impacts	<p>The Proponent comments that the Project will be associated with the following cumulative impacts during its construction phase:</p> <p>An appreciable increase in traffic could be experienced on the Moranbah Access Road, Goonyella Road and Peak Downs Highway, with consequent concerns about traffic safety. This will require each of the proponents to have and enforce codes of conduct, and to manage project traffic and transport to reduce traffic volumes and avoid impacts on traffic safety.</p> <p>Cumulative demands on Council infrastructure such as water and waste water , roads, parks and municipal services would be experienced. The capacity of infrastructure is examined in detail in other section of the EIS, however it has been assumed here that, given previous numbers of non-resident workers have been higher, there is capacity within Council infrastructure to absorb cumulative demands at this level.</p> <p>IRC notes that the appropriate source of funding for such infrastructure upgrades is largely through State Government grants. IRC has been in a difficult position in that many infrastructure projects necessitated by cumulative impacts of the mining sector have not been eligible under the most recent Building our Regions funding round. IRC therefore requires a funding commitment from the State Government so that its infrastructure can adequately cope with the impacts of the Projects and a funding commitment to recognise non-resident populations within funding for essential services (ie. health, police and emergency services) within the Bowen and Galilee Basins. It is noted that the Proponent has acknowledged the latter need in its comments under section 5.5.</p>	Nil.	<p>Consistent with the commitment made in the draft EIS, Pembroke is currently preparing a Road Use Management Plan in consultation with DTMR for the Project which will include further information regarding road safety management measures and will assess road safety on the road network, including the Peak Downs Highway and Fitzroy Developmental Road.</p> <p>Pembroke notes the IRC's comments regarding State Government infrastructure funding requirements.</p>
35.79	SIA - 5.9 Cumulative impacts	<p>The Proponent comments that the Project will be associated with the following cumulative impacts during its operational phase:</p> <p>The Project is assumed to commence operations in 2020, by which time BCP could be operational with 545 personnel. Between the Project and BCP, a cumulative total of approximately 1,500 jobs would be available in the Isaac LGA by 2021, which would be a significant benefit for local and regional communities. If the NLP proceeded, an additional estimated 300 operational jobs would be available, and if SEMLP also proceeded, the four projects could produce approximately 2,300 jobs.</p> <p>This combination could result in a direct population increase of several thousand people (based on Isaac's average households size, and dependent on the proportion of residential jobs), which would regain the population lost in 2011-2016 and support the LGA's future growth. The availability of housing would be the predominant concern which, in the event of cumulative impacts eventuating, will need a coordinated, multi-party response. There is also potential for residents to again feel 'swamped' by the number of non-residential workers in the LGA, albeit a majority are likely to be accommodated in WAVs.</p> <p>IRC agrees that the cumulative impacts of the mining projects on housing in particular will need a coordinated, multi-party response. As previously noted, IRC are in the process of commissioning a housing study which will examine supply and demand dynamics of the housing market and seeks the commitment of all mining projects and the Coordinator General in implementing its strategy.</p> <p>IRC cautions that it is difficult to assess the cumulative impacts of mining projects without knowing what the resident/non-resident workforce contribution of all projects is likely to be, as well as the maintenance schedules and mines being commission and decommissioned. IRC acknowledges the transparent approach of the Proponent in this regard and considers that a coordinated strategy needs to be developed with the leadership of the Coordinator General in relation to this issue.</p>	Nil.	<p>Pembroke is committed to working closely with the IRC to manage potential impacts associated with the accommodation requirements of the Project workforce.</p> <p>Pembroke will develop the Project Workforce Housing and Accommodation Plan in consultation with the IRC's Land and Housing Advisory Committee, and will consider the findings of the IRC's housing study, if available.</p>

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35.80	SIA - 6 Social impact management plan	It is noted that suggestions have been made throughout the submission regarding social impact management matters generally which will feed into the SIMP. IRC is broadly of the view that consultation should be coupled with an identified action and notes that the Proponent has established that nexus with reference to most social impact matters.	Nil.	Noted.
35.81	SIA - 6.3 Community & stakeholder engagement management strategy	Executive Summary: IRC requests that any Community and Stakeholder Engagement is meaningful and purposeful, rather than a tick and flick and translates to genuine action, in advance of decision making. It is important for all stakeholders to have an opportunity to influence an outcome, this is particularly important in the Isaac LGA where stakeholders have significant consultation/engagement fatigue. It is noted that the Proponent has recognised the prevalence of consultation fatigue in its community engagement.	Nil.	Pembroke considers that the engagement conducted as part of the SIA, and more generally for the Project, has been meaningful and purposeful. Pembroke has acknowledged the feedback from this consultation and is implementing measures to address issues raised (e.g. working with IRC on the development of the Project Workforce Housing and Accommodation Plan, and developing its employment and procurement strategies to target local employees/suppliers).
35.82	SIA - 6.3 Community & stakeholder engagement management strategy	IRC reiterates that all available WAV data with respect to existing and approved beds for WAVs has been provided to the Proponent and comments that the Proponent will need to contact each of the WAVs individually to determine availability of WAV rooms for its Project. As noted above, the data supplied gives no indication as to available rooms but rather as to the rooms that have been built. As also noted, anecdotal evidence suggests that WAVs are nearing capacity for existing beds built.	IRC reiterates its view that the CRG meetings should have a specific action oriented agenda. It is suggested that Community and Stakeholder Engagement Management Strategy implemented by the Proponent should be reviewed by the CRGs annually (or on a more frequent basis as determined by the CRG) during construction and each year of operation, with a set program for review to be determined after first three years of operation in renewal. The CRG should further reconvene before the commencement of Stage 2.	Pembroke will review the Community and Stakeholder Engagement Management Strategy in consultation with the Community Reference Groups. The frequency of review will be determined with the Community Reference Groups.
35.83	SIA - 6.3 Community & stakeholder engagement management strategy	IRC notes the Proponent's comments that "Consultation may also be required with Economic Development Queensland with respect to their Bushlark Grove development in Moranbah (see Section 6.5.4)".	It is requested that consultation be extended to all owners of land capable of development as identified at 4.9. IRC has discussed the water allocation issue in section 4.3 below and notes that IRC's request is reasonable, having regard to the 'reasonable' key principle of the SIA Guidelines. IRC notes that other detailed recommendations regarding consultation have also been made in the proceeding sections and is keen to see how the Proponent turns its consultation strategy into responsive action.	Pembroke notes there are a number of land development options available in the Isaac LGA. These options will be considered during development of the Workforce Housing and Accommodation Plan. The Workforce Housing and Accommodation Plan will be developed in consultation with the IRC's Land and Housing Advisory Committee. Refer to response to comment 113 regarding the water allocation issues identified by the IRC.
35.84	SIA - 6.4 Workforce management strategy	Executive Summary: IRC cautions against any approach with means that local recruitment is confined by arbitrary percentages and emphasises a need for the Proponent to offer genuine choice (via incentives and affordable housing) to live in the Isaac Region. IRC acknowledges the Proponent's commitment to workforce wellbeing with an underlying "focus on local employment which enables residents to enjoy the comforts of their homes and communities". IRC notes that this commitment is in line with the Proponent's obligations pursuant to the SSRC Act. IRC appreciates that the Proponent has taken its feedback into account in relation to its Workforce Management Strategy and considers that the Workforce Management Strategy is well considered but requests some changes to Table 6-2 which are eluded to in its comments above:	Nil.	Pembroke notes the requested changes proposed by the IRC. Pembroke commits to considering these changes during subsequent revisions of the SIMP components. All SIMP components will be revised prior to commencement of construction of the Project, in consultation with the IRC.
35.85	SIA - 6.4 Workforce management strategy	SECTION: PROJECT CONSTRUCTION WORKFORCE INCLUDES ISAAC LGA, MIW REGION AND CENTRAL QUEENSLAND RESIDENTS	REQUESTED CHANGE "Brief businesses and prospective applicants in Moranbah, Mackay and Rockhampton for to learn about project opportunities and register for contact" – Add Dysart, Nebo and Emerald "Provide advance notice of the construction schedule to local and regional businesses"- feedback provided by regional businesses suggests that at least 3 months' notice is required for shovel readiness "maximise the involvement of people and companies based in Central Queensland and the MIW Region" – this sentence should be revised to state "maximise the involvement of people and companies based in the Isaac LGA, MIW Region and Central Queensland Region, in that order of priority" "require Principal Contractors to report on local employment statistics" – add by requiring Principal Contractors to adhere to local recruitment contract conditions	Pembroke commits to revising the Workforce Management Strategy to incorporate these changes.

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35.86	SIA - 6.4 Workforce management strategy	SECTION: MAXIMISE LOCAL EMPLOYMENT IN PROJECT OPERATIONS, INCLUDING A FOCUS ON WOMEN AND INDIGENOUS PEOPLE	REQUESTED CHANGE “Develop a recruitment policy including goals for local employment, attraction of ‘new local’ personnel, female participation and Indigenous participation” to ensure commitment to local recruitment percentages	Pembroke will revise this section of the Workforce Management Strategy to: Develop a recruitment policy including goals for local employment, attraction of ‘new local’ personnel, female participation and Indigenous participation to meet targeted local recruitment percentages.
35.87	SIA - 6.4 Workforce management strategy	SECTION: RECRUITMENT OF WORKERS FROM OTHER REGIONS TO LIVE IN LOCAL TOWNS	“Advertise all jobs within the Mackay and other regions as advised by the OCG, including promotion of Pembroke’s policies on living locally” – add Central Highlands and Rockhampton	Pembroke commits to revising the Workforce Management Strategy to incorporate these changes.
35.88	SIA - 6.4 Workforce management strategy	In order to establish whether local/regional recruitment is occurring and whether the Proponent’s strategies are effective, it is suggested that a condition be included for the Proponent to provide reports on local recruitment to the Coordinator-General with copies to IRC. The reporting should be encompass both the Proponent’s direct workforce and the workforce of its Principal and EPCM 1 and 2 Contractors. IRC requires that the Proponent’s contract conditioning and procurement assessment of EPCM 1 and 2 Contractors contain requirements for those contractors to employ local apprentices and trainees. To this end, IRC also reiterates its comments at 4.7 regarding the Proponent’s own apprentice and trainee intake.	Nil.	Pembroke will comply with all required reporting requirements under the SSRC Act and any stated or imposed conditions from the Coordinator-General. Pembroke will report on recruitment and apprenticeships/traineeships at the regular Community Reference Groups.
35.89	SIA - 6.4 Workforce management strategy	Furthermore, IRC requires that if the level of local recruitment (including workers the Project has attracted to live in the Region) is considered by IRC to be too low, the Proponent commits to reviewing its strategies, with a focus on the Housing and Accommodation Management Strategy to ensure that housing affordability and lack of incentives are not detracting employees from living locally. IRC submits that this is in accordance with the key principles of the SIA Guidelines.	Nil.	Pembroke has committed to annual reviews of the SIMP, including the Workforce Management Strategy and Workforce Housing and Accommodation Plan (as described in Section 6.2 of the SIA). The annual reviews will consider actual recruitment data and, where required, management measures will be revised in consultation with the IRC.
35.90	SIA - 6.5 Housing and Accommodation Management Strategy	Executive Summary: The Isaac Region faces rapid changes in its housing supply which is dictated by cycles of upturns and downturns in the resources sector. To safeguard against these rapid changes in the housing market, IRC and other businesses in the Isaac LGA have learnt that investment in housing stock is essential for their long term sustainability. For example, IRC, the Moranbah Workers Club, Moranbah Tyre and Mechanical and Oaktree Medical are business that supply accommodation to their workforce. Isaac Views, owned by IRC was itself built by IRC to service the needs of businesses during the recent mining upcycle. IRC is a business of 400+ staff and yet it has invested in housing stock (having been in towns such as Moranbah only since 1967). It is noted that the Proponent intends to co-exist in the Isaac LGA for 79 years, therefore the Proponent’s housing strategy needs to reflect a firm, long term investment in their own housing stock/security. IRC cautions any over-reliance by the Proponent on availability within the rental market to supply its housing demand. It is noted that the Proponent has relied upon an outdated analysis of the Isaac rental market which is now 12 months old (October 2017) and has been subject to significant change in the resources upswing which has occurred over the past twelve (12) months. IRC has commented on the decreased rental vacancy rates and increased rent prices in detail at 5.4 above. Ultimately, rental and real estate vacancies in local towns will not be able to meet Project personnel’s housing needs and investment by the Proponent is required. IRC is committed to engaging with the Proponent in relation to their strategy to increase the availability of housing and notes that outcomes of its Land Development Advisory Committee may assist the Proponent’s Housing and Accommodation Strategy, however requires that the Proponent is taking unilateral steps to begin development of its own housing stock. IRC wishes to highlight that there is vacant land supply within IRC townships to enable development of the proposed 120 lots.	Nil.	Pembroke appreciates the IRC’s commitment to engage in the preparation of the Workforce Housing and Accommodation Plan. Pembroke will incorporate updated data on the Isaac LGA housing market in the development of the Workforce Housing and Accommodation Plan, and will consider land development options available in the Isaac LGA.
35.91	SIA - 6.5 Housing and Accommodation Management	IRC notes the following statements of the Proponent and seeks that they be reviewed in light of the comments above: Anticipating that approximately 120 new households will need	Nil.	Pembroke notes the IRC’s observations of housing availability during 2017-2018. Pembroke will incorporate updated data on the Isaac LGA housing market in the development of the Workforce Housing and Accommodation Plan, and will consider available options for workforce accommodation, including the potential for investment in new housing.

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	Strategy	to be housed during the first year of operations, local towns are likely to have some capacity to meet Project personnel's housing needs. Each local town has high rates of unoccupied dwellings, and market demand is likely to see the release of some of these to the rental and/or purchase market. Based on 2016 Census data, if just 10% of the LGA's unoccupied dwellings were made available to the rental market, an additional 217 dwellings would be available, more than doubling the listed rental pool in the four towns (as at October 2017). However, increases in mining activity and associated increases in local business and services staff saw a rapid decline in housing availability during 2017-2018. If these conditions persist, Project investment may be required to ensure housing is available for Project personnel whilst mitigating the potential for housing cost inflation.		
35.92	SIA - 6.5 Housing and Accommodation Management Strategy	IRC further notes that the Proponent has acknowledged at 5.4.3 that there will be a "need for an increase in local housing stocks (including use of existing unoccupied stocks)" and at 6.5.4 that the Housing Strategy is likely to include identification of "the potential need for Project support or investment to increase housing availability, in Moranbah, Dysart, Nebo and Middlesmoot, as determined" and investigation into "purchase incentives and 'rent to buy' options for its workforce". IRC reiterates that in line with the Executive Summary and the lifecycle focused and effective management key principles of the SIA Guidelines, the Proponent will need to make a firm commitment to investment in housing stocks and it is acknowledged that the aforementioned statements go some way toward evincing such commitment.	Nil.	Noted.
35.93	SIA - 6.5 Housing and Accommodation Management Strategy	In relation to section 6.5.3, part of the Proponent's strategy is to make "arrangements for single status personnel to be accommodated in the WAVs". IRC assumes this is supposed to refer to "single status non-resident personnel" and considers that this distinction should be made so that single employees are not discouraged from living locally. It is considered that the housing needs, policies and Strategy should be reviewed at earlier intervals (for example 2026/2027 and 2030/2031) to allow for any sufficient time to update the strategy and any necessary residential construction. IRC is supportive of the approach of using the capacity of existing WAVs to house the DIDO and FIFO workforces however is concerned by statements such as "consultation with IRC and commercial discussions with WAV owners will be required". IRC considers that it is essential that such consultation with WAV owners occurs simultaneously with the development of the EIS.	Nil.	Pembroke confirms that the statement relates to "single status non-resident personnel", as rightly pointed out by the IRC. Pembroke has committed to annual reviews of the SIMP (including the Workforce Housing and Accommodation Strategy). Pembroke acknowledges the IRC's comment that housing needs should be reviewed at an earlier interval, prior to the Project workforce expansion in 2033. Pembroke commits to conducting this review at an earlier period (e.g. 2026/2027 as suggested by the IRC) as part of a future annual review of the Workforce Housing and Accommodation Strategy. This review will be conducted in consultation with the IRC. Pembroke confirms that the WAV providers were consulted with during development of the EIS (and as part of the SIA), and Pembroke is in ongoing discussions with the WAV providers to ensure an adequate number of beds are available for the Project construction workforce.
35.94	SIA - 6.5 Housing and Accommodation Management Strategy	IRC acknowledges that it is difficult to project impacts of decommissioning in 2099 and considers that the Proponent's approach to re-engaging with IRC three years prior to decommissioning is sensible. IRC recommends that a further action should be included in Table 6-5: <ul style="list-style-type: none">• Strategy: Ensuring affordable housing• Pre-construction and Construction: Consult with IRC, IAHT and ELAM regarding the need for social housing• Operations: Partner with IRC, IAHT and ELAM to ensure an adequate level of social housing is maintained.	Nil.	Pembroke will include consideration of affordable housing availability during the preparation of the Workforce Housing and Accommodation Plan.
35.95	SIA - 6.6 Health and community wellbeing strategy	Executive Summary: IRC acknowledges the Proponent's commitment to join with IRC in its advocacy to the State. IRC have long advocated for the acknowledgement of the non-resident worker population in assessing the level of state service delivery provided in the Isaac Region. IRC also requires the Proponent to consider the impact of non-resident workers in relation to private service delivery (for example, GPs/dentists).	Nil.	Pembroke will prepare a Health and Community Wellbeing Plan in consultation with the IRC and general practitioners in the Isaac LGA. The Health and Community Wellbeing Plan will further consider the impact of the non-resident workforce on health services.

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35.96	SIA - 6.6 Health and community wellbeing strategy	<p>IRC has identified synergies with section 6.4.8 and notes the Proponent's commitment "to support health and minimise non-local employees' demands on local services, the workforce on-boarding process will also ensure that all non-local employees and contractors understand:</p> <ul style="list-style-type: none"> • routine matters and existing health issues should be addressed before they commence their rosters; • on site health staff's assistance can be sought in relation to health concerns; • their supervisor or manager should be made aware of any health issues that are hampering their ability to undertake usual duties; • demands on local services for minor and routine health issues should be minimised; and • where relevant, prescription drugs, prescriptions and records of chronic health issues should be brought to site for every roster." <p>IRC recognises the Proponent's attempt to ameliorate the impacts on non-resident workforces on State and private health and suggests that this strategy be revised six (6) months from the commencement of construction in consultation with State and private health service providers, with the outcome of such consultation being a financial commitment by the Proponent regarding the agreed outcome.</p> 	Nil.	Pembroke commits to reviewing this strategy in consultation with the IRC as part of the development of the Health and Community Wellbeing Plan, prior to commencement of construction.
35.97	SIA - 6.6 Health and community wellbeing strategy	In relation to 6.6.3 titled "Access to health services", it is acknowledged that the Proponent intends to regularly engage with GPs and local hospitals. It is noted that the Proponent has shown a commitment to "work with local health services to identify opportunities to provide health services and programs which both staff and other community members can benefit. This could include partnerships to increase the availability of e.g. men's health checks, skin cancer checks, breast screening or mental health promotion, and would be identified in liaison with local stakeholders during the first year of operation".	It is recommended that such partnerships should commence during the first year of construction and IRC requests that the Proponent makes a set commitment (rather than a "may" statement) for initiatives to be rolled out each year of construction and operation thereafter in all impacted Isaac towns, with such services to be accessible to all Isaac residents. In light of the issues which the Proponent has accepted with respect to funding methodologies for State health services and in order to ensure that SIA outcomes are underpinned by the 'reasonable' key principle of the SIA Guidelines, it is considered that a firm commitment to such partnerships will ensure a benefit to the community in terms to offset disadvantages associated with the strain the non-resident workforce places on state and private health provision. Again, it is also noted that the Proponent has committed to collaborating in IRC's advocacy efforts to the State Government regarding the funding methodology issue, to include non-resident workers.	Pembroke will develop health initiative commitments as part of the Health and Community Wellbeing Plan, to be prepared prior to commencement of construction. Pembroke agrees that the health initiatives should commence during the construction phase of the Project.
35.98	SIA - 6.6 Health and community wellbeing strategy	In relation to 6.6.4 titled "School enrolments", it is suggested that the schools individually and the Department of Education would be best placed to provide feedback as to how much advance notice of enrolments is required to enable sufficient resourcing of education facilities.	Nil.	Noted.
35.99	SIA - 6.6 Health and community wellbeing strategy	<p>In relation to 6.6.5 titled "Emergency services", it is suggested that protocols implemented by the Proponent should be reviewed with the respective emergency service provider annually during construction and each year of operation, rather than only the first three years of operation.</p> <p>IRC acknowledges the Proponent's commitment to enabling staff who volunteer for the Fire and Emergency and the State Emergency Service to attend call-outs for emergencies during work hours wherever possible. IRC would also appreciate the Proponent deploying any additional mine rescue staff to assist the Fire and Emergency and the State Emergency Services during major fire or storm events, acknowledging that the Proponent is required to keep an amount of Mines Rescue staff on site under the relevant legislation.</p>	Nil.	Pembroke has committed to preparing an Emergency Response Procedure in consultation with the relevant emergency services. Pembroke will commit to reviewing the Emergency Response Procedure annually during construction and annually during the first three years of operation.
35.100	SIA - 6.6 Health and community wellbeing strategy	<p>In relation to 6.6.6 titled "Community development and investment", IRC acknowledges the Proponent's gesture to develop a Community Development and Investment Strategy in consultation with IRC (including a Community Development Fund and Community Partnerships). As noted in meetings with the Proponent, it is IRC's preference for mining companies to work together to achieve broader community goals rather than 'reinventing the wheel':</p> <ul style="list-style-type: none"> • In relation to the Community Development Fund, it is 	Nil.	Pembroke will consider the IRC's recommendations for funding arrangements in discussions with the Community Reference Groups, during preparation of the Community Development and Investment Strategy, to be prepared prior to construction.

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		<p>understood that the Proponent has committed to providing funding of \$200,000 per annum (indexed to CPI) for grants to community groups and non-government organisations to promote community resilience and quality of life in Isaac LGA communities; and</p> <ul style="list-style-type: none"> In addition to the Proponent's commitment to the Community Development Fund, IRC notes the Proponent's commitment the Community Partnerships proposal, which will include "neighbourhood development programs and family and youth support programs". Instead of partnering with 'any individual service provider', IRC requests that the Proponent integrate with the Moranbah Youth and Community Centre (MYCC) which will fund the abovementioned programs and will be a community hub for the programs that the Proponent is proposing, this will allow for a periodic change in service provider without interruption to the Proponent's commitment to service delivery. In doing so we suggest that the Proponent consider investing in a one off investment of \$2million in the proposed MYCC Trust. IRC has identified the proposed Youth and Community Centre Trust as an unparalleled opportunity for all proponents to contribute to a continued positive legacy in the Isaac community, rather than a contribution the subject of mining cycles. It is noted that BMA has already built the building for the Youth and Community Centre which cost approximately \$3.5million. BMA has committed to contributing a further \$2million to the proposed Trust to be held in trust for community project delivery, to be held in trust for perpetuity. 		
35.101	SIA - 6.6 Health and community wellbeing strategy	In relation to the Indigenous Employment partnership with BBAC, IRC seeks further information in relation to how many indigenous people will be offered such training opportunities, on an annual basis and recommends that the proponent make a quantified minimum commitment to such training which is proportionate to its workforce. It is noted that the quantum of such indigenous employment should be subject to review after the first two years of the mine operation and the year before the commencement of the second stage of the mine, fostering the principles of 'participation' and 'adaptivity' encompassed in the key principles to the SIA Guidelines.	Nil.	<p>As described in Section 5.2.8 of the SIA, Pembroke and the Barada Barna Aboriginal Corporation have agreed on goals for employment of Indigenous people:</p> <ul style="list-style-type: none"> nine Indigenous employees during Years 1-10 of operations; 14 Indigenous employees during Years 11-15 of operations; and 28-30 Indigenous employees from Year 16 of operations. <p>Pembroke acknowledges these goals can be exceeded, pending availability of suitably qualified candidates.</p>
35.102	SIA - 6.6 Health and community wellbeing strategy	It is noted that there has been no commitment by the Proponent to assist in and facilitate child care in the Region. IRC has made extensive comments in this regard in 4.9 above and requests a condition that the Proponent contribute to the expansion (if possible) of an existing facility or establishment of a new facility in Moranbah, Dysart and Nebo in consultation with the existing facilities and any other interested stakeholders.	Nil.	As acknowledged by the IRC (refer to comment 36), Pembroke will collaborate with IRC, other mining companies and DCCSDS to identify and support possible partnership solutions. These may include registered and supported 'shared care' options involving employee families, or overnight family or centre-based care options.
35.103	SIA - 6.6 Health and community wellbeing strategy	IRC acknowledges that the Proponent will monitor the need for social housing, however seeks a firm quantitative commitment to financially partner with the Isaac Affordable Housing Trust and/or Emergency and Long Term Accommodation Moranbah Inc. when a need for social housing emerges as a result of Project impacts on housing availability, as opposed to providing consideration.	Nil.	<p>Pembroke is preparing a Workforce Housing and Accommodation Plan, in consultation with the IRC's Land and Housing Advisory Committee. The Workforce Housing and Accommodation Plan will consider the requirement for social housing.</p> <p>If monitoring data indicates the Project is impacting on affordable housing, Pembroke will provide financial support to the Isaac Affordable Housing Trust and/or Emergency and Long Term Accommodation Moranbah Inc.</p>
35.104	SIA - 6.7 Local business and industry content management strategy	<p>Executive Summary:</p> <p>A small commitment in the eyes of a mining company is a large commitment in the eyes of the local business.</p> <p>For example, if one of the WAVs was to source their bread from the local bakery in Moranbah, that bakery would be able to employ an additional 8.5 people. The same applies to sourcing supplies locally for WAV wet messes.</p> <p>It is IRC's position that the project could maximise benefits for local business as follows:</p> <ul style="list-style-type: none"> Ensuring the definition of 'local' is the Isaac region and the Isaac region's neighbouring regions, in that order of preference rather than the definition adopted by the Queensland Resources Council Local Content Code of Practice; 	Nil.	<p>Pembroke agrees with the IRC's definition of the term 'local'.</p> <p>As described earlier, Pembroke is committed to providing full, fair and reasonable opportunity for capable local businesses to compete and participate in the Project's supply chains.</p> <p>Pembroke acknowledges the limitation with the ICN Gateway raised by the IRC. Pembroke commits to using other services, in addition to the ICN Gateway, to identify local small to medium service providers in the Isaac LGA.</p> <p>Pembroke will consult with the Moranbah Traders Association, Clermont Business Group and Nebo Community Development Group during development of the local business engagement strategy.</p> <p>Pembroke will also consider the potential to use C-Res services to target SMEs.</p> <p>Pembroke will require its contractors to comply with the Code of Practice, and compliance with the Code of Practice will be monitored. Monitoring data will be reported to the Community Reference Groups on a regular basis. Where considered necessary, the Code of Practice would be revised in response to feedback from the Community Reference Groups.</p>

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		<ul style="list-style-type: none"> Ensuring payment terms for businesses do not exceed 30 days; Ensuring EPCM Tier 1 and 2 contractors and WAV accommodation providers are bound by the payment terms and local content requirements; Facilitating local capacity of SMEs through consultation with C-Res, MTA and Nebo Community Development Group, rather than a narrow reliance on the ICN Gateway Portal; and Streamlining procurement pathways. <p>Steps by the Proponent to ensure genuine local procurement will underpin the long term viability of local businesses.</p>		
35.105	SIA - 6.7 Local business and industry content management strategy	IRC is strongly supportive of a tiered Local Content Strategy in preference to the Queensland Resources Council Code of Practice for Local Content definition of local industry. IRC seeks a commitment from the Proponent to source goods and services from the local community, region, state and national/ANZ in that order of preference and would appreciate the Local Content Report provided to QRC pursuant to section 6.7.6 to also be provided to IRC.	Nil.	<p>Pembroke commits that, where practicable, goods and services would be preferentially sourced from the local community before being sourced from the region, state and nation (in that order).</p> <p>Pembroke will consider providing the Local Content Report to IRC when it is developed.</p>
35.106	SIA - 6.7 Local business and industry content management strategy	IRC has addressed potential issues with the ICN Gateway Portal above and seeks that the Proponent engage with C-Res and its suppliers to ensure that local spend is maximised. IRC notes the Proponents comments that it intends to embed "local content requirements into contract schedules for major tenders, and requires Principal and major contractors to report on their local content performance on a quarterly basis".	To that end, IRC would like to take this opportunity to recommend that the Proponent also adopt the following incentives outlined in the University of Queensland SME Institute Good Practice Guide to Local SME Procurement in order to address some issues with the EPCM contracting arrangement model and to ensure contractor commitment to the local content:	Pembroke notes the processes in the University of Queensland SME Institute Good Practice Guide to Local SME Procurement, and will consider their implementation in Pembroke's procurement strategy.
35.107	SIA - 6.7 Local business and industry content management strategy	<p>INCENTIVE</p> <p>Pre-qualification evaluation criteria</p>	<p>DETAIL OF PROCESS</p> <p>Prior to bidding, a questionnaire can be used to require interested bidders to provide evidence of:</p> <ul style="list-style-type: none"> corporate policy promoting local enterprise participation practices for community procurement and community relations that align with policy qualified staff in community procurement management, community engagement and local business support roles 	Noted.
35.108	SIA - 6.7 Local business and industry content management strategy	<p>INCENTIVE</p> <p>Compliance standards and performance-based KPIs in invitation to tender</p>	<p>DETAIL OF PROCESS</p> <p>The proponent can set compliance standards for local procurement and supplier development, which are thresholds the bidder is required to meet before being allowed to submit a tender. KPIs can be used to encourage the contractor to venture beyond compliance and to innovate. This may be done by allocating a budget for local economic development and requiring potential bidders to specify how they would draw on the budget to exceed compliance thresholds.</p>	Noted.
35.109	SIA - 6.7 Local business and industry content management strategy	<p>INCENTIVE</p> <p>Working with preferred bidders</p>	<p>DETAIL OF PROCESS</p> <p>After the pre-qualification stage, the proponent can work with preferred bidders so that they can develop a local procurement strategy jointly and encourage bidders to suggest adjustments to the contract to enhance local economic benefits. Suggestions for collaborative activities include:</p> <ul style="list-style-type: none"> reviewing the agreed social impact management and local economic development requirements for the project and agree how risk, costs and management responsibilities are to be allocated between the operator and contractor; conducting a survey to identify the skills gaps between project sourcing requirements and community skills and capacities; establishing partnerships with government, local business associations or development agencies jointly agreeing regular performance milestones and a reporting and monitoring process. <p>Variations to Contract are recommended, to allow for the complexities associated with compliance with local procurement objectives, and so as not to penalise contractors where these have been significantly underestimated.</p>	Noted.

