

Our Ref: 4004_R27_Response to RTS_20200317a_ltr

17 March 2020

Matthew Sprott
Director of Resource Assessments (Coal & Quarries)
Department of Planning, Industry & Environment
12 Darcy Street
Parramatta NSW 2150

Dear Matthew

Re: Response to Mangoola Coal Continued Operations Project (SSD-8642)
Request for Additional Information dated 17 February 2020

Further to your letter dated 17 February 2020, this letter has been prepared on behalf of Mangoola Coal Operations Pty Ltd (Mangoola) to provide a response to the comments made by three NSW government agencies on the Mangoola Coal Continued Operations Project (MCCO Project) Response to Submissions (RTS). A response to the comments noted in your request for further information is provided in **Section 2.0**.

1. Introduction

The Environmental Impact Statement (EIS) for the MCCO Project was placed on public exhibition from 18 July to 28 August 2019. A Response to Submissions (RTS) was subsequently prepared to address the issues raised in agency, community and interest group submissions. The RTS was submitted to the Department of Planning, Industry and Environment (DPIE) on 18 December 2019.

DPIE issued a Request for Additional Information on 17 February 2020 in regard to agency comments made on the MCCO Project RTS. DPIE has requested that Mangoola provide additional information to the following agency comments:

- Biodiversity Conservation Division (BCD) comments on test excavations of rock shelter
- Environment Protection Agency (EPA) comments on surface water discharges
- Resources Regulator comments on final landform.

Section 2.0 provides a response to specific comments made by BCD, EPA and Resources Regulator.

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2. Responses to Agencies Requested by DPIE

2.1 Biodiversity Conservation Division (BCD)

BCD considers test excavations should not be undertaken at Aboriginal sites that occur outside of the disturbance footprint. BCD recommends that the Rockshelter Complex (AHIMS 37-2-5443, 37-2-5444, 37-2-5445, 37-2-5446 and 37-2-5447) and any associated artefact sites or PADs should be preserved intact and are not subject to unnecessary test excavation.

As discussed in Section 3.1.2 of the MCCO Project RTS, the Aboriginal Archaeological Impact Assessment (AAIA) completed by OzArk Environmental & Heritage Management (OzArk) as part of the MCCO Project EIS identified that five previously recorded rock shelter sites, located to the northwest of the MCCO Additional Disturbance Area, may have been conservatively recorded as rock shelter sites during preliminary site investigations. OzArk re-inspected the five sites as part of the AAIA and recorded that despite potential archaeological deposit (PADs) being registered at these sites, there was no surface manifestation of artefacts at these locations. Mangoola had proposed the test excavations to confirm whether or not these previously recorded sites are actually sites, as based on OzArk's work these may not be sites.

In recognition of BCD's comments, Mangoola no longer proposes test excavations at these locations as part of the MCCO Project unless otherwise agreed with BCD at a later date.

In its response BCD also provided comments regarding rehabilitation completion criteria and flood mitigation. With regard to rehabilitation, Mangoola notes that it has made a number of commitments regarding rehabilitation and that rehabilitation practice is managed as part of the post approvals process regulated by the Resources Regulator within DPIE. Mangoola has also made commitments regarding management of flooding including to undertake further flood modelling as part of the detailed engineering design process.

It is expected that rehabilitation and flooding will both be addressed in relevant development consent conditions and associated management plans should approval be granted for the MCCO Project. Mangoola commit to engage further with BCD about these issues as part of the preparation of relevant management plans.

2.2 Environment Protection Agency (EPA)

Figure 15 of the Surface Water Assessment (Appendix 11 of the EIS) indicates mine water will be pumped from the Pit Water Dam to the Raw Water Dam which may overflow to Sandy Creek via farm dams. This is inconsistent with the principles of the Hunter River Salinity Trading Scheme which prohibits the discharge of saline water except under the rules of the Scheme. The EPA has recommended a condition of approval to ensure that the Scheme's principles are upheld.

