Table B
Agency Submissions Responses

	Recommendation	Response
1	**NSW ENVIRONMENT PROTECTION AUTHORITY**	
	Air Quality Impact Assessment	
1A	***1) Emissions Inventory*** *Additional information in the emissions inventory is needed to enable emission estimates to be transparently assessed and replicated.* *This includes:* *i) Details of the intensity of operations including, but not limited to:* o *the number, weight and load of haul trucks;* o *the area of stockpiles, open pit and exposed ground surface area; and* o *the amount of coal transferred to the onsite CHPP.* *ii) Confirmation of the modelling location of all crushing and screening emissions in the emissions inventory. If the modelling locations are not as described in the proposal, the AQIA should be revised using the correct locations for crushing and screening emissions.* *Emissions due to onsite hauling from the other mines to the CHPP have not been included. The AQIA needs to be revised to include onsite hauling from other mines to the CHPP.*	Detailed emission inventories for each assessment scenario (i.e. Project years 3, 7 and 21) are included in Attachment 1. These emission inventories include all assumptions made with regard to air quality modelling, such as wind erosion, haul lengths/loads and indicative fleet numbers. These detailed emission inventories also clarify that crushing and screening emissions (including handling) associated with run-of-mine (ROM) coal from the Tarrawonga and Rocglen Coal Mines have been modelled at the Project Coal Handling and Preparation Plant (CHPP). Haulage of ROM coal from the Tarrawonga and Rocglen Coal Mines to the Project CHPP is included in the cumulative modelling on the basis that this activity (i.e. on-road haulage of coal from the Tarrawonga and Rocglen Coal Mines) is approved and would occur regardless of the Project, as described in Appendix 1 of the Air Quality and Greenhouse Gas Assessment (Appendix E of the EIS). Note that hauling from the Tarrawonga and Rocglen Coal Mines would occur along sealed roads (including the on-site access road to the mine infrastructure area). Wheel generated dust emissions along sealed roads are very low (e.g. by comparison to wheel generated dust from unsealed roads). Notwithstanding, the Project would reduce dust emissions from on-road haulage as it would reduce the distance travelled by trucks transporting coal to and from the Tarrawonga and Rocglen Coal Mines.
1B	***2) Emissions Factors*** *The proponent is to revise the AQIA to use established control factors (for example, as documented in Katestone, 2011).*	The NSW Environment Protection Authority's (EPA's) submission commented on the use of ACARP 22027 and ACARP 20023 as references for some control factors used in the Air Quality and Greenhouse Gas Assessment (Appendix E of the EIS), and stated their preference for other emissions factors (summarised in Katestone, 2011).

		1. ACARP 22027 The Air Quality and Greenhouse Gas Assessment for the Project only references surface stabilisation control factors for wind erosion from ACARP 22027. Katestone (2017) prepared a benchmarking study for the EPA to determine appropriate dust controls to be implemented at the Maules Creek Coal Mine (*Best Practice Dust Management Benchmarking Study – Maules Creek Coal Mine* [Katestone, 2017]). This study updated the best practice control factors described in Katestone's 2011 report *NSW Coal Mine Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining*, which is referenced by the EPA in its submission. The Katestone (2017) study includes the specific surface stabilisation control factors used in the Air Quality and Greenhouse Gas Assessment for the Project (i.e. Katestone considers the surface stabilisation control factors documented in ACARP 22027 represent best practice management of wind erosion emissions). Therefore the surface stabilisation control factors used, which are consistent with ACARP C22027 and the Katestone (2017) study, are considered representative of best practice management and appropriate for the Project Air Quality and Greenhouse Gas Assessment. 2. ACARP 20023 The Air Quality and Greenhouse Gas Assessment for the Project only references surface treatment control factors (specifically watering of haul roads) from ACARP 20023. The EPA's submission stated the "90% control factor used for watering of roads is considered high and not achievable". Subsequent to the NSW Coal Benchmarking Study (Katestone, 2011) and the NPI Mining Manual (2012), the EPA's Dust Stop Pollution Reduction Program required all open cut coal mines in NSW to implement best practice measures to significantly reduce their dust emissions. The Dust Stop Pollution Reduction Program included a requirement for all mines to demonstrate at least 80% dust control was being achieved on active haul roads. This contradicts EPA's submission for the Project stating that a 75% control factor for watering is considered "more realistic and achievable".

	Recommendation	Response
		As a result of the Dust Stop Pollution Reduction Program, all NSW open cut coal mines successfully demonstrated control efficiencies of 80% or more. Results with greater than or equal to 90% control efficiency were reported by many mines, including: • Maules Creek Coal Mine (92%). *Maules Creek Coal Mine PRP E1: Monitoring Results – Wheel Generated Dust*, Pacific Environment Limited, 2016. • Werris Creek Coal Mine (96%). *Werris Creek Coal PRP U1: Monitoring Results – Wheel Generated Dust, Pacific Environment Limited, 2014.* • Bulga Coal Mine (90%). *Report for U1 Particulate Matter Control Best Practice Implementation – Wheel Generated Dust*, Glencore, 2014. As Whitehaven has demonstrated it can achieve greater than 90% control efficiency on unsealed haul roads at a number of its existing operations (e.g. Werris Creek and Maules Creek Coal Mines), it is reasonable to expect that at least a 90% level of control can be achieved for the Project. The Air Quality and Greenhouse Gas Assessment (Appendix E of the EIS) was peer reviewed by Todoroski Air Sciences (Aleks Todoroski, Director) (see Attachment 4 of the EIS). The peer review undertaken by Todoroski Air Sciences stated: *… The controls proposed appear to be sufficient and consistent with general best practice, especially in light of the relatively low predicted dust contributions.* *…* *The scale of the impacts appears to be consistent with the reviewer's expectations given the estimated dust emissions levels and the distance of sources to receptors. The Report indicates low levels of dust contribution due to the project.*
	Noise and Blasting Assessment	
1C	***Sound Power Levels*** *The sound power levels (SWLs) used as a basis of predicted noise impact levels for the Project are lower than expected by the EPA (see Table 5-4 Indicative Equipment SWL). If approved, the project is likely to have consent and licence limits based on noise emissions at the closest noise sensitive receivers. Underestimation of plant SWLs may result in a risk of non-compliance.*	The indicative sound power levels (SWLs) adopted in the Noise and Blasting Assessment (Section 5.5 of Appendix D of the EIS) are representative of current practice mining equipment, as evidenced by noise performance monitoring from the Maules Creek Coal Mine and other mines in the region.

	Recommendation	Response
	The EPA recommends the proponent provide additional information to validate the indicative SWLs in Table 5-4 of the NBA. ***Additional Information Request:*** *a) Additional information to validate the sound power levels for plant and equipment to be used for the Vickery Extension proposal.*	The EPA states "sound power levels (SWLs) used … for the Project are lower than expected by the EPA", however, EPA may not be aware of recent advances made by mining equipment manufacturers such as Hitachi to reduce SWLs. These SWL reductions have been achieved through implementation of a range of measures such as acoustic scanning of equipment (Plate 1) to identify and mitigate noise sources, re-engineered mufflers, variations to fan speed and modification of louvres to improve air flow. The use of current best practice mining equipment SWLs is consistent with the requirement for the Project to implement reasonable and feasible noise mitigation measures.  ***Plate 1: Acoustic Noise Scanning of Machinery (Source: Hitachi Construction Machinery Australia)***

Table 1 provides a comparison of the total SWLs adopted for the Approved Mine and the Project in Year 7.

Table 1
Predicted Total SWLs for Approved Mine and Project (Year 7)

Equipment	Approved Mine (Year 7)			Project (Year 7)		
	Number	SWL Per Item (dBA)	Total SWL (dBA)	Number	SWL Per Item (dBA)	Total SWL (dBA)
Trucks	33	114 – 118	132	50	107 – 113	130
Dozers	13	114 – 116	127	14	107 – 113	123
Excavators	7	115 – 117	125	9	113 – 114	123
Loaders	2	113	116	1	110	110
Drills	4	114	120	7	113	121
Graders	4	108	114	5	106	113
Scrapers	4	115	121	-	-	-
Water Carts	4	111	117	4	112	118
Ancillary	-	-	117.7	-	-	107
Infrastructure Area*	-	-	115.3	-	-	116.9
Rail	-	-	-	-	-	108
TOTAL	**-**	-	**135**	**-**	**-**	**132**

Source: Wilkinson Murray (2013; 2018)
** For the Project this includes noise sources at the CHPP and rail loop*

Generally, the total number of equipment required for the Project has increased, however total SWLs have reduced in comparison to those adopted for the Approved Mine (Table 1).