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			<p>A number of financial incentives can be built into conditions of contract, such as:</p> <ul style="list-style-type: none"> • payments for local procurement and/or enterprise development against performance milestones; • rewards for over-performance up to a certain limit; • penalising underperformance in circumstances that exceed Variations to Contract conditions; and • sharing costs in the event of cost overruns in meeting KPIs. 	
35.110	SIA - 6.7 Local business and industry content management strategy	IRC is generally encouraged by the Proponent's local content strategy however does also seek a commitment that the Proponent and its EPCM contractors will provide 30 day payment terms. Extended payment terms have been identified in IRC's recent submission to the Federal Inquiry into how the mining sector can better support regional businesses in regional economies as the major barrier from local businesses benefiting from mining developments and echoes that sentiment here. In addition, IRC also considers that it is important to incentivise businesses and industry to develop in/locate to the Isaac region. It is suggested that this could be achieved by the Proponent through an analysis of local business supply capacity and implementation of measures to address deficiencies.	Nil.	<p>Pembroke understands that extended payment terms restrict opportunities for smaller businesses to competitively service the mining industry. Pembroke has identified this issue to its contractors and has requested they consider committing to 30 day payment terms.</p> <p>Pembroke considers that its commitment to source goods and services from local businesses will provide incentive for the development of local business in the Isaac LGA.</p>
35.111	SIA - 6.8 Monitoring and reporting	IRC has addressed its concerns regarding review of the SIMP above and again indicates that given the statistics and economic/social environment assessed in the development of the SIA are fluid and changing daily, IRC considers that initially, annual review timeframes, with major reviews at 2026/2027 and 2030/2031 are more appropriate and Project specific, rather than adopting five year review periods.	It is considered that more regular review periods will ensure that the SIMP is 'adaptive' in line with the key principles of the SIA. IRC otherwise is satisfied that the Monitoring and Reporting Guidelines are comprehensive.	Pembroke has committed to providing a revised SIMP prior to project commencement and will review the SIMP annually.
35.112	EIS - 4.1 Flora and fauna	In relation to the proposed Mine Water and Sediment Dams, IRC requests that sufficient buffer zones should be put in place to avoid the risk of dam failure and subsequent contamination of local watercourses.	IRC requires that once full, Sediment Dams be left to dry out and a new sediment dam installed in its place to prevent adverse, and potentially fatal, effects on mine worker and resident health. IRC notes that the EIS does not provide any detail with respect to the location of the Sediment Dams, as such IRC requires further information from the Proponent and at a minimum, requires that the Sediment Dams be located such that they are up wind from any Isaac townships. IRC requests a map of the internal industrial mine site layout to enable Council to more reliably determine the impacts of the Project on Isaac townships.	<p>Sediment dams have been designed in accordance with Best Practice Sediment and Erosion Control Guideline (International Erosion Control Association [IECA], 2008). The sediment dams will be operated to maintain the required capacity to treat sediment laden water until the catchments that report to them have been rehabilitated, and the sediment dam is no longer required. Maintenance of the sediment dams would include progressive excavation of accumulated sediment to maintain design capacity. There would not be a requirement to install new sediment dams to prevent adverse effects on mine worker and resident health.</p> <p>The locations of the sediment dams and other relevant water management infrastructure are shown on Figures 2-1 to 2-9 of the draft EIS, and described in detail in Appendix E of the draft EIS.</p> <p>Given the sediment dams would be appropriately designed and constructed, the risk of dam failure and subsequent contamination of local watercourses does not warrant the implementation of 'buffer zones'.</p>
35.113	EIS - 4.3 Water resources	IRC notes the Proponent's comments as follows: As described in Section 2.7.7, the water balance model results show that there is a greater than 90 probability that an annual water allocation of 2,250 ML would be sufficient to meet all site demands, in any one year across the Project life (Appendix E). Pembroke intends to source this external water demand from SunWater via the Project water pipeline. IRC queries whether the annual water allocation of 2,250 ML is sufficient to also service IRC's water needs. As the Coordinator General is aware, IRC is in a unique position in that it has no water allocation from SunWater and is wholly reliant on the mining sector to supply the township needs of Moranbah, Coppabella and Nebo. IRC has been in negotiations with the Proponent which will have IRC receiving up to 300ML per annum from the Proponent.	A condition requiring the Proponent to enter into a Water Allocations Agreement with IRC to provide 300ML per annum from the Proponent would ensure that IRC can continue to service population increases in local towns which result from the Project, it is noted that such amount should be reviewed bi-yearly or as agreed between the Proponent and IRC to ensure that it keeps pace with population growth.	Pembroke will continue negotiations with the IRC regarding water allocations.
35.114	EIS - 4.3 Water resources	It is noted that assessment of the Proponent's comments regarding surface and groundwater are not within the control of IRC and rather a matter for DES with possible involvement from DNRME.	Nil.	Noted.
35.115	EIS - 4.3 Water resources	In relation to the Eungella water pipeline, it is noted that where water pipelines are situated within Council reserves such as roads or easements, appropriate arrangements will need to be made with relevant stakeholders/asset managers (including IRC, DNRME and Aurizon).	Nil.	Noted. Pembroke is currently discussing the construction of the Project water supply pipeline, from the Eungella pipeline, within road easements with IRC.

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35.116	EIS - 4.4 Flooding and regulated structures	<p>IRC makes the following comments with respect Section 4.4 (Flooding and Regulated Structures):</p> <ul style="list-style-type: none"> is noted that the EIS and Appendix F have established that as a result of the proposed development, there will be increases in flooding, flood levels, flow velocities, potential diversion, erosion of the Isaac River and its tributaries, extensive geomorphic changes and wiping out of significant areas of flora and species of fauna, impact on underground water quality and quantity and many other adverse ecological consequences of the proposed activities. In response to the predicted Environmental Impacts, the Proponents have offered management plans and mitigation measures which IRC considers to be vague and generally conditioned on future assessments and determinations. Ideally, such measures should be specifically defined/designed, to the best ability of the proponent, to address incidents that are identified and preferably quantified in the course of the assessment. It is understood that IRC is not the approving authority for the subject application however, IRC's interests and its rights to seek recovery from any and all future damages to the environment that may be directly or indirectly caused by the proposed activities should be made a condition of any consent that the Coordinator General will issue. The Proponent states that "the hydrology model has been calibrated against data at the Deverill gauge station for five historical flood events (i.e. August 1998, February 2008, December 2010, February 2016 and March 2017)", however, there is no indication as to whether the said hydrology model has taken into account the vast areas of forest that are proposed to be cleared. It is IRC's position that a flooding scenario is not without environmental impact/contamination. No consideration seems to have been given to the inevitability of release of pollutants, such as trailing dams discharge, residual surface contaminations etc. into the floodplain and private properties downstream. 	Nil.	<p>Pembroke considers that the IRC's comment "that the EIS and Appendix F have established that as a result of the proposed development there will be ...potential diversion, erosion of the Isaac River and its tributaries, extensive geomorphic changes and wiping out of significant areas of flora and species of fauna, impact on underground water quality and quantity and many other adverse ecological consequences of the proposed activities" does not accurately reflect the findings of the draft EIS and the Flood Assessment (Appendix F of the draft EIS). In particular "extensive geomorphic changes and wiping out of significant areas of flora and species of fauna" are not described in the draft EIS.</p> <p>Detailed descriptions of proposed management measures for potential environmental impacts are presented in the draft EIS. Although certain management plans are to be prepared prior to construction, it is considered that sufficient information has been presented in the draft EIS to allow for a full assessment of potential impacts and determination of appropriate conditions.</p> <p>Pembroke considers that the Environmental Authority, Mining Lease, EPBC Act approval and other relevant legislative requirements will provide sufficient regulatory control over the Project.</p> <p>The flood modelling considers the Isaac River and Ripstone Creek catchment excision due to development of the Project.</p> <p>The Project water management system has been designed to operate such that there are no uncontrolled mine affected water overflows to the receiving environment (Section 2.7.1 of the draft EIS).</p> <p>An assessment of potential impacts to the downstream environment due to controlled releases from the Project water management system concludes that the water quality objectives for the Isaac River sub-basin would be met (Section 2.7.7 of the draft EIS).</p>
35.117	EIS - 4.5 Air quality	<p>In relation to 4.5.4, IRC notes the Proponent's commitment as follows:</p> <p>Meteorological data and TSP, PM10 and PM2.5 levels would continue to be monitored on an ongoing basis at the existing monitoring site at the Project for the implementation of operational dust controls.</p> <p>A network of dust deposition gauges would also be installed.</p> <p>If monitoring indicates any unexpected exceedances of air quality objectives, an investigation would be conducted by Pembroke, including additional dust monitoring if required (Appendix G).</p>	IRC requires the Proponent to define what an "ongoing basis" means. IRC echoes its comments in the SIA that dust should be monitored on a real time basis and reporting on dust monitoring should occur on a monthly basis at a minimum for the life of the construction and operation of the mine, with the results of such monitoring reported to IRC and the CRGs and/or made publicly available online. If the Proponent prefers only doing one or the other, IRC's preference is for the data to be made available publicly to prevent a community expectation that IRC should interpret and regulate breaches. IRC also recommends implementation of a 'Near Neighbours dust, light and noise response procedure' to mitigate impacts of dust, light and noise on affected landholders. IRC also requires that dust monitoring stations be placed down wind of sensitive receptors to ensure accurate monitoring results.	<p>Air quality monitoring would be conducted in real-time, for the life of the Project. A summary of the air quality monitoring results will be provided to the Community Reference Groups.</p> <p>As described in Section 4.5.4 of the draft EIS, Pembroke would also implement proactive and reactive dust control measures. These measures would include the use of weather forecasting and real-time measurement of dust levels and meteorological conditions to modify mining operations as required in order to achieve compliance with applicable air quality objectives at the nearest privately-owned receivers.</p> <p>Pembroke does not consider that dust monitoring stations placed down wind of sensitive receptors would be required to demonstrate compliance with relevant air quality criteria.</p>
35.118	EIS - 4.6 Social values	As noted, IRC considers that the SIA data sources are generally robust and the Proponent's interpretations of same are generally sound. IRC again notes that Figure 4-24b of the EIS does not mark Dysart as a SIA local community of interest and it is requested that this omission be rectified. IRC notes that its comments regarding the Social Values are listed in detail above in relation to the Social Impact Assessment (Appendix H).	Nil.	Noted.
35.119	EIS - 4.7 Economics	Again, IRC's comments with respect to section 4.7 are outlined in detail above in the submission comments in relation to the SIA.	Nil.	Noted. Refer to previous responses.
35.120	EIS - 4.8.1 Road transport	In relation to section 4.8.1, the EIS provides specific detail with respect to the transport impact of the Project on State Controlled Roads however provides a limited assessment of	Nil.	Noted.

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		<p>the transport impact of the Project on Local controlled Roads.</p> <p>It is noted that the Appendix J Road Transport Assessment makes the following observation in relation to the Road Network:</p> <p>The major road transport routes in the vicinity of the Project are the Peak Downs Highway, located approximately 15 km to the north-west of the Project, and Fitzroy Developmental Road, located to the east of the Project.</p> <p>Fitzroy Developmental Road runs directly along the Project eastern boundary at the Willunga domain and would provide access to the Willunga infrastructure facilities in the south-east of the Project extent. Additionally, the Peak Downs Mine Road, which becomes Saraji Road when it intersects with the Saraji Coal Mine, runs generally north-south approximately 10 km to the west of the Project.</p> <p>The Iffley Connection Road (including Vermont Park Road), and Annandale Road are located to the east of the Project boundary and provide access from the Deverill, Iffley, Vermont Park, and Seloh Nolem properties to the Fitzroy Developmental Road and the Peak Downs Highway (via Daunia Road) respectively. Carfax Road runs east-west to the south of the Project boundary, connecting the Fitzroy Developmental Road with Dysart.</p> <p>Direct access to the Project would be from Fitzroy Developmental Road for the Willunga Domain and access via a private road connecting to Annandale Road for the Olive Downs South Domain. The Project traffic is anticipated to generally be limited to Peak Downs Highway, Fitzroy Developmental Road and Annandale Road. The characteristics of these roads proximate to the two proposed site.</p>		
35.121	EIS - 4.8.1 Road transport	<p>It is further noted that the following comments are made under Section 4.8.2 of the Environmental Impact Statement:</p> <p>Local Roads</p> <p>The Iffley Connection Road (including Vermont Park Road), and Annandale Road are located to the east of the Olive Downs South domain and provide access from the Deverill, Iffley, Vermont Park, and Seloh Nolem properties to the Fitzroy Developmental Road and the Peak Downs Highway (via Daunia Road) respectively (Figure 4-26).</p> <p>Both Annandale Road and Iffley Connection Road are unsealed roads, while Daunia Road is a sealed road (Appendix J). Carfax Road, an unsealed road, runs east-west to the south of the Project, connecting the Fitzroy Developmental Road with Dysart (Figure 4-26).</p> <p>The main vehicle access route to the Olive Downs South domain is proposed to be via Daunia Road (off the Peak Downs Highway), connecting to Annandale Road and then a new intersection and access road constructed to the mine infrastructure area (including a crossing of the Isaac River) (Figure 4-26).</p> <p>The proposed alignment of the new access road to the Olive Downs South domain follows the existing driveway and Isaac River crossing on the Deverill property, before entering the Iffley property within MLA 700032.</p>	Nil.	Noted.
35.121 (Cont.)		<p>Both Daunia Road and Annandale Road are unsealed gravel roads approximately five m wide. These roads would be widened (up to 8 m) where required, and the pavement upgraded to cater for the design loading of vehicles using the access route and in compliance with Isaac Regional Council requirements. These works would be conducted by the Isaac Regional Council through a road infrastructure arrangement with Pembroke. The detailed designs for the road upgrade would be prepared in consultation with the Isaac Regional Council.</p> <p>12-hour tube counts were undertaken to observe the traffic currently utilising Annandale Road proximate to the proposed</p>		Noted.

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		<p>site access. Results of the tube count and a site inspection (undertaken by GTA on 10 January 2018) indicate that there is minimal traffic currently using Annandale Road (Appendix J).</p> <p>As such it is expected that, following the construction of this access and upgrade of Annandale Road, the majority if not all of the traffic utilising Annandale Road would be Project-related traffic. As such, a basic left turn and right turn treatment from Annandale Road to the site access is expected to be sufficient (Appendix J). Notwithstanding, the detailed design process would take into consideration any potential impacts on road users, change in LOS and potential impacts to project traffic.</p> <p>A new three-way intersection off Fitzroy Developmental Road is proposed to provide access to the Willunga domain.</p> <p>...</p> <p>The Project workforce is assumed to approach and depart the Project from and to the following locations (Appendix H):</p> <p>Coppabella – 12%;</p> <p>Moranbah – 50%;</p> <p>Dysart – 19%;</p> <p>Middlemount – 11%; and</p> <p>Nebo – 8%.</p> <p>Heavy vehicle movements associated with deliveries would be highest during the construction period, and all deliveries would come from Mackay (Appendix J).</p>		
35.122	EIS - 4.8.1 Road transport	<p>IRC outlines concerns regarding the Project impact on local roads in the following paragraphs:</p> <ul style="list-style-type: none"> Within the Section 4.82 under 'Existing Infrastructure and Values', Daunia Road is at one stage identified as a sealed Road and then identified further in the document as an unsealed road. IRC wishes to clarify that the majority of Daunia Road is an unsealed road with isolated narrow sealed sections. IRC notes the Proponent's comments that the upgrade works to Daunia and Annandale Road will be conducted by the Isaac Regional Council through a road infrastructure agreement with the Proponent. IRC wishes to highlight that while IRC are currently in discussion with the Proponent regarding the Infrastructure Agreement, there has been no commitment by IRC to undertake the works and the condition should be on the Proponent to undertake such works. For clarity, IRC requires that the Proponent is responsible for all costs of maintenance from Project construction and operational traffic (both direct and indirect) and all costs of upgrades to the Road. There is reference by the Proponent to upgrading the Daunia and Annandale Road to up to 8m in width where required. IRC requires the roads to be upgraded in accordance with Capricorn Municipal Development Guidelines and AustRoads Guidelines which will likely require the road to be upgraded to at least 8.4m in width, subject to the Pavement Impact Assessment and the Transport Impact Assessment. To that end, it is noted that supporting documentation for the Daunia and Annandale Road works has not been included in the EIS, including the Pavement Impact Assessment, Transport Impact Assessment and Road Use Management Plan. It is noted that a section of Daunia/Annandale Road is not within the road reserve and will need to be realigned which will may result in a financial impost upon IRC. It is requested that any resultant financial impost on Council be the responsibility of the Proponent. IRC's discussions with the Proponent have focused on upgrade of all of Daunia Road and the northern portion of Annandale Road, terminating at the Olive Downs South Domain Access Road (which it understands is the section 	Nil.	<ul style="list-style-type: none"> Pembroke notes that Daunia Road is an unsealed road with isolated narrow sealed sections. Pembroke is currently in the process of negotiating an Infrastructure Agreement with the IRC regarding the proposed road upgrades which would define the extent of the staged external road infrastructure upgrades, timing and the associated costs (including who would bear the costs). Section 16 of the Additional Information to the EIS provides a description of the proposed upgrades of Daunia and Annandale Roads. Projex Partners has been engaged by the IRC to prepare the detailed designs for the first 21 km of road upgrades. As outlined above, Pembroke is currently in the process of negotiating an Infrastructure Agreement with the IRC regarding the proposed road upgrades which would define the extent of the staged external road infrastructure upgrades, including any requirement to realign sections of the road. Pembroke is currently in discussions with the IRC regarding the extent of proposed upgrades to Daunia/Annandale Roads. Although the southern portion of Annandale Road, may provide a shorter travel distances for employees travelling from the north to the Willunga domain, it should be noted that operations at Willunga would not commence until 2028 and, as such, for the first nine years of the Project, there is expected to be minimal traffic travelling to the Willunga domain. Notwithstanding, Pembroke has agreed to conduct ongoing monitoring of the usage of the southern portion of Annandale Road and if monitoring indicates that additional traffic is utilising this road, and impacts are being generated, Pembroke will determine whether upgrades are required in consultation with the IRC.

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		as highlighted in light and dark green in Figure 4-26). However IRC is concerned by the statement “Parts of Annandale Road, from Daunia Road to the Olive Downs South domain mine access road, would be upgraded” rather than a commitment to an upgrade of the entire length of the road.		
35.123	EIS - 4.8.1 Road transport	<p>It is IRC’s firm view that the Project will have a significant impact on the entirety of Annandale Road (ie. including south of the proposed Olive Downs South Domain Access Road), Iffley Connection Road and Vermont Park Road. Accordingly, IRC requires these roads to be included in the Infrastructure Agreement for the following reasons:</p> <ul style="list-style-type: none"> The workforce proposed for Olive Downs South will be sourced in part from Dysart and Middlemount (19%), this is supported by the projected increase in traffic on the Fitzroy Developmental Road noted by the Proponent (65 Passenger Car Units/hr in 2020). IRC notes the comments made by the Proponent that the main vehicle access route to Olive Downs South domain is proposed to be via Daunia Road, connecting to Annandale Road and the main vehicle access to the Willunga domain is proposed to be via Fitzroy Development Road. However, this does not preclude Project traffic from utilize the southern portion of Annandale Road (south of proposed Olive Downs South Domain Access Road) and the connecting Iffley Connection/Vermont Park Roads to access the Mine site. For example, it is anticipated that the following traffic will utilise this route: <ul style="list-style-type: none"> Project traffic residing in Dysart/Middlemount or travelling DIDO from the Rockhampton area for the Olive Downs South domain phase of the Project; and Project traffic travelling from Moranbah for the Willunga domain phase of the Project. The alternative for this traffic is to travel an additional approximately 80km via the Fitzroy Development Road and Peak Downs Highway (and vice versa), which is unlikely. IRC has recently removed its traffic counters from the Iffley Connection Road, however it is noted that those traffic counters measured that 10 vehicles per day utilize the Iffley Connection Road. As with the northern portion of Daunia/Annandale Roads, it is noted that the Iffley Connection Road and the southern portion of Annandale Road are currently unsuited to the traffic volumes and pavement impact that the Project will generate. 	Nil.	<p>As described in Section 16 of the Additional Information to the EIS, Pembroke does not propose to utilise Annandale Road (south of the proposed Olive Downs South access road), Iffley Connection Road or Vermont Park Road for any Project related traffic.</p> <p>Vermont Park Road provides access to the Vermont Park property from the Iffley Connection Road and terminates at the Isaac River (i.e. does not provide any through access). Vermont Park Road would not provide access to the Project site infrastructure areas. As described in the draft EIS, new access roads would be developed to allow Project personnel to access the Olive Downs South and Willunga domains.</p> <p>Although Iffley Connection Road and the southern portion of Annandale Road, may provide shorter travel distances for employees travelling from the north to the Willunga domain, it should be noted that operations at Willunga would not commence until 2028 and, as such, for the first nine years of the Project, there is expected to be minimal traffic travelling to the Willunga domain.</p> <p>Pembroke has been in discussions with the Isaac Regional Council (IRC) regarding the potential use of these roads and has agreed to conduct ongoing monitoring of the usage of Iffley Connection Road, to determine whether there is an increase in traffic movement associated with the Project. If monitoring indicates that additional traffic is utilising these sections of road, and impacts are being generated, Pembroke would determine whether upgrades are required in consultation with the IRC.</p> <p>Pembroke is currently in the process of negotiating an Infrastructure Agreement with the IRC which would define the extent of the staged external road infrastructure upgrades, timing and the associated costs.</p>
35.124	EIS - 4.8.1 Road transport	<p>Taking into consideration the abovementioned comments, IRC expects that the following intersections will need to be reviewed by the Proponent and DTMR and upgraded accordingly keeping the traffic speed maintained in the respective intersections:</p> <ul style="list-style-type: none"> Carfax/Golden Mile Road; Carfax/Fitzroy Developmental Road; Fitzroy Developmental/Iffley Connection Road; and Iffley Connection/Annandale Road. <p>Within Appendix J, it is identified “the majority if not all of the traffic utilising Annandale Road would be Project-related traffic. As such, a basic left turn and right turn treatment from Annandale Road to the site access is expected to be sufficient.” IRC is concerned that this may result in safety concerns and extended queuing of southbound traffic resulting from;</p> <ul style="list-style-type: none"> Project traffic residing in Dysart/Middlemount or travelling DIDO from the Rockhampton area for the Olive Downs South domain phase of the Project; and Project traffic travelling from Moranbah for the Willunga domain phase of the Project 	Nil.	<p>Pembroke does not propose to utilise Iffley Connection Road for any Project related traffic (refer to Section 16 of the Additional Information to the EIS). As such, anticipated traffic using the Fitzroy Developmental Road/Iffley Connection Road and Iffley Connection Road/Annandale Road intersections would only be related to through traffic (i.e. no project traffic would be turning at these intersections).</p> <p>Notwithstanding, Pembroke has agreed to conduct ongoing monitoring of the usage of Iffley Connection Road and if monitoring indicates that additional traffic is utilising this road, and impacts are being generated, Pembroke will determine whether upgrades are required in consultation with the IRC.</p> <p>Similarly, with respect to the intersections along Carfax Road, Project traffic would be limited to through traffic as Pembroke does not propose to utilise Carfax Road for any Project related traffic (refer to Section 16 of the Additional Information to the EIS). Carfax Road (an unsealed road) is approximately the same length as Golden Mile Road (along the route to the Project from Dysart), however, as Golden Mile Road is sealed, anyone travelling along this route is expected to use Golden Mile Road as it would allow for safer, more efficient travel compared to Carfax Road.</p> <p>Further to this, an additional assessment of potential impacts to Golden Mile Road has been undertaken in Appendix H of the Additional Information to the EIS. Given the small number of personnel expected to be travelling along Golden Mile Road, it was concluded that the Project is not expected to result in any significant impacts to this road, or its intersections with Carfax Road and/or Fitzroy Developmental Road (Appendix H of the Additional Information to the EIS).</p> <p>Pembroke is currently in the process of negotiating an Infrastructure Agreement with the IRC which would define the extent of the staged upgrades of Daunia and Annandale Roads, proposed timing and the associated costs. It is anticipated that the Infrastructure Agreement will be finalised in March 2019.</p>

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		<ul style="list-style-type: none">General through traffic Accordingly, IRC requires that further traffic modelling needs to be undertaken by the Proponent with the results of same determining the level of upgrade of the intersection/intersection treatment, pursuant to AustRoads standards.																																																												
35.125	EIS - 4.8.1 Road transport	<ul style="list-style-type: none">It is identified that 25% of the workforce is to be transported by bus, however there is no identification of suitable set down areas within the identified accommodation centres.Fleeting reference is made to Saraji Road, Golden Mile Road and Carfax Road, however no detail is provided as to the project related use and by omission it could be implied that the Proponent does not consider that the Project will have no impact on those roads. It is not accepted by IRC that the Project will have no impact on these roads and IRC requires that Traffic Impact Assessments should be carried out in relation to these roads.IRC notes the Proponent's statement that "Heavy vehicle movements associated with deliveries would be highest during the construction period, and all deliveries would come from Mackay", however it is unclear if the figures presented take into account backgrounding traffic such as:<ul style="list-style-type: none">Fuel delivery;Haulage of construction materials (road base and other specific material) for wash plant construction (33,000t of road base/ month), set down pads, internal road construction, drainage works and other works requiring supply and haulage external to site;Concrete and or concrete aggregates, powder sand haulage and supply;Infrastructure componentry supply;Construction machinery delivery and servicing;Trades site attendances; andWater and power line construction impact. IRC requests that further information is required in relation to the abovementioned road haulage, as such haulage will have a significant impact on the standard of road upgrade required.	Nil.	<ul style="list-style-type: none">Pembroke can confirm that the proposed accommodation centres in Moranbah and Coppabella have suitable set down areas for buses to facilitate the travel of personnel residing in these centres to and from project sites.Refer to response to item 124 which clarifies that Pembroke does not propose to utilise Carfax Road for any Project related traffic and an additional assessment of potential impacts to Golden Mile Road are provided in Appendix H of the Additional Information to the EIS. This assessment concludes that, given the small number of personnel expected to be travelling along Golden Mile Road, it was concluded that the Project is not expected to result in any significant impacts to this road, or its intersections with Carfax Road and/or Fitzroy Developmental Road (Appendix H of the Additional Information to the EIS). Further to this, Pembroke does not propose to use Saraji Road for any Project related traffic.A detailed breakdown of the construction and operation inputs and outputs has been included in the table below, demonstrating that 'background traffic (e.g. fuel ['operational materials'] and haulage of construction material) has been taken into account within the assessment provided in the draft EIS. <p style="text-align: center;">Project Transport Requirements for Inputs and Outputs</p> <table><tr><th>Inputs</th><th>Quantity (tonnes per day)</th><th>Number of Loads (per day)</th><th>Vehicle type</th><th>Origin</th><th>Destination</th></tr><tr><td>Road Base Gravel</td><td>630</td><td>10</td><td>B-Doubles</td><td>Mackay</td><td>Project</td></tr><tr><td>Fill Material</td><td>270</td><td>5</td><td>B-Doubles</td><td>Mackay</td><td>Project</td></tr><tr><td rowspan="3">Other Construction Materials</td><td rowspan="3">1,100</td><td>5</td><td>B-Double</td><td>Mackay</td><td>Project</td></tr><tr><td>20</td><td>Semi-Trailer</td><td>Mackay</td><td>Project</td></tr><tr><td>10</td><td>Other</td><td>Mackay</td><td>Project</td></tr><tr><td rowspan="2">Operational Materials</td><td rowspan="2">550</td><td>10</td><td>Semi-Trailer</td><td>Mackay</td><td>Project</td></tr><tr><td>2</td><td>B-Double</td><td>Moranbah</td><td>Project</td></tr><tr><th>Outputs</th><th>Quantity (tonnes per day)</th><th>Number of Loads (per day)</th><th>Vehicle type</th><th>Origin</th><th>Destination</th></tr><tr><td rowspan="2">Operational and Construction Wastes</td><td rowspan="2">Refer to Section 17 of the Additional Information to the EIS for specific waste stream volumes.</td><td>10</td><td>Semi-Trailer</td><td>Project</td><td>Mackay</td></tr><tr><td>2</td><td>B-Double</td><td>Project</td><td>Moranbah</td></tr></table> <p>Source: Pembroke (2018)</p> <p>As outlined in Tables 6-1 and 6-2 of the draft EIS, Pembroke is currently preparing a Road Use Management Plan in consultation with DTMR for the Project which will include a more detailed breakdown of any proposed over-size over mass (excess dimension) or special vehicle transport required during all project phases. This information will also be provided in the Road Use Management Plan currently being prepared by Pembroke. Pembroke will continue to consult with IRC during the preparation of the RUMP.</p>	Inputs	Quantity (tonnes per day)	Number of Loads (per day)	Vehicle type	Origin	Destination	Road Base Gravel	630	10	B-Doubles	Mackay	Project	Fill Material	270	5	B-Doubles	Mackay	Project	Other Construction Materials	1,100	5	B-Double	Mackay	Project	20	Semi-Trailer	Mackay	Project	10	Other	Mackay	Project	Operational Materials	550	10	Semi-Trailer	Mackay	Project	2	B-Double	Moranbah	Project	Outputs	Quantity (tonnes per day)	Number of Loads (per day)	Vehicle type	Origin	Destination	Operational and Construction Wastes	Refer to Section 17 of the Additional Information to the EIS for specific waste stream volumes.	10	Semi-Trailer	Project	Mackay	2	B-Double	Project	Moranbah
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35.126	EIS - 4.8.1 Road transport	As noted in comments regarding the SIA, whilst it is noted that the Proponent has indicated most operational traffic will access the mine site via bus, IRC requires that a traffic and pavement impact assessment should be carried out with respect to Moranbah Access Road to properly quantify Project impacts on these roads. Furthermore, while the intersection modelling of the Peak Downs Highway/Moranbah Access Road provides intersection requirements across the Peak Downs Highway, it is unclear as to the impact that the project traffic may have on Moranbah Access Road. Without further evidence provided by the Proponent, IRC does not accept the Proponent's view that the existing configuration of the Moranbah Access Road approach/exit geometrics (North &	Nil.	<p>An additional assessment of potential impacts to Moranbah Access Road (including traffic, pavement assessments and intersection analysis) has been undertaken in Appendix H of the Additional Information to the EIS. The additional assessment confirms the following:</p> <ul style="list-style-type: none">The forecast LOS for Moranbah Access Road, as a result of baseline plus Project generated traffic is a 'B' and is above the minimum operational LOS of D, as identified in DTMR's <i>Guide to Traffic Impact Assessment</i> (DTMR, 2017), and GTA Consultants concludes that there would be no significant impact to the road as a result of Project generated traffic (Appendix J).Based on the results of the SIDRA intersection analysis, the Peak Downs Highway / Moranbah Access Road intersection with its existing form and geometry is expected to continue to operate within capacity with the addition of the Project-generated traffic.																																																										

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		South Bound lanes) will completely provide for safe travel as a result of the expected increase due to project related traffic. It is therefore considered that these geometrics should be reviewed based on the results from the traffic impact assessment.		<ul style="list-style-type: none">Pavement impacts of larger than 5% have been identified along Moranbah Access Road due to the Project. It is expected that the 5% impact threshold has been exceeded due to the low baseline heavy vehicle movements on Moranbah Access Road, given the Project only generates a maximum of ~16 vehicle movements per day. Notwithstanding, Pembroke will arrange for a Pavement Design specialist to determine the existing capacity of the pavement on Moranbah Access Road, in consultation with IRC,												
35.127	EIS - 4.8.2 Rail transport	It is noted that the project will result in the introduction of an additional eight (8) trains per day (at full operational capacity) running through the Goonyella rail line. IRC cautions that extra safety measures should be implemented at crossings along the Goonyella rail line.	<p>The Proponent must develop and implement coal dust management procedures to mitigate the emission of coal dust from loaded and unloaded trains.</p> <p>Consideration should be given to the installation of acoustic barriers in proximity of sensitive receptors along the rail spur and rail loop, particularly where it is in close proximity to any homesteads. In addition, the Proponent should ensure that the coal loads have lacquer coverage.</p>	<p>As outlined in Section 6 of the draft EIS, Pembroke will prepare an air quality management plan which would provide a detailed description of the ongoing management of potential air quality impacts, including contingency measures if impacts are identified. The air quality management plan will also outline the coal dust management procedures proposed by Pembroke to mitigate the emission of coal dust from loaded and unloaded trains.</p> <p>It should be noted that Section 4.9.3 of the draft EIS indicates that rail transport noise levels are predicted to comply with the relevant rail noise limit at the closest sensitive receiver (approximately 1.5 km from the rail spur) based on a peak of 16 train movements per day (i.e. 8 unloaded and 8 loaded trains). As such, the use of acoustic barriers is not required.</p> <p>Further to this, Pembroke will prepare a noise management plan which would provide a detailed description of the proposed management of potential noise impacts (including rail noise), including the real-time monitoring system and proposed contingency measures if impacts are identified.</p>												
35.128	EIS - 4.8.3 Air transport	It is noted that the Air Transport assessment does not include impacts of the Project from the resident population.	It is suggested that the Air Transport assessment be revisited.	<p>As outlined in Section 4.8 of the draft EIS, it is estimated that only approximately 10% of the Project workforce would use air transport to commute to the Project and these personnel would fly from Brisbane into the following airports:</p> <ul style="list-style-type: none">Mackay Airport – 70%; andMoranbah Airport – 30%. <p>Based on the distribution above, and proportion of the workforce expected to utilise each airport (e.g. 10% of the overall workforce using air transport, 70% of which would utilise Mackay), the estimated incremental increase in the number of people using the airports servicing the Project area is summarised in the table below. This increase is expected to occur upon the commencement of construction and operation respectively. Airport usage by the resident population is not expected change as a result of the Project as these personnel would not be required to travel (via air) to the Project site.</p> <p style="text-align: center;">Estimated Incremental Increase in People using Airports Servicing the Project Locality</p> <table><tr><th>Airport</th><th>Construction</th><th>Operations</th></tr><tr><td>Mackay</td><td>35</td><td>91</td></tr><tr><td>Moranbah</td><td>16</td><td>38</td></tr><tr><td>Brisbane</td><td>51</td><td>129</td></tr></table> <p>The estimated incremental increase in the number of people using the airports servicing the Project locality is small (less than 1% of the capacity of each airport) and therefore is not expected to have any significant impact on the capacity of the airports.</p> <p>Further to this, to minimise impacts on existing regional air infrastructure, the Project would prioritise recruitment of people from the Isaac Regional Council LGA in the first instance, before seeking candidates from other areas.</p>	Airport	Construction	Operations	Mackay	35	91	Moranbah	16	38	Brisbane	51	129
Airport	Construction	Operations														
Mackay	35	91														
Moranbah	16	38														
Brisbane	51	129														
35.129	EIS - 4.9 Noise and vibration	IRC notes the Proponent's comments that “blasting would generally take place between the hours of 6am and 6pm and would generally not occur on public holidays”. IRC requests that this phrase is revisited to reflect that “blasting will only take place between the hours of 6am and 6pm and will generally not occur on public holidays”. IRC requires that the Blast Management Plan be developed in consultation with IRC and surrounding landholders. In addition, IRC requests two (2) business days’ notice of blasting activities which identifies the location, type, date and time and coordinates of the blasting.	Noise monitoring should also occur on a monthly basis at a minimum for the life of the mine construction and operation, with the results of such monitoring reported to IRC and/or made publicly available. If the Proponent prefers only doing one or the other, IRC’s preference if for the data to be made available publicly to prevent a community expectation that IRC should interpret and regulate breaches. As recommended above, IRC also recommends implementation of a ‘Near Neighbours dust, light and noise response procedure’ to mitigate impacts of dust, light and noise on affected landholders. Furthermore, IRC requires that noise monitoring stations be placed down wind of sensitive receptors to ensure accurate monitoring results.	<p>Pembroke commits to only conducting blasting between 6am and 6pm and generally not on public holidays.</p> <p>Pembroke will develop the Blast Management Plan in consultation with the IRC, and will discuss the proposed blast management measures with surrounding landholders. The blast notification protocol will be described in the Blast Management Plan.</p> <p>As described in Section 4.9.4 of the draft EIS, real-time noise monitoring would be conducted at locations representative of the nearest sensitive receptors to monitor compliance with applicable noise objectives.</p> <p>Pembroke does not consider that noise monitoring stations placed down wind of sensitive receptors would be required to ensure accurate monitoring results.</p>												
35.130	EIS - 4.9 Noise and vibration	It is noted that the conveyor is located only 700m from Seloh Nolem homestead. It is also noted that the Proponent proposes to “enclose a portion of the overland conveyor and utilise low noise idlers” to reduce noise levels from the overland conveyer. IRC requires that the effectiveness of this mitigation measure be monitored in consultation with impacted landholders after the first month of operation of the overland conveyor.	Nil.	Pembroke will monitor the effectiveness of the conveyor noise mitigation measures and compliance with applicable noise objectives through the real-time noise monitoring program.												
35.131	EIS - 4.10 Land - Planning Scheme	IRC is in the process of developing a new regional planning scheme (Proposed Isaac Regional Planning Scheme). The proposed zone for the project area will not change and remains “Rural” as in the existing planning schemes. As in the case of the existing schemes the mining industry will be acknowledged as a key land use in the rural zone.	Nil.	Noted.												