L1.2 The proponent must not transfer mine water from the Pit Water Dam to the Raw Water Dam. Saline water must only be discharged under the provisions of the Hunter River Salinity Trading Scheme.

Mangoola accept the need to only discharge saline water in accordance with the principles of the Hunter River Salinity Trading Scheme (HRSTS), which will only occur if water inventories reach predetermined levels in the operational water management system. There is no intention to discharge from the Raw Water Dam to Sandy Creek. The only potential for any release of water would be if the emergency spillway of the dam is triggered for use by an extreme weather event to prevent dam failure. In this case the dam would overflow via farms dams to Sandy Creek.



The operation needs to maintain the currently approved flexibility to permit transfers from the Pit Water Dam to the Raw Water Dam. The maximum operating level for the Raw Water Dam is RL 183.5 m equivalent to approximately 2,082 ML which provides sufficient storage capacity to contain the predicted Environmental Containment Flood (ECF), 1:250 annual exceedance probability (AEP) 72-hour storm event. The total maximum storage capacity for the Raw Water Dam is 2,566 ML. Therefore, even in extreme rainfall events (i.e. 1:250 AEP 72-hour storm event) the Raw Water Dam is designed not to overflow even if at full capacity at the beginning of the event.

The spills shown in Figure 15 of the Surface Water Assessment to Sandy Creek are a result of surface water overflows during only extreme weather events.

In its response the EPA also provided draft EPL conditions. Mangoola note that following determination of the MCCO Project, that a variation revision to the existing EPL will be required during the post approvals phase. Mangoola commit to engage further with EPA on the draft EPL conditions at this stage of the Project.

2.3 Resources Regulator

Additional information is required to demonstrate that sustainable rehabilitation outcomes can be achieved as a result of the project. The required additional information is as follows:

• It is noted that the Applicant has provided a description of preliminary recommendations provided by the geotechnical assessment such as bench widths and minimum setbacks, however bench height and slope has not been provided.

As discussed with the Resources Regulator the bench widths, minimum setbacks and highwall slopes for the void in the approved Mangoola Coal Mine will be as per the existing approved arrangements. Further information regarding the proposed void in the MCCO Additional Project Area is presented below.

For the purpose of this response the final void proposed within the existing Mangoola Coal Mine is referred to as the 'southern void' while the final void proposed in the MCCO Additional Project Area is referred to as the 'northern void'.

Mangoola has undertaken geotechnical assessments of the MCCO Additional Mining Area. To date, within the MCCO Additional Project Area, 86 boreholes have been drilled, geophysical surveys including seismic survey and downhole geophysical assessments have been undertaken, and in-depth geological modelling has been completed. This detailed exploration work, as well as, past mining records from the existing approved mining area for the Mangoola Coal Mine has resulted in a good understanding of the geology and structure of the coal deposits and the overburden/interburden strata in the MCCO Additional Mining Area. The deposits within the MCCO Additional Mining Area are consistent with those in the existing approved mining area and have allowed for an appropriate understanding of stability requirements for highwalls.

Mangoola commissioned a geotechnical stability assessment for the MCCO Project final landform as part of the planning process for the MCCO Project. The assessment was undertaken by Paul Lambert, Principal Engineering Geologist of Lambert Geotech Pty Ltd (Lambert Geotech 2018). Paul Lambert is an experienced geotechnical engineer and is well acquainted with the existing Mangoola site conditions and methods of mining which are proposed to continue for the MCCO Project.

In the area of the northern void, where the highwall will remain, the indicative maximum total height based on the conceptual mine plan will be in the order of 90 - 100 m. Taking into account the geotechnical advice from Lambert Geotech Pty Ltd, **Table 1** provides an indicative profile for bench heights and slopes for the final landform from the original ground level to the basal (UPA) seam at the depth of mining. This typical profile is indicatively illustrated on **Figure 1**.