Note references for each indicative SWL used in the modelling are included in Table 5-4 of the Noise and Blasting Assessment in accordance with Section 3.3.1 of the *Noise Policy for Industry* (EPA, 2017) (NPfI), either to industry (i.e. manufacturer) or measurements conducted at other mine sites (e.g. Maules Creek Coal Mine).

	Recommendation	Response
		The Noise and Blasting Assessment was peer reviewed by Glenn Thomas (Director, SLR Consulting) (see Attachment 4 of the EIS). The peer review undertaken by SLR Consulting stated: *… SLR confirms that the Noise and Blasting Assessment for the Project has been prepared in accordance with the appropriate requirements of the SEAR's, including the Noise Policy for Industry (NPfI), and the Interim Construction Noise Guideline (ICNG).* *…* *In summary, this peer review confirms that the Noise and Blasting Assessment for the Project conforms to the relevant guidelines. The report is comprehensive, considers other stakeholders and has been undertaken in a professional manner. The conclusions reached in the report are supported by appropriate assessment methodologies, calculations and assumptions where necessary to do so.*
1D	***Low Frequency Correction*** *The proponent states that the Project is similar to Bulga Coal Mine and that the Bulga Village Noise Audit low frequency measurements were conducted at distances of 3 to 4 km from the open cut mine with propagation paths comparable to those of the Vickery Extension proposal.* *The EPA understands that a low frequency correction of +2 dB applies to Bulga Coal Mine at Bulga Village. The EPA seeks an explanation as to why an equivalent low frequency correction would not apply to Vickery Coal Mine.* ***Additional Information Request:*** *b) Additional information to justify why a low frequency correction should not be applied to noise emissions from the Vickery Extension proposal.*	The low frequency spectrum shape determined as part of a noise audit in Bulga Village has been assumed to be representative for the Project in the absence of on-site measurements (i.e. as the Project has not yet commenced). The analysis of the low frequency noise for the Project used the Bulga Village low frequency spectrum and normalised that spectrum to the Project-specific levels predicted from the noise model (Section 5.6 of Appendix D of the EIS). Based on this low frequency spectrum shape, whether receivers in the vicinity of the Bulga Coal Mine require a low frequency correction would be a function of their location with respect to the mine. With regard to the Project, the low frequency spectrum shape has been assessed for each receiver individually, and it was determined that it would be unlikely that any of the receivers surrounding the Project would be subject to dominant low frequency noise. As such, a low frequency modifying factor was not found to be applicable in this assessment. Upon review of noise monitoring reports for the Bulga Coal Mine, it appears since adoption of the methodology for low frequency noise described in the NPfI in Q4 2017, there have been approximately 76 measurements at 10 locations in the vicinity of the Bulga Coal Mine. Of these measurements, only one resulted in the application of a 2 dBA penalty, however a subsequent re-measure at the same location did not result in the application of a penalty. Based on the above, no further assessment of potential low-frequency noise is considered necessary.

	Recommendation	Response
1E	***Cumulative Noise Impact Assessment*** *Cumulative noise impacts from surrounding coal mines are not clearly referenced and or correctly assessed. The References in Section 10 of the NBA do not reference the document, Noise and Vibration Impact Assessment – Rocglen Coal Mine Extension Project Gunnedah New South Wales - Spectrum Acoustics dated June 2010. Rather, the proponent states that Rocglen noise levels are referenced for cumulative noise levels, and corrected to LAeq,9hr levels. The corrected noise levels for receivers 94 and 98 are not consistent with respect to the Spectrum Acoustics Report dated June 2010.* *The proponent needs to review and confirm all the results of Table 5-11 of the NBA for noise emissions from the Vickery Extension proposal, Boggabri Coal Continuation Project, Tarrawonga Coal Project and Rocglen Coal Mine Extension Project.* ***Additional Information Request:*** *c) Review the cumulative noise impact assessment and amend where necessary.*	For the purposes of cumulative noise assessment, noise levels from the Rocglen Coal Mine were converted to $L_{Aeq,9hr}$ levels by subtracting 3 dBA, consistent with the recommended procedure in the NPfI. The noise levels presented in Table 5-11 of Appendix D of the EIS for receivers 94 and 98 ($L_{Aeq,9hr}$ of 32 dBA and 36 dBA) are consistent with those stated in the Spectrum Acoustics report for the Rocglen Coal Mine Expansion (i.e. $L_{Aeq,15min}$ of 35 dBA and 39 dBA). Given the above, no revisions to the cumulative assessment of noise levels are considered necessary.

	Recommendation	Response
1F	***Sleep Disturbance Assessment – Impact of Horns*** *Section 5.12 of the NBA indicates that noise events with the potential to result in sleep disturbance include dumping material in empty trucks, dozer track noise, impact noise in the infrastructure area, and haul truck passbys.* *The proponent needs to clarify whether horn noise will also be a possible noise source and include this noise source in the sleep disturbance assessment if appropriate.* ***Additional Information Request:*** *d) Assessment of the potential for sleep disturbance from equipment horns if they are to be used on the Vickery Extension proposal.*	It is common practice for mobile equipment at mines to use horns to communicate between each other. However, radio communication would be progressed at the Project in place of horns, where safe to do so. A sleep disturbance assessment was undertaken as a component of the Noise and Blasting Assessment, which assessed a maximum instantaneous noise of 125 dBA L_{AFmax}. Note that noise levels from the Project due to night operations are predicted to be below the Project's 52 dBA L_{AFmax} trigger level at all privately-owned residences. Typical maximum noise levels for vehicle horns or alarms are in the range of 115 to 120 dBA (Bridges Acoustics, 2011). Such noise levels would be less than the maximum case noise levels modelled in the Noise and Blasting Assessment (i.e. excavator dumping in empty truck bodies and infrastructure area impact noise was modelled at 125 dBA). Therefore, noise levels from horns, would also be less than the Project's 52 dBA L_{AFmax} trigger level at all privately-owned residences. Given the above, no additional quantitative assessment of potential sleep disturbance due to equipment horns is considered to be necessary.

	Recommendation	Response
1G	***Proposed Construction Hours*** *Noise from construction activities associated with mines is typically similar in character to noise from mining operations and is thus assessed as operational noise.* *The EPA notes that construction activities are proposed from Monday to Sunday during daytime hours, which is outside the Interim Construction Noise Guideline's (ICNGs) recommended standard hours of Monday to Friday 7am – 6pm and Saturday 8am – 1pm.* *The EPA recommends that construction activities be carried out only during the ICNGs standard hours, unless adequate justification is provided in accordance with Section 2.3 of the ICNG. This is particularly important for the construction of the rail spur as the report acknowledges the character of these activities will differ significantly from operational noise.* ***Additional Information Request:*** *e) Any construction activities should be restricted to the recommended standard hours in the Interim Construction Noise Guideline unless strong justification is provided.*	Whitehaven would generally limit construction/development activities to between 7.00 am and 6.00 pm Monday to Sunday (inclusive) (Section 2.2.1 of Appendix D of the EIS). Construction activities outside standard hours (e.g. Saturday afternoon and Sunday) are considered justified as it would allow continuity of work for construction crews, reducing the length of the construction period and therefore the overall duration of potential impacts from construction noise at receivers. Activities associated with the construction of the rail spur would by nature progressively move along the rail spur corridor. Therefore, the likelihood of the construction activities occurring in the vicinity of these receivers while outside of recommended standard construction hours and during adverse conditions is low. Whitehaven would maintain construction noise levels such that they would comply with the 'Noise Affected' noise management level in accordance with the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009) outside of recommended standard construction hours, unless a negotiated agreement is entered into with the owners of the relevant properties.
1H	***Rail Noise Impact Assessment*** *The proponent assesses noise impacts from rail operations close to the project site under the Noise Policy for Industry (NPfI), and outside of this the Rail Infrastructure Noise Guideline (RING) is applied in Section 7 of the NBA.* *The noise impacts at Rail Section 1 are stated as being low according to Table 7-4 of the NBA. The corresponding night time noise impacts in Rail Section 5 indicate that the impacts may be greater, increasing the compliance offset distance from 345m to 441m (a 27% increase). It is unclear how these differing impacts have been determined, and the proponent should review and clarify the rail noise impact assessment.* ***Additional Information Request:*** *f) Review and clarify the rail noise impact assessment.*	It is noted this comment relates to noise along the Werris Creek Mungindi Railway (the Main Line) (i.e. not the Project rail spur). The rail noise assessment undertaken for the Project (Section 7 of Appendix D of the EIS) considers the increase in rail noise along five sections of the main line by comparing the number of rail movements with and without the Project. The number of "other" movements (i.e. not Project-related) increases along the Main Line as it gets closer towards Newcastle. The sections of the Main Line considered in the rail noise assessment were: • Section 1 - Junction of Main Line and Project Rail Spur to Whitehaven CHPP. • Section 2 - Whitehaven CHPP to Junction with Watermark Spur. • Section 3 - Junction of Watermark Spur to Junction with Werris Creek Mungindi Railway. • Section 4 - Werris Creek Mungindi Railway to Main Northern Railway. • Section 5 - Main Northern Railway to Muswellbrook Junction.

