PEMBROKE

Olive Downs Coking Coal Project

Additional Information to the Environmental Impact Statement

Section 24

Consideration of Mined Land Rehabilitation Policy

24 CONSIDERATION OF MINED LAND REHABILITATION POLICY

This following section has been prepared in response to a number of comments from DES regarding the proposed final landform (refer Appendix A) and provides a description of how the proposed final landform for the Project has been developed in consideration of the Queensland Government's Mined Land Rehabilitation Policy (MLR Policy).

The requirements of the MLR Policy relating to final voids centre on *site specific mines* and a *PRCP* that are to be assessed under the *new* assessment regime on the commencement of relevant provisions under the *Mineral and Energy Resources (Financial Provisioning) Act 2018*.

The Project will be assessed in full under the pre-amended *Environment Protection Act 1994*.

Despite the above, the draft EIS demonstrates that:

- there would be no voids situated wholly or partially in a floodplain; and
- 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."*

Queensland Government's Mined Land Rehabilitation Policy

The MLR Policy states that "…*for all new site-specific mines, the administering authority will not approve a Progressive Rehabilitation and Closure Plan 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 post-mining land use that does not cause environmental harm*".

In accordance with the *Mineral and Energy Resources (Financial Provisioning) Act 2018* (MER(FP) Act) passed by the Queensland Parliament on 14 November 2018, the Olive Downs Coking Coal Project is a "*mining EA applicant*" (i.e. an applicant for a site-specific application for a mining activity relating to a mining lease, made on or before the PRCP start date). The PRCP start date has not commenced, and the EA application for the Project has already been made. Consequently, and in accordance with the MER(FP) Act, **the pre-amended Act applies** to the Project and it, therefore, is not a '*new site specific mine'* for the purposes of the MLR Policy.

The MER(FP) Act transitional arrangements are unambiguous in that the restriction on a final void in a flood plain that is a non-use management area does **not** apply where that land outcome is assessed and approved in a 'land outcome document' for an EA application assessed under the pre-amended Act.

The restriction on voids situated wholly or partly in a floodplain under the MLR Policy is entirely predicated on the enactment and commencement of the *Environmental Protection Act* 1994 (the Act) amendments contained in the MER(FP) Act. The MLR Policy specifically relates to obtaining approval of a Progressive Rehabilitation and Closure Plan (PRCP). The transitional arrangements in the MER(FP) Act are clear that a PRCP for applications assessed and approved under the pre-amended Act can authorise final voids in a flood plain. **For the MLR Policy to be sensibly applied it must operate with the underpinning of the PRCP regime. The transitional arrangements for the MER(FP) Act make clear that:**

1. **the PRCP regime does not apply the assessment and approval of the Project; and**
2. **the restriction on a final void in a flood plain that is a non-use management area does not apply where that land outcome is assessed and approved in a 'land outcome document' for an EA application assessed under the pre-amended Act. The Project is being assessed under the pre-amended Act.**

Regardless of the above, in recognition of the concepts to be introduced by the MER(FP) Act amendments, the draft EIS describes the extent to which the Project voids are 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.*"

Definition of Floodplain

The draft EIS assumed reasonable meanings for the key terms of "floodplain" and "approved post mining land use". Assumptions were necessary because, at the time of submitting the draft EIS, definitions had not been drafted to support the MLR Policy. Despite the MER(FP) Act, a definition of the key term "floodplain" is still unavailable.

The DES states that Pembroke's "…*approach to floodplain definition is not acceptable*". The basis for "unacceptability" is not clear. Pembroke has defined a floodplain in the absence of any other definition, in particular, in the absence of a definition in the MER(FP) Act. Pembroke has maintained the approach to the definition in the draft EIS and described below, which is reasonable having regard to the objects of the MLR Policy.

DES also states that 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*". Pembroke maintains that the Project does not include final voids on a floodplain and, in addition, provides for final voids which 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 (refer to Section 4).

Pembroke notes that there is nothing in the MLR Policy, MER(FP) Act, the Project Terms of Reference and SDPWO Act that states or indicates that the "…*status and extent of a floodplain cannot be changed by the construction of constraining landforms*".

The draft EIS adopted a definition for floodplain which combines the definition from the *Queensland Water Act 2000* with the Queensland Government's published *Queensland Floodplain Assessment Overlay* mapping.

The *Queensland Water Act 2000* defines a floodplain as:

> "*floodplain means an area of reasonably flat land adjacent to a watercourse that—*
>
> *(a) is covered from time to time by floodwater overflowing from the watercourse; and*
>
> *(b) does not, other than in an upper valley reach, confine floodwater to generally follow the path of the watercourse; and*
>
> *(c) has finer sediment deposits than the sediment deposits of any bench, bar or in-stream island in the watercourse".*

The Queensland Government has published a *Queensland Floodplain Assessment Overlay* map. It was overlaid on the proposed final void locations. As a result, only voids ODS7/8 and ODS3 are potentially relevant to the floodplain issue.