Table 1 Indicative Bench Slope and Heights for Final Landform in Northern Void

	Slope from Vertical (degrees)	Indicative Height to Bench (m)	Comment
Natural surface to base of weathering	45	15 (depth of weathering varies)	Increased batter angle accounts for weathered surface zone
Below the base of weathering to Wallarah seam floor	27	45	
Wallarah seam floor to basal seam floor	27	38	Lowest part of the mined area

Mangoola commits that the MCCO Project mine plan and conceptual final landform, including the final highwalls and use of safety berms, will be subject to ongoing geotechnical investigation and refinement by Mangoola over the life of the operation, to achieve the overall objective of providing a safe and stable final landform.

 It is noted that the Applicant has committed to further investigation of alternatives to the use of safety berms along the top of each highwall, however no alternative or control measures to address ongoing maintenance into perpetuity has been presented.

The inclusion of a safety berm along the top of the highwall is designed to reduce the potential for inadvertent access. This safety berm, along with the battering back of the upper section of the highwall to a slope angle of 45 degrees (refer to the response to the preceding comment) will mean that there will not be inadvertent access to steep highwall slopes (that is you would need to cross a safety berm and the 45 degree slope of the weathered zone to reach the steeper highwall).

Subject to consultation with stakeholders at the time of developing the detailed Mine Closure Plan, another suitable alternative measure to achieve the same outcome may be preferred, however, to provide certainty at this time, as part of the Mining Operations Plan (MOP) at the time of mine closure a safety berm is the proposed measure. It is noted that safety berms are common practice and included in approved mine closure plans for a number of mining operations. The safety berm, like the rest of the site post closure, will require maintenance as part of any ongoing land management process in respect of drainage lines, fencing, weeds, erosion, etc. Final design of the highwall and completion criteria will be detailed in the MOP and subject to the review and approval from the Resources Regulator. As stated in the MCCO Project EIS, a detailed Mine Closure Plan will commence five years prior to the planned mine closure and will be aimed at achieving the post mining landform and land use as presented in the EIS.

Further to the discussions undertaken with the Resources Regulator on 26 February 2020 regarding the MCCO Project RTS, Mangoola commits to the application of appropriate risk assessment methods as part of the Mine Closure Plan process. The risk assessment(s) would be used to plan for appropriate designs for the final highwalls and safety berms, associated controls and any ongoing maintenance activities. The following activities (along with others as relevant) may be considered in the risk assessment(s) for the proposed final landform design for remaining highwalls and safety berms:

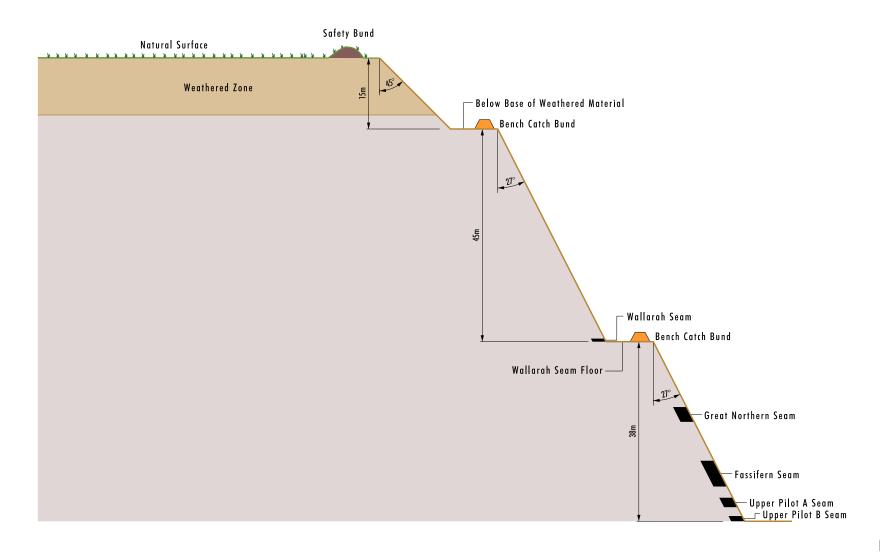
- blast pre-splitting of the final highwall face to provide a clean and stable rock face
- highwalls selectively blasted to flatten the slope angle and/or shaped for visual amenity and geotechnical stability reasons