<table>
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The compliance offset distance for Rail Section 5 may increase during the night from approximately 410 m (existing/approved plus other proposed projects) to 441 m (existing/approved/other proposed plus the Project) (Table 7-5 of Appendix D of the EIS).

The 345 m value highlighted by the EPA includes existing/approved movements only (i.e. does not include other proposed projects) and comparing this to the 441 m value is not a representative indication of the potential increase in noise due to the Project.

Table 7-5 of Appendix D of the EIS is reproduced below and the distances described above are highlighted.

Table 7-5: Offset Distances to Achieve ARTC and RING Criteria - Sections 1-5
<table>
<tr><th rowspan="2">Section</th><th rowspan="2">ARTC/RING Criteria (dBA)</th><th colspan="3">Distance from Track (m)</th></tr>
<tr><th>Existing/Approved Movements</th><th>Existing/Approved Plus Other Proposed Movements</th><th>Existing/Approved/ Proposed plus Project Movements</th></tr>
<tr><td>1</td><td>65 (15 hr/day)
60 (9 hr/night)</td><td>86
222</td><td>86
222</td><td>116
294</td></tr>
<tr><td>2</td><td>65 (15 hr/day)
60 (9 hr/night)</td><td>98
259</td><td>98
259</td><td>116
294</td></tr>
<tr><td>3</td><td>65 (15 hr/day)
60 (9 hr/night)</td><td>121
312</td><td>121
312</td><td>138
345</td></tr>
<tr><td>4</td><td>65 (15 hr/day)
60 (9 hr/night)</td><td>121
312</td><td>146
378</td><td>162
410</td></tr>
<tr><td>5</td><td>65 (15 hr/day)
60 (9 hr/night)</td><td>138
345</td><td>162
410</td><td>177
441</td></tr>
<tr><td>All</td><td>L_{Amax} – 85 dBA with wheel defects
Without wheel defects (based on loco)</td><td>130
55</td><td>130
55</td><td>130
55</td></tr>
</table>
</td></tr>
</table>

	Recommendation	Response
1I	***Cumulative Frequency of Occurrence Graphs*** *The graph in Appendix E of the NBA for Year 07-Winter Night- Receiver 131a states a P10 Noise Level of 35 dB(A), however Table 5-8 of the NBA states a corresponding value of 34 dB(A). The proponent should review and amend the information in Appendix E against Table 5-8 predictions where necessary.* ***Additional Information Request:*** *g) Review the results of the cumulative frequency of occurrence graphs in Appendix E of the NBA.*	The methods of processing the noise results to determine the single P10 value presented in Table 5-8 of the Noise and Blasting Assessment and the range of values used to develop the graphs presented in Appendix E are slightly different. The minor difference noted between the two data sets is due to rounding. As these values and graphs have been included for information only (i.e. to provide some guidance as to the frequency of the noise levels determined in accordance with Fact Sheet D of the NPfI), no additional processing of the noise results is considered necessary.
	Surface Water Assessment	
	Dirty Water Area	
1J	***1) Assessment of Surface Water Impacts from Project Site*** *To ensure appropriate assessment of surface water impacts from the proposed site, the EPA requires an assessment of potential impacts of discharges from sediment basins be provided, based on:* • *comparison to either the relevant ANZECC trigger values for aquatic ecosystem protection or trigger values from suitable slightly modified ecosystem reference site which are selected and sampled in accordance with the Australian Water Quality Guidelines;* • *all potential pollutants that could cause non-trivial harm in discharges, including metals, salinity and pH; and* • *available dilution from receiving water flows that occur after sediment settling periods or when discharges will occur.*	Please see response to Recommendation 7 in Table A (NSW Department of Planning and Environment [DPE] Preliminary Issues Report Responses).

	Recommendation	Response
1K	*Any water quality assessment must separate:* *1. discharge trigger values or criteria (which should be based default trigger values in ANZECC 2000 for slightly to moderately disturbed aquatic ecosystems or site-specific trigger values from slightly modified reference sites selected and sampled in accordance with the Australian Water Quality Guidelines); and* *2. trigger values or criteria that may be used to assess ambient water quality differences upstream and downstream of the development. In this case site-specific trigger values from upstream sites on the Namoi River (that are not based on ANZECC reference site requirements) can be used to compare upstream water quality to downstream water quality using appropriate statistical comparisons. These upstream waters, however, if degraded, do not provide a basis for deriving site-specific discharge criteria.*	It is not considered necessary to model the effect of the infrequent overflow events from sediment dams to water quality in the Namoi River, given these events would occur when there would be a significant dilution effect in the receiving environment due to higher creek/river flows. On this basis, potential impacts to surface water quality were assessed by Advisian (2018) to be negligible. Whitehaven agrees with the EPA's comment that trigger values can be developed based on Australian and New Zealand Environmental and Conservation Council (ANZECC) 2000 and/or site-specific measurements both upstream and downstream of the Project, to confirm negligible impacts to water quality from the Project. These triggers will be described in a Water Management Plan to be developed for the Project.
1L	*The worst case for climatic conditions must also be considered in the discharge water quality assessment.*	The site water modelling is based on 124 years of daily rainfall records, and as such, considers the full range of climatic conditions (i.e. rainfall and evaporation) that have been experienced over this period. If the worst case climatic condition is considered to be the lowest rainfall conditions ("dry conditions"), there would be no discharge from the site. If the worst case climatic condition is considered to be the highest rainfall conditions ("wet conditions"), this would lead to a high dilution of any sediment dam overflows in the receiving environment. No releases of mine water or coal contact water are predicted based on the worst case climate sequence modelled.
1M	***2) Expanded Parameter Suite for Surface Water Monitoring Program*** *The proponent needs to commit to an expanded surface water monitoring program to validate/verify EIS predictions. This initial monitoring should occur until it is demonstrated that mitigation measures are effective (e.g. measures include placement of inert material on the outer surfaces of the waste rock emplacement.) Subject to initial results, a reduced suite of key indicators may*	Whitehaven agrees with the EPA's comment regarding surface water monitoring. Consistent with the recommendations of the Surface Water and Geochemistry Assessments (Appendices B and M of the EIS, respectively), surface water monitoring will be undertaken at points upstream and downstream on watercourses closest to the Project mining area (monitoring locations would be selected during development of the Water Management Plan) as follows: • Water quality monitoring of sediment dams would include analysis of pH, TSS, EC, total alkalinity/acidity, sulphate, aluminium, arsenic, molybdenum and selenium.