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		<p>Although the impact of the project on good quality agricultural land is limited as the project is located outside of the areas mapped as good quality agricultural land in the Mackay/ Isaac/ Whitsunday Regional Plan (2012) and there are no strategic cropping areas mapped within the project area, agricultural land should still be protected. IRC support and would encourage a progressive rehabilitation strategy to return rehabilitated land back to agriculture to be used for cattle grazing and understand that the Proponent has taken some steps towards this.</p> <p>IRC acknowledge that development within a Mining Lease (ML) or Special Purpose Mining Lease (SPL), does not need to consider the Planning Act 2016 (Qld), Planning Regulations or planning schemes but it should be noted that development not related to the mining activity on a ML or SPL would still require consideration under the Planning Act 2016 (Qld), Planning Regulations, planning scheme or associated instruments. It is noted that the ETL runs parallel to the Annandale Road. It is noted that the Proponent must obtain all relevant approvals/tenure if the ETL is intended to be placed within the road reserve.</p>		
35.132	EIS - 4.10 Land - Strategic cropping land and stock routes	<p>Strategic cropping land</p> <p>It is noted that the Project is not located on any strategic cropping land.</p> <p>Stock Routes</p> <p>It is noted that the Proponent states that there are two areas designated as Stock Routes (Reserves) that would be intersected by the Project pipeline and rail spur over the following lots:</p> <ul style="list-style-type: none"> Pipeline - Lot 9 GV33 Rail spur and pipeline - Lot 15 CNS111 <p>IRC has examined relevant mapping and records and notes that the relevant lots are listed as reserves for stock routes but are not in fact used as stock routes. Mapping investigations indicate that Lot 15 CNS111 is reserve with a lease over it to Beryl A Neilsen (Winchester Downs) and Lot 9 GV33 is reserve with Isaac Regional Council as owner. It is noted that neither lot is in the stock route network (has no stock route entering or exiting or in close vicinity) and there is no infrastructure on 9GV33. IRC understands that the impact on the stock route network is minor however the Proponent will be required to obtain relevant consent/approvals from each of the interest holders.</p>	Nil.	Noted. Pembroke will obtain relevant consent/approvals from each of the interest holders.
35.133	EIS - 4.13 Biosecurity	<p>IRC considers that the Proponent has referenced all the applicable legislation dealing with Bio Security and have a good understanding of their bio security obligations. The Proponent has referenced the Bio Security Plans for Mackay and Whitsunday. It is noted that IRC is currently in the drafting phase for its Bio Security Plan which will be distributed to the Proponent for compliance on completion and it is recommended that the Project also be conditioned to reflect "any relevant Bio Security Plan issued by IRC", or words to that effect.</p> <p>In relation to the Bushfire Prevention and Management Plan, IRC notes the reference to "appropriate" buffer distances between the Project and surrounding bushland. IRC requires that determination as to appropriate buffer distances is made in consultation with the Queensland Fire and Rescue Service.</p>	Nil.	Noted. Pembroke has committed to preparing an Emergency Response Procedure in consultation with the relevant emergency services. Appropriate buffer distances between the Project and surrounding bushland will be determined through consultation with the Queensland Fire and Rescue Service.
35.134	EIS - 4.14 Water management	<p>IRC is gravely concerned about the waste management component of the EIS.</p> <p>Whilst it is accepted that the waste management component of the EIS is a general overview and significant detail will be included in the Waste Management Strategy, at present, IRC has no level of comfort around the Proponent's waste management plans.</p> <p>IRC highlights that the Proponent has made reference to a</p>	Nil.	<p>Pembroke has prepared a draft Waste Management Program which includes additional information on Project waste management. Pembroke will provide the draft Waste Management Program to the IRC for comment and consult with them prior to finalisation of the document.</p> <p>Pembroke intends to form an agreement with the IRC for the disposal of certain waste streams within IRC landfills, however it is acknowledged that alternative waste management facilities outside the Isaac LGA (e.g. the Hogan's Pocket Landfill in the Mackay LGA) would be used if capacity within the LGA is not available.</p>

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		<p>number of items which are lacking in detail including:</p> <ul style="list-style-type: none"> On site backfilled pit for tyre disposal without specifying what approvals are needed to enable same; Disposal of waste to a registered landfill without specifying which landfill; Disposal of waste to recycling facilities and waste oil facilities without specifying which facility and a contingency plan in the event that resource recovery is not possible; and Disposal of regulated waste without specifying which facility will accept the regulated waste. <p>It is not evident from the EIS that the Proponent has taken any steps to consult with potential waste management facilities/landfills/recycling facilities.</p>		
35.135	EIS - 4.14 Waste management	<p>It is acknowledged that the Proponent has forecast quantities of waste (for example 2,500m³ of general waste per annum) however IRC is concerned that the Proponent has provided little detail in relation to how the estimated quantities have been arrived at and holds further concerns that by omission, IRC waste management facilities are considered the default accepting facilities. To explain the cause for IRC's concern, it is noted that if the Proponent disposes of 2,500m³ of general waste to the Moranbah waste management facility, a significant proportion of that facility's annual limit would be consumed, and if the figure was found to be underestimated, this could present a unacceptable burden on the Moranbah waste management facility over the life of the project. IRC acknowledges that the capacity of the Moranbah facility has been exhausted in the past boom, when two coal mines and a gas project came online, causing IRC to invest upwards of \$7million in an upgrade to the facility. The Dysart waste management facility is already exceeding its annual Environmental Approval limit and cannot accept any further waste, with IRC currently taking steps to reduce waste intake at that facility.</p>	<p>IRC requires a condition to be inserted in the Evaluation Report of the Coordinator-General that IRC must approve the Proponent's Waste Management Plan. Without an approved Waste Management Plan to Council's satisfaction, Council will not accept any waste generated by the Project or its contractors.</p> <p>IRC also suggests that the Proponent consider implications of the recent Waste Reduction and Recycling (Waste Levy) and Other Legislation Amendment Bill 2018 (Qld) on the Proponent's waste management .</p>	<p>As described above, Pembroke has prepared a draft Waste Management Plan which includes additional information on Project waste management. Pembroke will provide the draft Waste Management Plan to the IRC for comment and consult with them prior to finalisation of the document.</p> <p>Pembroke intends to form an agreement with the IRC for the disposal of certain waste streams within IRC landfills, however it is acknowledged that alternative waste management facilities outside the Isaac LGA (e.g. the Hogan's Pocket Landfill in the Mackay LGA) would be used if capacity within the LGA is not available.</p> <p>Pembroke acknowledges the waste levy to be introduced on 4 March 2019. It is anticipated that this will have a financial impact on waste disposal and will encourage alternative waste management practices (e.g. reduced waste generation, increased rates of recycling etc.)</p>
35.136	Other waste matters – sewage	<p>Whilst the EIS is silent on the disposal of black waste/sewerage waste products/bio solids, IRC has concerns that the expectation of the Proponent is for such waste products to be disposed of at IRC's waste water treatment plants. There is no information in the EIS in this regard with respect to quantities, volumes or frequencies of tankered bio solids or sewerage sludge that may be disposed of at IRC's waste water treatment plants. If it is the Proponent's intention to tanker sewerage sludge to IRC's waste water treatment plants, IRC requires further information from the Proponent regarding volumes, quantities and frequencies that may impact upon IRC's infrastructure.</p>	<p>IRC requires a condition to be inserted in the Evaluation Report of the Coordinator-General that IRC must approve the Proponent's Black Waste/Sewerage Waste Products/Bio Solids Management Plan. Without an approved Black Waste/Sewerage Waste Products/Bio Solids Management Plan which is to Council's satisfaction, Council will not accept any black waste/sewerage waste products/bio solids generated by the Project or its contractors.</p>	<p>As described above, Pembroke has prepared a draft Waste Management Plan which includes additional information on Project waste management. Pembroke will provide the draft Waste Management Plan to the IRC for comment and consult with them prior to finalisation of the document.</p> <p>Pembroke intends to form an agreement with the IRC for the disposal of solids from the on-site sewage treatment facilities at the IRC's sewage treatment facilities.</p>
36. Warp Project Services Pty Ltd				
36.1	Project Support	<p>Proactive Australian Business initiative with long term operational life approximately 79years (Olive Downs Coking Coal Project Draft EIS Executive Summary - ES1) providing quality resources to the growing world markets to be utilised for production of products for future world steel developments and technologies.</p> <p>Providing Direct & Indirect employment and business growth in Qld in line with the Qld Department of State Development Strategic Plan for 2018 -2022.</p> <p>Comprehensive Environmental Impact Statement that has considered strategies to maintain or improve current site conditions by staging construction and mining so that progressive rehabilitation (Olive Downs Coking Coal Project Draft EIS Executive Summary - ES1.4.4)</p> <p>Concerns for future sustainability of the direct regional and indirect state economical growth with limited new industry investments. Also concerns of Non Australian investments providing local, state and National Economics.</p>	<p>No Issues. The Project Development and Mining Strategies show positive consideration to minimise and eliminate impacts like the extraction methodology.</p> <p>Also provides opportunities to local community direct & Indirect employment and business growth.</p> <p>Infrastructure upgrades in roads, communications, power & water supply will also provide not only Mine requirements but added benefits in availability to the local region which may have been financially not achievable for smaller organisations or individuals.</p>	Note.

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37. Department of Environment and Energy				
37.1	Vegetation clearing	<p>Background and Olive Downs Project Mine Site and Access Road (EPBC 2017/7867)</p> <p>Vegetation mapping (Figure 3-2) suggests there is vegetation onsite that is not considered 'Ground-trothed Regional Ecosystems' but will be impacted by surface disturbance (particularly the north and north-western area of the Willunga Domain).</p> <p>The Department notes habitat for EPBC listed threatened species does not generally correlate directly with Queensland Regional Ecosystems (REs).</p> <p>It is not clear as to the width (in metres) of the right-of-way for the haul road and overland conveyor which intersects the Isaac River (and riparian vegetation) in at least three places.</p>	<p>Include a discussion on the type of vegetation (based on ground-trothed vegetation assessments) in the project area that were not field-verified as 'Ground-trothed Regional Ecosystems'.</p> <p>Discuss this vegetation in the context of known and/or potential habitat (e.g. nesting, denning, roosting, foraging, dispersal, etc.) for relevant EPBC listed threatened species. Include the vegetation (in hectares) within the disturbance footprint if determined to be habitat for EPBC listed threatened species.</p> <p>Clearly identify the width (in metres) of the right-of-way for all instances the haul road and overland conveyor intersects the Isaac River (and riparian vegetation).</p>	<p>Section 3.2.6 of the draft EIS describes that there is 17,838 ha of land in the Study area that is not associated with any regional ecosystems. This area has been classified as 'agricultural grasslands dominated by buffel grass (<i>Cenchrus ciliaris</i>)' (Figure 3-2 of the draft EIS). Much of this area contains sparse Brigalow (<i>Acacia harpophylla</i>) regrowth (which does not meet the criteria to be mapped as Brigalow TEC), buffel grass and gilgai (Appendix A of the draft EIS).</p> <p>Consideration of whether the agricultural grasslands provides potential habitat (e.g. nesting and denning habitat) for each of the relevant MNES is also provided within Section 3.3.7.1 of the draft EIS. It should be noted that none of the MNES considered relevant to the Project area rely on 'roosting' or 'sheltering' habitat. These are reproduced below:</p> <p>Ornamental Snake</p> <p>Based on observations of Ornamental Snake across the Project area, areas of potential habitat occur in a significant portion of agricultural grasslands (where there was once brigalow), and small patches of palustrine wetlands (swamps) and Acacia dominated open forests, woodlands and shrublands where these soil types are also present (Figure 3-6b of the draft EIS) (Appendix B of the draft EIS).</p> <p>The other habitat types within the Project area (including the remaining grassland vegetation) are not considered to provide potential habitat for the Ornamental Snake on the basis that they are lacking the cracking clay soils, gilgai habitat and microhabitat features required by this species (Appendix B of the draft EIS).</p> <p>Squatter Pigeon (southern)</p> <p>Small patches some of agricultural grasslands within the Project area has been identified by DPM Envirosciences as potential dispersal habitat for the Squatter Pigeon (southern) (Section 7 of the Additional information to the EIS). This is comprised of areas of lower quality regrowth vegetation (i.e. areas which contain a high abundance of weeds and low abundance of native species in the early stages of regrowing, no greater than 100 m wide) between areas of breeding/foraging habitat.</p> <p>The other areas of agricultural grasslands habitat type in the Project area is not considered potential habitat because it does not support the grassy understorey with a high density of native grasses necessary to provide a food resource for the species (DPM Envirosciences, 2018b).</p> <p>Australian Painted Snipe</p> <p>In the Project area all areas of wetlands (lacustrine or palustrine) are considered potential habitat for this species (Figure 3-6a of the draft EIS). Although the species was observed in wetted gilgai habitat within the agricultural grasslands, this habitat would only be suitable for a short period after rainfall when the gilgai are full. In addition, these areas lack the dense cover reported in the SPRAT database as being required by this species for foraging (DPM Envirosciences, 2018b).</p> <p>Koala</p> <p>The areas of agricultural grasslands in the Project area do not contain Koala feed trees of an adequate size to support Koalas (i.e. <i>Eucalyptus spp.</i>, <i>Corymbia spp.</i>, <i>Lophostemon spp.</i> or <i>Melaleuca spp.</i> that are > 4 m in height and > 10 cm diameter at breast height [DBH]), in accordance with the definition of non-juvenile Koala habitat in the <i>Planning Regulation, 2017</i>. Other habitat types, such as 'Other coastal communities and heath' and 'Acacia dominated open forests, woodlands and shrublands', also do not contain Koala food trees required to support the species.</p> <p>Greater Glider</p> <p>Other habitat types within the Project area (including the 'Agricultural Grasslands' habitat type) are not considered suitable for the species because they lack a high density of large mature eucalypts, which are important for foraging and denning (DPM Envirosciences, 2018b).</p> <p>Further to this, revised species habitat mapping has been produced by DPM Envirosciences and is discussed in detail in Section 7 of the Additional Information to the EIS. This information provides additional detail of the habitat mapped within the Project area by mapping the extent of breeding (i.e. nesting and denning), foraging and dispersal habitat of the Ornamental Snake, Squatter Pigeon (southern), Australian Painted Snipe, Koala and Greater Glider. This includes the identification of some of these patches of grassland vegetation as potential dispersal habitat for the Squatter Pigeon (southern). It should be noted that none of the MNES considered relevant to the Project area rely on 'roosting' or 'sheltering' habitat</p> <p>In relation to the DEE's third recommendation:</p> <ul style="list-style-type: none"> The proposed 3.5 km access road would be co-located with existing public and private roads as far as possible to reduce impacts to native vegetation. The access road would be restricted to 40 m at the crossing point to reduce the impact on the riparian habitat. The haul road crossing of the Isaac River would provide access to the waste emplacement on Deverill from the Olive Downs South Domain. The crossing would be located approximately 2 km south-south east of the access road where it crosses the Isaac River entering an area ground-truthed as being RE 11.3.25 of Least Concern. The haul road would be restricted to a construction corridor of 60 m. <p>The conveyor and access road would be restricted to a construction corridor of 180 m width, however this would be reduced when crossing the Isaac River where, within 200 m of the defining bank, the construction corridor width would be limited to 45 m to reduce impacts on aquatic habitat.</p>

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37.2	Habitat requirements	<p>Habitat definitions</p> <p>The Department notes the habitat definitions for several EPBC listed threatened species have been updated and generally align with Departmental information. The Department will provide comments on the habitat definitions for relevant EPBC listed threatened species below.</p> <p>The Department notes Table 3-8 provides a breakdown of direct impacts to EPBC listed threatened species specific to REs in the project area. However, there is no total amount (in ha) of these REs in the table for the project area.</p> <p>The Department considers there is insufficient detail to understand the habitat use types (i.e. nesting, roosting, denning, shelter, foraging, dispersal, etc.) present onsite for EPBC listed threatened species and inform the environmental impact assessment.</p> <p>The Department notes the proponent is proposing to offset direct vegetation clearance impacts on EPBC listed threatened species. A requirement for providing a suitable environmental offset is to understand the nature of the habitat to be impacted and how each species utilises this habitat.</p> <p>The Department notes the habitat definitions and discussions for the water pipeline, electricity transmission line and rail spur projects have been directly copied from the mine and access road project discussion. The vegetation to be impacted by each project should be considered and discussed on its own merit, including identifying and describing how the vegetation is used by EPBC listed threatened species.</p>	<p>Update Table 3-8 to include the total amount (in ha) of each of the REs in the project area and include a percentage of the total area of each RE proposed to be cleared as part of the project.</p> <p>In the comments for each relevant EPBC listed threatened species, include the amount of each habitat requirement in the project area and to be impacted by the project.</p> <p>Apply this approach to each of the four EPBC projects.</p>	<p>The term 'Project Area' within the draft EIS has been used to refer to the full extent of land within the proposed disturbance footprint. To conservatively assess potential impacts, it has been assumed that all land within the 'Project area' is proposed to be cleared. As such, Table 3-8 of the draft EIS provides the total amount (in ha) of each of the REs in the Project area. There is no instance where the extent of RE considered to be habitat for a species only represents a subset of the overall extent of the RE within the Project area. As such, it is not possible to indicate what percentage of the total area of each RE this comprises (i.e. it equates to 100%).</p> <p>Table 3-49 of the draft EIS provides the total amount of habitat for each MNES (including Brigalow) to be cleared by the Project. This includes a breakdown of the amount of habitat being cleared by each of the four Actions separately.</p> <p>Further to this, DPM Envirosiences has provided additional detail of the habitat mapped within the Project area by mapping the extent of breeding (i.e. nesting and denning), foraging and dispersal habitat of each relevant MNES as requested by DEE and has been applied to each of the four Actions. It should be noted that none of the MNES considered relevant to the Project area rely on 'roosting' or 'sheltering' habitat</p> <p>These habitat definitions are based on the information contained in the DEE's Species Profiles and Threats (SPRAT) database, including the relevant statutory documents (listing advices, conservation advices, draft referral guidelines, recovery plans) and published research. Where a species habitat has been treated as a homogenous unit with overlapping habitat attributes, justification has been provided based on-site specific information and published research.</p> <p>This information is provided in Section 7 of the Additional Information to the EIS.</p>
37.3	Habitat requirements	<p>Ornamental Snake – Habitat Assessment and Definition</p> <p>The Department notes there is no clear reference and consideration of 'Known important habitat' and 'Suitable habitat' as described in the Draft Referral guidelines for nationally listed Brigalow Belt Reptiles (2011). Further, there is no discussion of the nature and importance of habitat connectivity, including identifying important dispersal habitat for the species, noting one 'transient' individual was found within Eucalypt woodland.</p> <p>It is not clear as to whether the wetlands on the project site to be cleared is considered habitat for the species. The Department considers the wetlands are 'important habitat' for the species.</p> <p>Figure 3-5c does not include an overlay with the species habitat and mine infrastructure layout (i.e. the locations of all infrastructure and pits).</p> <p>No detail is provided discussing the species of prey (frogs) which have been identified onsite and where the prey species were identified.</p> <p>The EIS discusses 'potential' habitat for the species. The Department considers that based on the species being found onsite, the EIS should consider discussing 'known' habitat for the species.</p>	<p>Review and include reference to the habitat definitions with the draft referral guidelines in the habitat definition for the Ornamental Snake.</p> <p>Provide a discussion on connective/dispersal habitat, derived from Departmental sources or other published research, in the context of the project area.</p> <p>Clarify whether the wetlands in the project area are considered suitable habitat for the species, including whether its prey (frogs) was identified in these areas.</p> <p>Update Figure 3-5c to include the important habitat, suitable habitat and connective/dispersal habitat. Include a detailed overlay of the mine layout.</p> <p>Include a detailed discussion of the species of prey (frogs) which have been identified onsite and where the prey species were identified. Discuss this information in the context of the suitable habitat for the Ornamental Snake, including the wetlands (if relevant). The Department recommends updating Figure 3-5c with this information.</p> <p>Consider updating the EIS to reflect 'known' habitat for the species in the project area.</p>	<p>As outlined above, DPM Envirosiences has provided additional detail of the habitat mapped within the Project area for the Ornamental Snake by assessing the extent of Important, Suitable and Dispersal/connective habitat for this species as defined in the <i>Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles</i> (DSEWPC, 2011) and SPRAT profile. Further to this, revised figures have been provided identifying the extent of important habitat, suitable habitat and connective habitat for the Ornamental Snake within the Project area.</p> <p>Known Important Habitat</p> <p>Within the Project area, it was determined that all areas of brigalow TEC and mapped gilgai represent potential 'known important habitat' for the Ornamental Snake, as do wetland REs 11.3.3, 11.3.27 and 11.5.17 because the species was recorded on several occasions within these habitats across the Project area.</p> <p>In the Project area, the gilgai landform is associated with cleared agricultural grasslands. Cracking clays and woody debris (each considered refuge) and burrowing frogs (considered prey) were observed in representative gilgai surveyed within the Project area.</p> <p>Nine species of native amphibians were recorded during the spring 2016 field surveys and an additional two species were recorded during autumn 2017 (Appendix B of the draft EIS). Each of these species are common Least Concern species which are generally found in the vicinity of dams, creeks and other moist habitats of central Queensland. These areas have been included as Important Habitat for the Ornamental Snake.</p> <p>Some of the gilgai are likely to be used for breeding and foraging and some may only be suitable for dispersal, however any habitat that allows connectivity between gilgais and other 'suitable habitat' is also considered 'important' in accordance with DSEWPC (2011).</p> <p>Suitable Habitat</p> <p>Given the Ornamental Snake was recorded within the Project area, and it was determined that all areas of mapped gilgai represent potential important habitat for this species, no additional areas of suitable habitat have been identified.</p> <p>Dispersal/Connective Habitat</p> <p>Dispersal habitat for this species has not been mapped within the Project area given there is no definition of dispersal habitat for this species on the SPRAT database.</p> <p>Figure 3-5 has been superseded by the revised figures provided in Section 7 of the Additional Information to the EIS which demonstrate the locations of the Ornamental Snake, the extent of Important Habitat and the overall extent of clearance associated with the Project.</p>
37.4	Habitat requirements	<p>Ornamental Snake – Impacts</p> <p>The Department notes the only impact discussed is vegetation clearance. Further, the EIS only provides one habitat clearance amount (7,621.5 ha) and does not consider different habitat use types (i.e. important habitat, suitable habitat and dispersal/connective habitat).</p> <p>The Department notes there is no discussion on other potential impacts of the project on the species, including but not limited to habitat fragmentation, mortality, lighting, noise, dust and</p>	<p>Include a breakdown of the habitat clearance amount based on the refinement of the habitat definitions section. For example:</p> <p>Important habitat (e.g. gilgai, cracking soils): XXX ha (project area) / XXX ha (impact)</p> <p>Suitable habitat (e.g. location of frog species, riparian vegetation): XXX ha (project area) / XXX ha (impact)</p> <p>Dispersal/connective habitat (e.g. other vegetation which provides connectivity between important/suitable habitats): XXX ha (project area) / XXX ha (impact)</p>	<p>As outlined above, DPM Envirosiences has provided additional detail of the habitat mapped within the Project area for the Ornamental Snake by assessing the extent of Important, Suitable and Dispersal habitat for this species as defined in the <i>Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles</i> (DSEWPC, 2011) and SPRAT profile. Further to this, revised figures have been provided identifying the extent of important habitat, suitable habitat and connective habitat for the Ornamental Snake within the Project area.</p> <p>In summary, all habitat within the Project area (7,621.5 ha) meets the definition of 'Important Habitat' as outlined in the <i>Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles</i> (DSEWPC, 2011).</p> <p>As outlined in response 37.3, the Project would not result in the removal of any additional suitable habitat or dispersal habitat).</p>

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		coal dust, vibration, changes to surface hydrology, pest animals (cane toads), predation by feral pests, invasive weeds and fencing.	Provide a detailed discussion, including nature and scale, of the other potential impacts of the project on the species. The Department recommends reviewing the SPRAT Database, and relevant statutory documents, to inform this discussion	<p>Indirect impacts to this species are described within the assessment of significance tables provided in Section 3 (i.e. Tables 3-9, 3-27, 3-35 and 3.42). For example, Table 3-9 states:</p> <p><i>Weed and feral animal threat levels are unlikely to change significantly due to the Mine Site and Access Road given the current agricultural use of the surrounding area. As outlined above, the majority of the potential habitat for this species is mapped within the agricultural grasslands, there are a number of existing threats to the Ornamental Snake. These include, heavy weed infestation, presence of introduced fauna species (including cane toads); agricultural grazing and habitat fragmentation. Through effective pest and weed management, Pembroke's Weed and Pest Management Plan would seek to identify, treat, and propose removal strategies to manage these risks to avoid a significant impact to this species.</i></p> <p>Given the implementation of management measures proposed by Pembroke (refer to comment 37.5), it is unlikely that any indirect impacts (e.g. increased bushfire risk, habitat fragmentation or edge effects) would result in a significant impact to this species.</p> <p>Notwithstanding, Section 6 of the Terrestrial Flora Assessment, Terrestrial Fauna Assessment and Aquatic Ecology Assessment provide a detailed assessment of potential indirect impacts on native flora, fauna and aquatic values species. This includes an assessment of impacts from clearance activities and vehicle strike, weeds and feral animals, edge effects, bushfire, impacts to water quality and flow (both surface water and groundwater), loss in connectivity, dust, noise, artificial lighting and cumulative impacts. Further to this, Section 3 of the draft EIS contains significant impact assessments for the Ornamental Snake, including assessment of potential indirect impacts.</p>
37.5	Mitigation and management measures	<p>Ornamental Snake – Avoidance, Mitigation and/or Management</p> <p>The Department notes there is only a high level discussion of some applicable avoidance, mitigation and management measures, with reference to section 3.3.1.1 of the EIS. The Department notes the EIS does not propose appropriate buffers to minimise impacts to riparian corridors.</p>	<p>Provide a detailed discussion on the specific measures to be implemented to avoid, mitigate and manage impacts on the Ornamental Snake. This discussion must include robust supporting evidence (e.g. published research or studies, Australian standards, etc.), which demonstrates the appropriateness and success of these measures.</p> <p>This discussion must include detailed information on how the proposed measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans.</p> <p>Further, the Department expects information to be drawn from the SPRAT Database for the species, noting there is relevant information available in the 'Threat Abatement and Recovery', 'Mitigation Approach' and 'Management Documentation' sections.</p>	<p>Section 4.1.4 of the draft EIS provides a detailed description of the proposed buffer distances associated with the mining pits, overland conveyor, access road, haul road, water pipeline, ETL and rail spur. Further to this, Section 2.10 of the draft EIS provides a description of the project justification, including an assessment of Project alternatives, including alternative locations for infrastructure components. Impacts to riparian vegetation along the Isaac River has been minimised in the mine design and a minimum buffer zone of 200 m between the mine pits and Isaac River has been implemented. The Terrestrial Flora and Terrestrial Fauna Assessments (Appendices A and B of the draft EIS) found that there is not predicted to be a significant impact on the riparian vegetation associated with the Isaac River or Ripstone Creek which occurs outside the Project area (i.e. through indirect impacts such as habitat fragmentation and edge effects). As such, Pembroke is of the view that appropriate buffer to minimise impacts to riparian corridors have been incorporated into the Project design.</p> <p>As outlined in Section 7 of the Additional Information to the EIS, the following measures would be undertaken by Pembroke to minimise potential adverse impacts on the Ornamental Snake:</p> <ul style="list-style-type: none"> Vegetation clearance procedures outlined in Table 7-6. This includes progressive vegetation clearing, demarcation of habitats proposed to be cleared, the implementation of pre-clearance surveys and the use of a qualified fauna spotter catcher. Implementation of a Weed and Pest Management Plan to monitor and control feral animals (including feral pigs which can degrade important habitat for the Ornamental Snake [DEE, 2018a]). Bushfire prevention would be undertaken, noting that the important habitat for the Ornamental Snake occurs in Brigalow Woodland and this species uses groundcover which is susceptible to fire (DEE, 2018a). <p>The above measures are predicted to be effective in minimising potential adverse impacts from the Project on the important habitat for the Ornamental Snake because they are focused on addressing the recognised threats to the species and they are consistent with the relevant threat abatement actions (e.g. avoiding additional habitat loss and minimising the risk of invasive and predatory species) (DEE, 2018a).</p> <p>Further to this, the unavoidable loss of habitat for the Ornamental Snake associated with the Project would be offset in accordance with the <i>EPBC Act Environmental Offsets Policy</i> (DSEWPC, 2012a) (Section 10 of the Additional Information to the EIS).</p> <p>Further information on the management of potential impacts to threatened flora would be provided in the Fauna Species Management Plan as described in Tables 6-1 and 6-2 of the draft EIS.</p> <p>Section 4.1.4 of the draft EIS provides a detailed description of the proposed buffer distances associated with the mining pits, overland conveyor, access road, haul road, water pipeline, ETL and rail spur. Further to this, Section 2.10 of the draft EIS provides a description of the project justification, including an assessment of Project alternatives, including alternative locations for infrastructure components. Notwithstanding, further information on impact avoidance and minimisation associated with the Project is provided in Sections 8 and 21 of the Additional Information to the EIS. This includes a detailed justification for the Ripstone Creek Diversion and the final alignment of the overland conveyor (relative to the mapped HES wetlands and their associated buffers).</p>
37.6	Offsets	<p>Ornamental Snake – Summary of EPBC Act Assessment</p> <p>The EIS states the removal of 7,621.5 ha of potential habitat for the species will be mitigated and offset. The Department considers the removal of habitat cannot be mitigated.</p> <p>It is not clear from Table 3-9 as to whether the proponent considers a residual significant impact will occur on the Ornamental Snake as a result of the project. The Department notes offsets are required to compensate for residual significant impacts.</p> <p>The Department's view is that at the very least, the removal of 7,621.5 ha of known suitable habitat (including known important habitat in gilgai, wetlands, riparian vegetation and</p>	<p>Update the conclusion to remove the reference to 'mitigated'.</p> <p>Provide a more detailed conclusion outlining the proponent's view of whether the project will result in a residual significant impact on the Ornamental Snake and its habitat. Further, clearly commit to the provision of an environmental offset in accordance with the EPBC Act Environmental Offsets Policy (2012).</p>	<p>Pembroke notes the Department's view that the removal of habitat cannot be mitigated and this terminology has been removed from the Additional Information to the EIS.</p> <p>Further to the information provided in Table 3-9, Pembroke is of the view that the removal of 7,621.5 ha of important habitat for the Ornamental Snake associated with the Project would result in a residual significant impact to the species. As such, a detailed Biodiversity Offset Strategy has been prepared, and is provided in Appendix F of the Additional Information to the EIS, describing that Pembroke would offset these potential impacts in accordance with the <i>EPBC Act Environmental Offsets Policy</i> (2012).</p>