- the engineering, installation and maintenance of appropriate water drainage where required to prevent pooling of water on the highwall
- appropriate access to the highwall benches for inspection, maintenance and remediation purposes
- buffering of the highwall and the exposed seams in the highwall by the placement of mined overburden against the highwall
- fencing
- signage.

A conceptual indicative design for remaining highwalls and safety berms in the MCCO Project final landform is provided in **Figure 1**.





Legend

Topsoil and Grasses
Safety Bund

FIGURE 1

Indicative Final Highwall Cross-Section (Northern Void)



• The level of detail provided in the Environmental Impact Statement and Response to Submissions is not consistent between each considered final landform. The independent review has considered economic, mine feasibility / engineering and broad environmental outcomes to further justify the preferred final landform (case 3). The financial implications and surface disturbance area of each option has broadly been described. The Resources Regulator does not consider sufficient information has been provided to discount differing case options. For example, case option 6 (partial backfilling of each void) has been cited as resulting in a larger surface area affected by the final void, however whether sustainable rehabilitation outcomes may have been increased / decreased such as increased land use opportunities and potentially enhanced landform/ geotechnical stability have not been articulated for each discounted option. As such, the Resources Regulator cannot comment on the appropriateness of the preferred final landform. The Resources Regulator would recommend that at minimum, further information is provided for landform case option 6 (partial backfilling of each void) and case option 4 (one final void in the north).

It is acknowledged that different levels of information were included on the different final landform options considered in the EIS. The initial final landform options investigation processes identified that some options were more viable or suitable than others and further detailed investigations were undertaken on these options. The same level of investigation was not undertaken on options that were identified in the early assessment process as not viable. The level of investigation undertaken was sufficient to differentiate the cases being considered.

The Resources Regular also states that the independent review considered a range of factors 'to further justify the preferred final landform case'. This is not an accurate reflection of the expert review process. As per the request from DPIE - Division of Resources and Geoscience (DRG), the scope of work was that 'an independent expert examination of the proposed final landform be undertaken, focusing on whether the final landform case selected by the Proponent is the best option'. The expert review process included the reviewers requesting information they required and undertaking a site inspection to inform their review and expert opinion.

As presented in the MCCO Project RTS, the independent review (IEMA 2020) concluded that Case 3, as presented in the MCCO Project EIS and Mine Plan Options Report (Appendix 2 of the EIS), represents an appropriate outcome which demonstrates that Mangoola has considered the balance between delivering an economic mine plan whilst giving proper regard to leaving beneficial post mining land uses and minimising final voids. Further, the review found that Mangoola has demonstrated through the rehabilitation already completed at the existing Mangoola Coal Mine that it has been able to successfully design and construct the natural style landforms along with the revegetation techniques that are proposed in the MCCO Project EIS.

In response to the request from the Resources Regulator further information in the form of a comparison between the Case 3 (MCCO Project), Case 4 (one void in the north) and Case 6 (partial backfill) landform is provided below. An overview of the case options including the proposed strategy, time and cost required to achieve each case option is provided in **Table 2**. Further detail is available within the Mine Plan Options Report (Appendix 2 of the EIS).