	Recommendation	Response
	be able to be developed, however, periodic monitoring of a wider suite of analytes may be required.	• Water quality monitoring during a controlled discharge would be conducted in accordance with an EPL for the Project and would include analysis of EC, TSS, pH, oil and grease and total organic carbon. • Water quality monitoring at selected locations along the ephemeral creeks surrounding the Project (on an opportunistic basis) would include EC, TDS, TSS, turbidity, pH, oil and grease, total organic carbon. The Project surface water management and monitoring program will be developed to validate and verify the EIS predictions.
	Mine Water Area	
1N	***1) Mine Water Reuse in Dirty Water Catchments*** *If reuse is proposed potential risks need to be identified and adequately assessed including:* • *salinity of irrigation water and related erosion and soil structure degradation risk to soils;* • *salinity and pollutants in mine water runoff to sediment basins that discharge to the environment and increased risk of a wide range of potential pollutants in discharges to the environment.*	Irrigation of mine catchments as a means of mine water disposal is not required during typical operations (i.e. mine water is preferentially used to meet on-site water demands associated with the Project CHPP and dust suppression). If irrigation of mine water to mine catchments is required as a contingency measure (i.e. in very wet periods) this would: • not result in erosion impacts causing increased sediment, as runoff would report internally to mine water dams or the open cut; and • not result in impact to soils, as mine catchments by definition have not had topsoil reapplication.
1O	***2) Permeability of Mine Water Storages*** *The proponent needs to commit to mine water storages being lined to a permeability equivalent to a 900mm clay liner with permeability not less than 10^{-9} ms^{-1}. A more permeable liner may be acceptable if a detailed justification is provided, including demonstration that the likely long-term fate of salt will not impact the beneficial use and environmental values of surrounding ground and surface waters.*	EPA's comment regarding lining of water storages is noted. It is expected this information would be confirmed as part of detailed design work for the Project.

	Recommendation	Response
1P	***3) Final Void Design*** *The proponent needs to investigate additional or alternate management solutions that demonstrate salinity impacts on the surrounding soil, ground and surface water environments are avoided or further minimised while there remains opportunity to amend the final landform.*	Please see response to Recommendation 10 in Table A (DPE Preliminary Issues Report Responses).
1Q	***4) Water Balance Modelling*** *Further clarification is to be provided regarding worst case conditions and the potential for no surface water discharge to occur under worst case rainfall conditions (which would require treatment and discharge limits to be developed).* *A program of verification monitoring of the EIS modelling must be developed and contingency options must be included to mitigate any significant deviations from the modelled output.*	The site water modelling is based on 124 years of daily rainfall records, and as such, considers the full range of climatic conditions (i.e. rainfall and evaporation) that have been experienced over this period. No releases of mine water or coal contact water are predicted based on the worst case climate sequence modelled. DPEs Independent Peer Reviewer (Martin Giles of BMT) stated: *Based on the review, it is considered that the parameters and methodology adopted for the modelling of surface water are appropriate. The results obtained from the modelling can be used to consider the water balance of the mine and the likelihood of discharges occurring from the mine to receiving downstream watercourses.* The Surface Water Assessment was peer reviewed by Emeritus Professor Tom McMahon (University of Melbourne) (see Attachment 4 of the EIS). The peer review states: *… overall, the study detailed in the Vickery Extension Project Surface Water Assessment Report was completed in a professional and detailed manner, and the conclusions in the Report are appropriately supplemented by suitable modelling studies carried out by the consultant.* Ongoing revisions of the site water balance would be conducted throughout the life of the Project to verify the site water balance modelling predictions in the Surface Water Assessment.
	Waste	
1R	*The proponent needs to demonstrate that all feasible and reasonable options have been considered with regards to waste management. The waste hierarchy of reducing waste generation, reusing and recycling waste needs to be considered with disposal being a 'last resort'.*	General waste minimisation principles (i.e. reduce, re-use and recycle) would be applied at the Project to minimise the quantity of wastes that require off-site disposal. Project waste management (including sewage and wastewater management) is described in Section 2.13 of the EIS. The Project waste management strategy would be prepared in accordance with the NSW *Protection of the Environment Operations Act, 1997* (PoEO Act) and relevant Development Consent and Environment Protection Licence (EPL) conditions.

	Recommendation	Response
	Groundwater	
1S	***1) Final Void Design*** *The proponent is to provide further discussion on alternate final mine landform and further justification for final voids if this remains the preferred option. Justification must include demonstration of how long-term impacts on ground and surface water quality (from salts and metals ingress) and existing groundwater flow paths will be maintained.*	Please see response to Recommendation 10 in Table A (DPE Preliminary Issues Report Responses).
1T	***2) Groundwater Quality Sampling Locations*** *The proponent is to provide a detailed map clarifying the locations of all groundwater monitoring bores used for groundwater quality sampling.*	Figure 17 of Appendix A of the EIS (reproduced below as Figure 1), which was included in EPA's submission, shows the location of test sites for the groundwater investigation programme undertaken to confirm the extent of the Namoi River Alluvium. Figure 16 of Appendix A of the EIS (reproduced below as Figure 2) shows existing groundwater monitoring locations within and in the vicinity of the Project area. Groundwater monitoring locations are also detailed in Section 2.9 of Appendix A of the EIS. The existing groundwater monitoring network would be reviewed as part of preparation of the Water Management Plan, with consolidation of the network as required.