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		cracking clay soils), without consideration of any other potential impacts, will result in a residual significant impact on the Ornamental Snake.		
37.7	Habitat requirements	<p>Australian Painted Snipe – Habitat Assessment and Definition</p> <p>Figure 3-5a does not include an overlay with the species habitat and mine infrastructure layout (i.e. the locations of all infrastructure and pits).</p> <p>The EIS does not identify how the Australian Painted Snipe uses the potential habitat within the project site. The EIS states wetted gilgai habitat is not considered optimal or primary habitat.</p> <p>Based on the information available to the Department, the wetlands should be considered as breeding habitat for the species and the wetted gilgai habitat should be considered as foraging and/or dispersal habitat.</p> <p>The EIS discusses ‘potential’ habitat for the species. The Department considers that based on the species being found onsite, the EIS should consider discussing ‘known’ habitat for the species.</p>	<p>Update Figure 3-5a to include breeding and foraging/dispersal habitat. Include a detailed overlay of the mine layout.</p> <p>Provide a discussion on the nature of the potential habitat on the project site as breeding, foraging and/or dispersal habitat, including justifying why wetted gilgai is not considered optimal or primary habitat.</p> <p>This discussion must be informed by relevant Commonwealth or State information, policies or guidelines, and/or published research.</p> <p>Consider updating the EIS to reflect ‘known’ habitat for the species on the project site.</p>	<p>DPM Envirosiences has provided additional detail of the habitat mapped within the Project area for the Australian Painted Snipe by assessing the extent of breeding and foraging/dispersal habitat for this species as defined on the SPRAT profile. Further to this, revised figures have been provided identifying the extent of breeding, foraging and dispersal habitat for the Australian Painted Snipe within the Project area.</p> <p>Breeding Habitat</p> <p>Within the Project area, it was determined that all areas of lacustrine and palustrine wetlands (including palustrine wetland REs 11.3.27, 11.3.3 and 11.5.17) represent potential breeding habitat for the Australian Painted Snipe, particularly as water levels change seasonally and islands or mounds and bare earth are exposed.</p> <p>Foraging Habitat</p> <p>The Project area does not contain any foraging habitat that would not also provide the potential for breeding (i.e. breeding habitat). As outlined in the Terrestrial Fauna Assessment, the gilgai habitat would only be suitable for a short period after rainfall when the gilgai are full. In addition, these areas lack the dense cover reported in the SPRAT database as being required by this species for foraging.</p> <p>Dispersal Habitat</p> <p>Dispersal habitat for this species has not been mapped within the Project area given:</p> <ul style="list-style-type: none"> there is no definition of dispersal habitat for this species on the SPRAT database; and this species does not require specific habitat features to assist it in dispersing. <p>Figure 3-5 has been superseded by the revised figures provided in Section 7 of the Additional Information to the EIS which demonstrate the locations of the Australian Painted Snipe, the extent of breeding habitat and the overall extent of clearance associated with the Project.</p>
37.8	Habitat requirements	<p>Australian Painted Snipe – Impacts</p> <p>The Department notes the only impact discussed is vegetation clearance. Further, the EIS only provides one habitat clearance amount (113 ha).</p> <p>The Department notes the proposed locations of the overland conveyor and haul road linking the two Olive Downs domains traverses approximately 54 ha of wetland habitat (also protected under State legislation). The Department notes the potential for the avoidance of these wetlands by moving the infrastructure to the south of the wetlands.</p> <p>The Department notes there is no discussion on other potential impacts of the project on the species, including but not limited to habitat fragmentation, mortality, lighting, noise, dust and coal dust, and predation by feral pests.</p>	<p>Include a breakdown of the habitat clearance amount based on the refinement of the habitat definitions section. For example:</p> <p>Breeding habitat: XXX ha (project area) / XXX ha (impact) Foraging habitat: XXX ha (project area) / XXX ha (impact) Dispersal habitat: XXX ha (project area) / XXX ha (impact)</p> <p>Provide a detailed discussion justifying the proposed route for the overland conveyor and haul road, including why the 54 ha of wetland habitat cannot be avoided.</p> <p>Provide a detailed discussion, including nature and scale, of the other potential impacts of the project on the species. The Department recommends reviewing the SPRAT Database, and relevant statutory documents, to inform this discussion.</p>	<p>As outlined above, DPM Envirosiences has provided additional detail of the habitat mapped within the Project area for the Australian Painted Snipe by assessing the extent of breeding and foraging/dispersal habitat for this species as defined on the SPRAT profile. Further to this, revised figures have been provided identifying the extent of breeding, foraging and dispersal habitat for the Australian Painted Snipe within the Project area.</p> <p>In summary, all habitat within the Project area meets the definition of potential breeding habitat for the Australian Painted Snipe as outlined on the species’ SPRAT profile (DEE, 2019). As outlined in response 37.7, the Project would not result in the removal of any additional foraging habitat or dispersal habitat.</p> <p>Section 4.1.4 of the draft EIS provides a detailed description of the proposed buffer distances associated with the mining pits, overland conveyor, access road, haul road, water pipeline, ETL and rail spur. Further to this, Section 2.10 of the draft EIS provides a description of the project justification, including an assessment of Project alternatives, including alternative locations for infrastructure components. Notwithstanding, further information on impact avoidance and minimisation associated with the Project is provided in Sections 8 and 21 of the Additional Information to the EIS. This includes a detailed justification for the final alignment of the overland conveyor (relative to the mapped HES wetlands and their associated buffers).</p> <p>Indirect impacts to this species are described within the assessment of significance tables provided in Section 3 (i.e. Table 3-9, 3-27, 3-35 and 3.42). For example Table 3-9 states:</p> <p><i>Weed and feral animal threat levels are unlikely to change significantly due to the Mine Site and Access Road given the current agricultural use of the surrounding area. As outlined above, the majority of the potential habitat for this species is mapped within the agricultural grasslands, there are a number of existing threats to the Ornamental Snake. These include, heavy weed infestation, presence of introduced fauna species (including cane toads); agricultural grazing and habitat fragmentation. Through effective pest and weed management, Pembroke’s Weed and Pest Management Plan would seek to identify, treat, and propose removal strategies to manage these risks to avoid a significant impact to this species.</i></p> <p>Given the implementation of management measures proposed by Pembroke (refer to comment 37.9), it is unlikely that any indirect impacts (e.g. habitat fragmentation or edge effects) would result in a significant impact to this species.</p> <p>Notwithstanding, Section 6 of the Terrestrial Flora Assessment, Terrestrial Fauna Assessment and Aquatic Ecology Assessment provide a detailed assessment of potential indirect impacts on native flora, fauna and aquatic values species. This includes an assessment of impacts from clearance activities and vehicle strike, weeds and feral animals, edge effects, bushfire, impacts to water quality and flow (both surface water and groundwater), loss in connectivity, dust, noise, artificial lighting and cumulative impacts. Further to this, Section 3 of the draft EIS contains significant impact assessments for the Australian Painted Snipe, including assessment of potential indirect impacts.</p>
37.9	Mitigation and management measures	<p>Australian Painted Snipe – Avoidance, Mitigation and/or Management</p> <p>The Department notes there is only a high level discussion of some applicable avoidance, mitigation and management measures, with reference to section 3.3.1.1 of the EIS.</p> <p>As discussed in comment 8 above, the Department notes the potential for avoidance of 54 ha of wetlands by moving the infrastructure to the south of the wetlands. Further, the Department notes no buffers have been proposed to protect wetlands not to be impacted by the project.</p>	<p>Provide a detailed discussion on the specific measures to be implemented to avoid, mitigate and manage impacts on the Australian Painted Snipe. This discussion must include robust supporting evidence (e.g. published research or studies, Australian standards, etc.) which demonstrates the appropriateness and success of these measures.</p> <p>This discussion must include detailed information on how the proposed measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans.</p>	<p>Section 4.1.4 of the draft EIS provides a detailed description of the proposed buffer distances associated with the mining pits, overland conveyor, access road, haul road, water pipeline, ETL and rail spur. Further to this, Section 2.10 of the draft EIS provides a description of the project justification, including an assessment of Project alternatives, including alternative locations for infrastructure components. Impacts to riparian vegetation along the Isaac River has been minimised in the mine design and a minimum buffer zone of 200 m between the mine pits and Isaac River has been implemented.</p>

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		Minimal supporting evidence is provided to demonstrate the appropriateness of the proposed measures. Further, there are no contingencies provided if the proposed measures are not successful (as described in section 11.14 of the Terms of Reference).	As discussed in comment 8 above, provide a detailed discussion justifying the proposed route for the overland conveyor and haul road, including why the 54 ha of wetland habitat cannot be avoided. Further, the Department expects information to be drawn from the SPRAT Database for the species, noting there is relevant information available in the 'Threat Abatement and Recovery' section, and the approved conservation advice for the species.	The Terrestrial Flora and Terrestrial Fauna Assessments (Appendices A and B of the draft EIS) found that there is not predicted to be a significant impact on the riparian vegetation associated with the Isaac River or Ripstone Creek which occurs outside the Project area (i.e. through indirect impacts such as habitat fragmentation and edge effects). As such, Pembroke is of the view that appropriate buffer to minimise impacts to riparian corridors have been incorporated into the Project design. The following measures would be undertaken by Pembroke to minimise potential adverse impacts on breeding/foraging habitat for the Australian Painted Snipe: <ul style="list-style-type: none">Vegetation clearance procedures outlined in Table 7-6. This includes progressive vegetation clearing, demarcation of habitats proposed to be cleared, the implementation of pre-clearance surveys and the use of a qualified fauna spotter catcher.Implementation of a Weed and Pest Management Plan to monitor and control feral animals (including foxes and feral cats which are known threats to the Australian Painted Snipe) within the breeding/foraging habitat identified. The above measures are predicted to be effective in minimising potential adverse impacts from the Project on potential foraging habitat for the Australian Painted Snipe because they are focused on addressing the recognised threats to the species identified in the <i>Approved Conservation Advice for Rostratula australis Australian Painted Snipe</i> (DSEWPC, 2013) and are consistent with the relevant threat abatement actions (e.g. avoiding additional habitat loss and controlling feral animals) (after DotE, 2014b). Further to this, the unavoidable loss of habitat for the Australian Painted Snipe associated with the Project would be offset in accordance with the <i>EPBC Act Environmental Offsets Policy</i> (DSEWPC, 2012a) (Section 10 of the Additional Information to the EIS). Further information on the management of potential impacts to threatened flora would be provided in the Fauna Species Management Plan as described in Tables 6-1 and 6-2 of the draft EIS. Section 4.1.4 of the draft EIS provides a detailed description of the proposed buffer distances associated with the mining pits, overland conveyor, access road, haul road, water pipeline, ETL and rail spur. Further to this, Section 2.10 of the draft EIS provides a description of the project justification, including an assessment of Project alternatives, including alternative locations for infrastructure components. Notwithstanding, further information on impact avoidance and minimisation associated with the Project is provided in Sections 8 and 21 of the Additional Information to the EIS. This includes a detailed justification for the final alignment of the overland conveyor (relative to the mapped HES wetlands and their associated buffers).
37.10	Offsets	Australian Painted Snipe – Summary of EPBC Act Assessment The EIS concludes “there are many examples of similar wetland habitats outside of the Mine Site and Access Road area.” The Department considers robust evidence has not been provided in the EIS to support this conclusion. The EIS states the removal of 113 ha of potential habitat for the species will be mitigated and offset. The Department considers the removal of habitat cannot be mitigated. It is not clear from Table 3-10 as to whether the proponent considers a residual significant impact will occur on the Australian Painted Snipe as a result of the project. The Department notes offsets are required to compensate for residual significant impacts. The Department’s view is that at the very least, the removal of 113 ha of known suitable habitat for an endangered EPBC listed threatened species, without consideration of any other potential impacts, will result in a residual significant impact on the Australian Painted Snipe.	To support the conclusion, update the relevant sections of the Australian Painted Snipe discussion in the EIS to provide robust evidence of the other similar wetland habitats available in the broader region, including whether they are of similar or greater regional importance to the species.	Further to the information provided in Table 3-10, Pembroke is of the view that the Project would result in a significant impact to the Australian Painted Snipe. As such, a biodiversity offset has been provided for this species as detailed in the Biodiversity Offset Strategy (Section 10 of the Additional Information to the EIS). The biodiversity offset strategy describes the location of other wetlands, which provide potential breeding habitat for this species, throughout the wider locality (including mapping of such wetlands on land owned by Pembroke).
37.11	Habitat requirements	Squatter Pigeon (Southern) – Habitat Assessment and Definition The EIS notes preferred breeding and foraging habitat are typically the same and have not been separately assessed. The Department notes the vegetation and soil requirements are generally similar, however breeding habitat is considered to be within one kilometre of a water source and foraging habitat is considered to be within three kilometres of a water source. No detail has been provided for the definition of dispersal habitat. The EIS provides limited detail on the preferred land zones available onsite for the Squatter Pigeon and the species of grasses available for the Squatter Pigeon to forage. Figure 3-5a does not include an overlay with the species habitat and mine infrastructure layout (i.e. the locations of all infrastructure and pits). The EIS discusses 'potential' habitat for the species. The	Refine the broad habitat definition to consider breeding, foraging and dispersal habitat. A framework for these three habitat definitions is provided at Attachment A for your reference. The Department expects this framework to be applied in the EIS and refined using site-specific information in the attached technical reports and appendices. Update Figure 3-5a to include the breeding habitat, foraging habitat and dispersal habitat. Include a detailed overlay of the mine layout. Consider updating the EIS to reflect 'known' habitat for the species on the project site.	As outlined above, DPM Envirosciences has provided additional detail of the habitat mapped within the Project area for the Squatter Pigeon (southern) by assessing the extent of breeding, foraging and dispersal habitat for this species as defined on the SPRAT profile and Attachment A of the DEE’s comments. Further to this, revised figures have been provided identifying the extent of breeding, foraging and dispersal habitat for the Squatter Pigeon (southern) within the Project area. Breeding Habitat Within the Project Area, it was determined that RE’s and the areas of more advanced regrowth vegetation (i.e. lower abundance of native species in the early stages of development) on land zones 3, 4, 5, 7 and 10 (where within 1 km of a suitable, permanent or seasonal waterbody) provide potential breeding habitat for the Squatter Pigeon (southern). Those RE’s (both remnant and regrowth) that were excluded are: <ul style="list-style-type: none">REs 11.9.5. The occurrence of this RE within the Project area was recorded as having a dense vine thicket understorey which limited the availability of native, perennial tussock grasses required by this species.REs 11.3.27 and 11.5.17. The occurrence of these REs within the Project area have wetted groundcover and do not possess well-draining, sandy or gravelly soils.REs 11.3.1, 11.4.8, 11.4.9 and 11.9.2. The occurrences of these REs within the Project area contain cracking clay soils (i.e. not sandy or gravelly soils low, gently sloping, flat to undulating plains and foothills, lateritic (duplex) soils)

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		Department considers that based on the species being found onsite, the EIS should consider discussing 'known' habitat for the species.		<p>A total of 3,628 ha of breeding habitat for the Squatter Pigeon (southern) has been mapped across the Project area (Figure 7-1).</p> <p>Foraging Habitat</p> <p>Within the Project area, it was determined that RE's and the areas of more advanced regrowth vegetation (i.e. lower abundance of weeds and higher abundance of native species in the early stages of regrowing) on land zones 3, 4, 5, 7 and 10 (where between 1 km and 3 km of a suitable, permanent or seasonal waterbody) provide potential foraging habitat for the Squatter Pigeon (southern).</p> <p>Those RE's (both remnant and regrowth) that were excluded are:</p> <ul style="list-style-type: none"> REs 11.9.5. The occurrence of this RE within the Project area was recorded as having a dense vine thicket understorey which limited the availability of native, perennial tussock grasses required by this species. REs 11.3.27 and 11.5.17. The occurrence of these REs within the Project area have wetted groundcover and do not possess well-draining, sandy or gravelly soils. REs 11.3.1, 11.4.8, 11.4.9 and 11.9.2. The occurrences of these REs within the Project area contain cracking clay soils (i.e. not sandy or gravelly soils low, gently sloping, flat to undulating plains and foothills, lateritic (duplex) soils) <p>A total of 1,822 ha of foraging habitat for the Squatter Pigeon (southern) has been mapped across the Project area (Figure 7-1).</p> <p>Dispersal Habitat</p> <p>Additional areas of dispersal habitat for the Squatter Pigeon (southern) have been mapped within the Project area. These comprise all remnant vegetation and areas of lower quality regrowth vegetation (i.e. areas which contain a high abundance of weeds and low abundance of native species in the early stages of regrowing, no greater than 100 m wide) between areas of breeding/foraging habitat.</p> <p>A total of 160 ha of dispersal habitat for the Squatter Pigeon (southern) has been mapped across the Project area (Figure 7-1).</p> <p>Figure 3-5 has been superseded by the revised figures provided in Section 7 of the Additional Information to the EIS which demonstrate the locations of the Squatter Pigeon (southern), the extent of breeding, foraging and dispersal habitat and the overall extent of clearance associated with the Project.</p>
37.12	Habitat requirements	<p>Squatter Pigeon (Southern) – Impacts</p> <p>The Department notes the only impact discussed is vegetation clearance. Further, the EIS only provides one habitat clearance amount (5,387 ha) and does not consider different habitat use types (i.e. breeding habitat, foraging habitat and dispersal habitat).</p> <p>The Department notes there is no discussion on other potential impacts of the project on the species, including but not limited to habitat fragmentation, mortality, lighting, noise, dust and coal dust, predation by feral pests, invasive weeds and fencing.</p>	<p>Include a breakdown of the habitat clearance amount based on the refinement of the habitat definitions section. For example:</p> <p>Breeding habitat: XXX ha (project area) / XXX ha (impact) Foraging habitat: XXX ha (project area) / XXX ha (impact) Dispersal habitat: XXX ha (project area) / XXX ha (impact)</p> <p>Provide a detailed discussion, including nature and scale, of the other potential impacts of the project on the species. The Department recommends reviewing the SPRAT Database, and relevant statutory documents, to inform this discussion</p>	<p>As outlined above, DPM Envirosiences has provided additional detail of the habitat mapped within the Project area for the Squatter Pigeon (southern) by assessing the extent of Breeding, Foraging and Dispersal habitat for this species as defined on the SPRAT profile and Attachment A of the DEE's comments. Further to this, revised figures have been provided identifying the extent of breeding, foraging and dispersal habitat for the Squatter Pigeon (southern) within the Project area.</p> <p>This information, including the extent of impact to each habitat type is provided in Section 7 of the Additional Information to the EIS. In summary, the potential habitat within the Project area comprises areas of breeding (3,628 ha), foraging (1,822 ha) and dispersal habitat (160 ha) as outlined on the species' SPRAT profile (DEE, 2019)</p> <p>Indirect impacts to this species are described within the assessment of significance tables provided in Section 3 (i.e. Table 3-11, 3-29, 3-36 and 3.44). For example, Table 3-11 states:</p> <p><i>The introduction and spread of invasive weeds and feral animals may occur as a result of the Mine Site and Access Road. However, threat levels are unlikely to change significantly due to the Mine Site and Access Road given the current agricultural use of the surrounding area and implementation of mitigation and management measure proposed to be implemented by Pembroke.</i></p> <p><i>Reduction of food resources and cover from the establishment and maintenance of Buffel Grass pastures have been identified as a threat to the Squatter Pigeon (southern) (TSSC, 2015). Along with excessive predation by foxes and feral cats, this often increases in response to disturbance (TSSC, 2015). However, through effective pest, weed and introduced pasture grass management, Pembroke would seek to identify, treat, and propose removal strategies to manage this threat through the implementation of a Weed and Pest Management Plan.</i></p> <p>Given the implementation of management measures proposed by Pembroke (refer to comment 37.13), it is unlikely that any indirect impacts (e.g. habitat fragmentation or edge effects) would result in a significant impact to this species.</p> <p>Notwithstanding, Section 6 of the Terrestrial Flora Assessment, Terrestrial Fauna Assessment and Aquatic Ecology Assessment provide a detailed assessment of potential indirect impacts on native flora, fauna and aquatic values species. This includes an assessment of impacts from clearance activities and vehicle strike, weeds and feral animals, edge effects, bushfire, impacts to water quality and flow (both surface water and groundwater), loss in connectivity, dust, noise, artificial lighting and cumulative impacts. Further to this, Section 3 of the draft EIS contains significant impact assessments for the Ornamental Snake, including assessment of potential indirect impacts</p>
37.13		<p>Squatter Pigeon (Southern) – Avoidance, Mitigation and/or Management</p> <p>The Department notes there is only a high level discussion of some applicable avoidance, mitigation and management measures, with reference to section 3.3.1.1 of the EIS. The Department notes the EIS does not propose appropriate buffers to minimise impacts to riparian corridors.</p> <p>Minimal supporting evidence is provided to demonstrate the appropriateness of the proposed measures. Further, there are no contingencies provided if the proposed measures are not</p>	<p>Provide a detailed discussion on the specific measures to be implemented to avoid, mitigate and manage impacts on the Squatter Pigeon. This discussion must include robust supporting evidence (e.g. published research or studies, Australian standards, etc.) which demonstrates the appropriateness and success of these measures.</p> <p>This discussion must include detailed information on how the proposed measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans.</p> <p>Further, the Department expects information to be drawn from the</p>	<p>As outlined in Section 7 of the Additional Information to the EIS, the following measures would be undertaken by Pembroke to minimise potential adverse impacts on the breeding, foraging and dispersal habitat for the Squatter Pigeon (southern):</p> <ul style="list-style-type: none"> Vegetation clearance procedures outlined in Table 7-6. This includes progressive vegetation clearing, demarcation of habitats proposed to be cleared, the implementation of pre-clearance surveys and the use of a qualified fauna spotter catcher. A Weed and Pest Management Plan would be implemented to monitor and control feral animals (such as the European Rabbit, Feral Cat and European Red Fox which are known threats to the Squatter Pigeon [southern]) in the breeding, foraging and dispersal habitat for this species.

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		successful (as described in section 11.14 of the Terms of Reference).	SPRAT Database for the species, noting there is relevant information available in the 'Threat Abatement and Recovery' section.	<p>The above measures are predicted to be effective in minimising potential adverse impacts from the Project on the breeding, foraging and dispersal habitat for the Squatter Pigeon (southern) because they are focused on addressing the recognised threats to the species and are consistent with the relevant threat abatement actions (e.g. avoiding additional habitat loss and controlling predators and herbivores) (DEE, 2018a). A National or State recovery plan has not been prepared for this species.</p> <p>Further to this, the unavoidable loss of habitat for the Squatter Pigeon (southern) associated with the Project would be offset in accordance with the <i>EPBC Act Environmental Offsets Policy</i> (DSEWPC, 2012a) (Section 10 of the Additional Information to the EIS).</p> <p>Further information on the management of potential impacts to threatened flora would be provided in the Fauna Species Management Plan as described in Tables 6-1 and 6-2 of the draft EIS.</p>
37.14		<p>Squatter Pigeon (Southern) – Summary of EPBC Act Assessment</p> <p>The EIS concludes “the habitat is of sub-optimal quality and the availability of surrounding habitat indicates that it is not of particular regional importance.” The Department considers robust evidence has not been provided in the EIS to support this conclusion.</p> <p>The EIS states the removal of 5,387 ha of potential habitat for the species will be mitigated and offset. The Department considers the removal of habitat cannot be mitigated.</p> <p>It is not clear from Table 3-11 as to whether the proponent considers a residual significant impact will occur on the Squatter Pigeon as a result of the project. The Department notes offsets are required to compensate for residual significant impacts.</p> <p>The Department's view is that at the very least, the removal of 5,387 ha of known suitable breeding, foraging and dispersal habitat, without consideration of any other potential impacts, will result in a residual significant impact on the Squatter Pigeon.</p>	<p>To support the conclusion, update the relevant sections of the Squatter Pigeon discussion in the EIS to provide robust evidence of the sub-optimal quality of the habitat, including whether there is surrounding habitat available of similar or greater regional importance to the species.</p> <p>Update the conclusion to remove the reference to 'mitigated'.</p> <p>Provide a more detailed conclusion outlining the proponent's view of whether the project will result in a residual significant impact on the Squatter Pigeon and its habitat. Further, clearly commit to the provision of an environmental offset in accordance with the EPBC Act Environmental Offsets Policy (2012).</p>	<p>Pembroke notes the Department's view that the removal of habitat cannot be mitigated and this terminology has been removed from the Additional Information to the EIS.</p> <p>Further to the information provided in Table 3-11, Pembroke is of the view that the Project would result in a significant impact to the Squatter Pigeon. As such, a biodiversity offset has been provided for this species as detailed in the Biodiversity Offset Strategy which is described in Section 10 of the Additional Information to the EIS. The biodiversity offset strategy describes the location of other breeding, foraging and dispersal habitat for the Squatter Pigeon (southern) throughout the wider locality, including mapping of such habitat on land owned by Pembroke.</p>
37.15		<p>Koala – Habitat Assessment and Definition</p> <p>Figure 3-5b does not include an overlay with the species habitat and mine infrastructure layout (i.e. the locations of all infrastructure and pits).</p> <p>The EIS discusses 'potential' habitat for the species. The Department considers that based on the species being found onsite, the EIS should consider discussing 'known' habitat for the species.</p> <p>The EIS states “adequate density of Koala food trees ... that are > 4 m in height and > 10 cm DBH” to determine which broad vegetation types are considered suitable habitat for the Koala. The Department notes robust evidence to support the appropriateness of these constraints has not been provided in the EIS. Further, the Department considers emergent food trees are suitable habitat for the species, as identified on page 3-66 in the EIS.</p> <p>The EIS has scored the “Recovery value” attribute in Table 3-12 as a '0' with the justification that it does not meet the recovery objectives of the coastal population.</p> <p>Based on the information available, the Department considers the project lies within the inland population of the Koala (as per the Koala referral guidelines). Further, the Department considers the habitat on the project site is important for achieving the interim recovery objectives because the site:</p> <ul style="list-style-type: none"> contains water courses and riparian vegetation; and is adjacent to the Isaac River (where there is a high abundance of species records), which is considered a habitat refuge. 	<p>Update Figure 3-5b to include the suitable habitat. Include a detailed overlay of the mine layout.</p> <p>Consider updating the EIS to reflect 'known' habitat for the species on the project site.</p> <p>Update the habitat condition discussion for the Koala to provide robust supporting evidence as to the appropriateness of using "> 4 m in height and > 10 cm DBH" constraints to refine the Koala habitat on the project site.</p> <p>The Department expects the discussion to apply relevant Commonwealth or State information, policies or guidelines, and/or published research.</p> <p>Review the Koala Habitat Assessment (Table 3-12) to consider the importance of the habitat on the project site in relation to the interim recovery objectives of the inland population of the Koala.</p> <p>Consider including an acknowledgement that the suitable habitat to be impacted by the project is habitat critical to the survival of the Koala.</p>	<p>As outlined above, DPM Envirosciences has provided additional detail of the habitat mapped within the Project area for the Koala and provided a detailed justification for why the habitat all meets the definition of 'Critical' in accordance with the <i>EPBC Act Referral Guidelines for the Vulnerable Koala</i> (DotE, 2014). Further to this, revised figures have been provided identifying the extent of critical habitat for the Koala within the Project area.</p> <p>The revised figures show the locations of the Koala within the Project area, thereby indicating the areas of known habitat.</p> <p>This information is provided in Section 7 of the Additional Information to the EIS.</p> <p>The "> 4 m in height and > 10 cm DBH" is based on the definition of non-juvenile koala habitat as defined in the <i>Planning Regulation, 2017</i>. It is identifying that, the trees in these areas would not provide suitable habitat for Koalas on the basis that they are too small/too sparse.</p> <p>In addition to this, The Koala Habitat Assessment table in Section 3.3.7.1 of the draft EIS (i.e. Table 3-13) identifies that the Project would remove habitat which meets the definition of 'Critical Habitat' for the Koala as defined in the <i>EPBC Act Referral Guidelines for the Vulnerable Koala</i> (DotE, 2014).</p> <p>Increasing the Recovery Value from a '0' to a '2' and reassessing the Koala habitat against the criteria of an 'inland population' still results in the identification of Critical Habitat for the Koala within the Project area. Given this, there is no change to the conclusion in Section 3.3.7.1 of the draft EIS (i.e. the Project would remove habitat which meets the definition of 'Critical Habitat' for the Koala), and no subsequent change to the Project offset requirements as outlined in Section 10 of the Additional Information to the EIS.</p> <p>The Biodiversity Offset Strategy prepared for the Project (Section 10 of the Additional Information to the EIS) outlines how the Stage 1 Offset Area compensates for the loss of Koala habitat in accordance with the <i>EPBC Act Environmental Offsets Policy</i>.</p>
37.16		<p>Koala – Impacts</p> <p>The Department notes the only impact discussed is vegetation clearance.</p> <p>The Department notes there is no discussion on other potential impacts of the project on the species, including but not limited to habitat fragmentation, mortality, lighting, noise, dust and</p>	<p>Provide a detailed discussion, including nature and scale, of the other potential impacts of the project on the species. The Department recommends reviewing the SPRAT Database, and relevant statutory documents, to inform this discussion.</p>	<p>Indirect impacts to this species are described within the assessment of significance tables provided in Section 3 (i.e. Table 3-13, 3-30, 3-37 and 3-45). For example, Table 3-13 states:</p> <p><i>The introduction and spread of invasive weeds and feral animals may occur as a result of the Mine Site and Access Road. However, threat levels are unlikely to change significantly due to the Mine Site and Access Road given the current agricultural use of the surrounding area and implementation of mitigation and management measure proposed to be implemented by Pembroke.</i></p>