Table 2 Comparison of Final Landform Case Options 3, 4 & 6

Description	Case 3 - MCCO Project Case (as included in EIS)	Case 4 - One Void in the North (Non-Preferred Case)	Case 6 – Partial Fill of Final Voids (Non-Preferred Case)
Overburden Emplacement Strategy	Haul approximately 50,000,000 bank cubic meters (bcm) of overburden from the MCCO Additional Mining Area to the existing approved mining area for the purpose of improving the final landform	Haul approximately 83,000,000 bcm of overburden from the MCCO Additional Mining Area to the southern void enabling it to be filled to approximately 150 RL to 160 RL which is sufficient to allow it to drain.	Haul approximately 56,000,000 bcm of overburden from the MCCO Additional Project Area to the Approved Project Area for the purpose of partially filling the existing approved mining area void. The void will still have a pit lake but will be shallower
Rehandle Requirements	Approximately 5,000,000 bcm overburden rehandle back into the northern final void at the completion of mining in the MCCO Additional Project Area, to improve the overall shape and reduce the total void area	Limited overburden rehandle or filling of the MCCO Additional Mining Area void	Nominally 8,000,000 bcm overburden rehandle at the completion of mining in the MCCO Additional Project Area, to improve the overall shape, reduce the total void area and depth
Number of Final Voids at Completion	Two final voids as proposed	One final void (northern void)	Two final voids with some additional backfilling
Void Size*	Northern void – 81 ha Southern void – 46 ha	Northern void – 132 ha Southern void – 0 ha	Northern void – 144 ha Southern void – 62 ha
Highwall	Highwall remains in both voids Reduced extent in northern void due to rehandle	Despite filling the southern void, there will still be an area with an exposed final highwall. Highwalls will remain for the northern void.	Highwall remains in both voids Northern void highwall larger than Case 3 Southern void highwall similar to Case 3 (reduced height)
Additional Time to Complete (above base MCCO Project timing)	6 months	Nil (occurs during operations)	9 months
Indicative Total Cost (above base MCCO Project costing)	\$75 M	\$114 M	\$95 M

^{*} Final void areas are defined as all land within the crest of the final highwall circumnavigating the predicted long-term water recovery level of the pit lake and excluding the low wall/end walls which will be shaped post mining to allow rehabilitation. With regard to Case 6 in lieu of water recovery information the size of the southern void has been calculated based on pit floor area and highwall only.



Further information and a direct comparison of the benefits of Case 3 against Case 4 and Case 6 in terms of providing a safe and stable final landform in accordance with the principles of the Glencore Mine Closure Planning Protocol is provided in **Table 3**. The proposed land availability and land use opportunities for Case 3, Case 4 and Case 6 options are also discussed, along with information about the achievement of sustainable post-mining land uses and reducing visual amenity impacts. As noted in the MCCO Project RTS further work has been undertaken since the MCCO Project EIS to optimise the final void designs for Case 3. Further detailed design or refinement of Case 4 or Case 6 will not fundamentally change any of the key environmental or other aspects of the cases.

Case 3 remains the mine plan for which approval is being sought. Mangoola consider that Case 3 represents a balanced outcome which achieves economic expectations for the MCCO Project whilst also improving the overall shape and total area of the two proposed final voids. Additionally, the overall visual amenity and usability of land, in terms of achieving a self-sustaining native ecosystem post mining land use, is improved in Case 3 (in comparison to Case 4 and Case 6) due to availability of overburden material for enhanced landform design.

It is also noted that the independent expert review also identified Case 3 as representing an appropriate outcome.



Table 3 Comparison of Benefits for Case 3, Case 4 and Case 6 Final Landforms for the MCCO Project