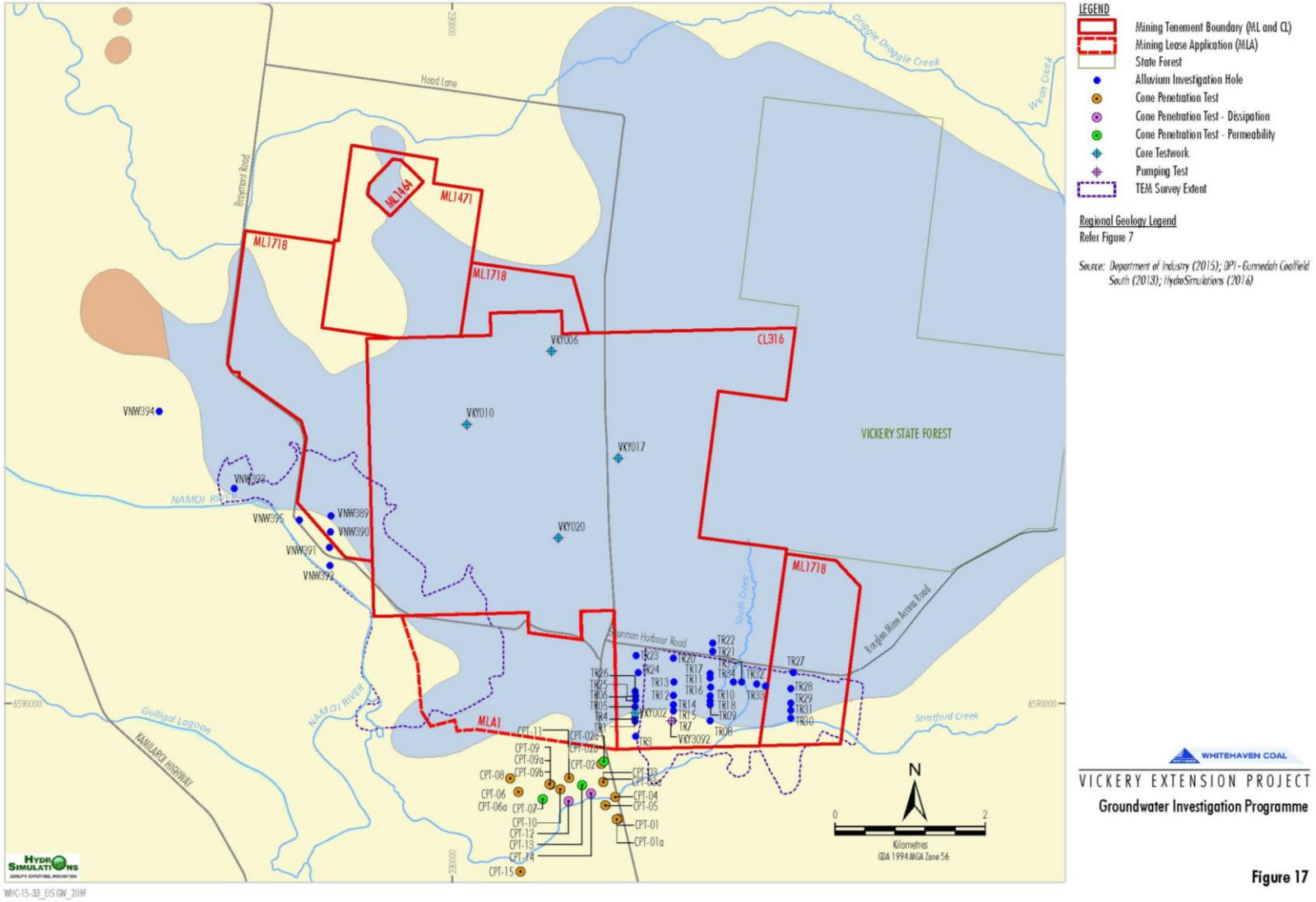


Figure 1: Groundwater Investigation Programme

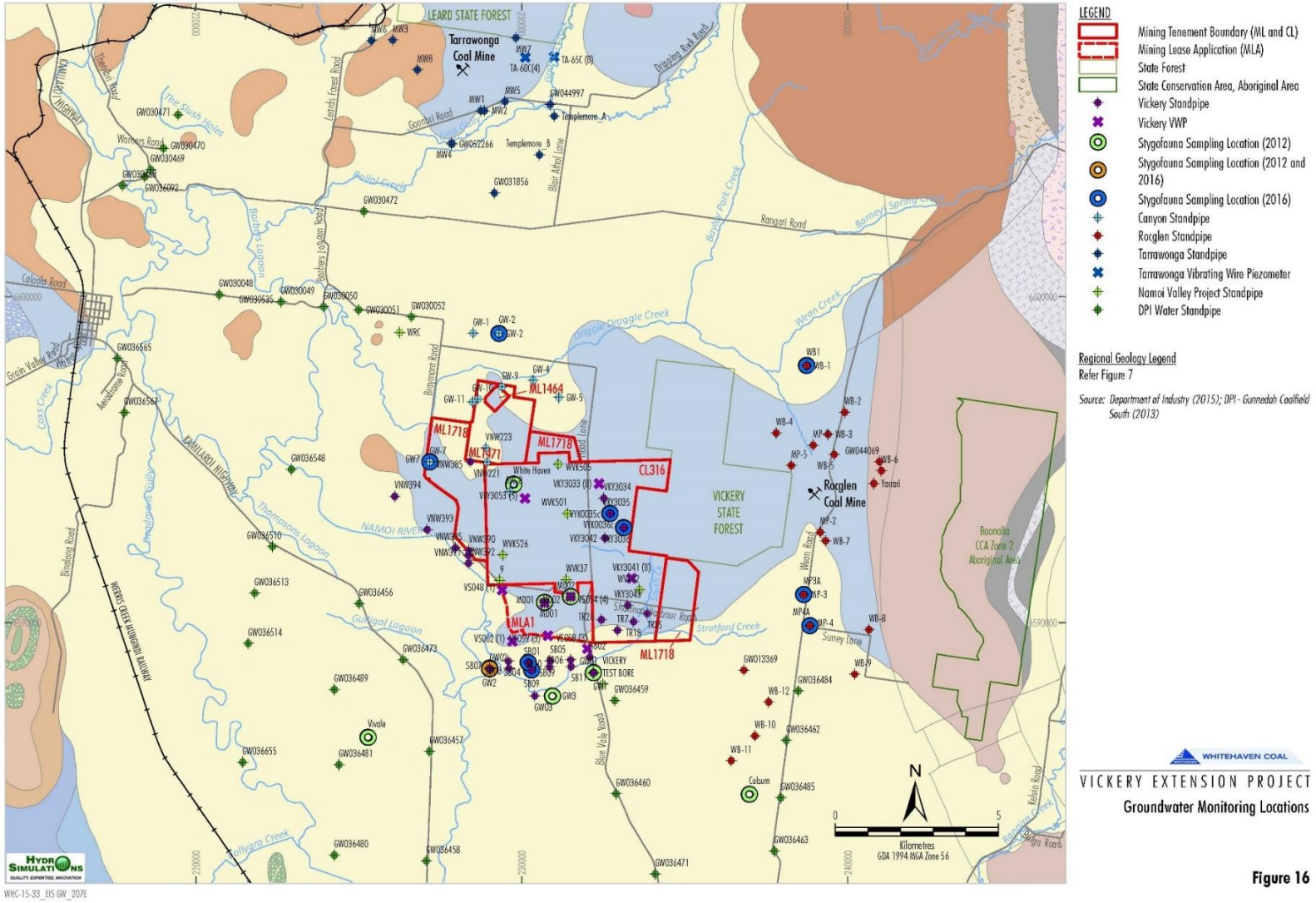
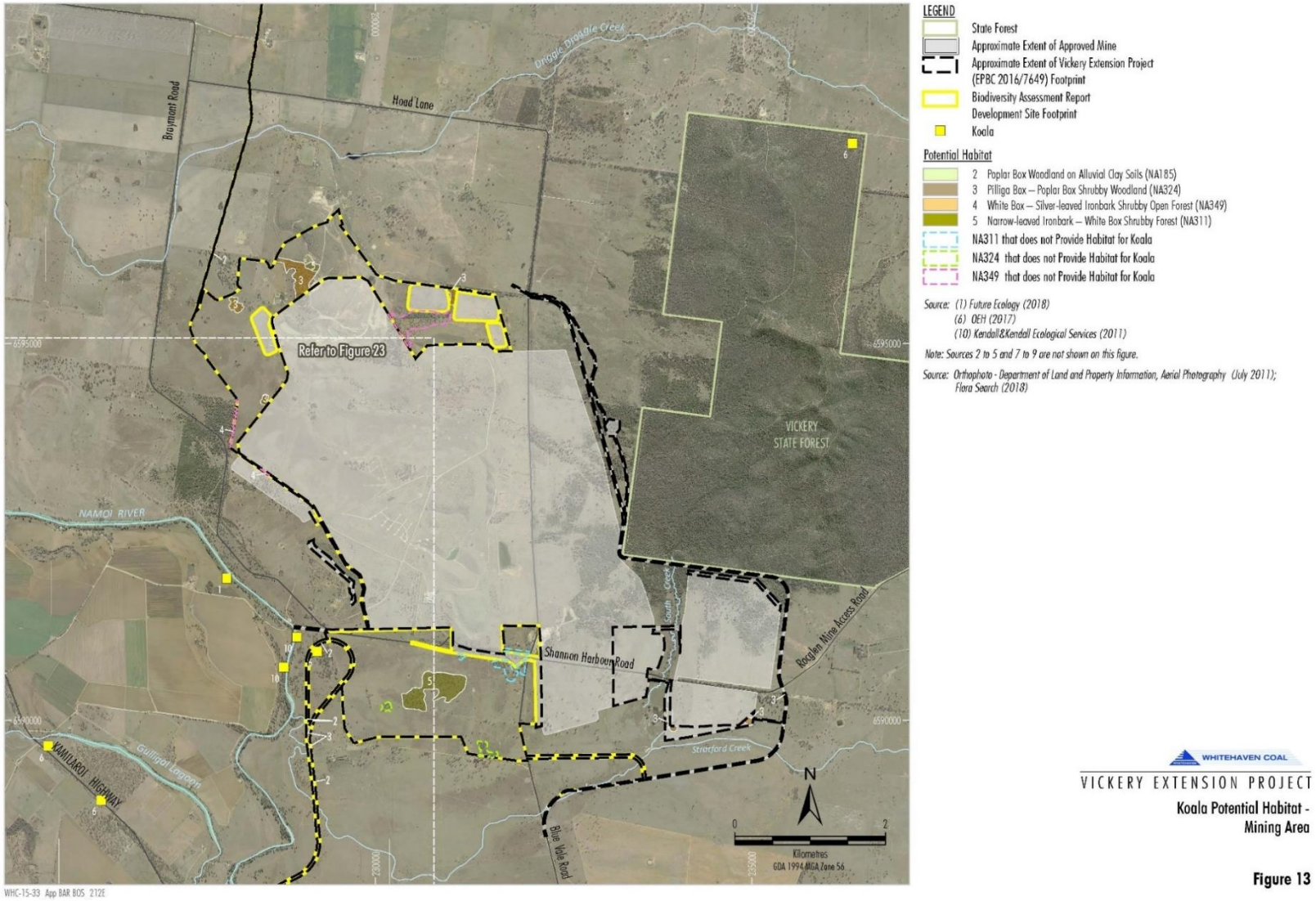