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		coal dust, fencing, predation by feral pests, disease and fencing.		<p><i>Feral dogs have been identified as posing a direct threat to the Koala. However, through effective pest management Pembroke would seek to identify and propose removal strategies through the implementation of a Weed and Pest Management Plan.</i></p> <p><i>Koala populations are threatened by at least two diseases: chlamydia and Koala retrovirus (KoRV). KoRV is estimated to infect up to 100% of Koalas in Queensland, with infection rates slightly lower in southern populations (DEE, 2018a). It is likely that both these diseases already occur in the populations found on and around the Mine Site and Access Road area. The Mine Site and Access Road does not include activities that would result in the spread of a disease that may cause the species to decline.</i></p> <p>Given the implementation of management measures proposed by Pembroke (refer to comment 37.18), it is unlikely that any indirect impacts (e.g. habitat fragmentation or edge effects) would result in a significant impact to this species.</p> <p>Notwithstanding, Section 6 of the Terrestrial Flora Assessment, Terrestrial Fauna Assessment and Aquatic Ecology Assessment provide a detailed assessment of potential indirect impacts on native flora, fauna and aquatic values species. This includes an assessment of impacts from clearance activities and vehicle strike, weeds and feral animals, edge effects, bushfire, impacts to water quality and flow (both surface water and groundwater), loss in connectivity, dust, noise, artificial lighting and cumulative impacts. Further to this, Section 3 of the draft EIS contains significant impact assessments for the Ornamental Snake, including assessment of potential indirect impacts.</p>
37.18		<p>Koala – Avoidance, Mitigation and/or Management</p> <p>The Department notes there is only a high level discussion of some applicable avoidance, mitigation and management measures, with reference to section 3.3.1.1 of the EIS. The Department notes the EIS does not propose appropriate buffers to minimise impacts to riparian corridors.</p> <p>Minimal supporting evidence is provided to demonstrate the appropriateness of the proposed measures. Further, there are no contingencies provided if the proposed measures are not successful (as described in section 11.14 of the Terms of Reference).</p> <p>The Department notes this section comes after the significant impact assessment.</p>	<p>Provide a detailed discussion on the specific measures to be implemented to avoid, mitigate and manage impacts on the Koala. This discussion must include robust supporting evidence (e.g. published research or studies, Australian standards, etc.) which demonstrates the appropriateness and success of these measures.</p> <p>This discussion must include detailed information on how the proposed measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans.</p> <p>Further, the Department expects information to be drawn from the SPRAT Database for the species, noting there is relevant information available in the 'Threat Abatement and Recovery', 'Mitigation Approach' and 'Management Documentation' sections.</p> <p>Update the EIS to ensure this section is located before the significant impact assessment.</p>	<p>As outlined in Section 7 of the Additional Information to the EIS, the following measures would be undertaken by Pembroke to minimise potential adverse impacts on critical habitat for the Koala:</p> <ul style="list-style-type: none"> Impact avoidance measures outlined in Table 7-6 of the Additional Information to the EIS (including minimising potential impacts to the riparian corridor associated with the Isaac River). Vegetation clearance procedures outlined in Table 7-6. This includes progressive vegetation clearing, demarcation of habitats proposed to be cleared, the implementation of pre-clearance surveys and the use of a qualified fauna spotter catcher. Implementation of fauna crossings to ensure safe fauna movement across haul roads (between areas of critical habitat). A Weed and Pest Management Plan would be implemented to monitor and control feral animals (such as the feral dog which is a known threat to the Koala) in the critical habitat for the Koala. <p>The above measures are predicted to be effective in minimising potential adverse impacts from the Project on critical habitat for the Koala because they are focused on addressing the recognised threats to the species and are consistent with the relevant threat abatement actions (e.g. avoiding additional habitat loss and controlling predators) (DEE, 2018a). A National or State recovery plan has not been prepared for this species.</p> <p>Further to this, the unavoidable loss of habitat for the Koala associated with the Project would be offset in accordance with the <i>EPBC Act Environmental Offsets Policy</i> (DSEWPC, 2012a) (Section 10 of the Additional Information to the EIS).</p> <p>Further information on the management of potential impacts to threatened flora would be provided in the Fauna Species Management Plan as described in Tables 6-1 and 6-2 of the draft EIS.</p> <p>Section 4.1.4 of the draft EIS provides a detailed description of the proposed buffer distances associated with the mining pits, overland conveyor, access road, haul road, water pipeline, ETL and rail spur. Further to this, Section 2.10 of the draft EIS provides a description of the project justification, including an assessment of Project alternatives, including alternative locations for infrastructure components. Notwithstanding, further information on impact avoidance and minimisation associated with the Project is provided in Sections 8 and 21 of the Additional Information to the EIS. This includes a detailed justification for the Ripstone Creek Diversion.</p>
37.19		<p>Koala – Summary of EPBC Act Assessment</p> <p>The EIS states the removal of approximately 5,500 ha of potential habitat for the species will be mitigated and offset. The Department considers the removal of habitat cannot be mitigated.</p> <p>It is not clear from Table 3-13 as to whether the proponent considers a residual significant impact will occur on the Koala as a result of the project. The Department notes offsets are required to compensate for residual significant impacts.</p> <p>The Department's view is that at the very least, the removal of 5,500 ha of known habitat critical to the survival of the Koala, without consideration of any other potential impacts, will result in a residual significant impact on the Koala.</p>	<p>Update the conclusion to remove the reference to 'mitigated'.</p> <p>Provide a more detailed conclusion outlining the proponent's view of whether the project will result in a residual significant impact on the Koala and its habitat. Further, clearly commit to the provision of an environmental offset in accordance with the EPBC Act Environmental Offsets Policy (2012).</p>	<p>Pembroke notes the Department's view that the removal of habitat cannot be mitigated and this terminology has been removed from the Additional Information to the EIS.</p> <p>Further to the information provided in Table 3-13, Pembroke is of the view that the Project would result in a significant impact to the Koala. As such, a detailed Biodiversity Offset Strategy has been prepared, describing how Pembroke proposes to offset these potential impacts in accordance with the <i>EPBC Act Environmental Offsets Policy</i> (2012).</p>
37.20		<p>Greater Glider – Habitat Assessment and Definition</p> <p>Figure 3-5b does not include an overlay with the species habitat and mine infrastructure layout (i.e. the locations of all infrastructure and pits).</p> <p>The EIS discusses 'potential' habitat for the species. The Department considers that based on the species being found onsite, the EIS should consider discussing 'known' habitat for the species.</p>	<p>Update Figure 3-5b to include the suitable habitat. Include a detailed overlay of the mine layout.</p> <p>Consider updating the EIS to reflect 'known' habitat for the species on the project site.</p> <p>Provide a detailed discussion to justify why these 'other habitat types' do not provide suitable habitat for the Greater Glider. This discussion must include information regarding the vegetation structure and composition of these areas and an assessment against the habitat requirements of the species.</p>	<p>As outlined above, DPM Envirosciences has provided additional detail of the habitat mapped within the Project area for the Greater Glider and provided a detailed justification for why the habitat has been treated as a single homogenous unit. Further to this, revised figures have been provided identifying the extent of suitable habitat for the Greater Glider within the Project area.</p> <p>The revised figures show the locations of the Greater Glider within the Project area, thereby indicating the areas of known habitat.</p> <p>This information is provided in Section 7 of the Additional Information to the EIS.</p>

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		<p>The EIS provides limited discussion on the nature of ‘other habitat types’ within the project area, particularly regarding vegetation structure and composition, to determine these areas as not providing suitable habitat for the species.</p> <p>The EIS states the species is “known to disperse over cleared land to reach areas of suitable habitat.” The Department notes the home ranges for the species is typically small (generally 1-4 ha) and has low dispersal ability (as described in the approved conservation advice).</p>	<p>Update the habitat condition discussion for the Greater Glider to provide robust supporting evidence to the statement that the species is known to disperse over cleared land to reach areas of suitable habitat. The Department expects the discussion to apply relevant Commonwealth or State information, policies or guidelines, and/or published research.</p>	<p>As stated in Section 3.3.7.1, other habitat types within the Project area (including the ‘Agricultural Grasslands’ habitat type) are not considered suitable for the species because they are dominated by Buffel Grass and lack a high density of large mature eucalypts, which are important for foraging and denning as identified in the species’ Conservation Advice available on DEE’s website.</p> <p>Further description of this habitat category is provided in Section 3.2.6.3, which states that there is 17,838 ha of land in the Study area that is not associated with any regulated vegetation. This area has been classified as ‘agricultural grasslands dominated by buffel grass (Cenchrus ciliaris)’. Much of this area contains sparse Brigalow (Acacia harpophylla) regrowth (which does not meet the criteria to be mapped as Brigalow TEC [DPM Envirosciences, 2018a]), buffel grass and gilgai (DPM Envirosciences, 2018a).</p> <p>The Biodiversity Offset Strategy prepared for the Project (Section 10 of the Additional Information to the EIS) outlines how the Stage 1 Offset Area compensates for the loss of Greater Glider habitat in accordance with the <i>EPBC Act Environmental Offsets Policy</i>.</p>
37.21		<p>Greater Glider – Impacts</p> <p>The Department notes the only impact discussed is vegetation clearance.</p> <p>The Department notes there is no discussion on other potential impacts of the project on the species, including but not limited to habitat fragmentation, mortality, lighting, noise, dust and coal dust, fencing and predation by feral pests.</p>	<p>Provide a detailed discussion, including nature and scale, of the other potential impacts of the project on the species. The Department recommends reviewing the SPRAT Database, and relevant statutory documents, to inform this discussion</p>	<p>Indirect impacts to this species are described within the assessment of significance tables provided in Section 3 (i.e. Table 3-14, 3-31, 3-38 and 3-46). For example, Table 3-14 states:</p> <p><i>The introduction and spread of invasive weeds and feral animals may occur as a result of the Mine Site and Access Road. However, threat levels are unlikely to change significantly due to the Mine Site and Access Road given the current agricultural use of the surrounding area and implementation of mitigation and management measure proposed to be implemented by Pembroke.</i></p> <p><i>No particular weeds or feral animals have been implicated as a threat to the species. However, threat levels would be managed by Pembroke through effective pest and weed management Pembroke would seek to identify and propose removal strategies through the implementation of a Weed and Pest Management Plan.</i></p> <p>Given the implementation of management measures proposed by Pembroke (refer to comment 37.22), it is unlikely that any indirect impacts (e.g. habitat fragmentation or edge effects) would result in a significant impact to this species.</p> <p>Notwithstanding, Section 6 of the Terrestrial Flora Assessment, Terrestrial Fauna Assessment and Aquatic Ecology Assessment provide a detailed assessment of potential indirect impacts on native flora, fauna and aquatic values species. This includes an assessment of impacts from clearance activities and vehicle strike, weeds and feral animals, edge effects, bushfire, impacts to water quality and flow (both surface water and groundwater), loss in connectivity, dust, noise, artificial lighting and cumulative impacts. Further to this, Section 3 of the draft EIS contains significant impact assessments for the Ornamental Snake, including assessment of potential indirect impacts.</p>
37.22		<p>Greater Glider – Avoidance, Mitigation and/or Management</p> <p>The Department notes there is only a high level discussion of some applicable avoidance, mitigation and management measures, with reference to section 3.3.1.1 of the EIS. The Department notes the EIS does not propose appropriate buffers to minimise impacts to riparian corridors.</p> <p>Minimal supporting evidence is provided to demonstrate the appropriateness of the proposed measures. Further, there are no contingencies provided if the proposed measures are not successful (as described in section 11.14 of the Terms of Reference).</p>	<p>Provide a detailed discussion on the specific measures to be implemented to avoid, mitigate and manage impacts on the Greater Glider. This discussion must include robust supporting evidence (e.g. published research or studies, Australian standards, etc.) which demonstrates the appropriateness and success of these measures.</p> <p>This discussion must include detailed information on how the proposed measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans.</p> <p>Further, the Department expects information to be drawn from the approved conservation advice for the species, noting there is relevant information available in the ‘Conservation Actions’ section.</p>	<p>As outlined in Section 7 of the Additional Information to the EIS,</p> <p>The following measures would be undertaken by Pembroke to minimise potential adverse impacts on habitat for the Greater Glider:</p> <ul style="list-style-type: none"> Impact avoidance measures outlined in Table 7-6 of the Additional Information to the EIS (including minimising potential impacts to the riparian corridor associated with the Isaac River). Vegetation clearance procedures outlined in Table 7-6. This includes progressive vegetation clearing, demarcation of habitats proposed to be cleared, the implementation of pre-clearance surveys and the use of a qualified fauna spotter catcher. Implementation of fauna crossings to ensure safe fauna movement across haul roads (between patches of Greater Glider habitat). A Weed and Pest Management Plan would be implemented to monitor and control pests and feral animals in Greater Glider habitat. <p>The above measures are predicted to be effective in minimising potential adverse impacts from the Project on habitat for the Greater Glider because they are focused on addressing the recognised threats to the species and are consistent with the relevant threat abatement actions (e.g. avoiding additional habitat loss and controlling predators) (DEE, 2018a). A National or State recovery plan has not been prepared for this species.</p> <p>Further to this, the unavoidable loss of habitat for the Greater Glider associated with the Project would be offset in accordance with the <i>EPBC Act Environmental Offsets Policy</i> (DSEWPC, 2012a) (Section 10 of the Additional Information to the EIS).</p> <p>Further information on the management of potential impacts to threatened flora would be provided in the Fauna Species Management Plan as described in Tables 6-1 and 6-2 of the draft EIS.</p> <p>Section 4.1.4 of the draft EIS provides a detailed description of the proposed buffer distances associated with the mining pits, overland conveyor, access road, haul road, water pipeline, ETL and rail spur. Further to this, Section 2.10 of the draft EIS provides a description of the project justification, including an assessment of Project alternatives, including alternative locations for infrastructure components. Notwithstanding, further information on impact avoidance and minimisation associated with the Project is provided in Sections 8 and 21 of the Additional Information to the EIS.</p>
37.23		<p>Greater Glider – Summary of EPBC Act Assessment</p> <p>The EIS states the removal of 5,500 ha of potential habitat for the species will be mitigated and offset. The Department considers the removal of habitat cannot be mitigated.</p> <p>It is not clear from Table 3-14 as to whether the proponent considers a residual significant impact will occur on the Greater Glider as a result of the project. The Department notes</p>	<p>Update the conclusion to remove the reference to ‘mitigated’.</p> <p>Provide a more detailed conclusion outlining the proponent’s view of whether the project will result in a residual significant impact on the Greater Glider and its habitat. Further, clearly commit to the provision of an environmental offset in accordance with the EPBC Act Environmental Offsets Policy (2012).</p>	<p>Pembroke notes the Department’s view that the removal of habitat cannot be mitigated and this terminology has been removed from the Additional Information to the EIS.</p> <p>Further to the information provided in Table 3-14, Pembroke is of the view that the Project would result in a significant impact to the Greater Glider As such, a detailed Biodiversity Offset Strategy has been prepared, describing how Pembroke proposes to offset these potential impacts in accordance with the <i>EPBC Act Environmental Offsets Policy</i> (2012).</p>

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		offsets are required to compensate for residual significant impacts. The Department's view is that at the very least, the removal of 5,500 ha of known suitable habitat for the Greater Glider, without consideration of any other potential impacts, will result in a residual significant impact on the Greater Glider.		
37.24		<p>Other Threatened Species</p> <p>Table 3-15 provides a summarised assessment of other EPBC listed threatened species that are unlikely to be significantly impacted by the project. The Department notes the main premise for not considering these species is that they were not identified during surveys or not previously recorded within 50 km of the project area.</p> <p>The Department considers that although a species might not be identified on the project site during field surveys, it does not mean that the vegetation onsite does not form habitat for the species. The Department considers that while Table 3-5 does provide a brief habitat definition for each species, there is no consideration as to whether the vegetation on the project site is potential habitat for the species.</p> <p>The Department considers further investigation is required in regards to the following EPBC listed threatened species:</p> <ul style="list-style-type: none"> • Red Goshawk • Painted Honeyeater • Black-throated Finch • Grey-headed Flying-fox • Ghost Bat • Corben's Long-eared Bat • Southern Snapping Turtle • Fitzroy River Turtle • Yakka Skink • Dunmall's Snake 	<p>Update Table 3-15 to include a habitat assessment for the identified EPBC listed threatened species.</p> <p>The evidence-based discussion should include information derived from the field surveys (i.e. vegetation composition and species) which is assessed against the desktop-based habitat definition (including the SPRAT Database, relevant documents and/or published research). The discussion should also consider the value of the potential habitat in terms of habitat use for each species (i.e. breeding, foraging, denning, dispersal, etc.) and what food sources/prey are available on the project site.</p> <p>Where potential habitat is identified, the EIS must state the amount of potential habitat on the project site (in ha) and the amount of habitat to be impacted (in ha) by the project.</p> <p>Further, other relevant impacts must be discussed in relation to the species and its potential habitat.</p>	<p>As acknowledged by DEE, Table 3-15 of the draft EIS identifies whether the Project would potentially impact suitable habitat for each of these species and includes a brief description of what these habitats include. Where suitable habitat is identified as occurring within the Project area, Table 3-15 also provides a description of whether or not the Project would result in a significant impact to the species through the removal of the habitat. Further information/clarification regarding the extent of habitat for each of these species within the project area is provided below.</p> <p>Further to this, additional information on the management of potential impacts to fauna species would be provided in the Fauna Species Management Plan as described in Section 12 of the Additional Information to the EIS.</p> <p>Red Goshawk</p> <p>This species typically occurs in tall open forest, woodland, lightly treed savannah and the edge of rainforest (DEE, 2019). Despite this, the species was not recorded during the targeted surveys and the nearest previous record is located approximately 45 km to the east of the Project area (ALA, 2018).</p> <p>The Red Goshawk nests in tall trees within 1 km of, and often besides, permanent water (river, swamp, pool), usually in fairly open, biologically rich forest or woodland. The average distance of the nest tree to water is 164 m (DEE, 2019). Nest trees are often significantly taller than the surrounding vegetation, with larger crown diameters, and the height of the lowest live branch was higher than the tallest trees found in the immediate vicinity of random locations along rivers (DEE, 2019).</p> <p>It is unlikely that the species would utilise the habitat within the Project area and broader locality, given:</p> <ul style="list-style-type: none"> • this species has not been recorded within Project area despite targeted survey work having been conducted in accordance with the relevant State and Commonwealth survey guidelines; • permanent water sources are scarce within the Project area, and limited to man-made farm dams; • nests for this species were not recorded in any of the habitats in close proximity to water sources, and there were limited potential nest trees in these habitats (i.e. trees significantly taller than the surrounding vegetation); <p>Given the above, it is unlikely that the Project would involve the removal of any habitat likely to be used by the Red Goshawk, and as such, is not likely to result in a significant impact to this species in accordance with the <i>Matters of National Significance Significant Impact Guidelines 1.1, Environment Protection and Biodiversity Act 1999</i> (DotE 2013).</p> <p>Painted Honeyeater</p> <p>It should be noted that the EPBC Act Protected Matters Report (provided in Appendix A of the Terrestrial Fauna Assessment) indicates that this species, or species habitat '<u>may</u>' occur within the Project area. It is not 'likely' or 'known' to occur.</p> <p>This species typically inhabits dry, open forests and woodlands (Box, Ironbark, Yellow Gum, Melaleuca, Casuarina, Callitris, Acacia), usually in areas with flowering and fruiting mistletoe and flowering eucalypts as described in the Conservation Advice for this species (DEE, 2019).</p> <p>It is unlikely that the species would utilise the habitat within the Project area and broader locality, given:</p> <ul style="list-style-type: none"> • this species has not been recorded within 120 km of the Project area despite targeted survey work having been conducted in accordance with the relevant State and Commonwealth survey guidelines; and • this species is strongly associated with flowering mistletoes (DEE, 2018e) which are rare within the Project area. <p>Given the above, it is unlikely that the Project would involve the removal of any habitat likely to be used by the Painted Honeyeater, and as such, is not likely to result in a significant impact to this species in accordance with the <i>Matters of National Significance Significant Impact Guidelines 1.1, Environment Protection and Biodiversity Act 1999</i> (DotE 2013).</p> <p>Black-throated Finch (southern)</p> <p>It should be noted that the EPBC Act Protected Matters Report (provided in Appendix A of the Terrestrial Fauna Assessment) indicates that this species, or species habitat '<u>may</u>' occur within the Project area. It is not 'likely' or 'known' to occur.</p> <p>The Black-throated Finch inhabits grassy woodland dominated by eucalypts, paperbarks or acacias where there is accessibility to seeding grasses, with riparian habitat being particularly important (DEE, 2019). The Black-throated Finch (southern subspecies) appears to be sedentary, although localised movement has been observed (DEE, 2019). Flocks of 40 or more are formed by this sociable bird and contact is maintained during the day by calling. During the breeding season, domed nests are constructed in trees or tree hollows.</p> <p>It is unlikely that the species would utilise the habitat within the Project area and broader locality, given:</p> <ul style="list-style-type: none"> • this species has not been recorded within 70 km of the Project area despite targeted survey work having been conducted in accordance with the relevant State and Commonwealth survey guidelines; • no nests (either active or abandoned) were recorded within the potential habitat during the recent surveys undertaken by DPM Envirosciences; • calls of this species were not identified by the experienced ecologists conducting the fauna surveys; and • the species is often seen congregating in large flocks and would have been identified during the targeted surveys.

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				<p>Given the above, it is unlikely that the Project would involve the removal of any habitat likely to be used by the Black-throated Finch (southern subspecies) , and as such, is not likely to result in a significant impact to this species in accordance with the <i>Matters of National Significance Significant Impact Guidelines 1.1, Environment Protection and Biodiversity Act 1999</i> (DotE 2013).</p> <p>Grey-headed Flying Fox</p> <p>This species typically roosts in native vegetation near water, including mangrove, rainforest, melaleuca or casuarina (Churchill 2008). The Grey-headed Flying Fox typically commute within 15 km to feed on flowering and fruiting plants, including blossoms of various species of eucalypt, angophora, tea-tree and banksia (Strahan 1995). If present, the Grey-headed Flying Fox would have been detected during daytime surveys, scat searches and night-time searches consistent with DEWHA (2010b).</p> <p>It is unlikely that the species would utilise the habitat within the Project area and broader locality, given:</p> <ul style="list-style-type: none"> • this species has not been recorded within 120 km of the Project area despite targeted survey work having been conducted in accordance with the relevant State and Commonwealth survey guidelines; and • no roosts were identified in the potential habitat during the recent surveys undertaken by DPM Envirosiences. <p>Given the above, it is unlikely that the Project would involve the removal of any habitat likely to be used by the Grey-headed Flying Fox, and as such, is not likely to result in a significant impact to this species in accordance with the <i>Matters of National Significance Significant Impact Guidelines 1.1, Environment Protection and Biodiversity Act 1999</i> (DotE 2013).</p> <p>Ghost Bat</p> <p>As detailed in the Terrestrial Ecology Assessment, this species is unlikely to occur within the Project area as it was not recorded during the recent surveys undertaken by DPM Envirosiences (2018b) and it has not been previously recorded within 70 km of the Project area, and the closest sighting of this species is from 1978.</p> <p>The Ghost Bat typically inhabits spinifex hillsides, black soil grasslands, monsoon forest, open savannah woodland, tall open forest, deciduous vine forest and tropical rainforest, influenced by the availability of caves and mines for roosting (Churchill 2008). Roost sites include caves, rock crevices and disused mine adits. Given the site characteristics (predominately eucalypt woodland) and the lack of caves within the Project area it is unlikely the Ghost Bat would utilise the habitat within the Project Area.</p> <p>Corben's Long-eared bat</p> <p>It should be noted that the EPBC Act Protected Matters Report (provided in Appendix A of the Terrestrial Fauna Assessment) indicates that this species, or species habitat '<u>may</u>' occur within the Project area. It is not 'likely' or 'known' to occur.</p> <p>With this in mind, Table 3-6 of the draft EIS describes that the survey methodology that was employed for the Corben's Long-eared Bat were in accordance with the relevant State and Commonwealth survey guidelines. Methods included anabats, active searches of roosts and harp trapping. The assessment of the likelihood of this species occurring within the Project area was not solely based on the lack of survey records.</p> <p>Records for this species are primarily located in south-east Queensland and throughout NSW. The nearest known record for this species is located more than 320 km south of the Project area. This record is also the northern-most record for the species within Queensland. As such, it was concluded by DPM Envirosiences that this species is not likely to occur as far north as the Project area.</p> <p>This conclusion was further supported by the lack of records from the targeted survey work which was undertaken in accordance with the relevant State and Commonwealth survey guidelines. It is acknowledged that the lack of call data alone would not be sufficient, however given the species was not identified during active roost searching or harp trapping, it was concluded that this species is unlikely to occur. Although other long-eared bat species were recorded (i.e. the Lesser Long-eared Bat [<i>Nyctophilus geoffroyi</i>]), the identify of these species was confirmed during the harp trap surveys.</p> <p>Southern Snapping Turtle</p> <p>As described in response to comment 37.25, Table 3-15 of the EIS states that the Southern Snapping Turtle inhabits permanent flowing water habitats where there are suitable shelters and refuges (DEHP 2018h); clear, flowing, well-oxygenated waters of the Fitzroy, Mary and Burnett catchments. Suitable habitat for this species was not identified during the aquatic ecology surveys undertaken by DPM Envirosiences (2018c).</p> <p>Fitzroy River Turtle</p> <p>As described in response to comment 37.25, Table 3-15 identifies that the Fitzroy River Turtle is known to inhabit fast-flowing water of the Fitzroy River and its tributaries (Cogger, 2014). Rivers with large deep pools and rocky, gravelly or sandy substrates, connected by shallow riffles. Preferred areas have high water clarity and are often associated with ribbonweed (<i>Vallisneria</i> sp.) (DEE 2017). Suitable habitat for this species was not identified during the aquatic ecology surveys undertaken by DPM Envirosiences (2018c).</p> <p>Yakka Skink</p> <p>It should be noted that the EPBC Act Protected Matters Report (provided in Appendix A of the Terrestrial Fauna Assessment) indicates that this species, or species habitat '<u>may</u>' occur within the Project area. It is not 'likely' or 'known' to occur.</p> <p>It is unlikely that the species would utilise the habitat within the Project area and broader locality, given:</p> <ul style="list-style-type: none"> • this species has not been recorded within 100 km of the Project area despite targeted survey work having been conducted in accordance with the relevant State and Commonwealth survey guidelines; and

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				<ul style="list-style-type: none"> no burrows which could have been used by the Yakka Skink were identified in the potential habitat during the recent surveys undertaken by DPM Envirosciences. <p>Given the above, it is unlikely that the Project would involve the removal of any microhabitat features within 200 metres of a colony, and as such, is not likely to result in a significant impact to this species in accordance with the <i>Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles</i> (Commonwealth of Australia, 2011).</p> <p>Dunmall's Snake</p> <p>It should be noted that the EPBC Act Protected Matters Report (provided in Appendix A of the Terrestrial Fauna Assessment) indicates that this species, or species habitat '<u>may</u>' occur within the Project area. It is not 'likely' or 'known' to occur.</p> <p>This species typically inhabits woodlands and dry sclerophyll forest, particularly areas featuring brigalow (Wilson and Swan, 2013). It was determined that that this species is unlikely to occur within the Project area as the elevation is too low (this species prefer habitat 200 to 500 m AHD [DEE, 2018a]).</p>
37.25		<p>Other Threatened Species – Turtles</p> <p>The EIS provides limited information on the survey effort for the Southern Snapping Turtle (<i>Elseya albagula</i>) and Fitzroy River Turtle (<i>Rheodytes leukops</i>), including stating sites were not surveyed as they were dry.</p> <p>The Department notes no habitat assessment was provided in the EIS for either species in the context of the project site.</p>	<p>Update Table 3-15 to include a detailed habitat assessment for both species, drawing information from relevant technical reports and appendices.</p> <p>Consider investigating the known suitable habitat for the species in other catchments (i.e. where there are records of the species) and assess the aquatic values located in and downstream of the project site in the context of those known suitable habitats.</p>	<p>Sections 3.2.8.1 of the draft EIS and 4.5.5 of the Aquatic Ecology Assessment provides a detailed description of the survey effort undertaken for threatened turtles within the Project area and wider surrounds. These sections outline that the <i>Survey Guidelines for Australia's Threatened Reptiles</i> (DSEWPC 2011) suggests that the Fitzroy River Turtle (<i>Rheodytes leukops</i>) can be readily observed in riffle zones by diving with a face mask and snorkel, or collected by seine netting, and also that the partly carnivorous diet of this species indicates it might be attracted to meat baits in traps. Survey guidelines for the Southern Snapping Turtle (<i>Elseya albagula</i>) are not identified in DSEWPC 2011, due to the subsequent listing of this species as Critically Endangered (from common / Least Concern) in November 2014. However, DPM Envirosciences has successfully captured this species using baited cathedral traps on other projects in the Fitzroy River Basin (including for the proposed Arrow Bowen Pipeline; unpublished). Freshwater turtles were surveyed at most wetted sites by overnight deployment of baited fyke nets and baited cathedral traps, as well as observations of the bank and water surface for sunning and breaching turtles. Water clarity was too poor to enable snorkelling surveys at any sites.</p> <p>Table 3-15 of the EIS states that the Southern Snapping Turtle inhabits permanent flowing water habitats where there are suitable shelters and refuges (DEHP 2018h); clear, flowing, well-oxygenated waters of the Fitzroy, Mary and Burnett catchments. Suitable habitat for this species was not identified during the aquatic ecology surveys undertaken by DPM Envirosciences (2018c).</p> <p>Further, Table 3-15 identifies that the Fitzroy River Turtle is known to inhabit fast-flowing water of the Fitzroy River and its tributaries (Cogger, 2014). Rivers with large deep pools and rocky, gravelly or sandy substrates, connected by shallow riffles. Preferred areas have high water clarity and are often associated with ribbonweed (<i>Vallisneria sp.</i>) (DEE 2017). Suitable habitat for this species was not identified during the aquatic ecology surveys undertaken by DPM Envirosciences (2018c).</p> <p>Further to this, neither species has been recorded within 50 km of the Project area as identified within Table 3-15 of the EIS.</p> <p>Notwithstanding the above, further information on the management of potential impacts to turtle species would be provided in the Fauna Species Management Plan as described in Section 12 of the Additional Information to the EIS.</p>
37.26		<p>Other Threatened Species – Corben's Long-eared Bat</p> <p>The EIS concludes the Corben's Long-eared Bat was not detected as "Bat detectors were used at least one night per survey site and at other potential bat habitat areas (at least 32 nights)."</p> <p>While ultrasonic detection of bat calls is an effective and non-invasive methodology to sample a wide variety of bat species, some bat species cannot be reliably distinguished to species level due to within-species regional variations, call quality, and overlap of calls between species or genera.</p> <p>Long-eared Bats (<i>Nyctophilus</i> spp), Broad-nosed Bats (<i>Scotorepens</i> spp.) or different genera (e.g. <i>Saccolaimus</i>/<i>Mormopterus</i>) are some examples. These species can be identified if caught in traps. As the species was not caught in traps, the conclusion "this species is unlikely to occur within the Mine Site area as it was not recorded during the recent surveys undertaken" is incorrect. The EIS notes the project site contains suitable foraging habitat for the species.</p> <p>Further, the Department considers the project site and surrounds contain suitable roosting habitat for the species considering the prevalence of hollows in the riparian vegetation and the Eucalypt woodland.</p>	<p>Provide a detailed habitat assessment for the Corben's Long-eared Bat, including references to potential roosting and foraging habitat. This discussion must consider relevant Commonwealth or State information, policies or guidelines, and/or published research.</p> <p>Provide a detailed impact assessment, including the amount (in ha) of suitable roosting and/or foraging habitat available in the project site and the amount (in ha) which will be impacted by the project. Further, other relevant impacts must be discussed in relation to the species and its potential habitat.</p> <p>The Department expects a similar approach to the 'known' EPBC listed threatened species.</p>	<p>It should be noted that the EPBC Act Protected Matters Report (provided in Appendix A of the Terrestrial Fauna Assessment) indicates that this species, or species habitat '<u>may</u>' occur within the Project area. It is not 'known' to occur.</p> <p>With this in mind, Table 3-6 of the draft EIS describes that the survey methodology that was employed for the Corben's Long-eared Bat were in accordance with the relevant State and Commonwealth survey guidelines. Methods included anabats, active searches of roosts and harp trapping. The assessment of the likelihood of this species occurring within the Project area was not solely based on the lack of survey records.</p> <p>Records for this species are primarily located in south-east Queensland and throughout NSW. The nearest known record for this species is located more than 320 km south of the Project area. This record is also the northern-most record for the species within Queensland. As such, it was concluded by DPM Envirosciences that this species is not likely to occur as far north as the Project area.</p> <p>This conclusion was further supported by the lack of records from the targeted survey work which was undertaken in accordance with the relevant State and Commonwealth survey guidelines. It is acknowledged that the lack of call data alone would not be sufficient, however given the species was not identified during active roost searching or harp trapping, it was concluded that this species is unlikely to occur. Although other long-eared bat species were recorded (i.e. the Lesser Long-eared Bat [<i>Nyctophilus geoffroyi</i>]), the identity of these species was confirmed during the harp trap surveys.</p> <p>Notwithstanding the above, further information on the management of potential impacts to bat species would be provided in the Fauna Species Management Plan as described in Section 12 of the Additional Information to the EIS.</p>
37.27		<p>Brigalow TEC</p> <p>The Department notes the discussion of Brigalow TEC does not reflect the discussion for the 'known' EPBC listed threatened species.</p> <p>The EIS does not identify the total amount (in ha) of Brigalow TEC available on the project site. The EIS only identifies the</p>	<p>Update the Brigalow TEC discussion to reflect the discussions for the 'known' EPBC listed threatened species.</p> <p>Provide the total amount (in ha) of Brigalow TEC in the project area.</p> <p>Provide a detailed discussion on the condition of the Brigalow TEC (i.e. vegetation layers and microhabitat features) describe its suitability as habitat for relevant EPBC listed threatened species.</p>	<p>Brigalow TEC has been considered to provide habitat for listed threatened species where suitable habitat features are present. For example, Section 3.3.7.1 of the EIS states that Brigalow TEC has been identified as potential habitat for the Ornamental Snake. Mapping in the Mine Site and Access Road area identified two patches as being Brigalow TEC, comprised of RE 11.4.9. In accordance with the <i>Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles</i>, RE 11.4.9 comprises habitat suitable for the Ornamental Snake.</p>