Benefits	Case 3 - MCCO Project Case (as included in EIS)	Case 4 – One Void in the North (Non-Preferred Case)	Case 6 – Partial Fill of Final Voids (Non-Preferred Case)
Number of Final Voids	Two final voids proposed (northern void and southern void)	One final void (northern void). This void is larger than the northern void in Case 3 as more overburden is taken south to fill the southern void.	Two final voids proposed (northern void and southern void), with the voids partially filled. The southern void would be a similar size to Case 3 but not be as deep. The northern void would be larger than Case 3 as more overburden is transported to the southern void but would not be as deep.
Area of Final Voids*	Total void area for both final voids is 127 ha: - northern void approximately 81 ha - southern void approximately 46 ha	Total void area for the one final void will be 132 ha which is an increase compared to Case 3: - northern void approximately 132 ha - southern void backfilled but with limited topographic relief as not sufficient overburden to provide for micro relief	Total void area for both partial-filled final voids will be 206 ha which is substantially increased compared to Case 3. The partial filled voids will remain voids, just shallower when compared to Case 3. As overburden is used to partially fill the voids to reduce depth rather than reduce void area, the area of the final voids is increased: Northern void approximately 144 ha Southern void approximately 62 ha
Depth of Final Voids	Depth of two proposed final voids: depth of northern void approximately 100 RL depth of southern void approximately 90 RL both voids will be waterbodies	Depth of one proposed final void: - depth of northern void approximately 100 RL - void will be a waterbody	Depth of two proposed (partial-filled) final voids: depth of northern void approximately 120 RL depth of southern void approximately 130 RL both voids anticipated to be waterbodies
Proposed Post Mining Land Use	Native ecosystem comprising native woodland and grassland species, rehabilitated land will be of a quality which can be used for biodiversity offsets.	Makes no difference to proposed land use as any change to available areas would still be proposed as native ecosystem areas. It is noted that in the flat areas different vegetation communities may be required.	Makes no difference to proposed land use as any change to available areas would still be proposed as native ecosystem areas.
Area of Available Land to Achieve Post Mining Land Use (i.e. non void areas)	All rehabilitated land available for future land use except for the final void areas which have reduced post mining land use options. Total void area is 127 Ha	5 ha less area available than for Case 3.	79 ha less area available than for Case 3.

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Benefits	Case 3 - MCCO Project Case (as included in EIS)	Case 4 – One Void in the North (Non-Preferred Case)	Case 6 – Partial Fill of Final Voids (Non-Preferred Case)
Final Topography	The final landform (outside of final voids) will incorporate natural landform design features (i.e. micro relief) and will be undulating and will align with the natural terrain features of the surrounding area. Slopes will be safe, stable and non-polluting. Rehabilitated slopes (with the exception of final void retained highwalls and slopes) will generally be, on average, <10 degrees. To allow for the creation of micro relief in topography, slope angles will be ≥10 degrees in some areas.	The southern void will be filled to approximately 150 RL to 160 RL which is sufficient to allow it to drain. Due to the limited available overburden, topographic relief of the back-filled void will be limited and will comprise a large flat area. Due to the majority of available overburden being hauled south to back-fill the southern void, the final landform within the MCCO Additional Mining Area (surrounding the northern void) will be flatter with less opportunity for meaningful topographic relief and micro relief (in comparison to Case 3).	The final landform (outside the voids) will incorporate natural landform design features and will be undulating. However, due to available overburden material being used primarily to partially fill voids, the final landform will be flatter and have less micro relief in comparison to Case 3. As noted above, the void areas will be larger.
Visual Amenity of Final Landform	Reduces the overall size and improves the visual appearance of the northern void by backfilling the angular ends of the void and providing rounded ends	The southern void will be filled to approximately 150 RL to 160 RL which is sufficient to allow it to drain. However, the size and overall shape of the northern void would not be improved (as proposed in Case 3) as all available overburden material has been placed in the southern void under this case. The final landform in the MCCO Additional Mining Area will be generally flat as there will not be sufficient overburden left to vary the landform. Furthermore, low walls in the northern void will be shaped but there will be limited filling of the sharp looking ends due to insufficient overburden material to complete any further works. Due to the location of surrounding public vantage points e.g. roads, the rehabilitated landform and final void in the MCCO Additional Mining Area is more visible than the southern void. Therefore, the larger void and less optimal topography proposed for the MCCO Additional Mining Area (in comparison to Case 3) will result in greater visual amenity impacts to the community particularly towards the final highwalls.	The partial-filled final voids will achieve a final landform with reduced void depths. It is expected that water lakes will still form within the partial-filled final voids as they are below the topography of the surrounding rehabilitated land. Shaping and backfilling of the angular ends of the final voids is not proposed as any available overburden will be primarily used to partially back-fill the voids. There will be less filling of the sharp looking ends of the northern void due to insufficient overburden material to complete any further works. Due to the location of surrounding public vantage points e.g. roads, the rehabilitated landform and final void in the MCCO Additional Mining Area will be more visible than the southern void. Therefore, the larger void and less optimal topography proposed for the MCCO Additional Mining Area (in comparison to Case 3) will result in greater visual amenity impacts to the community.

