Maxwell Project – Response to DPIE Questions (Received 24 July 2020)

ID	DPIE Question	Malabar Response
	Groundwater	
1	Section 6.2 of the Groundwater Assessment (GA) states: "The location of drawdown associated with the reduction in upward seepage along Saddlers Creek and Saltwater Creek is shown on Figure 85." This is not shown on Figure 85.	This text should reference Figure 73 (Maximum drawdown due to Project, Layer 1).
2	Section 6.3 of the GA states: "Figure 85 shows that there is no change in baseflow along Saddlers Creek and Saltwater Creek." Figure 85 does not provide any data with respect to Saltwater Creek.	There would be no change in baseflow along Saltwater Creek (Section 6.3 of the Groundwater Assessment). Accordingly, the Saltwater Creek data series is the same as the Saddlers Creek data series shown on Figure 85 (i.e. zero increase in river leakage).
3	Section 6.3 of the GA indicates that the Project is unlikely to significantly impact baseflows along Saddlers Creek, as the stream exhibits losing conditions in this location. However, both the EIS and the BDAR indicate that Swamp Oak along Saddlers Creek in the vicinity of the mining area is dependent on baseflows to Saddlers Creek (see page 6-32 of the EIS and Section 5.3.6 of the BDAR) . Isn't this a contradiction?	The Integrated Assessment of Potential Impacts on Groundwater Dependent Ecosystems (Appendix V of the Environmental Impact Statement [EIS]) states: *Swamp Oak grows from the stream bed level up to the high bank (a height at which trees are not likely to be able to access the groundwater table) indicating that the Swamp Oak along Saddlers and Saltwater Creeks are primarily accessing the stream baseflow and seepage in the soil profile rather than the deeper groundwater.* In this context, stream baseflow is referring to the subsurface flow that occurs due to seepage of water from the stream following flow events. This is consistent with the description of Saddlers Creek baseflow in Section 4.7.2 of the Groundwater Assessment, which states: *Saddlers Creek has intermittent flow, with flows occurring in response to rainfall events. When flowing, Saddlers Creek generally exhibits losing conditions, where surface water seeps into the underlying alluvium.* It is relevant to note that Malabar has committed to implementing a monitoring program for the riparian vegetation along Saddlers Creek in response to comments received from the Department of Planning, Industry and Environment – Water (DPIE – Water). This would include: • monitoring of the shallow, alluvial bores in the Saddlers Creek alluvium (MW1, MW2, MB2-Alluvial and MB3-Alluvial); and • annual Swamp Oak health inspections on Saddlers Creek and Saltwater Creek.

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4	In Table 6-1 of the GA, why is post-mining water take from alluvial water sources required to be licensed, but not post-mining water take from the fractured and porous rock water sources?	No post-mining groundwater take is predicted to occur from the fractured and porous rock water sources following the completion of mining. Extraction of water from the Maxwell Underground would cease once mining is completed and the underground is no longer dewatered. There would be some post-mining take from the alluvial water sources due to the delayed propagation of drawdown through the *in-situ* rock towards the alluvium (i.e. the post-mining alluvial water take is a delayed response to water taken from the hard rock during mining). Figure 84 of the Groundwater Assessment demonstrates that the peak take from the alluvium occurs approximately 200 years post-mining.
5	Page 6-32 of the Main Volume of the EIS states that the maximum predicted cumulative drawdown at GW029660 is "2.8 m (1.7 m due to the Project)". Table 6-2 of the GA indicates that the maximum predicted cumulative drawdown is 3.7 m (2.3 m due to the Project).	The maximum predicted cumulative drawdown at GW029660 would be 3.7 metres (m) (2.3 m due to the Project). Page 6-32 of the EIS describes the predicted maximum drawdown that would occur during the life of the Project. Based on the above, GW029660 was assessed as exceeding the Level 1 minimal impact consideration in the Aquifer Interference Policy (i.e. greater than 2 m drawdown) (refer Table A8-6 in Attachment 8 of the EIS). Accordingly, Malabar would implement appropriate contingency measures (i.e. 'make good' provisions) for Project-related drawdown greater than 2 m at GW029660 so that the Project would result in no more than minimal impact on existing extractions. Malabar has met with the owner of GW029660. At the meeting, Malabar explained the predicted drawdown effects and the 'make good' provisions that would be made available to the landowner in accordance with the Aquifer Interference Policy.
6	Page 6-31 of the EIS and Page 122 of the GA indicate that the total groundwater inflows to the underground workings are predicted to peak at 1,387 ML/year in Year 12. However, Table 6-1 and Section 5.4.4 of the GA indicates that inflows to underground workings would peak at 1,085 ML/year. The Department requests clarification in this regard.	Page 6-31 of the EIS and Page 122 of the Groundwater Assessment should state that the peak inflow rate to the Maxwell Underground would be 2.9 megalitres per day (ML/day) (1,085 megalitres per year [ML/year]), as described in Section 5.4.4 and shown on Figure 69 of the Groundwater Assessment. These predicted groundwater inflows (Section 5.4.4 and Figure 69) were used to inform the groundwater and surface water impact assessments (Appendices B and C of the EIS) and water licensing considerations (Attachment 8 of the EIS).