Figure 2: Groundwater Monitoring Locations

	Recommendation	Response
2	**OEH**	
	Biodiversity	
2A	1. *The species credit polygons for the koala should be increased from 44.6 hectares to 72.6 hectares at the mine site. The subsequent species credit liability for the koala should be updated and offset appropriately.*	Whitehaven intends to work with the NSW Office of Environment and Heritage (OEH) to finalise the biodiversity offset requirements for the Project. The following provides an initial response to OEH's comments. The species credit polygon mapped for the Koala (Figures 13 and 23 of Appendix F of the EIS, reproduced as Figures 3 and 4 below) is consistent with *State Environmental Planning Policy No 44 – Koala Habitat Protectio*n (SEPP 44) and the NSW *Recovery Plan for the Koala* and covers all potential habitat in the vicinity of records of the Koala near the Namoi River. OEH requests that the Koala species credit polygon be expanded to also include other tree species (which are not listed in SEPP 44 or the NSW *Recovery Plan for the Koala*) in patches and scattered trees further away from the Namoi River, where the Koala has not been recorded and is considered unlikely to occur due to a lack of primary feed trees. Whitehaven is concerned that OEH's proposed approach for mapping the Koala species credit polygon in the Project area will not be applied equally to the proposed offset areas for the Project, due to the differences in assessment processes that will apply to the offset areas. Whitehaven is aware that offset areas for the Project will need to be secured under the NSW *Biodiversity Conservation Act, 2016* (BC Act) (or other acceptable mechanism) in accordance with the Biodiversity Assessment Method (BAM) and credits generated under the BC Act are not equivalent to those generated under the NSW *Threatened Species Conservation Act, 1995* (TSC Act). It is understood that OEH considers the 'reasonable equivalence' of biodiversity credits on a case by case basis. Under the BC Act, the Koala is now a species credit species only within 'important' habitat that will be mapped by OEH. It is understood that species credits are not required for a development site, and cannot be generated at an offset area, unless within a mapped 'important' habitat. Increasing the Koala species credit polygon to 72.6 ha in the NSW Assessment Footprint and 108.9 ha in the Commonwealth Assessment Footprint would be subject to further discussion with OEH, particularly with respect to consistency with OEH's mapping of 'important' habitat under the BC Act. Note that Quadrat 10 is not in NA324 (as mentioned by OEH) but is in NA185, outside the development footprint. Therefore it is not relevant to the Koala species credit polygon.



LEGEND

- State Forest
- Approximate Extent of Approved Mine
- Approximate Extent of Vickery Extension Project (EPBC 2016/7649) Footprint
- Biodiversity Assessment Report Development Site Footprint
- Koala

Potential Habitat

- 2 Poplar Box Woodland on Alluvial Clay Soils (NA185)
- 3 Pilliga Box – Poplar Box Shrubby Woodland (NA324)
- 4 White Box – Silver-leaved Ironbark Shrubby Open Forest (NA349)
- 5 Narrow-leaved Ironbark – White Box Shrubby Forest (NA311)
- NA311 that does not Provide Habitat for Koala
- NA324 that does not Provide Habitat for Koala
- NA349 that does not Provide Habitat for Koala

Source: (1) Future Ecology (2018)
(6) OEH (2017)
(10) Kendall&Kendall Ecological Services (2011)

Note: Sources 2 to 5 and 7 to 9 are not shown on this figure.

Source: Orthophoto - Department of Land and Property Information, Aerial Photography (July 2011); Flora Search (2018)

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VICKERY EXTENSION PROJECT

Koala Potential Habitat - Mining Area

Figure 13

Figure 3: Koala Potential Habitat – Mining Area

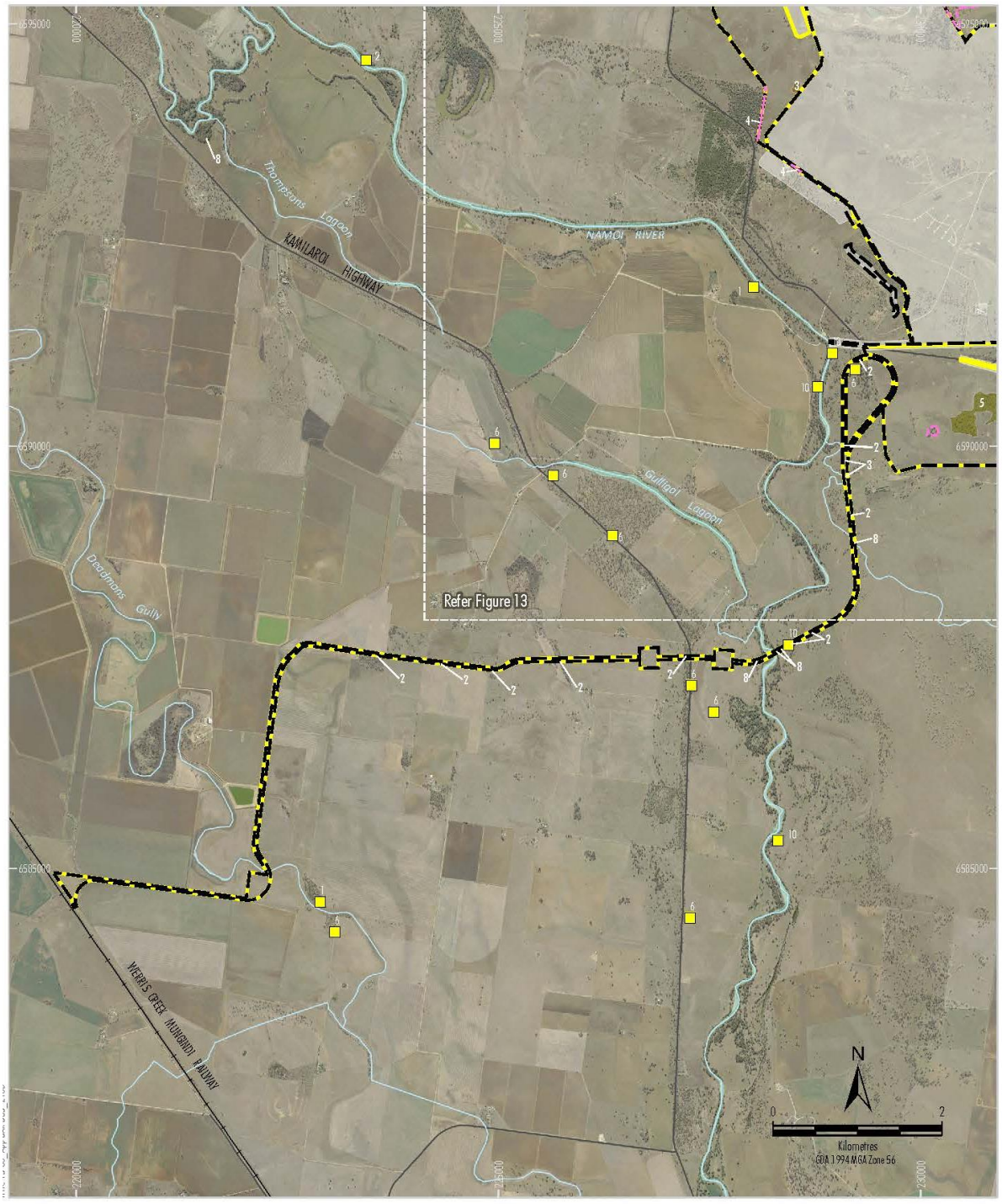


Figure 4: Koala Potential Habitat – Project Rail Spur

	Recommendation	Response
2B	2. *The species credit polygons for the koala in the Commonwealth assessment footprint should be reviewed and updated. The subsequent species credit liability for the koala should be updated and offset appropriately.*	Increasing the Koala species credit polygon to 108.9 ha in the Commonwealth Assessment Footprint (and 72.6 ha in the NSW Assessment Footprint) would be subject to further discussion with OEH, particularly with respect to consistency with OEH's mapping of 'important' habitat under the BC Act (see response to submission 2A). Whitehaven intends to work with OEH to finalise the offset requirements for the Project.
2C	3. *The proposal to develop a Koala Management Plan for the Vickery Extension Project should be captured in the project approval.*	Whitehaven is preparing a Koala Plan of Management for the Project that describes measures to manage the impact to koala habitat along the Namoi River, in accordance with *State Environmental Planning Policy No 44 – Koala Habitat Protection*. The Koala Plan of Management will be provided to DPE and OEH for review as a component of the Responses to Submissions. The final Koala Plan of Management will be made available on Whitehaven's website.
2D	4. *Further justification should be provided to explain why NA185 (poplar box woodland on alluvial clay soils) would not be used as habitat by the squirrel glider.*	Figures 19 and 24 of Appendix F of the EIS (reproduced as Figures 5 and 6 below) show that the records of the Squirrel Glider are within NA324 and NA193, both recognised in the OEH's *Archived BioMetric and Threatened Species Profiles Datasets*. OEH's *Archived BioMetric and Threatened Species Profiles Datasets* does not recognise NA185 as habitat and the Squirrel Glider was not recorded in NA185.