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Benefits	Case 3 - MCCO Project Case (as included in EIS)	Case 4 – One Void in the North (Non-Preferred Case)	Case 6 – Partial Fill of Final Voids (Non-Preferred Case)
Visual Amenity of Final Highwalls	Remaining highwalls may be selectively blasted and shaped for visual amenity and geotechnical stability reasons. There will be limited public vantage points from which the remnant highwalls will be visible (particularly once vegetation has been established on adjacent areas).	Despite filling the southern void, there will still be an area with an exposed final highwall. Highwalls will remain for the northern void. The highwall of the northern void will be more visible under this case due to the reduced shielding offered by the rehabilitated and natural landform design. Remaining highwalls may be selectively blasted and shaped for visual amenity and geotechnical stability reasons.	Highwalls will remain for the partial-filled final voids and will be treated as described in Case 3.
Final Drainage	The final landform (outside of the final voids) will be free-draining and will be in keeping with surrounding rehabilitated landscapes incorporating micro relief and natural drainage lines that connect to the existing surface water environment.	The backfilled void area in the south will be established to make it free draining however there will not be sufficient material for establishment of micro relief or drainage lines (i.e. the backfilled landform will be flat). There are potential for issues with overland flow and boggy areas (due to the flat topography in the backfilled area). With all of the material being used to backfill the southern void the northern void is much larger under Case 4. The rehabilitated area of the landform in the MCCO Additional Project Area will also remain fairly flat as there will be limited overburden to provide for topographic change. There will be enough overburden to make the area outside the void free draining but only just. Due to the flat rehabilitated topography, the rehabilitated area is likely to be prone to over-land sheet flow and possibly boggy areas as there is not predicted to be enough overburden to create sufficient topographic relief and variance to reinstate natural drainage lines throughout the landform. Further investigation of drainage issues would be required if this option was further considered.	The final landform (outside of the partial-filled final voids) will be free-draining. However, due to available overburden material being used to partially fill both voids, the final landform in the MCCO Additional Project Area will be flatter in comparison to Case 3. Further investigation of drainage issues would be required if this option was further considered.
Land Area within Final Voids Below Equilibrium Groundwater Level	Yes, both voids are below the equilibrium groundwater level of the final landform and will act as long-term groundwater sinks.	Yes for the northern void which is below the equilibrium groundwater depth of the final landform and will act as a long-term groundwater sink. No for the southern void which will be backfilled and is expected to act as a flow through system.	Yes, the northern void is below the equilibrium groundwater depth of the final landform and will act as a long-term groundwater sink. The southern void, despite being partially filled is expected to be below the equilibrium groundwater depth of the final landform and is expected to be inundated in the long-term.

^{*} Final void areas are defined as all land within the crest of the final highwall circumnavigating the predicted long-term water recovery level of the pit lake and excluding the low wall/end walls which will be shaped post mining to allow rehabilitation. With regard to Case 6 in lieu of water recovery information the size of the southern void has been calculated based on pit floor area and highwall only.

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3. Conclusion

We trust that the additional information provided in this letter meets your requirements and will enable DPIE to progress the assessment process.

Should you have any questions or require any further information please do not hesitate to contact Daniel Sullivan or myself on 4950 5322.

Yours sincerely,

John Merrell

Executive Manager Environment NSW & ACT