The extent of the floodplain at the point in time when mining is completed and the operational open cuts become final voids can be the only relevant consideration because the MLR Policy relates to final voids, not operational open cuts. If restrictions to operational open cuts within floodplains were meant, then the MLR Policy would **not** have needed to specify rehabilitation outcomes for voids within a floodplain. To rehabilitate a void necessarily requires an open pit to precede and create the void in the first place.

Of primary relevance is the location of the floodplain when mining is completed and voids ODS7/8 (open cut pits ODS7 and ODS8 form one final void) and ODS3 come into being. At this point in time these voids would be isolated from all flood waters from the Isaac River up to and including a Probable Maximum Flood (PMF) event, by permanent waste rock emplacements which would be constructed to effectively surround the final voids. At their smallest, the permanent waste rock emplacements would be in the order of 300 m to 400 m wide, and approximately 25 m high. The voids would **not** be located in an area that is covered from time to time by floodwater overflowing from the Isaac River. **Consequently, the voids would not be located on a floodplain**.

Definition of Post Mining Land Use

For the purposes of the draft EIS, the post-mining land use of the ODS3 and ODS7/8 final voids was defined as habitat for native fauna and water bodies which would act as groundwater sinks. In general, the post-mining land use is proposed to be "native ecosystem".

It is noted that the MER(FP) Act includes a definition of post-mining land use:

> *"…post-mining land use, for land the subject of a PRC plan, means the purpose for which the land will be used after all relevant activities for the PRC plan carried out on the land have ended."*

If it was assumed that the areas of voids ODS3 and ODS7/8 were the subject of a PRCP (the requirement for which is yet to commence, as explained above), then the post-mining land use would be habitat for native fauna and water bodies which would act as groundwater sinks.

Further information about suitable habitat for native fauna in the final voids is provided in Section 4.

MLR Policy - Safe and Structurally Stable Voids

Amendments proposed to the EP Act by the MER(FP) Act include a meaning of "stable condition":

> *Land is in a stable condition if—*
>
> *(a) the land is safe and structurally stable; and*
>
> *(b) there is no environmental harm being caused by anything on or in the land; and*
>
> *(c) the land can sustain a post-mining land use.*

Despite the obvious duplication in the wording of the MLR Policy and the meaning of "stable condition", the structural stability of the highwall of the final voids is key. To provide for a long-term, structurally stable final void highwall, site specific geological data was collected and geotechnical modelling was undertaken. Section 5.2.4 of the draft EIS states:

> *The recommendations from the preliminary geotechnical assessment have been adopted as design criteria, including the following:*
>
> - *Final void highwalls would be laid back to 20º 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 20º set back in the final landform.*
> - *Final void highwalls would have a maximum overall angle of 45º where located within a fault fractured zone, and 55º where they are located away from fault zones. An overall angle of 55º could be achieved by 50 m high batters at 65º 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 7º 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.*

The catchment areas of the final voids have been minimised to decrease the erosion potential of surface water runoff reporting to the final voids.

In addition to the above, Table 5-2 of the draft EIS states that perimeter bunding would be formed and security fencing and signage installed to enhance the long-term safety of the final voids.

Additional Information and completion criteria for the final voids is provided in Section 4.

MLR Policy – Voids which do Not Cause Environmental Harm

Permanent waste rock emplacements would surround the final voids and isolate them from all flood events, up to and including a PMF event. Section 5.2.3 of the draft EIS states:

> *Final voids ODS3 and ODS7/ODS8 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.*
>
> *A conceptual layout of the part of the Olive Downs South domain final landform, illustrating how the permanent highwall emplacements integrate with the in-pit and out-of-pit waste rock emplacements and surround the final voids is shown on Figures 5-4a and 5-4b.*

Section 4.4 of the draft EIS states:

> *Importantly, the post-mining flood modelling results show that water would not enter the final voids located behind the permanent highwall emplacements in events up to and including the PMF event (Appendix F).*
>
> *…*
>
> *Hatch (2018b) considered the risk of the Project increasing flood levels and velocities in the Flood Assessment (Appendix F) and concluded that the Project is not considered to result in any significant change to the existing flood risk for surrounding privately-owned properties or infrastructure (Appendix F).*

Final voids would act as groundwater sinks into perpetuity, preventing the migration of potentially saline water that would accumulate in the final voids into adjacent aquifers and watercourses. Section 4.2.3 of the draft EIS states:

> *The recovered levels in Pits ODS3 and ODS7/ODS8 are around 65 m and 140 m below the pre-mining groundwater level, which means these final voids would act as a sink to groundwater flow (Appendix D).*

Final void water bodies would equilibrate well below the point at which they would spill to the surrounding environment. Section 5.2.3 of the draft EIS states:

> *The final void waterbodies are not predicted to spill to the surrounding environment, as they would remain at least 90 m below ground level (Table 5-4).*

MLR Policy –Post-Mining Land Use of Voids ODS3 and ODS7/8

Mine scheduling has maximised opportunities for progressive backfilling of open cut pits to minimise the number and size of final voids and improve final land use outcomes. Significant volumes of overburden material are proposed to be hauled large distances to completely backfill the majority of the open cut pits (Section 5.2.3 of the draft EIS).

The final voids would be rehabilitated to provide habitat for native fauna, and the water bodies would act as groundwater sinks into perpetuity. Section 5.2.1 of the draft EIS states:

> *Pembroke has considered potential post-mining land uses (e.g. nature conservation, agriculture) taking into account the rehabilitation hierarchy described in the Rehabilitation Requirements for Mining Resource Activities Guideline (DEHP, 2014), relevant strategic land use objectives of the area in the vicinity of the Project and the potential benefits of the post-mining land use to the environment, future landholders and the community.*
>
> *The conceptual post-mining land use for the Project is to reinstate land that would be suitable for the existing land uses, namely low intensity cattle grazing, while establishing woodland vegetation in areas which would benefit from enhanced stability effects (e.g. near watercourses and drainage lines and on the permanent highwall emplacements and adjacent areas). Parts of the final voids above the equilibrated water body would provide habitat for native fauna, and the final voids would act as groundwater sinks into perpetuity.*

In addition to what was provided in the draft EIS, Pembroke has further investigated the likelihood that the final void would provide suitable native ecosystem habitat. The final voids would comprise a low wall, highwall and a void water body.

The final voids would likely provide habitat resources as follows:

Final Void Landform Component	Native Ecosystem Habitat Resources
Low Wall	• Native vegetation (predominantly native grasses) which would provide habitat for native ground-dwelling fauna (e.g. the Stripe-faced Dunnart - recorded within the Project area by DPM Envirosciences).
High Wall	• Native vegetation in the upper shallow slope areas (slopes < 20 degrees). • Cliff habitat in the high walls can be used by nesting native birds and cave-dwelling bats. For example, Peregrine Falcon have a wide distribution across Qld (DES, 2018) and have been previously recorded nesting in mine pit walls (Potts and Donato, 2008; CBC, 2011; DeBeers Group, 2017) and other man-made structures (DES, 2018). Various cave dwelling microbats (such as the Hoary Wattled Bat [*Chalinolobus nigrogriceus*] recorded on site by DPM Envirosciences) can roost in rock fissures and crevices (Churchill, 2008).
Void Water Body	• The air space above the final void water bodies can be used by native insectivorous microbats for foraging on aerial flying insects. Studies have found multiple bat species foraging over made-made saline and hypersaline environments at mine sites (Griffiths et al. 2014; Griffiths, 2013). It is also possible that some bats drink brackish water (Griffiths et al. 2014). • The final void water bodies will increase in salinity over time. A water body with a salinity level <4,000 mg/L TDS is able to provide habitat for a variety of freshwater aquatic plants and invertebrates in shallower edge areas (after Hart et al, 1991, Proctor and Grigg, 2006 and Richardson, 2012). The WIL5, ODS7/8 and ODS3 water bodies are predicted to remain below 4,000 mg/L TDS for approximately 420, 280 and 140 years respectively. • Based on simulations by WRM (2019), the salinity of the ODS3 final void water body is expected to remain brackish <5,000 mg/L TDS) for at least the first 150 years. The ODS7/8 and WIL5 final void water bodies will remain brackish for an even longer time (300 and 550 years). Some plants (such as the Common Reed [*Phragmites australis*] recorded on site by DPM) can grow in brackish water (Hart et al, 1991). Brackish water is potable to most (if not all) terrestrial wildlife (Griffiths et al. 2014). Some ducks, such as the Australian Grey Teal recorded on site by DPM Envirosciences, are known to use permanent brackish and saline habitats, particularly as a dry season refuge (Lavery, 1972). • Although the final void water bodies are not predicted to become hypersaline for at least the duration of the modelling exercise (600 years), it is known that ducks are able to live in hypersaline environments by also drinking fresh water from elsewhere (Hart et al, 1991). Halophytic plants grow around the edges of water bodies under hypersaline conditions (after Hart et al, 1991).

Further information on rehabilitation of the Project and the post-mining land use is presented in Section 4 of this Additional Information to the EIS.