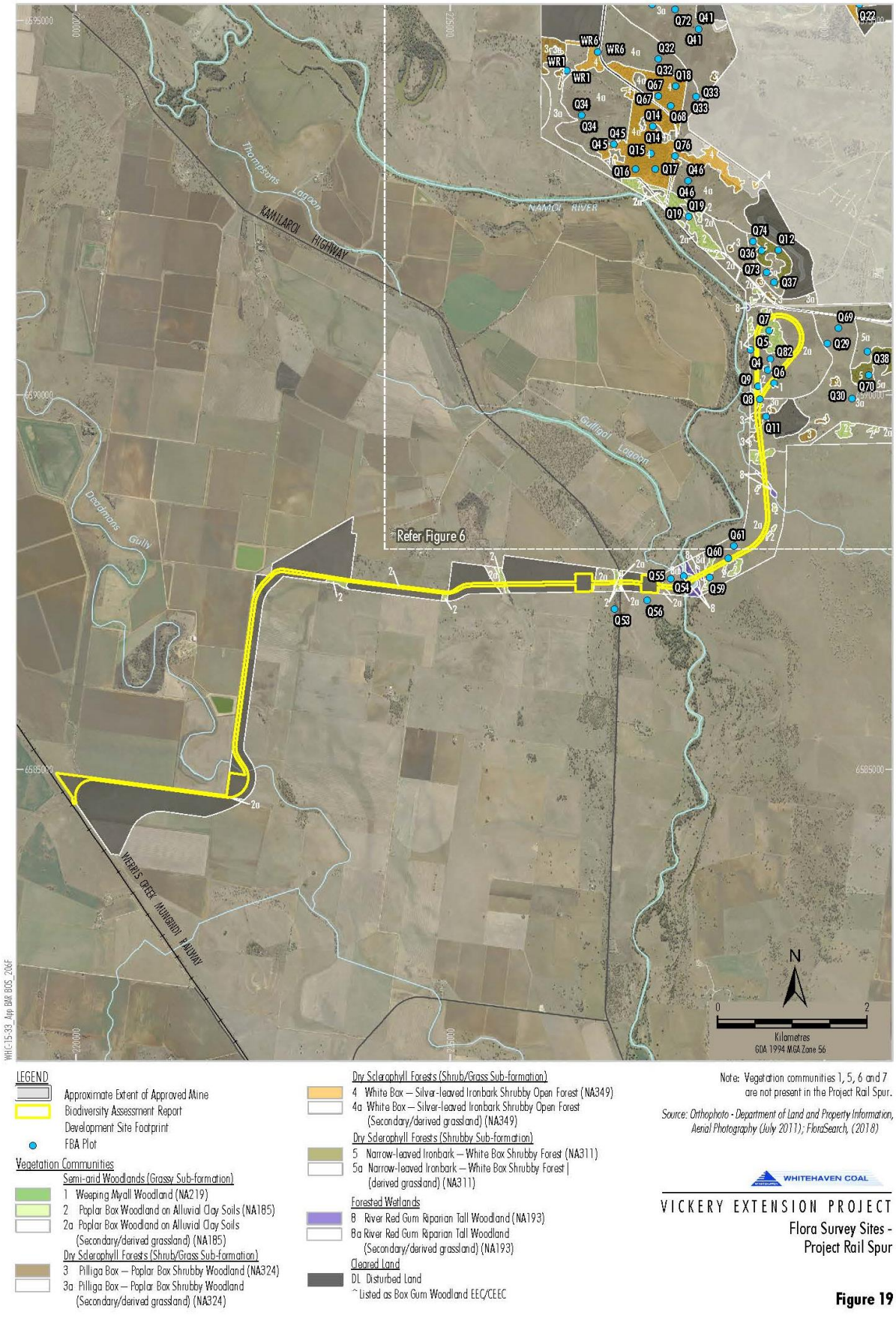


Figure 5: Flora Survey Sites – Project Rail Spur

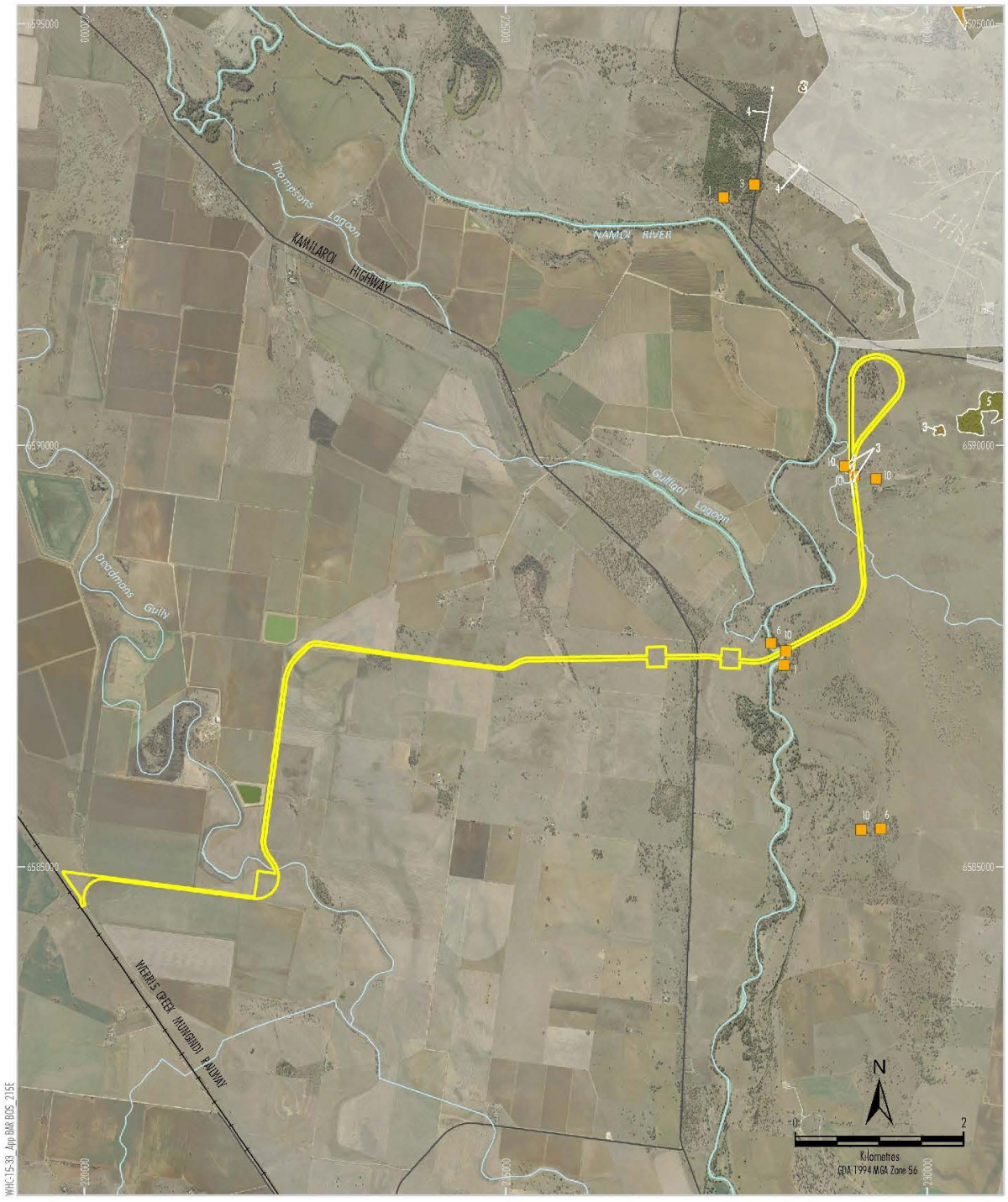


Figure 6: Squirrel Glider Potential Habitat – Project Rail Spur

	Recommendation	Response
2E	5. *Further information should be provided detailing how the area of potential habitat was determined for each EPBC Act-listed species likely to be significantly impacted by the proposed development. This should include the area of each vegetation community considered to be habitat for each species.*	This information is provided in Table 36 of Appendix F of the EIS (reproduced below). The assignment of vegetation types to habitat is consistent with OEH's data (i.e. the *Archived BioMetric and Threatened Species Profiles Datasets*). Increasing the Koala species credit polygon to 108.9 ha in the Commonwealth Assessment Footprint (and 72.6 ha in the NSW Assessment Footprint) would be subject to further discussion with OEH, particularly with respect to consistency with OEH's mapping of 'important' habitat under the BC Act. Whitehaven intends to work with OEH to finalise the offset requirements for the Project.
2F	6. *The consolidated project approval should be updated to capture the increased area of Offset Area 5 (65 hectares compared to 52 hectares in the existing approval).*	This comment regarding conditions of approval of the Project is directed at DPE.
2G	7. *The Biodiversity Offset Strategy should be updated to include all of the information required in Section 12.2 of the FBA.*	Under the *NSW Offset Policy* (OEH, 2014a) (and associated *Framework for Biodiversity Assessment* [OEH, 2014b]), the number of ecosystem credits produced for mine rehabilitation does not vary according to the vegetation type proposed to be established (Section 6.2.2.1 of Appendix F of the EIS). Therefore, it is reasonable that, prior to the commencement of construction of the Project, the Mining Operations Plan (MOP) (or equivalent) required under the NSW *Mining Act, 1992* would identify: • the vegetation types proposed to be targeted in the Project mining area (that occur in the surrounding sub-region and are the same vegetation class as the vegetation types listed in Table 37 of Appendix F of the EIS); • a list of suitable native plant species to be used in the revegetation of the post-mining landforms; and • completion/relinquishment criteria. The MOP would be prepared in accordance with relevant NSW Government rehabilitation and mine closure guidelines. Accordingly, this information is not considered to be required prior to determination of the Project.

Table 36
Relevant Matters of National Environmental Significance - Potential Habitat Clearance

Vegetation Community		Potential Habitat Clearance (ha)					
		Swift Parrot	Regent Honeyeater	Painted Honeyeater	Koala	Corben's Long-eared Bat	Large-eared Pied Bat
Semi-arid Woodlands (Grassy Sub-formation)							
2	Poplar Box Woodland on Alluvial Clay Soils	0	3.7	3.7	3.7	3.7	3.7
2a	Poplar Box Woodland on Alluvial Clay Soils (secondary/derived grassland)	0	0	0	0	88.5	0
Dry Sclerophyll Forests (Shrub/Grass Sub-formation)							
3	Pilliga Box – Poplar Box Shrubby Woodland	26.7	0	26.7	22.7	26.7	26.7
3a	Pilliga Box – Poplar Box Shrubby Woodland (secondary/derived grassland)	0	0	0	0	339.3	0
4	White Box – Silver-leaved Ironbark Shrubby Open Forest	17	17	17	0.5	17	17
4a	White Box – Silver-leaved Ironbark Shrubby Open Forest (secondary/derived grassland)	0	0	0	0	38	0
Dry Sclerophyll Forests (Shrubby Sub-formation)							
5	Narrow-leaved Ironbark – White Box Shrubby Forest	60	53	60	53	60	60
5a	Narrow-leaved Ironbark – White Box Shrubby Forest (secondary/derived grassland)	0	0	0	0	148.5	0
Freshwater Wetlands							
7	Mixed Marsh Sedgeland	0	0	0	0	4	0
Forested Wetlands							
8	River Red Gum Riparian Tall Woodland	1	1	1	1	1	1
8a	River Red Gum Riparian Tall Woodland (secondary/derived grassland)	0	0	0	0	1.7	0
	Scattered paddock trees in secondary derived grassland	0	0.5	0	0	0	0
Habitat in the Commonwealth Assessment Footprint		***104.7***	***75.2^***	***108.4^***	***80.9^***	***728.4>***	***108.4^***

^ Potential foraging habitat.

> Potential foraging and breeding habitat

	Recommendation	Response