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7	Section 6.8 of the GA indicates that the East Void will likely act as a groundwater sink, while the North and South Voids would act as 'partial' groundwater sinks. Is this referring to the connectivity between the voids? Please provide further explanation in this regard, and how the post-mining behaviour of the North and South Voids is expected to differ from the East Void.	Yes – the reference to partial sinks is referring to the connectivity between the voids and the in-pit spoil. The East Void would be largely backfilled with CHPP reject and would therefore have a smaller waterbody and reduced connectivity with the surrounding in-pit spoil. Relevant quotes from the Groundwater Assessment are below. Section 6.8 of the Groundwater Assessment states: *As also shown in Figure 96, groundwater levels around Maxwell Infrastructure area show that North Void and South Void act as partial groundwater sinks, drawing groundwater from the in situ strata towards the mined area.* Section 6.9.2 of the Groundwater Assessment states: *Therefore the northern end of the Maxwell Infrastructure area is likely to act as a sink, drawing groundwater towards North Void.* *Similarly South Void is predicted to have a final steady state pit lake level of approximately 166 mAHD (WRM, 2019) and would remain lower than groundwater levels in the in situ strata to the south, acting as a sink.* *…* *Overall, the final voids within the Maxwell Infrastructure area are predicted to act as groundwater sinks, and are therefore unlikely to impact on water quality within the surrounding stratigraphy.*
8	Please clarify what the 'basecase' in the GA refers to, as references to the 'basecase' later in the document (e.g. Figure 69) appear to conflict with the description in Section 5.4.1.	The term 'basecase' is used in the Groundwater Assessment to describe the predicted impacts of the Maxwell Project from the calibrated model (the basecase). These are differentiated from the results of different modelling scenarios undertaken in the sensitivity and uncertainty analysis (refer to Section 7 of the Groundwater Assessment). The term 'baseline' is used to refer to the modelling of the currently existing/approved mines (without the Maxwell Project). A footnote in Section 5.4.1 of the Groundwater Assessment notes that this scenario is sometimes referred to as a basecase model.

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9	Page 26 of the Submissions Report states that Figure 31 in the GA indicates the location of all registered bores within 10 km of the Project Area. This figure only identifies monitoring bores. It appears that other registered bores are shown, but they have no reference numbers and there's no way to distinguish between privately-owned and mine-owned bores.	Refer to figure enclosed which shows: • Bores identified during the bore census for the Project. • The one privately-owned bore that is predicted to experience greater than 2 m drawdown (GW029660). • The five mine-owned bores predicted to experience greater than 2 m drawdown. • Other registered groundwater bores within 10 km of the Project that were assessed in the groundwater model (excludes bores registered with a 'monitoring' or 'test' purpose).
	Surface Water	
10	It is unclear how the transport and services corridor integrates with Figures 4.1 to 4.3 of the SWA.	The water from the transport and services corridor would be managed by the dirty water management system and would therefore not be captured in the mine water management system. Accordingly, it is not shown on Figures 4.1 to 4.3 of the Surface Water Assessment. This is consistent with the management of the transport and services corridor described in Sections 4.3.4 and 9.1.5 of the Surface Water Assessment (refer relevant quotes below). Section 4.3.4 of the Surface Water Assessment states: *Surface runoff from disturbance areas that drain off-site would be managed by the dirty water management system to reduce sediment loads. As the majority of the catchments at Maxwell Infrastructure and mine entry area drain internally to site storages, this would mainly comprise the transport and services corridor and upcast ventilation shaft site (including shafts, associated fans and ancillary infrastructure).* Section 9.1.5 of the Surface Water Assessment states: *An erosion and sediment control plan would be developed to manage runoff during the construction phase and to manage runoff from the disturbed areas peripheral to the mine entry area (i.e. transport and services corridor).*