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		total disturbance footprint and how much Brigalow TEC will be cleared (13 ha). The EIS does not provide adequate detail on the condition of the Brigalow TEC, with Table 3-16 noting "The patches of Brigalow TEC are already small, degraded by edge effects and highly fragmented."		Other patches of Brigalow regrowth have been mapped as potential habitat for threatened species where suitable habitat features are present (i.e. gilgais, wetlands and suitable prey habitat). Further to this, Section 5.13 of the Terrestrial Flora Assessment describes that four patches of Brigalow TEC were confirmed within the Project area and broader locality. This includes a 7 ha patch on which flora survey site Q49 was positioned, a 4 ha patch on which flora survey site Q70 was positioned, a 6 ha patch on which flora survey site T5 was positioned and a 1 ha patch along the rail spur corridor. In addition, Table 3-24 provides a breakdown of the amount of Brigalow to be cleared by each Action, along with the total area of clearance (13 ha) associated with the Project. Further to this, a detailed description of the condition requirements which the patches of Brigalow met to be mapped as the TEC is provided in Section 4.5.4 of the Terrestrial Flora Assessment.
37.28		<p>Listed Migratory Species</p> <p>The EIS does not provide an adequate environmental impact assessment for listed migratory species. The Department notes the EIS concludes the project will not significantly impact listed migratory species but there is limited supporting evidence to justify this conclusion. Similarly to the comments on EPBC listed threatened species above, detail is lacking on:</p> <ul style="list-style-type: none"> a robust description of the nature of the listed migratory species; robust habitat definitions; mapping of potential habitat on the project site; mapping of where individuals were identified; total amount (in ha) of potential habitat on the project site; total amount (in ha) of potential habitat to be impacted by the project; potential impacts (other than vegetation clearance); all appropriate avoidance, mitigation and management measures; and supporting evidence to justify the appropriateness of proposed avoidance, mitigation and management measures. <p>The EIS references "A National or State recovery plan has not been prepared for this species" for a number of listed migratory species.</p>	<p>The Department considers any comments above for EPBC listed threatened species apply to listed migratory species, particularly in relation to:</p> <ul style="list-style-type: none"> a robust description of the nature of the listed migratory species; robust habitat definitions; mapping of potential habitat on the project site; mapping of where individuals were identified; total amount (in ha) of potential habitat on the project site; total amount (in ha) of potential habitat to be impacted by the project; potential impacts (other than vegetation clearance); all appropriate avoidance, mitigation and management measures; and supporting evidence to justify the appropriateness of proposed avoidance, mitigation and management measures. <p>The Department expects the level of detail provided in response to the Department's comments on the EPBC listed threatened species above is applied to the listed migratory species section of the EIS.</p> <p>Consider removing reference to recovery plans and any other statutory documents (i.e. approved conservation advices and threat abatement plans) for listed migratory species. Consideration of these statutory documents are only relevant to EPBC listed threatened species and communities which come under the 'Listed threatened species and communities' controlling provision (sections 18 and 18A of the EPBC Act).</p>	<p>Section 3.3.8 of the EIS provides a detailed assessment of the potential impacts to each potentially occurring migratory species in accordance with the structure provided by DEE with its comments on the adequacy version of the EIS. An example of one of the assessments, for the Glossy Ibis, is provided below.</p> <p>Background/Description</p> <p>Within Australia, the Glossy Ibis is generally located east of the Kimberley in Western Australia and Eyre Peninsula in South Australia. The species is also known to be patchily distributed in the rest of Western Australia and is rare or a vagrant in Tasmania (DEE, 2018).</p> <p>Survey Effort</p> <p>Diurnal bird surveys were conducted during spring (1-14 November 2016) and autumn (23 April to 4 May 2017), with six 20 minute searches conducted within the dedicated survey sites (DPM Envirosciences, 2018b).</p> <p>Habitat Assessment and Definition</p> <p>The Glossy Ibis typically inhabits freshwater marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons (Morcombe, 2003).</p> <p>Within the Mine Site and Access Road area, potential habitat for the species consists of the following habitat types (as shown on Figure 3-4 of the draft EIS:</p> <ul style="list-style-type: none"> eucalypt dry woodlands on inland depositional plains; eucalypt open forest to woodlands on floodplains; palustrine wetlands; lacustrine wetlands; and waterways. <p>The Glossy Ibis was recorded three times within the Mine Site and Access Road area during the November 2016 and April-May 2017 field surveys (DPM Envirosciences, 2018b). The habitat the species was recorded in was eucalypt dry woodlands on inland depositional plains (BVG 5) and palustrine wetlands (BVG 15).</p> <p>Potential Impacts</p> <p>The Mine Site and Access Road will result in the removal of potential and known habitat for this species. However, this is unlikely to result in significant impacts to this species given:</p> <ul style="list-style-type: none"> the Mine Site and Access Road impact area is not a known breeding place for the Glossy Ibis which typically breeds in America and across the Atlantic coast, with only five recorded sites across Australia, the closest to the Project being on the South Australian border (DEE, 2018; ALA, 2018); the species is wide ranging, with records widespread in Eastern Australia and scattered across Western Australia (ALA, 2018); and habitat for the species is abundant outside the Mine Site and Access Road impact area, as indicated by the numerous database records for this species (ALA, 2018). <p>Avoidance, Mitigation and/or Management Measures</p> <p>As described in Section 3.3.11 of this document, the following measures would be undertaken by Pembroke to reduce potential adverse impacts on the Glossy Ibis:</p> <ul style="list-style-type: none"> Impact avoidance measures outlined in the table in Section 3.3.11 (since the Glossy Ibis could utilise a variety of habitats). Vegetation clearance procedures, including progressive vegetation clearing. <p>The above measures are predicted to be effective in reducing potential adverse impacts on the Glossy Ibis from the Mine Site and Access Road because they are focused on addressing the recognised threats (i.e degradation of habitat) to the species as identified on the Department's SPRAT profile. A National or State recovery plan has not been prepared for this species.</p> <p>Summary of EBPC Act Assessment</p> <p>This species was recorded during the diurnal bird surveys within the Mine Site and Access Road area, however records for this species are widespread and the habitat in the Mine Site and Access Road impact area is not classified as important to the species given it is not a known breeding place and habitat for the species is abundant outside the Mine Site and Access Road impact area.</p>


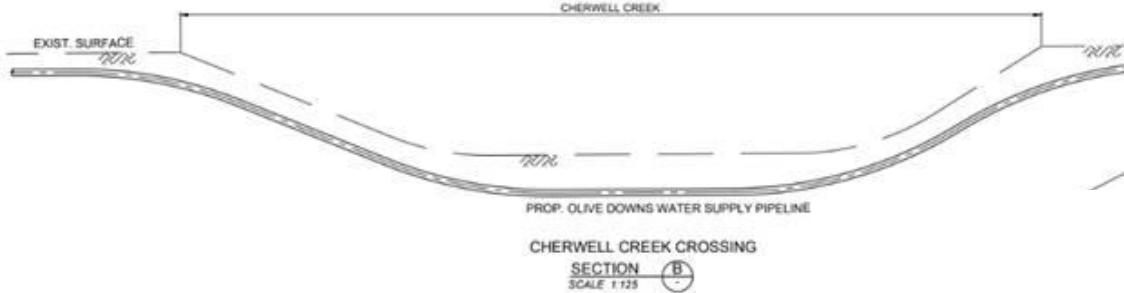
Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response
				<p>As such, it is not likely the Mine Site and Access Road will have a significant impact on the species habitat given it would not (DotE, 2013):</p> <ul style="list-style-type: none"> substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering biological) cycles, destroy or isolate an area of important habitat for a migratory species; result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species. <p>In addition, Figure 16 of the Terrestrial Fauna Assessment shows the location of migratory species identified during the fauna surveys.</p>
37.29		<p>Impacts on Water Resources</p> <p>The Department notes the project was considered at the September IESC meeting (3-4 October 2018).</p>	<p>Include a detailed response to the IESC Advice (IESC 2018-096) on the draft EIS, particularly in relation to the key impacts identified on page 2 of the IESC Advice.</p> <p>The Department expects the proponent to consider collecting and/or providing additional data and/or information as articulated on page 2 of the IESC Advice.</p> <p>In particular, the Department considers baseline information in relation to groundwater-dependent ecosystems (GDEs) (i.e. wetlands and riparian vegetation) should be strongly considered as referenced in the IESC Advice (Richardson et al. [2011] and Emelyanova et al. [2017]). The Department has required long-term GDE monitoring in recent approvals with the requirement of environmental offsets for adverse impacts on GDEs as a result of groundwater drawdown.</p> <p>Consider the construction of nested bores into all relevant aquifers (as recommended in the IESC Advice) to provide baseline information in relation to groundwater depth and quality, and assist in developing a monitoring program to identify adverse impacts on GDEs from groundwater drawdown in the future.</p> <p>The Department further expects the proponent to provide justification as to why diverting Ripstone Creek is required, noting the diversion is on the corner of the disturbance footprint, as raised by the IESC Advice.</p>	<p>Separate responses are provided to the IESC Advice.</p> <p>Figures 4-13 and 4-9 in the draft EIS show the groundwater monitoring and investigation site network and water quality network used for baseline data collection for the EIS. As shown on Figure 4-13, existing Lacustrine Wetland and Palustrine Wetlands monitoring sites are presented.</p> <p>The process for collection of additional data, as outlined in the draft EIS, includes:</p> <ul style="list-style-type: none"> Section 4.2.4: Surface Water (Quality) Monitoring Program (Page 4-62) Section 4.2.4: Groundwater Quality Monitoring (Page 4-64) Section 4.3.4: Surface Water (Resources) Monitoring Program (Page 4-86) Section 4.3.4: Groundwater Level and Pressure Monitoring (Page 4-86) Section 4.3.4: Receiving Environment Monitoring Program (Page 4-87) <p>The REMP would identify:</p> <ul style="list-style-type: none"> suitable test sites within the receiving waters that are potentially impacted by the release; suitable control sites where a background or reference condition can be established; methodologies for assessing the condition of, and impacts to, EVs at test sites using both WQOs and control site data based on appropriate and valid assessment protocols from relevant guideline documents. <p>This methodology for assessing the condition of control sites and test sites would involve the collection of baseline information in relation to GDEs, and where considered appropriate, cognisant of the references (Richardson et al, 2011; and Emelyanova et al, 2017).</p> <p>The draft EIS clearly outlines the processes for collection of additional data and information.</p> <p>Furthermore, Section 4.1.3 of the draft EIS relevantly concludes that although the potential drawdown of approximately 2 to 5 m is predicted to occur in areas where vegetation may be dependent on subsurface expression of groundwater, it is unlikely that this potential impact would result in a significant impact to terrestrial riparian vegetation surrounding the Project (DPM Envirosciences, 2018a).</p> <p>This is due to the fact that the vegetation in these locations is subject to continuous (natural) wetting and drying cycles which in turn results in continual fluctuations in the groundwater levels in these locations (DPM Envirosciences, 2018a).</p> <p>The Project would not result in a drawdown in the alluvial aquifers that would dewater the aquifer to the extent that it would not recover following rainfall (HydroSimulations, 2018).</p> <p>Table 8-1 in the Groundwater Assessment (EIS Appendix D) outlines the proposed groundwater monitoring program, including all relevant aquifers (e.g. alluvium, regolith, Rewan Formation and Permian measures) and various depths as well as the groundwater quality suite of parameters (Page 109 of EIS Appendix D). This program would provide the relevant groundwater information, which in conjunction with surface water and vegetation monitoring in the wetlands, would be used to support the conclusion that habitats have a low likelihood of being dependent on groundwater, or where they do the terrestrial riparian vegetation is unlikely to experience a significant impact as a result of the predicted 2-5 m drawdown.</p>
37.30		<p>Impacts on Water Resources – Avoidance, Mitigation and Management</p> <p>The Department notes there is no discussion in the Impacts to Water Resources section in relation to avoidance, mitigation and management measures.</p>	<p>Provide a detailed discussion on the specific measures to be implemented to avoid, mitigate and manage impacts on the water resources. This discussion must include robust supporting evidence (e.g. published research or studies, Australian standards, etc.) which demonstrates the appropriateness and success of these measures.</p>	<p>Examples of Avoidance, Mitigation and Management of Impacts on Water Resources from the draft EIS (Section 3.3.11 - Pages 3-159 to 3-166) are provided below. Section 3.3.15 also includes a conclusion summarising the alternatives considered.</p> <p>Avoidance examples:</p> <p>No aquatic habitats supporting aquatic species of conservation significance listed under the NC Act or EPBC Act are expected to be removed by the Project. (Page 4-24)</p> <p>The detailed design of the ETL would implement aerial crossings over waterways (including the Isaac River) and thereby avoid clearing of riparian vegetation or instream aquatic habitat. (Page 4-25)</p> <p>Where possible, riparian vegetation along the Isaac River has been avoided in the mine design and a minimum buffer zone of 200 m between the mine pits and Isaac River has been implemented. (Page 4-37)</p> <p>If, during operations, there was a risk that the licence allocation could be exceeded, the site water demands could be adjusted accordingly (e.g. reduce dust suppression demand) or alternative water harvesting measures on-site could be implemented, to avoid and/or minimise any impacts on regional water availability. (Page 4-85)</p>

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				<p>Mitigation examples:</p> <p>Surface water runoff control practices to prevent up-catchment runoff water from entering the open cut mining areas would be generally adopted for the Project. (Page 4-82)</p> <p>Sediment dams would be designed based on Best Practice Sediment and Erosion Control Guideline (IECA, 2008) for flows with an ARI of between 3 months and 1 year. (Page 4-82)</p> <p>The conveyor and access road would be restricted to a construction corridor of 180 m width, however this would be reduced when crossing the Isaac River where, within 200 m of the defining bank, the construction corridor width would be limited to 45 m to reduce impacts on aquatic habitat. (Page 4-25)</p> <p>The Olive Downs South Domain access road would require one crossing of the Isaac River and a crossing of an ephemeral drainage line, limited to a 40 m wide disturbance corridor. The crossing of the Isaac</p> <p>River would result in the removal of aquatic habitat and the riparian vegetation along the banks of the Isaac River. The crossing would be constructed using selected materials for the pavement with low flow culverts laid under the pavement at the lowest point in the river bed to convey low river flows beneath the access road. (Page 4-25)</p> <p>The Olive Downs South Domain haul road (to the eastern waste emplacement) would require one crossing of the Isaac River, limited to a 60 m wide disturbance corridor. Construction of the haul road would result in the removal of temporary aquatic habitat from within the watercourse and include low flow culverts to minimise potential impacts on fish passage. (Page 4-25)</p> <p>Further to this, all waterway crossings would be designed and constructed with consideration to the Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works (DAF, 2017b) to avoid potential impacts to aquatic ecology. (Page 4-38)</p> <p>Over the life of the Project, there would be numerous options for adaptive management of the mine water management system to accommodate climatic conditions. For example, temporary adjustments to pumping arrangements could be made to accommodate very wet or dry periods. These alternative management approaches would be used to reduce the risks to the Project associated with climatic variability and could include, for example:</p> <ul style="list-style-type: none"> advanced dewatering within the proposed open cut pit extents; and use of chemical or other dust suppressants to reduce the amount of water required for dust suppression. (Page 4-86) <p>Management examples:</p> <p>Flood management infrastructure design (temporary flood levees; and permanent highwall emplacements. (Page 4-97)</p> <p>The site water management system has been designed such that the risk of off-site uncontrolled release of mine affected water during operations is very low and sediment inputs can be controlled through drainage, and erosion and sediment control measures. On this basis, the Project is not expected to make any significant contribution to cumulative sediment loads in the Fitzroy River Basin (Hatch, 2018a). (Page 4-37)</p> <p>Operational measures would allow for the practical limitations of being able to redistribute stored volumes across the containment system (including operability of equipment under extreme weather conditions); (Page 4-99)</p> <p>Controlled water release conditions have been developed for releases to the Isaac River and Ripstone Creek, based on the DEHP Guideline Model Mining Conditions. (Page 4-85)</p> <p>Monitoring and Inspections (Pages 4-39, 4-62, 4-64, 4-86, 4-98 & 4-99)</p> <p>Water Management Plan (Pages 4-64 & 4-87)</p> <p>Erosion and Sediment Control Plan (Pages 4-64 & 4-87)</p> <p>Receiving Environment Monitoring Program (Pages 4-65 & 4-87)</p> <p>Pembroke would prepare an Underground Water Impact Report (UWIR) prior to the commencement of mining in accordance with Chapter 3 of the Water Act. The UWIR would be based on the information</p> <p>contained in the Groundwater Assessment (Appendix D), and would describe, make predictions about and manage the impacts of underground water extraction by the Project. (Page 4-86)</p>
37.31		<p>Impacts on Water Resources – Summary of EPBC Act Assessment</p> <p>The Department notes there is no discussion in the Impacts to Water Resources section in relation to a summary of the EPBC Act assessment of the project on water resources, including whether the project will result in a residual significant impact on water resources.</p>	<p>Include a summary of the EPBC Act assessment of the project on water resources, including whether the project will result in a residual significant impact on water resources.</p>	<p>Section 3.3.9 of the EIS (Assessment of Matters of National Environment Significance) includes the assessment of impacts on water resources. A summary of the assessments undertaken is provided at the beginning of Section 3.3.9. The predicted impacts of the Project are outlined in Section 3.3.9, as well as cumulative impacts and avoidance, mitigation and management measures in 3.3.10 and 3.3.11 respectively.</p> <p>The residual predicted impacts (post-mining) include an area of approximately 49 km² would report to the final voids at the completion of mining. The changed topography as a result of the final landform would have the following impacts on catchment areas:</p> <ul style="list-style-type: none"> The catchment draining to Ripstone Creek would reduce by around 19 km² (compared to pre-mining conditions), a decrease of less than 7% of the total 286 km² catchment area. The catchment draining to the Isaac River would reduce by around 49 km² (compared to pre-mining conditions), a decrease of less than 1% of the total 7,782 km² catchment area. <p>As stated on Page 3-137, it is clarified that this captured catchment area is 'not significant'.</p>

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				<p>As stated on Page 3-141, the final void modelling indicates that the expected water levels are below the full supply levels for each void, and the voids would remain as long-term groundwater sinks. Further, the post-mining flood modelling undertaken by Hatch (2018b) identified that based on the final landform design, flood waters would not enter any of the final voids in events up to and including the PMF event.</p> <p>Given the final voids would be sinks, the final voids would not result in any adverse groundwater quality related impacts on GDEs (refer to Appendix E of the Additional Information to the EIS).</p> <p>The draft EIS relevantly states that the results of the Flooding Assessment undertaken by Hatch (2018b) for the 50%, 2%, 1% and 0.1% AEP flood events show that the majority of peak flows would be unchanged by the Project, with only a few insignificant changes occurring.</p> <p>In relation to flooding and diversion of Ripstone Creek the assessment of the most critical areas found that while there could be isolated areas subject to somewhat higher risk of scour compared to the existing situation, the overall risk of rapid and significant geomorphic change in the Isaac River due to the Project was low. Hatch (2018b) concluded that by comparing the results of the flood modelling with the ACARP guidelines for the Bowen Basin, the diversion would not change the hydraulic behaviour of the waterway significantly.</p> <p>Seepage from in-pit emplacements is not expected to migrate to the surrounding alluvium, as the groundwater level that would ultimately equilibrate within the waste rock would be below the base of the alluvium (HydroSimulations 2018). Given this, the Project is not expected to have a significant impact on groundwater quality that would lead to any adverse impact on potential GDEs (DPM Envirosciences, 2018a).</p> <p>The site water management system has been designed such that the risk of off-site uncontrolled release of mine affected water during operations is very low and sediment inputs can be controlled through drainage, and erosion and sediment control measures. On this basis, the Project is not expected to make any significant contribution to cumulative sediment loads in the Fitzroy River Basin.</p> <p>The release conditions have been developed by the regulators within an overarching strategic framework for the management of the cumulative impacts of water releases from mining activities and are therefore expected to have negligible cumulative impact on surface water quality and associated environmental values.</p>																																																																																																														
37.32		<p>Cumulative Impacts – Listed Threatened Species and Ecological Communities</p> <p>The Department notes Table 3-24 provides a breakdown of direct impacts to EPBC listed threatened species specific to remnant and non-remnant habitat in the project area of all four projects. However, there is no total amount (in ha) of remnant and non-remnant habitat in the project area in its entirety.</p> <p>The EIS provides limited detail on the cumulative impacts on EPBC listed threatened species, and their habitat, and Brigalow TEC in a regional context. The Department notes references to only other mines in the region with no detail on the actual impacts of those mines (i.e. clearance of suitable habitat) on relevant EPBC listed threatened species and Brigalow TEC. The Department notes the IESC Advice provides comments on this issue.</p>	<p>Update Table 3-24 to include the total amount (in ha) of remnant and non-remnant habitat in the project area of all four projects and include a percentage of the total area of remnant and non-remnant habitat proposed to be cleared as part of the project in its entirety.</p> <p>Ensure Table 3-24 is updated accordingly based on the comments above in relation to EPBC listed threatened species and Brigalow TEC.</p> <p>Provide a detailed discussion of the cumulative impacts on EPBC listed threatened species and Brigalow TEC in a regional context, including from remote sensing data, and from proponents' environmental assessments and subsequent monitoring data.</p>	<p>Separate responses are provided to the IESC Advice.</p> <p>As described in Section 3.2 of the draft EIS, the Project is located within the Brigalow Belt North Bioregion (as defined by DEE [2018]). In a local context, the Project is located within the Bowen Basin mining area where, in parallel with agricultural activities, open cut (and underground) coal mining is a key land use. As a result, the majority of the Project area comprises agricultural grasslands with tracts of remnant vegetation (DPM Envirosciences, 2018).</p> <p>The REs to be cleared during the life of the Project all occur more widely in surrounding landscapes and subregions (Accad et al., 2017), with clearance associated with the Project representing approximately 0.4% of the remaining remnant vegetation in the Northern Bowen Basin and Isaac-Comet Downs biodiversity sub-regions (Accad et.al., 2017).</p> <p>The table below outlines the area of potential habitat for the relevant threatened species and communities listed under the EPBC Act (using the habitat definitions developed in response to Item 1 above), proposed to be removed by the Project, relative to the area of potential habitat within the broader locality (i.e. within 10 km of the Project area), Isaac River Catchment and Isaac-Comet Subregion.</p> <p>Figures 7-1 to 7-5 of the Additional Information to the EIS show the presence of each of the fauna species within the broader locality.</p> <table><tr><th rowspan="2">Action</th><th rowspan="2">Habitat Type</th><th colspan="6">Habitat Clearance (ha)</th></tr><tr><th>Brigalow EEC</th><th>Ornament al Snake</th><th>Squatter Pigeon (Southern)</th><th>Australian Painted Snipe</th><th>Koala</th><th>Greater Glider</th></tr><tr><td rowspan="3">Mine Site and Access Road</td><td>Remnant</td><td>13</td><td>144</td><td>5,530</td><td>113</td><td>5,500</td><td>5,500</td></tr><tr><td>Grassland</td><td>0</td><td>7,477.5</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Sub-total</td><td>13</td><td>7,621.5</td><td>5,530</td><td>113</td><td>5,500</td><td>5,500</td></tr><tr><td rowspan="3">Water Pipeline</td><td>Remnant</td><td>0</td><td>0</td><td>23</td><td>1</td><td>27.5</td><td>27.5</td></tr><tr><td>Grassland</td><td>0</td><td>7</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Sub-total</td><td>0</td><td>7</td><td>23</td><td>1</td><td>27.5</td><td>27.5</td></tr><tr><td rowspan="3">Project ETL</td><td>Remnant</td><td>0</td><td>0</td><td>14</td><td>0</td><td>12</td><td>12</td></tr><tr><td>Grassland</td><td>0</td><td>10.5</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Sub-total</td><td>0</td><td>10.5</td><td>14</td><td>0</td><td>12</td><td>12</td></tr><tr><td rowspan="3">Rail Spur and Loop</td><td>Remnant</td><td>0</td><td>0</td><td>43</td><td>6</td><td>43</td><td>43</td></tr><tr><td>Grassland</td><td>0</td><td>27</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Sub-total</td><td>0</td><td>27</td><td>43</td><td>6</td><td>43</td><td>43</td></tr><tr><td colspan="2">Total</td><td>13</td><td>7,666³</td><td>5,494.5⁴</td><td>5,6104</td><td>5,583.5⁶</td><td>5,583.5⁷</td></tr></table>	Action	Habitat Type	Habitat Clearance (ha)						Brigalow EEC	Ornament al Snake	Squatter Pigeon (Southern)	Australian Painted Snipe	Koala	Greater Glider	Mine Site and Access Road	Remnant	13	144	5,530	113	5,500	5,500	Grassland	0	7,477.5	0	0	0	0	Sub-total	13	7,621.5	5,530	113	5,500	5,500	Water Pipeline	Remnant	0	0	23	1	27.5	27.5	Grassland	0	7	0	0	0	0	Sub-total	0	7	23	1	27.5	27.5	Project ETL	Remnant	0	0	14	0	12	12	Grassland	0	10.5	0	0	0	0	Sub-total	0	10.5	14	0	12	12	Rail Spur and Loop	Remnant	0	0	43	6	43	43	Grassland	0	27	0	0	0	0	Sub-total	0	27	43	6	43	43	Total		13	7,666 ³	5,494.5 ⁴	5,6104	5,583.5 ⁶	5,583.5 ⁷
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Rail Spur and Loop	Remnant	0	0	43	6	43	43																																																																																																											
	Grassland	0	27	0	0	0	0																																																																																																											
	Sub-total	0	27	43	6	43	43																																																																																																											
Total		13	7,666 ³	5,494.5 ⁴	5,6104	5,583.5 ⁶	5,583.5 ⁷																																																																																																											

Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response																												
				<table><tr><td>Approximate Area of Habitat within the broader locality (i.e. 10 km of the Project boundary)¹</td><td>16,068</td><td>43,178</td><td>62,978</td><td>62,978</td><td>63,633</td><td>63,633</td></tr><tr><td>Approximate Area of Habitat within the Isaac River Catchment²</td><td>41,621</td><td>57,657</td><td>598,855</td><td>598,855</td><td>883,471</td><td>883,471</td></tr><tr><td>Approximate Area of Habitat within the Isaac-Comet Downs Subregion²</td><td>81,369</td><td>122,842</td><td>524,567</td><td>524,567</td><td>413,453</td><td>413,453</td></tr></table>	Approximate Area of Habitat within the broader locality (i.e. 10 km of the Project boundary) ¹	16,068	43,178	62,978	62,978	63,633	63,633	Approximate Area of Habitat within the Isaac River Catchment ²	41,621	57,657	598,855	598,855	883,471	883,471	Approximate Area of Habitat within the Isaac-Comet Downs Subregion ²	81,369	122,842	524,567	524,567	413,453	413,453	<p>¹ Based on the REs identified as potential habitat on DEE (2018a) from the DSITI (2018) regional mapping available over the area. This area does not include dispersal habitat as the identification of potential dispersal habitat requires field validation.</p> <p>² Based on the REs identified as potential habitat on DEE (2018a) from Accad et. al. (2017). This area does not include dispersal habitat as the identification of potential dispersal habitat requires field validation.</p> <p>³ This is comprised entirely of ‘Important Habitat’ for the Ornamental Snake.</p> <p>⁴ This is comprised of approximately 3,628 ha of breeding habitat, approximately 1,822 ha of foraging and approximately 160 ha of dispersal habitat.</p> <p>⁵ This is comprised entirely of potential breeding habitat for the Australian Painted Snipe.</p> <p>⁶ This is comprised entirely of ‘Critical Habitat’ for the Koala.</p> <p>⁷ This is comprised entirely of potential breeding/foraging habitat for the Greater Glider.</p> <p>As demonstrated in the table above, although the Project would result in removal of potential habitat for each of these MNES, the area of habitat proposed to be cleared is only a small portion of the habitat available for each of these MNES within the broader locality, catchment and subregion.</p> <p>It is noted that the Lake Vermont Coal Mine Northern Extension Project (EPBC 2016/7701) (Lake Vermont Project) was approved on 29 June 2018. Although the Lake Vermont Project was not determined to be a Controlled Action for threatened species and communities, the Squatter Pigeon (southern) was recorded during the ecology surveys, and it was determined that suitable habitat for the southern Squatter Pigeon (southern) exists throughout the Lake Vermont Project site (AARC, 2016). The area of habitat of the Squatter Pigeon (southern) within the Lake Vermont Project site is taken into consideration in the table above.</p> <p>As outlined in the table above, the Project would result in the removal of approximately 5,494.5 ha of potential habitat for the Squatter Pigeon, which would, in conjunction with the Lake Vermont Project, further minimise the area of potential habitat for this species in the broader locality.</p> <p>In addition to the progressive rehabilitation of the Project, Pembroke would provide a biodiversity offset for the impacts associated with the Project in accordance with the Queensland Environmental Offsets Policy (Version 1.4) (DEHP, 2017) and EPBC Act Environmental Offsets Policy (SEWPaC, 2012a) (and supporting EPBC Act Offsets Assessment Guide [SEWPaC, 2012b]) (Section 3.8 of the draft EIS). The biodiversity offset area (once established) would provide a beneficial conservation outcome for biodiversity in the broader locality, catchment and region.</p>						
Approximate Area of Habitat within the broader locality (i.e. 10 km of the Project boundary) ¹	16,068	43,178	62,978	62,978	63,633	63,633																										
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37.33		<p>Cumulative Impacts – Listed Migratory Species</p> <p>The EIS does not consider cumulative impacts on listed migratory species, and their habitat, from a whole-of-project perspective (all four components) or in a regional context. The Department notes the IESC Advice provides comments on this issue.</p>	<p>Provide a detailed discussion of the cumulative impacts on listed migratory species from a whole-of-project perspective (all four components). See comment 30 to ensure consistency with EPBC listed threatened species and ecological communities.</p> <p>Further, provide a detailed discussion of the cumulative impacts on listed migratory species in a regional context, including from remote sensing data, and from proponents’ environmental assessments and subsequent monitoring data.</p>	<p>Separate responses are provided to the IESC Advice.</p> <p>The cumulative effect of the existing mines and agricultural activities in the broader locality is already evident in the landscape, with most wetlands within the Project locality already exhibiting impacts from grazing stock (DPM Envirosciences, 2018c).</p> <p>The Project would result in the clearance of some areas of wetland habitat, including palustrine (e.g. swamps) and lacustrine (e.g. dams) wetlands, along with areas of gilgai habitat that would provide temporary wetted habitat after rainfall (DPM Envirosciences, 2018b).</p> <p>As demonstrated in the table provided in response 32, Accad et. al. (2017) indicates that large areas of wetland habitat, required by migratory species, exist within the broader locality, catchment and region as follows:</p> <ul style="list-style-type: none">655 ha of wetlands within 10 km of the Project area;271,100 ha of wetlands within the Isaac River Catchment; and174,573 ha of wetlands within the Isaac-Comet Downs Subregion. <p>With this in mind, it is evident that the wetland habitats proposed to be removed by the Project only represent a very small portion of the wetland habitat available for use by migratory species in the broader locality, catchment region, and indeed the greater extent of Queensland and Australia as demonstrated by the wide-ranging distribution of these species (DEE, 2018a).</p>																												
37.34		<p>Cumulative Impacts – Water Resources</p> <p>The Department notes the IESC Advice provides comments to assist in a robust assessment of cumulative impacts.</p> <p>The EIS does not specify the maximum cumulative extent of groundwater drawdown (in metres).</p>	<p>Include a detailed response to the relevant IESC comments in relation to cumulative impacts with other mines in the region, including on the Isaac River.</p> <p>Include the maximum cumulative extent of groundwater drawdown (in metres).</p>	<p>Separate responses are provided to the IESC Advice.</p> <p>The Groundwater Assessment (Appendix D of the draft EIS) has considered the cumulative drawdown impacts of the Project and surrounding mines (existing and approved), as well as the approved Bowen Gas Project. As stated in Appendix D of the draft EIS, based on the modelling results, cumulative groundwater drawdown extents from the Bowen Gas Project are predicted to be greater than impacts produced by the Project alone.</p>																												

Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response																		
				<p>The maximum cumulative extent of groundwater drawdown (in metres) is shown on Figure B5-4 and the Groundwater Assessment concludes (Page 43, Appendix B in Appendix D):</p> <p><i>Figure B5-4 shows the Bowen Gas Project would increase the drawdown extent by 15 km to the east of the Olive Downs Domain, and by 10 km south of the Willunga Domain.</i></p> <p>Further to this, the cumulative maximum predicted drawdown extent at the five (5) bores by comparison to the Project maximum predicted drawdown (alone) is provided in the table below.</p> <table><tr><th>Bore ID</th><th>Project Maximum Drawdown (m)</th><th>Cumulative Maximum Drawdown (m)</th></tr><tr><td>Bore 8</td><td>3.6</td><td>3.6</td></tr><tr><td>RN97181 (Pisscutter)</td><td>1.6</td><td>1.6</td></tr><tr><td>Swamp Bore</td><td>14.4</td><td>18.1</td></tr><tr><td>RN122458 (Rolfies #2)</td><td>11.5</td><td>16.9</td></tr><tr><td>RN122458 (Rolfies #1)</td><td>11.5</td><td>16.9</td></tr></table>	Bore ID	Project Maximum Drawdown (m)	Cumulative Maximum Drawdown (m)	Bore 8	3.6	3.6	RN97181 (Pisscutter)	1.6	1.6	Swamp Bore	14.4	18.1	RN122458 (Rolfies #2)	11.5	16.9	RN122458 (Rolfies #1)	11.5	16.9
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37.35		<p>Impact Avoidance, Mitigation Measures and Management Plans</p> <p>The proponent has proposed the implementation of management plans as a mitigation measure for MNES, with only a high level information on what the management plan is for and what it will contain. The Department considers further detail of what measures will be implemented in the management plan to achieve the desired environmental outcomes is required.</p> <p>Table 3-25 provides a high level summary of the proposed avoidance and mitigation measures. The Department notes other potential impacts which are relevant to the project include, but not limited to:</p> <ul style="list-style-type: none">dust and coal dust;noise and vibration;changes to surface hydrological regimes; andlighting.	<p>Provide more detail on the environmental outcomes to be achieved with the implementation of management plans.</p> <p>These outcomes should link directly to relevant conservation advices, recovery plans and/or threat abatement plans.</p> <p>Describe the measures to be incorporated in the management plans. The measures should be 'S.M.A.R.T':</p> <ul style="list-style-type: none">SpecificMeasurableAchievableRelevantTime bound <p>Update Table 3-25 to take into account other potential impacts and describe appropriate measures to avoid, mitigate and manage the potential impacts.</p> <p>Supporting evidence (e.g. published research or studies, Australian standards, etc.) which demonstrates the appropriateness and success of proposed measures must be discussed.</p> <p>Further, provide detail on the monitoring approach to be undertaken to determine the success of the implementation of the management plan and how it will inform adaptive management. Supporting evidence which demonstrates the appropriateness of the proposed monitoring approach must be discussed.</p> <p>Consider reviewing the SPRAT Database and relevant documentation to identify additional mitigation and management measures that can be implemented to manage impacts on EPBC listed threatened species, Brigalow TEC and listed migratory species.</p>	<p>An environmental outcome that would be achieved by the implementation of the proposed management measures identified in Table 3-25 of the draft EIS would be a potential reduction in the degradation of habitat for MNES within the Project area and broader locality. This includes the avoidance and minimisation of potential edge effects (e.g. an increase feral animal and weed abundance) that would be realised if the management measures (e.g. feral animal and weed control) were not implemented by Pembroke.</p> <p>Further to this, an outcome of the Project for MNES would be the enhancement and security of the Project biodiversity offset areas (as described in Section 10 of the Additional Information to the EIS) to address the potentially significant residual impacts on threatened species and communities. The desired outcome of the proposed offset is that the extent and condition of the habitat values of threatened species and communities within the offset areas are protected and enhanced. The land in the offset areas will be enhanced so as the currently degraded areas provide suitable habitat for the relevant MNES (including Brigalow EEC).</p> <p>The outcome described above has been determined in consideration of the DEE <i>Outcomes-based Conditions Policy 2016</i> (DotE, 2016a) and <i>Outcomes-based Conditions Guidance 2016</i> (DotE, 2016b). These outcomes have also been developed in consideration of the recognised threats identified in the relevant conservation advices, recovery plans and threat abatement plans to the MNES available on the DEE’s SPRAT profiles (e.g. controlling predators and herbivores and avoiding additional habitat loss).</p> <p>Table 3-25 provides an overview of the measures that would be implemented by Pembroke to mitigate impacts on native fauna and flora. Further to this, Section 7 of the Additional Information to the EIS outlines the avoidance and mitigation measures proposed to be implemented by Pembroke for each MNES (including Brigalow EEC). These measures are also reproduced in responses 37.5, 37.9, 37.13, 37.18 and 37.22.</p> <p>In addition, the Fauna Species Management Plan to be prepared and implemented by Pembroke would provide specific management measure to minimise the potential impacts of construction and maintenance activities on threatened fauna, including specific measures for the each MNES. The measures would be specific, measurable, achievable, relevant and time bound (i.e. S.M.A.R.T) and developed in consideration of the DEE’s <i>Environmental Management Plan Guidelines</i> (DotE, 2014).</p> <p>The MNES-specific measures described in responses 37.5, 37.9, 37.13, 37.18 and 37.22 and Section 7 of the Additional Information to the EIS are predicted to be effective in minimising potential adverse impacts from the Project on habitat for the MNES because they are focused on addressing the recognised threats identified in the relevant conservation advices, recovery plans and threat abatement plans to the MNES available on the DEE’s SPRAT profiles (e.g. avoiding additional habitat loss, minimising the risk of fire and controlling predators and herbivores).</p> <p>The Terrestrial Flora and Terrestrial Fauna Assessments (Appendices A and B of the draft EIS) found that there is not predicted to be a significant impact on the vegetation or fauna habitat (including Brigalow Woodland EEC) which occurs outside the Project area through indirect impacts such as coal dust, noise and vibration, changes to surface hydrological regimes, habitat fragmentation and edge effects (e.g. artificial lighting).</p> <p>Further to this, the effectiveness of the Fauna Species Management Plan will be evaluated via independent and internal audits to formally assess the level of compliance with the Fauna Species Management Plan. Audit outcomes will be used to develop corrective actions which may include changes to the measures outlined in the Fauna Species Management Plan.</p> <p>The Fauna Species Management Plan will be reviewed if any of the following occur:</p> <ul style="list-style-type: none">any modification to the conditions within the Environmental Authority or EPBC Act Approval;upon the direction of the Commonwealth Minister; orany changes in legislative requirements.																		
37.36		<p>Olive Downs Project Water Pipeline (EPBC 2017/7868)</p> <p>The Department considers the comments below complement the comments provided above for EPBC listed threatened species and ecological communities for the Olive Downs Project Mine Site and Access Road (EPBC 2017/7867).</p>	<p>Update the EIS to provide more detail, including diagrams, on the construction and maintenance requirements of the water pipeline.</p>	<p>The pipeline would be constructed within a 0.8 m wide corridor (see conceptual cross section below). Where it is located west of the Norwich Park Branch Railway, the pipeline will be constructed within an existing road reserve, the width of which varies, but is generally approximately 20 m wide. Some clearing of vegetation along the existing road reserve will be required, however it is noted this access road has been previously cleared and is used by the local landholder for property access, and used by the public to access the parcel of State Land to the east of the Norwich Park Branch Railway.</p>																		

Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response
		<p>Description of the Action</p> <p>The EIS is not clear in regards to:</p> <ul style="list-style-type: none">• whether creek crossings are required during pipeline construction and details of the locations of such crossings;• the width (in metres) of the right-of-way for pipeline construction;• the width (in metres) of the right-of-way post- construction;• the timeframe for construction (trenching activities);• the maximum length of the trench which will be open during trenching activities; and• the timeframe for how long the trench will be open for during trenching activities. <p>The EIS does not provide detail on the maintenance requirements of the pipeline, including maintenance infrastructure (i.e. access tracks) and frequency of use of the maintenance infrastructure.</p> <p>The EIS does not provide any schematics, figures or diagrams to represent how trenching activities will be undertaken.</p>		<p>A 4 metre wide corridor will be maintained within the existing road reserve during operation of the pipeline for ongoing regular inspection and maintenance of the pipeline.</p> <p>East of the Norwich Park Branch Railway, the pipeline would be co-located with the Project rail spur.</p> <div></div> <p>The water pipeline would require two crossings of ephemeral drainage lines and palustrine wetlands associated with the Isaac River, and a third crossing of Cherwell Creek. To avoid direct impacts to Cherwell Creek, the pipeline crossing would be constructed using horizontal directional drilling, rather than excavating a trench and laying the pipeline through the watercourse itself. A drill rig would be used to drill a hole beneath the watercourse and the pipeline would be fed through the hole. An indicative cross section of the pipeline installed beneath Cherwell Creek is below.</p> <div></div> <p>Crossings of the ephemeral drainage lines would be achieved by excavating below the invert of the drainage line to lay the pipeline at least 0.8 m below the base of the drainage line. The pipeline would be covered with natural fibre matting, geotextile fabric and rock to reinstate the profile of the drainage line. An indicative plan and cross sections of the ephemeral drainage line crossing designs are below.</p>

Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response
				<p>PLAN SCALE 1:100</p> <p>SECTION A SCALE 1:20 REFER AS2566.2</p> <p>The pipeline trench would be progressively excavated ahead of the pipe laying activities. For safety and environmental considerations (e.g. minimising erosion and sediment generation) the trench would only be open for the minimum practical length ahead of pipe laying. Material excavated from the trench would be stockpiled adjacent to the excavation for reinstatement following laying of the pipe.</p> <p>Figures 3-2b and 3-2c show the alignment of the water pipeline (including vegetation mapping and all creek crossings).</p>

Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response
37.37		<p>Impacts</p> <p>The Department notes no additional impacts on EPBC listed threatened species and Brigalow TEC, particularly the Ornamental Snake, Squatter Pigeon and Koala, have been identified in the EIS specific to the water pipeline component of the Olive Downs project.</p> <p>The EIS does not discuss the potential impact of mortality in relation to Ornamental Snake individuals seeking refuge in soil cracks during trenching activities.</p> <p>The EIS does not discuss the potential impact of mortality in relation to Ornamental Snake, Squatter Pigeon and Koala individuals becoming trapped in open trenches or in uncapped pipes.</p>	<p>Consider additional impacts on EPBC listed threatened species and Brigalow TEC, particularly the Ornamental Snake, Squatter Pigeon and Koala, specific to the water pipeline component of the Olive Downs project and update the EIS accordingly.</p> <p>Provide a discussion on the individual mortality for Ornamental Snake individuals during trenching activities.</p> <p>Provide a discussion on the individual mortality for Ornamental Snake, Squatter Pigeon and Koala individuals becoming trapped in open trenches or in uncapped pipes.</p>	<p>Section 3.4.7 of the draft EIS provides a description of the potential impacts of the proposed water pipeline on threatened species, including the Ornamental Snake, Koala and Squatter Pigeon. The draft EIS conservatively assumes that the removal of all habitat for the Ornamental Snake, Koala and Squatter Pigeon within a 20 m wide corridor would be removed by the Water Pipeline.</p> <p>As outlined above, the detailed design phase of water pipeline is currently underway and detailed information regarding trenching activities would be provided in the Plan of Operations for the Project.</p> <p>Notwithstanding, Pembroke considers that the works associated with the water pipeline would result in a significant impact to the Ornamental Snake, Koala and Squatter Pigeon and as such is proposing to provide an offset for these species in accordance with the <i>EPBC Act Environmental Offsets Policy (2012)</i> (refer Section 10 of the Additional Information to the EIS).</p> <p>Further to this the Fauna Species Management Plan to be prepared and implemented by Pembroke would provide specific management measure to minimise the potential impacts of trenching activities on fauna.</p>
37.38		<p>Avoidance, Mitigation and/or Management Measures</p> <p>The Department notes no additional measures to avoid, mitigate and/or manage impacts on EPBC listed threatened species and Brigalow TEC, particularly the Ornamental Snake, Squatter Pigeon and Koala, have been identified in the EIS specific to the water pipeline component of the Olive Downs project.</p> <p>The EIS does not discuss the potential measures to avoid, mitigate and/or manage mortality impacts in relation to individuals becoming trapped in open trenches or in uncapped pipes. At a minimum, the Department considers the following measures be committed to in more detail:</p> <ul style="list-style-type: none"> the open pipe being capped when work is not being undertaken and overnight; surveys by suitably qualified experts of the entire open trench prior to work activities to identify and remove (if necessary) individuals trapped in the trench; and install appropriately designed fauna ramps, at appropriate intervals, to assist individuals to escape the open trench. 	<p>Consider additional measures to avoid, mitigate and/or manage impacts on EPBC listed threatened species and Brigalow TEC, particularly the Ornamental Snake, Squatter Pigeon and Koala, specific to water pipeline component of the Olive Downs project and update the EIS accordingly.</p> <p>Provide a detailed discussion on the specific measures to be implemented to avoid, mitigate and manage impacts on EPBC listed threatened species and Brigalow TEC, particularly the Ornamental Snake, Koala and Squatter Pigeon, in relation to individuals being trapped in open trenches.</p> <p>Supporting evidence (e.g. published research or studies, Australian standards, etc.) which demonstrates the appropriateness and success of proposed measures must be discussed.</p>	<p>The proposed water pipeline would connect to the existing Eungella Pipeline west of the Project. The water pipeline would be approximately 23 km long and has been co-located with the rail corridor as far as possible (for a distance of 15 km from the mine site to the existing Norwich Park Branch) to minimise native vegetation clearance. All patches of TEC have been avoided and impacts to Endangered and Of Concern REs minimised by minimising the corridor for the water pipeline to 20 m.</p> <p>The Fauna Species Management Plan to be prepared and implemented by Pembroke would provide specific management measure to minimise the potential impacts of trenching activities on threatened fauna, including measures specific to the Ornamental Snake, Squatter Pigeon and Koala. Once the final design is complete, Pembroke will consider implementing additional management measures within the Fauna Species Management Plan (once developed), including:</p> <ul style="list-style-type: none"> avoidance of threatened fauna habitat; the open pipe being capped when work is not being undertaken and overnight; surveys by suitably qualified experts of the entire open trench prior to work activities to identify and remove (if necessary) individuals trapped in the trench; and install appropriately designed fauna ramps, at appropriate intervals, to assist individuals to escape the open trench.
37.39		<p>Impact Avoidance, Mitigation Measures and/or Management Plans</p> <p>See comment 34 above.</p>	<p>See comment 34 above. The same considerations apply to the specific avoidance, mitigation and management measures for the water pipeline component of the Olive Downs Project.</p>	<p>See previous response 37.34</p>
37.40		<p>Olive Downs Project Electricity Transmission Line (EPBC 2017/7869)</p> <p>The Department considers the comments below complement the comments provided above for EPBC listed threatened species and ecological communities for the Olive Downs Project Mine Site and Access Road (EPBC 2017/7867).</p> <p>Description of the Action</p> <p>The EIS is not clear in regards to how construction takes into account creek crossings.</p> <p>The EIS does not provide detail on the maintenance requirements of the transmission line, including maintenance infrastructure (i.e. access tracks), maintenance of the cleared area under the transmission line and frequency of the use of maintenance infrastructure.</p> <p>The EIS does not provide any schematics, figures or diagrams to represent how the transmission line will be constructed, including within a 10 metre right-of-way.</p>	<p>Update the EIS to provide more detail, including diagrams, on the construction and maintenance requirements of the transmission line.</p>	<p>The Project ETL would consist of towers spaced approximately 200 m apart (although the distance between towers may vary with changes in direction) with a clearance corridor width of approximately 10 m across.</p> <p>A 10 m wide corridor beneath the ETL would be maintained (i.e. cleared and graded) to provide suitable vehicle access for regular inspection and maintenance, and to prevent vegetation from growing beneath the ETL.</p> <p>The detailed design of the ETL would implement aerial crossings over waterways (including the Isaac River) and thereby minimising clearing of riparian vegetation or instream wetlands. Notwithstanding, the EIS assumes a 10 m wide corridor of clearance through the riparian corridor.</p>
37.41		<p>Impacts</p> <p>The Department notes no additional impacts on EPBC listed threatened species and Brigalow TEC, particularly the Koala and Greater Glider, have been identified in the EIS specific to the transmission line component of the Olive Downs project.</p>	<p>Consider additional impacts on EPBC listed threatened species and Brigalow TEC, particularly the Koala and Greater Glider, specific to the transmission line component of the Olive Downs project and update the EIS accordingly.</p>	<p>Section 3.5.7 of the draft EIS provides a description of the potential impacts of the proposed ETL on threatened species, including the Koala and Greater Glider. The draft EIS conservatively assumes that the removal of all habitat for the Koala and Greater Glider within a 10 m wide corridor would be removed by the ETL.</p> <p>As outlined above, the detailed design phase of ETL is currently underway and more specific information regarding the construction of the ETL would be provided in the Plan of Operations.</p> <p>Further to this the Fauna Species Management Plan to be prepared and implemented by Pembroke would provide specific management measure to minimise the potential impacts of construction activities on threatened fauna, including specific measures for the Koala and Greater Glider.</p> <p>Notwithstanding, Pembroke considers that the works associated with the ETL would result in a significant impact to the Brigalow TEC, Koala and Greater Glider and as such is proposing to provide an offset for these species in accordance with the <i>EPBC Act Environmental Offsets Policy (2012)</i> (refer Section 10 of the Additional Information to the EIS).</p>

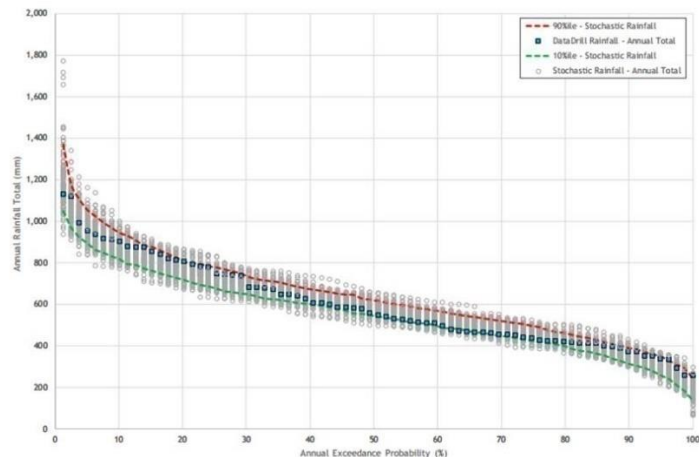
Issue No.	EIS Chapter / Section	Issue Detail	Submitter Recommendations / Suggested Mitigation	Pembroke Response
37.42		<p>Impact Avoidance, Mitigation Measures and/or Management Plans</p> <p>The Department notes no additional measures to avoid, mitigate and/or manage impacts on EPBC listed threatened species and Brigalow TEC, particularly the Koala and Greater Glider, have been identified in the EIS specific to the transmission line component of the Olive Downs project.</p> <p>See comment 34 above.</p>	<p>Consider additional measures to avoid, mitigate and/or manage impacts on EPBC listed threatened species and Brigalow TEC, particularly the Koala and Greater Glider, specific to the transmission line component of the Olive Downs project and update the EIS accordingly.</p> <p>Supporting evidence (e.g. published research or studies, Australian standards, etc.) which demonstrates the appropriateness and success of proposed measures must be discussed.</p> <p>See comment 34 above. The same considerations apply to the specific avoidance, mitigation and management measures for the transmission line component of the Olive Downs Project.</p>	<p>The detailed design of the ETL would implement aerial crossings over waterways (including the Isaac River) and thereby avoid clearing of riparian vegetation or instream wetlands. Detailed design is currently being conducted and additional information regarding the construction of the ETL would be provided in the Plan of Operations.</p> <p>The Fauna Species Management Plan to be prepared and implemented by Pembroke would provide specific management measure to minimise the potential impacts of construction and maintenance activities on threatened fauna, including specific measures for the Koala and Greater Glider (e.g. use of a qualified fauna spotter catcher during clearing activities). The measures would focus on minimising/mitigating impacts to these species during clearing as outlined in Section 7 of the Additional Information to the EIS. Measures would include:</p> <ul style="list-style-type: none"> Impact avoidance measures outlined in Table 7-6 of the Additional Information to the EIS (including minimising potential impacts to the riparian corridor associated with the Isaac River). Vegetation clearance procedures outlined in Table 7-6. This includes progressive vegetation clearing, demarcation of habitats proposed to be cleared, the implementation of pre-clearance surveys and the use of a qualified fauna spotter catcher. Implementation of a Weed and Pest Management Plan to monitor and control feral animals (DEE, 2018a). Bushfire prevention would be undertaken (DEE, 2018a). <p>The above measures are predicted to be effective in minimising potential adverse impacts from the Project on habitat for the MNES because they are focused on addressing the recognised threats to the matters and are consistent with the relevant threat abatement actions (e.g. avoiding additional habitat loss, minimising the risk of fire and controlling predators and herbivores) (DEE, 2018a).</p>
37.43		<p>Olive Downs Project Rail Spur (EPBC 2017/7870)</p> <p>The Department considers the comments below complement the comments provided above for EPBC listed threatened species and ecological communities for the Olive Downs Project Mine Site and Access Road (EPBC 2017/7867).</p> <p>Description of the Action</p> <p>The EIS is unclear as to why a section of the rail spur alignment is located in such close proximity to the Isaac River (i.e. within 85 metres of the bank extending for approximately two kilometres).</p> <p>The rail spur location shows it intersects with suitable habitat (i.e. riparian vegetation and a wetland) for EPBC listed threatened species, including the Ornamental Snake.</p> <p>The EIS is not clear in regards to the width (in metres) of the right-of-way for the rail spur during and post construction.</p>	<p>Provide a discussion on how the current siting of the rail spur avoids and minimises, to the greatest degree practicable, impacts on EPBC listed threatened species. Further, describe why alternate siting of this infrastructure is not possible to avoid and minimise impacts on EPBC listed threatened species.</p> <p>Update the EIS to provide more detail, including diagrams, on the construction and maintenance requirements of the rail spur.</p>	<p>As outlined in Section 4.10.3 of the draft EIS, the Project rail spur have been designed to minimise impacts on MNES, as well as overlapping coal exploration tenements. The proposed rail spur is located adjacent the northern boundary of MDL 183 (owned by Whitehaven) and as such cannot be moved further south. As such, the rail spur has been located to maximise the distance from the riparian corridor (i.e. the most suitable habitat for the Koala and the Greater Glider), while also avoiding a small patch of Brigalow TEC which was mapped within the original rail spur alignment.</p> <p>The rail spur and loop would be constructed during the first Stage of the Project (Section 3.3.2 of the draft EIS).</p> <p>Figures 3-2a and 3-2c of the draft EIS show the alignment of the rail spur (including vegetation mapping and all creek crossings).</p> <p>A description of the works to be undertaken during the construction, operations and decommissioning phases of the Rail Spur and Loop is provided below. The total disturbance footprint of the Rail Spur and Loop would be limited to a 70 m wide corridor, and is approximately 103.5 ha (Figure 2-2 of the draft EIS).</p> <p>It should be noted that entirety of the Rail Spur and Loop has been collocated with the Water Pipeline to minimise impacts (Section 3.3 of the draft EIS).</p> <p>As outlined in Section 3.6 of the draft EIS, overhead line equipment may be installed for traction power to facilitate train operations, as well as other connecting infrastructure to the main line. Diesel train operations may also be used. Communications and control systems would also be established to integrate with the existing network.</p> <p>The track and formation levels would be designed to achieve a desirable 1% AEP flood immunity (to the top of ballast), or otherwise match the existing main line level of immunity. Diversion channels and supplemental earthworks would be undertaken if required to protect the alignment and control flood behaviour.</p> <p>New culvert crossings would be installed along the Rail Spur and Loop to the Olive Downs South Domain with the final locations to be determined during the detailed design. The associated rail loop to be constructed adjacent the rail-loadout facility at the Olive Downs South Domain would be designed for a two train capacity.</p> <p>Section 3.6.2 of the draft EIS also provides a detailed description of the construction and operation requirements for the rail spur.</p>
37.44		<p>Impacts</p> <p>The Department notes no additional impacts on EPBC listed threatened species and Brigalow TEC have been identified in the EIS specific to the rail spur component of the Olive Downs project.</p> <p>Noting a two kilometre section of rail spur is located within 85 metres of the bank of Isaac River, and riparian vegetation, the Department considers coal dust has the potential to impact on the habitat for EPBC listed threatened species during the transport of coal to the main rail line.</p>	<p>Provide a discussion on the potential for coal dust during coal transport to impact riparian vegetation which is suitable habitat for EPBC listed threatened species, including the Koala, Greater Glider and Ornamental Snake.</p> <p>Consider additional impacts on EPBC listed threatened species specific to the rail spur component of the Olive Downs project and update the EIS accordingly.</p>	<p>The draft EIS conservatively assumes that the removal of all habitat for the Koala, Greater Glider and Ornamental Snake within a 70 m wide corridor would be removed by the rail spur.</p> <p>Further to this, Section 6.6 of the Terrestrial Fauna Assessment provides a detailed description of the potential noise impacts from the Project (including rail noise) on fauna species located in nearby habitat. Further to this, Section 6.7 of the Terrestrial Flora Assessment provides a detailed assessment of the potential impacts of dust (including coal dust) on adjacent vegetation likely to provide habitat for threatened fauna species.</p> <p>Pembroke would design the train load out facility consistent with the dust management strategies identified for new facilities in QR Network's (2010) Coal Dust Management Plan (refer Section 2.5.9 of the draft EIS), including:</p> <ul style="list-style-type: none"> automated loading of train wagons to prevent overloading; sill beam brushes to remove coal on the outside faces of the train wagons; veneering system to prevent coal dust generation during transit to port; and use of spill pit to recover spilt coal under the train load out. <p>With the implementation of these measures, the rail spur is not expected to result in a significant impact to threatened fauna (as a result of coal dust) along the rail spur. In addition, the air quality management plan will also outline the coal dust management procedures proposed by Pembroke to mitigate the emission of coal dust from loaded and unloaded trains.</p> <p>The detailed design phase of rail spur is currently underway and more specific information regarding the construction of the rail spur would be provided in the Plan of Operations.</p>