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11	Does Malabar have/need an agreement with HVEC to permit the minor intrusion of the proposed diversion drain around the western emplacement area into CL 396 (as shown in Figure 4.3 of the SWA)?	The proposed diversion drain is assumed to be established in Stage 3 of the site water balance model, after the final landform in this area has had time to establish (nominally Year 8 of the Project). As discussed in Section 2.3.3 of the EIS, the approved Mining Operations Plans for Mt Arthur Mine and the Maxwell Infrastructure both show potential integration between the final landforms. Malabar would continue consultation with BHP regarding potential interactions between the Maxwell Infrastructure and Mt Arthur Mine final landforms. In the event an agreement couldn't be reached, the proposed diversion could be amended slightly to remain within Coal Lease 229.
12	In Table 5.11 of the SWA, why does water usage for dust suppression drop sharply from 56.3 ML in Year 2 to 7 ML in Year 3, given that coal production is projected to increase from Year 2 to Year 3 and the overland conveyor would not yet be operational? The sealing of the access road can't account for it, as that happens in Year 1?	The drop in water for dust suppression is associated with the completion of construction earthworks within the mine entry area and the transport and services corridor. Dust suppression associated with coal handling is accounted for under 'CHPP water usage' (Table 5.10 of the Surface Water Assessment).
13	I note that WRM has prepared an updated version of Table 5.13 (it was attached to a memo which you provided by email). We will need to formalise this in a format we can publish online, along with the updated GA figures you provided by email on 30 June (eg with a covering letter).	Noted – this can be provided separately together with any other information required to be provided formally.

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14	Table 6.1 provides an annual water balance based on the average of all 103 modelled realisations. Are you able to provide some further explanation as to how the results in Table 6.1 provide a conservative representation of very wet and very dry years. Is it possible to provide alternate versions of Table 6.1 based (a) a very wet and (b) a very dry year?	***Performance of Water Management System During Dry Years*** As an underground mine, the Project would have a surplus of water, including during dry climatic conditions. This is confirmed by Figures 6.1 and 6.2 of the Surface Water Assessment, which show the mine water inventory continuing to increase, including under the 90th percentile results (dry climatic conditions). ***Performance of Water Management System During Wet Years*** The Project would not involve controlled release of water to the Hunter River or Saddlers Creek. The water balance model was used to assess the risk of uncontrolled off-site spills from the water management system under all modelled climate realisations, including during the highest rainfall years on record. Section 6.3.3 of the Surface Water Assessment states (WRM, 2019): • There were no modelled overflows from MEA Dam, Treated Water Dam and Savoy Dam during any of the model realisations over the life of the Project. • There is a 1% probability (in any one year) that Rail Loop Dam and Access Road Dam could overflow to Ramrod Creek. The predicted overflow volume ranges from 20 to 30 megalitres (ML). However, overflows from these storages would only occur during extreme rainfall events. The water within the dams during these events would be heavily diluted by catchment inflows and any overflows would be further diluted by significant flows in Ramrod Creek. WRM (letter dated 11 December 2019) clarified that the above reference to a 1% probability (in any one year) of an overflow from Rail Loop Dam and Access Road Dam means that these dams are predicted to overflow in only 1 of the 103 historical climate sequences that were modelled (i.e. effectively once in 100 years).
15	Is it correct to say that of the 103 modelled scenarios, the majority resulted in an annual water surplus over all five stages of the Project?	Yes, that is correct (refer above).

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	Figures	
16	Section 6.1.1 of the Groundwater Assessment (GA) states: "Figure 73 shows along Saddlers Creek there is up to 8 m of maximum predicted drawdown within the saturated alluvium within two localized areas..." However, the scale and colour gradient used on this figure makes it difficult to see where these localised areas are. Please provide a clearer figure depicting the spatial variation of drawdown within the Saddlers Creek alluvium.	The spatial extent of drawdown in the Saddlers Creek and Saltwater Creek alluvium is shown more clearly on Figure 7 of the Integrated Assessment of Potential Impacts on Groundwater Dependent Ecosystems (Appendix V of the EIS).
17	Is it possible to combine Figures 92 to 94 of the GA into a single A4 figure (similar to Figure 95)?	Refer figure enclosed.