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				<p>The Fauna Species Management Plan, to be prepared and implemented by Pembroke, would provide specific management measure to minimise the potential impacts associated with the proposed rail spur on threatened fauna, including the Koala, Greater Glider and Ornamental Snake.</p> <p>Notwithstanding, Pembroke considers that the works associated with the rail spur and loop would result in a significant impact to the Koala, Greater Glider and Ornamental Snake and as such is proposing to provide an offset for these species in accordance with the <i>EPBC Act Environmental Offsets Policy (2012)</i> (refer Section 10 of the Additional Information to the EIS).</p>
37.45		<p>Impact Avoidance, Mitigation Measures and/or Management Plans</p> <p>The Department notes no additional measures to avoid, mitigate and/or manage impacts on EPBC listed threatened species and Brigalow TEC have been identified in the EIS specific to the rail spur component of the Olive Downs project.</p> <p>The Department notes the EIS does not propose appropriate buffers to minimise potential impacts on riparian corridors.</p> <p>The EIS does not discuss the potential measures to avoid, mitigate and/or manage the potential for coal dust to impact riparian vegetation which is suitable habitat for MNES.</p> <p>See comment 34 above.</p>	<p>Consider additional measures to avoid, mitigate and/or manage impacts on EPBC listed threatened species and Brigalow TEC specific to the rail spur component of the Olive Downs project and update the EIS accordingly.</p> <p>Provide a detailed discussion on the specific measures to be implemented to avoid, mitigate and manage impacts on suitable riparian habitat for on EPBC listed threatened species, including the Koala, Greater Glider and Ornamental Snake, in relation to coal dust during coal transport.</p> <p>Supporting evidence (e.g. published research or studies, Australian standards, etc.) which demonstrates the appropriateness and success of proposed measures must be discussed.</p> <p>See comment 34 above. The same considerations apply to the specific avoidance, mitigation and management measures for the rail spur component of the Olive Downs Project.</p>	<p>The Fauna Species Management Plan, to be prepared and implemented by Pembroke, would provide specific management measure to minimise the potential impacts associated with the proposed rail spur on threatened fauna, including the Koala, Greater Glider and Ornamental Snake (e.g. implementation of fauna crossings to ensure safe fauna movement).</p> <p>As outlined above, Pembroke would design the train load out facility consistent with the dust management strategies identified for new facilities in QR Network's (2010) Coal Dust Management Plan (refer Section 2.5.9 of the draft EIS), including:</p> <ul style="list-style-type: none"> • automated loading of train wagons to prevent overloading; • sill beam brushes to remove coal on the outside faces of the train wagons; • veneering system to prevent coal dust generation during transit to port; and • use of spill pit to recover spilt coal under the train load out. <p>The air quality management plan will also outline the coal dust management procedures proposed by Pembroke to mitigate the emission of coal dust from loaded and unloaded trains.</p>
37.46		<p>Offset Strategy relevant to Matters of National Environmental Significance</p> <p>The EIS provides a brief summary of the draft Offsets Strategy with additional information in Terrestrial Fauna Assessment technical report.</p> <p>The Department notes the proponent proposes four stages of offsets, which is illustrated in Figure 3-32. The EIS notes the Stage 1 offsets will compensate for the first five years of the Olive Downs project. The EIS does not provide information on the offsets which form the other three offset stages.</p> <p>The Department notes the proponent has purchased three properties totalling approximately 34,250 ha, with approximately 15,800 ha of remnant vegetation. The Department notes preliminary field surveys have been undertaken and identified similar vegetation and EPBC listed threatened species and Brigalow TEC as to that of the project site.</p> <p>The Department considers the unavoidable loss of 120 ha of known habitat for an endangered species is likely to result in a residual significant impact. The draft Offsets Strategy does not demonstrate how the unavoidable loss of 120 ha of known habitat for the Australian Painted Snipe will be adequately compensated for in accordance with the EPBC Act Environmental Offsets Policy (2012).</p> <p>The Department notes all tables in the Offsets Strategy section refer to REs, not specific habitat use types for relevant MNES (see comment 2).</p>	<p>Provide a draft Biodiversity Offsets Strategy (BOS) as a stand-alone appendix in the EIS which contains all relevant information in relation to environmental offsets under the EPBC Act Environmental Offsets Policy (2012).</p> <p>The draft BOS must describe the proposed offset properties, including the nature, location, tenure, connectivity with other relevant habitats and biodiversity corridors, capacity to meet multiple offset requirements and potential for inclusion in the nature conservation reserve system.</p> <p>At a minimum, the draft BOS must include detailed information on the following:</p> <ul style="list-style-type: none"> • a breakdown of the total amount (in ha) of residual significant impacts on MNES that require an offset which reflects each component of the Olive Downs project, and a total amount for the Olive Downs project in its entirety (i.e. Table 3-49); • a description of the proposed offset area/s and how the offset area/s compensate for all residual significant impacts as a result of the Olive Downs project; • the components of the Olive Downs project which form each of the four offset stages; • timeframe (in years) of construction and operation of the Olive Downs project which form each of the four offset stages; • the type (based on the habitat definitions) and amount (in ha) of habitat for each relevant MNES that requires an offset for each of the four offset stages; • the type (based on the habitat definitions) and amount (in ha) of habitat for each relevant MNES that is available for offsets for each of the four offset stages; and • habitat mapping for each relevant MNES based on the habitat definitions. <p>Update the tables accordingly based on the revision of the environment impact assessment for the Olive Downs project, as informed by the comments above.</p>	<p>Pembroke has prepared a separate MNES Biodiversity Offset Strategy (BOS) in Appendix F of the Additional Information to the EIS. The draft BOS provides detailed information on those items as noted by the DEE.</p> <p>Section 10 of the Additional Information to the EIS identifies how each of the information requirements has been addressed.</p>
37.47		<p>Offsets Strategy – Stage 1</p> <p>The EIS proposes feral animal control, weed management and fire management as measures to be implemented in the Stage 1 offset area.</p> <p>The EPBC Act Environmental Offsets Policy (2012) requires that offsets must be additional to what is already required on a property, as determined by law or planning regulations or agreed to under other schemes or programs. The Department</p>	<p>The draft BOS must include an assessment, including robust justifications and supporting evidence (e.g. from site-specific field surveys), of the Stage 1 offset area against the Offsets Assessments Guide for each relevant MNES. This includes, but not limited to:</p> <ul style="list-style-type: none"> • an outline of the attributes of quality categories for the habitat for each relevant MNES (i.e. stocking rate, site context, site condition, etc.) to inform offset area/s context; • correlate the impact site/s, and start and future quality of the offset 	<p>Pembroke has prepared a separate MNES Biodiversity Offset Strategy (BOS) in Appendix F of the Additional Information to the EIS. The BOS has been prepared to provide detailed information about Stage 1 of the Project's Offset Strategy. This detailed level of information is possible because Pembroke owns the offset property. There is therefore, 100% certainty in Pembroke's ability to commit to the Stage 1 Offset Area.</p> <p>Section 11 of the Additional Information to the EIS identifies how each of the information requirements has been addressed.</p>

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		understands the Queensland Biosecurity Act 2014 requires the control of feral and weed pest species. As such, the Department considers these activities cannot be considered as additional when providing justifications for the values used in the Offsets Assessment Guide.	<p>area/s, with the above categories;</p> <ul style="list-style-type: none"> identify quantifiable ecological improvements to the offset area/s to attain future quality; ensure start and future quality are informed by EPBC Act listing advice/criteria; and the provision of scientific evidence and/or agreement substantiating the confidence in result values for time until ecological benefit/future quality and risk of loss values used in the Offsets Assessment Guide. The draft BOS must include a schedule of conservation commitments required to establish and manage the Stage 1 offset area/s, and to monitor the effectiveness of interventions to achieve future quality. The schedule must include: a process and timeframes for securing, under a legally binding instrument, the offset area/s for biodiversity conservation purposes; an outline of the short, medium and long term management arrangements for the offset area/s in order to achieve future quality; commitments to engage qualified ecologists/appropriate experts to conduct ecological monitoring, survey and performance evaluation activities; and <p>an approach to monitoring and detecting change in environmental condition due to offset management actions, whilst accounting for climatic variability, and that is capable of demonstrating attainment of future quality.</p>	
37.48		MNES Impacts – Mapping See relevant comments above for specific EPBC listed threatened species and communities, and listed migratory species.	Update all mapping as required based on the relevant comments above.	Revised habitat mapping figures are provided in Section 7 of the Additional Information to the EIS.
37.49		Impact significance The EIS is not clear as to whether the removal of known suitable habitat for relevant EPBC listed threatened species and Brigalow TEC constitutes a residual significant impact, but the proponent proposes an environmental offset to be in accordance with the EPBC Act Environmental Offsets Policy (2012). This approach is inconsistent as environmental offsets are proposed if it is concluded the project is likely to have a residual significant impact on a MNES.	Review the conclusions for all MNES to ensure consistency between the conclusion of residual significant impact/s and whether an offset is required.	Pembroke is of the view that the following species would be significantly impacted by the Project: <ul style="list-style-type: none"> Ornamental Snake; Australian Painted Snipe; Squatter Pigeon (southern); Koala; and Greater Glider. As such, a detailed Biodiversity Offset Strategy has been prepared, describing how Pembroke proposes to offset these potential impacts in accordance with the <i>EPBC Act Environmental Offsets Policy (2012)</i> .
37.50		General – Language Language used for commitments or actions.	Where commitments are made (particularly for mitigation and management measures), the terms 'will' and 'must' must be used, instead of 'generally', 'where possible', 'as required', 'to the greatest extent possible', 'should' or 'may'	The Additional Information to the EIS uses this terminology
37.51		Commitments There no commitments referenced in the MNES chapter in relation to EPBC listed threatened species and communities, listed migratory species and water resources.	Include a table of commitments in the MNES chapter in relation to EPBC listed threatened species and communities, listed migratory species and water resources.	Section 22 of the Additional Information to the EIS provides a proponent commitment table specific to MNES.
38. IESC Advice				
38.1	Threatened species	The IESC has identified key areas in which additional information is required. To address these, the proponent should: <ul style="list-style-type: none"> undertake additional baseline ecological surveys. The small ecological survey effort described in the EIS, relative to the size of the project, and the limited time-series data available means that there is a strong potential for listed and rare species to be present but not yet recorded; 	Nil.	Table 6 of the Terrestrial Fauna Assessment details that the survey effort was undertaken in accordance with the relevant State and Commonwealth survey guidelines for each potentially occurring threatened species. Neither DES, nor DEE have indicated that the survey effort was inadequate. Pembroke commits to conducting various monitoring programs described in the draft EIS. This includes: <ul style="list-style-type: none"> Ecology monitoring surveys of potential GDEs; Flora and fauna monitoring surveys undertaken as part of the Fauna Species Management Plans and Weed and Pest Management Plan; and Rehabilitation Monitoring Program.
38.2	Groundwater impacts	Update the numerical groundwater modelling once additional data have been collected. Confidence in the conclusions drawn about groundwater	Nil.	Pembroke proposes a network of reference and compliance bores be included in the EA Conditions for the Project, including proposed new monitoring locations to add to existing baseline datasets. As stated on Page 4-86 of the draft EIS, recording of groundwater levels from existing monitoring bores and VWPs would continue and would enable

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		drawdown impacts is severely constrained by a paucity of relevant data, and this limitation is not offset by the adopted level of modelling complexity;		<p>natural groundwater level fluctuations (such as responses to rainfall) to be distinguished from potential groundwater level impacts due to depressurisation resulting from proposed mining activities. Since lodgement of the draft EIS, groundwater monitoring has continued, and updated groundwater quality data has been included in Section 13.</p> <p>Each year, an annual review of groundwater level trends would be conducted by a suitably qualified person. The review would assess the change in groundwater levels over the year, compared to historical trends and impact assessment predictions.</p> <p>As stated on Page 3-161 of the draft EIS, the validity of the groundwater model predictions would be assessed and, if the data indicates significant divergence from the model predictions, the groundwater model would be updated for simulation of mining.</p> <p>Pembroke's approach is generally consistent with the IESC's suggestion. If after two years after installation of additional monitoring bores there is a significant deviation from the model predictions identified, then the model would be subject to review. The review process would involve re-running the groundwater model, confirming the revised predictions, undertaking any additional consultation deemed necessary and adjusting the proposed control measures as required.</p>
38.3	Surface water impacts	Provide additional information on the predicted quality of untreated discharge water and associated impacts of both intentional and unintentional releases. The IESC acknowledges the apparent intent to provide this information as part of the Receiving Environment Management Plan;	Nil.	<p>Sediment dams (for settling of solids with residence time) are a primary water treatment process. Controlled releases from sediment dams are not considered to be 'untreated' discharges. Importantly it should be recognised that when releases do occur, the mine water management system has been designed to preferentially ensure that runoff from largely disturbed areas do not report to a dam that is then used for discharge.</p> <p>Sediment dam water quality is generally expected to be of better quality than mine water dams. In rainfall events below the design standard, runoff from disturbed areas would be intercepted and treated by sediment dams. In larger events that exceed the design standards, these dams would overflow following a period of settlement treatment. Available geochemical information (Terrenus Earth Sciences, 2018) indicates that the runoff draining to the sediment dams should have low salinity.</p> <p>Overflows would only occur during significant rainfall events which would also generate runoff from surrounding undisturbed catchments. Hence it is unlikely that sediment dam overflows would have a measurable impact on receiving water quality or environmental values (Appendix E of the draft EIS).</p> <p>Nevertheless, the REMP process is acknowledged, and Pembroke has committed to monitoring runoff reporting to sediment dams to validate the relevant predictions and assumptions. Surface runoff and seepage from waste rock emplacements, including any rehabilitated areas, would be monitored for 'standard' water quality parameters including, but not limited to, pH, EC, major anions (sulfate, chloride and alkalinity), major cations (sodium, calcium, magnesium and potassium), TDS and a broad suite of soluble metals/ metalloids.</p> <p>The sediment dam monitoring would be used to validate the anticipated quality of water runoff reporting to sediment dams and haul road runoff dams. Initially, the sediment dam monitoring would occur on a regular (e.g. monthly) basis to demonstrate the water quality of stored waters is consistent with the relevant operating parameters to allow releases from sediment dams to occur when required. Subject to demonstrating the water quality objectives can be met, the frequency of monitoring and suite of parameters for the sediment dam monitoring would be reviewed and updated accordingly (e.g. to occur only when releases occur).</p> <p>The water quality parameters proposed to be monitored have been outlined in the draft EIS (as above) and will be included in the REMP. It is anticipated the monitoring requirements as part of the REMP will be stipulated in the EA Conditions (as per the draft EA Condition F20).</p>
38.4	GDEs	Undertake further assessment of groundwater-dependent ecosystems beyond the area of direct clearing to determine their location, condition and vulnerability to projected groundwater drawdown;	Nil.	Pembroke has prepared a separate assessment of potential impacts on GDEs located both inside and outside the Project area in Appendix E of the Additional Information to the EIS.
38.5	Ripstone Creek diversion	Consider avoidance and further mitigation measures for the proposed 2-km diversion of Ripstone Creek;	Nil.	<p>A detailed description of the economic and operational impacts to the Project of not diverting Ripstone Creek is provided in Section 21 of the Additional Information to the EIS. Without diverting the creek, approximately 3 Mt tonnes of coal would be left in situ. The economic benefit of mining the coal in this location out-weighs the cost of the environmental impacts, including the diversion of Ripstone Creek and the rehabilitation works required to replicate the natural hydraulic behaviour of the Ripstone Creek waterway. A net benefit of at least \$11M was calculated when accounting for the value of the coal (i.e. \$36M), the production benefits associated with employment and royalties associated with ODS9 and the cost of the Ripstone Creek diversion (i.e. \$25M).as well as a description of the proposed mitigation measures for the diversion.</p> <p>As outlined in Table 6-2 of the draft EIS, a monitoring strategy for the Ripstone Creek Diversion has also been developed and includes monitoring prior to construction, during operation and for relinquishment. Pembroke has prepared proposed draft EA conditions (included as Appendix B to the Additional Information to the EIS). Schedule I of the proposed draft EA conditions outlines potential requirements regarding the proposed diversion.</p>
38.6	Surface water impacts	Update surface water modelling to address deficiencies identified in this advice. In the modelling presented, little use has been made of local streamflow gauging information. This reduces confidence in the accuracy of and impact estimates relating to maximum flood levels, erosivity, performance of the diversion channel, and the assessed changes to the flow regime on the long-term viability of riparian vegetation and its recruitment. Modelling should be updated to inform detailed landform planning, particularly on the floodplain and the proposed diversion channel;	Nil.	<p>Local streamflow information which has been used for the surface water modelling comes from the DNRME Deverill gauging station (located immediately adjacent to the Project), the Project's Isaac River downstream gauging station (ISDS) (located approximately 20 km downstream of the Project) and the DNRME Yatton gauging station (located 60 km downstream of the Project). The Deverill gauging station, with its 50 year data record, is considered to provide excellent site-specific, relevant data for the Project, which in-turn, results in superior quality surface water modelling.</p> <p>The IESC acknowledges the effort taken to ensure that the adopted methodology is consistent with the new national guidelines (Ball et al. 2016) and that the configuration of the regional flood event model is well suited to characterising flood risk at the appropriate scale of interest, and an excellent level of agreement has been achieved between model</p>

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				<p>and observed characteristics at the Deverill gauging station. IESC Item 21(a) suggests that EITHER surface water modelling be revised OR the approach be explained. A detailed explanation of the approach, in response to the specific IESC comments is provided below.</p> <p>It is important to consider that the key output of the regional flood hydrology scope for the Olive Downs Coking Coal Project was to enable description of the changes to upstream and downstream characteristics to address the Terms of Reference for the EIS. The level of detail for the modelling has been determined to be fit-for-purpose by both the hydrological specialist and an independent peer reviewer. It is expected that review and refinement of the flood hydrology modelling would be undertaken during the detailed design.</p> <p>The following points from the IESC advice relate to surface water modelling. A response to each point is provided below.</p> <p>IESC Point 6 Response:</p> <p>The IESC advice states:</p> <p><i>The IESC also acknowledges the effort that the proponent has taken to ensure that the adopted methodology is consistent with the new national guidelines (Ball et al. 2016). However, while the large-scale estimates for the regional flood event model make good use of the available gauging and design information, little or no use appears to have been made of the eight other streamflow gauges in the local area. The upstream areas reporting to these gauges are of a similar size as the creeks near the Olive Downs Coking Coal Project Area and would provide valuable information on how flood peaks scale with area.</i></p> <p>The flood hydrology model for Olive Downs Coking Coal Project EIS was calibrated to five historical flood events (August 1998, February 2008, December 2010, February 2016, and March 2017) using up to four (4) nearby gauging stations. While it is recognised there are other rainfall gauges and stream gauge records (of which most have ceased and no longer record) located within the catchment of Isaac River, the selection of the historic calibration events using the gauging stations to address the TOR requirements for the Olive Downs Coking Coal Project EIS was considered sufficient. Relevantly, recorded data of other nearby gauges (namely, Phillips Creek at Tayglen, Isaac River at Burton Gorge, Scott Creek at Norwich Park and Devlin Creek at Bombandy) did not cover any of the calibration events.</p> <p>IESC Item 19:</p> <p>The IESC advice states:</p> <p><i>The natural inputs to the mine water management system are based on an Australian Water Balance Model (AWBM) (which has been calibrated to only one catchment of the Isaac River) and the use of stochastic rainfall replicates. It is concerning that the median observed annual rainfalls coincide with the lower (90%) bound of the synthetic series (Figure 5.8, Appendix E), which suggests that the typical annual synthetic inflows are biased high. However, this "high bias" would be partially offset by the underestimation of streamflows obtained using the AWBM model (Figure 7.5, Appendix E). Overall, it is possible that the water usage requirements associated with the predicted 10% (dry) climatic conditions are representative of the likely future typical (50%) requirements, without allowing for climate change. For example, the external makeup requirements associated with a 10% probability of exceedance might be better regarded as being associated with median climatic conditions. If this is of critical concern, then the efficacy of the stochastic rainfall replicates should be revised to be more consistent with local observations.</i></p> <p>As described in Section 5.2.2.1 of the draft EIS Surface Water Assessment report, a stochastically generated rainfall dataset was produced to provide a sufficient number of climatic sequences, given the long mine life. This stochastic rainfall dataset was generated using the Stochastic Climate Library (SCL) software (in accordance with the SCL User Guide [SCL, 2004]), using the SILO rainfall data as the source data. The SCL software is effectively a "black box" type program, and does not provide any ability to modify parameters or settings which can change the results.</p> <p>To test the efficacy of the program, WRM compared the source (SILO) rainfall data against the generated rainfall data (Figure 5-8 of the Surface Water Assessment reproduced below). This showed that, when ranked, the historical annual rainfall totals were generally within the 10th and 90th percentile bounds of the stochastic annual totals.</p> <p>Some of the historical data was closer to the 10th %ile, some closer to the 90th %ile and some near the median. In WRM's opinion, the stochastically generated data was successfully replicating the historical data with a reasonable amount of variation and the use of the adopted stochastic rainfall dataset is acceptable for the following reasons:</p> <ul style="list-style-type: none">• The SCL program has been designed specifically for this purpose (i.e. the generation of stochastic climate data based on historical climate data for Australian conditions). There are few other programs available which can generate daily climate sequences, especially for Australian conditions.• While the position of the historical data varies between the 10th and 90th %iles, the range of annual totals for the stochastic data at each AEP is fairly tight, with the spread increasing somewhat for the highest rainfall years (AEP <5%). Therefore the difference between the 10% and 90% totals is fairly small. Discounting the top 3 values, the average variation is only 85mm/year. For most years, this equates to a variation of around 10-15% annual rainfall total.• Any potential "bias" in the stochastic rainfall data is minor, and any uncertainty associated with the rainfall data would be captured within the sensitivity analysis presented in Section A.3 and A.4 of the Surface Water Assessment. As part of this sensitivity assessment, the AWBM soil capacity was adjusted by +/- 20% and the predicted impacts on the performance of the water management system was presented.• Therefore, in WRM's opinion, the uncertainty associated with the generation of the stochastic rainfall data is adequately addressed through the model sensitivity analysis process. <p>In order to quantify the difference between the historical and stochastic rainfall data in terms of runoff volumes, WRM has undertaken an assessment of the long-term coefficient of runoff (C_r) for each of the modelled land disturbance types. This allows for a comparison between the difference in modelled long-term average runoff (rather than rainfall),</p>

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				<p>and is presented in the table below. The table shows the following:</p> <ul style="list-style-type: none">• There is very little difference in the effective Cv for the “Isaac River”, “Natural” and “Rehab” land disturbance types (<3%).• There is a slightly larger difference for the “Roads/Hardstand” and “Mining Pit” land types, however it is still less than 7.5%.• The variation for “Spoil” is around 17%.• While there is some variation in the long term Cv between the two datasets, it is considered reasonable given that the relationship between rainfall and runoff is not linear, and the SCL software targets multiple statistics in its calculation (not just average rainfall total). This is why WRM have undertaken a sensitivity analysis of +/- 20% for the rainfall runoff parameters to ensure that the impact of the uncertainty in the AWBM parameters is understood. <p style="text-align: center;">Comparison of long-term runoff coefficient (C_v)</p> <table><tr><th>Land disturbance type</th><th>Historical rainfall data (%)</th><th>Stochastic rainfall data (%)</th></tr><tr><td>Isaac River</td><td>8.2%</td><td>8.0%</td></tr><tr><td>Natural/undisturbed</td><td>13.0%</td><td>13.3%</td></tr><tr><td>Roads/Hardstand</td><td>32.3%</td><td>34.7%</td></tr><tr><td>Mining pit</td><td>21.9%</td><td>23.4%</td></tr><tr><td>Spoil</td><td>8.5%</td><td>10.0%</td></tr><tr><td>Rehab</td><td>14.1%</td><td>14.5%</td></tr></table> <div></div> <p style="text-align: center;">Figure 5-8: Comparison of DataDrill vs Stochastic Rainfall Data</p> <p>IESC Point 21-a Response</p> <p>The IESC advice states:</p> <p><i>The configuration of the regional flood event model is well suited to characterising flood risk at the larger scales of interest, and an excellent level of agreement has been achieved between model and observed characteristics at the Deverill gauging station. However:</i></p> <p>a. <i>it is unclear why the proponent did not make use of stream flow records from the nearest gauge on Isaac River (at Deverill) in their flood event modelling to calculate design runoff. This should either be explained, or the modelling should be revised to make use of these data;</i></p> <p>As described in Sections 6.2 and 7.4 of the draft EIS Flood Assessment (Appendix F to the draft EIS), calibration of the flood model catchment parameters was conducted using recorded stream flow data from the Deverill gauging station, including recorded data from five flood events (1998, 2008, 2010, 2016 and 2017). The design runoff was calculated using these parameters in conjunction with design intensity-frequency-duration rainfall data from Bureau of Meteorology. Accordingly, the flood model has included the use of data from the local Deverill gauging station.</p> <p>Similar to the IESC comment, the Peer Review also recommended that further analysis be conducted during subsequent studies or detailed design to refine the design of the water management infrastructure, including improved catchment yield (flow) modelling of the Isaac River using streamflow data from the Deverill gauging station.</p>	Land disturbance type	Historical rainfall data (%)	Stochastic rainfall data (%)	Isaac River	8.2%	8.0%	Natural/undisturbed	13.0%	13.3%	Roads/Hardstand	32.3%	34.7%	Mining pit	21.9%	23.4%	Spoil	8.5%	10.0%	Rehab	14.1%	14.5%
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				<p>Notwithstanding, the peer review found that this further analysis was considered unlikely to significantly affect the modelling outcomes/conclusions and therefore assessment of potential impacts already described in the Surface Water Assessment.</p> <p>IESC Point 21-b Response</p> <p>The IESC advice states:</p> <p><i>In the regional flood event model, it is noted that there are only two or three model sub-areas upstream of the locations relevant to the other creeks near the Olive Downs Coking Coal Project area. While the adoption of approximately equal sub-areas in the flood event is generally to be preferred, in this application it presents two problems: first, the number of sub-areas upstream of these locations is probably insufficient to adequately characterise the storage routing characteristics in the local catchments, and second, these catchments are over an order of magnitude smaller than the scale at which the model has been verified;</i></p> <p>The adoption of approximately equal sub-catchments areas is essential in order to avoid overestimating or underestimating either volume or peak discharge from a catchment. Having said that, there are 41 sub-catchments (out of 90) located upstream of the Project area. This is considered to be sufficient to account for the storage routing characteristics in the local catchments and model validation.</p> <p>IESC Point 21-c Response</p> <p>The IESC advice states:</p> <p><i>The development of individual flood event models are based on regional routing parameters and thus do not make good use of the information contained in the calibrated large-scale model. There is in general a factor of two difference between the local and regional model estimates, which does not provide good confidence in either set of estimates of flood risk; ...</i></p> <p>The flood routing parameters used for this project have been adopted from a calibrated model (Section 7.5 of Appendix F of the draft EIS) and verified against regional routing parameters as a validation. The peer review process generated a number of requests for clarification and suggestions for modifications to the flood modelling methodology and the majority were resolved to the peer reviewer's satisfaction, concluding "<i>It was resolved that the modelling as it stands is sufficient and fit for purpose for the EIS, in terms of the assessment of relative flood impacts...</i>"</p> <p>IESC Point 21-d Response</p> <p>The IESC advice states:</p> <p><i>In addition to the difference in the estimates derived using the regional- and local-scale models, the IESC notes that the relationship between sub-catchment area and flood peaks does not vary in a manner consistent with physical reasoning. In order to reconcile the difference between the different model estimates and improve confidence in the estimates, it is suggested that additional information be compiled on how flood magnitude varies with catchment area. This is best undertaken using flood frequency quantiles derived from nearby gauging stations. Information from RFFE model estimates would also be helpful.</i></p> <p>While catchment area has a major influence on the total volume of runoff, a combination of routing storage, average distance and shape factor determines the catchment response to rainfalls and peak discharges.</p> <p>According to Dr William Weeks (main contributor of RFFE Model), the RFFE estimates are an indication of the design flows based on the regional catchment routing parameters, however flood frequency analysis is the preferred method of design flow validation where possible and, as such, was adopted for the Project (as outlined in the Flood Assessment provided in the draft EIS).</p> <p>Notwithstanding, it should be recognised that flood estimates generated by the RFFE Model for a catchment with flood characteristics that are distinctly different from typical gauged catchments in the region may not only be associated with larger error margins but also significant bias. In such situations hydrological judgment must be exercised to assess if any adjustment of the regional flood frequency estimate is required (based on comparison of relevant catchment characteristics). To support such an assessment, the RFFE Model output describes the set of gauged catchments used in developing the RFFE Model, which are located closest to the ungauged catchment of interest. The following additional catchment attributes may need to be considered as a basis for adjustments to the flood estimates obtained directly from RFFE Model:</p> <ul style="list-style-type: none">• Natural flood storage: large flood storage areas in catchments with extensive floodplains or swamps have the effect of attenuating flood peaks; flood estimates from RFFE Model would thus tend to overestimate peak flows and they could be regarded as upper bound flood estimates for these catchments.• Drainage efficiency: steep catchments, streams with little vegetation along banks, catchments affected by large scale drainage or flood protection works can be expected to produce faster flood flows, less attenuation and thus higher peak flows; flood estimates from RFFE Model would thus tend to underestimate peak flows and they could be regarded as lower bound flood estimates for these catchments. <p>IESC Point 22 Response</p> <p>The IESC advice states:</p> <p><i>It is not entirely clear how the temporal pattern ensembles have been used. While it is appropriate to adopt a single representative temporal pattern to derive inputs to the TUFLOW model, the peaks of such hydrographs should be scaled to match the average peak obtained from the flood event model ensembles based on approximately ten temporal patterns.</i></p> <p>The methodology adopted for the selection of critical temporal pattern was in accordance with Australian Rainfall and Runoff, Book 2, Section 5.9.2. Given the simulation times of two-dimensional hydraulic models, ARR suggests that is not practical to hydraulically run all 10 patterns for multiple durations and, therefore, undertaking such an exercise for</p>

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				the Project would be unnecessary and disproportionate. As an illustration, a full set of hydraulic model simulations of Olive Downs Coking Coal Project EIS for the critical temporal pattern took approximately one week, excluding post-processing of the results. The size of each result file for every parameter (depth, height, velocity, stream power and shear stress) is approximately 4 Gigabytes. According to ARR, a more practical approach is to run a separate hydrological modelling process of the whole catchment of interest in order to determine the average pattern in terms of peak flow or volume depending on the problem. Therefore, this method was adopted for Olive Downs Coking Coal Project EIS study.
38.7	Surface water impacts	Provide a trigger action response plan (TARP) as part of the Water Management Plan that outlines effective mitigation actions to be taken when there is a suspected exceedance of a trigger value;		<p>The Project surface water monitoring program will assist in determining that the site water management system is effective in meeting its objectives and will allow for early detection of any impacts and appropriate corrective action, as described in Section 10.7.1 of Appendix E of the draft EIS.</p> <p>Pembroke has proposed EA Condition F27 which will require the preparation of a Water Management Plan, including a TARP. The TARP will outline effective mitigation actions to be taken when there is a suspected exceedance of a trigger value.</p>
38.8	Surface water impacts	Provide information on relevant recent regional impacts to Queensland and Commonwealth listed species and to wetlands, and an assessment of the cumulative potential impacts to the Isaac River from nearby mining activities. This would enable a more robust assessment of cumulative impacts to surface water resources and listed species and water-dependent communities and ecosystems from the present proposal; and		<p>Section 3 of the draft EIS contains an assessment of impacts to MNES relevant to the Project.</p> <p>As stated in Section 3.3.9.9 of the draft EIS, the cumulative surface water impacts of all mining projects in the region (i.e. 17 existing open cut and underground coal mines, six new or developing open cut and underground coal mines and the approved Bowen Gas Project) on the environmental values of the receiving waters and cumulative groundwater depressurisation and drawdown were considered and assessed.</p> <p>Cumulative impacts on water resources are described in Section 3.3.10.3 of the draft EIS, including Catchment Excision, Water Releases, Flooding and Groundwater Depressurisation and Drawdown.</p> <p>Notwithstanding, additional assessment of potential impacts to wetlands has been undertaken and is provided in the separate assessment in Appendix E of the Additional Information to the EIS.</p>
38.9	Final Landform	consider further avoidance and mitigation options for the two final voids proposed to be placed on the Isaac River's floodplain. The risks could be avoided by revising mine plans to avoid placing voids on the floodplain. The risks could be partially mitigated by partial backfilling to above the water table or to above the elevation of saline aquifers.		<p>The Project final landform would include three final voids, two within the Olive Downs South domain (Figure 5-2 of the draft EIS) and one within the Willunga domain (Figure 5-3 of the draft EIS).</p> <p>The final voids within the Olive Downs South domain would be isolated from all flood waters up to and including a PMF event by permanent waste rock emplacements (referred to as permanent highwall emplacements). These permanent highwall emplacements would integrate with the in-pit and out-of-pit waste rock emplacements, effectively surrounding the final voids and redefining the Isaac River floodplain extent.</p> <p>The Willunga final void is located beyond the extent of potential flood impacts from the Isaac River.</p> <p>The final voids would, therefore, not be located on a floodplain.</p> <p>As described in Sections 4.3 of the draft EIS, final void waterbodies are predicted to equilibrate below the regional groundwater table, meaning the voids would act as groundwater sinks into perpetuity, preventing potentially contaminated water migrating into surrounding aquifers. The final void waterbodies are not predicted to spill to the surrounding environment, as they would remain at least 90 m below ground level.</p> <p>Additional information outlining how the void would be isolated from potential floodwaters is provided in response to comment #9 received from DES.</p>