2H	*8. The species credits able to be generated on Offset Areas 6, 7, 8 and Mt Somner in accordance with the FBA must be reviewed. If the review results in a reduction of species credits generated by the current BOS, additional species credits must be retired to satisfy the species credit liability.*	Whitehaven is aware that biodiversity offset areas for the Project will need to be secured under the BC Act in accordance with the BAM, and credits generated under the BC Act are not equivalent to those generated under the TSC Act. It is understood that OEH considers the 'reasonable equivalence' of biodiversity credits on a case by case basis. Whitehaven may choose to substitute proposed Offset Areas 6, 7, 8 or the Mt Somner Property with alternative offset areas that produce the type and number of species credits required. With regard to the specific issues in relation to species credits identified by OEH, the following is noted: **Regent Honeyeater** OEH comment: • *The regent honeyeater was not recorded on Offset Areas 6, 7, 8 or Mt Somner.* Response: • The Regent Honeyeater was not recorded in the Project area and no 'important' habitat for the Regent Honeyeater has been mapped by OEH in the Project area. • Offsetting the impact from the Project within only 'important' habitat mapped by OEH (i.e. elsewhere in NSW) would not be 'reasonable equivalent'. **Squirrel Glider** OEH comment: • *The squirrel glider was not recorded on Offset Area 7, 8 or Mt Somner. Figure 35 in the BAR indicates that the squirrel glider was recorded in Offset Area 6 in 2018. However, no details regarding this record have been provided.* Response: • The Squirrel Glider was recorded in proposed Offset Area 6 by Future Ecology (2018) (Attachment D of Appendix F of the EIS) and Cenwest (2011).

	Recommendation	Response
		Koala OEH comment: • *The koala was not recorded on Offset Areas 6, 7 or 8. The koala was recorded on Mt Somner in 2012. No details of this survey have been provided. Given that this survey occurred more than 5 years ago, its results can inform the credit generation process, but it cannot be used in place of a targeted threatened species survey. No koalas were recorded during the surveys undertaken for this project.* Response: • OEH's proposed approach for mapping the Koala species credit polygon (i.e. 'important' habitat mapping under the BC Act) in the Project area should also apply to the proposed offset areas. • The FBA does not specify that fauna records need to be less than 5 years old. Whitehaven welcomes further discussions with OEH in relation to the generation of 'reasonably equivalent' species credits.
2I	*9. The ecosystem credits able to be generated on Offset Areas 6, 7, 8 and Mt Somner in accordance with the FBA should be reviewed. If the review results in a reduction of ecosystem credits generated by the current BOS, additional ecosystem credits must be retired to satisfy the ecosystem credit liability.*	Whitehaven is aware that biodiversity offset areas for the Project will need to be secured under the BC Act (or other acceptable mechanism) in accordance with the BAM, and credits generated under the BC Act are not equivalent to those generated under the TSC Act. It is understood that OEH considers the 'reasonable equivalence' of biodiversity credits on a case by case basis. Whitehaven may choose to substitute proposed Offset Areas 6, 7, 8 or The Mt Somner Property with alternative biodiversity offset areas that produce the type and number of ecosystem credits required. Whitehaven welcomes further discussions with OEH in relation to the generation of 'reasonably equivalent' ecosystem credits.

	Recommendation	Response
	Aboriginal Cultural Heritage	
2J	1. *That the proponent facilitates and documents on-site discussion between the RAPs and the experts about the results of the technical investigation of the scarred trees, allowing opportunities for the RAPs to discern the technical findings of the expert assessments, and to also be given opportunity to discuss the findings.*	This requirement has already occurred. The scarred tree reassessment reports prepared by Kamminga and Lance (2016) and Burns (2016) were appended to the draft (and final) Aboriginal Cultural Heritage Assessment (ACHA), which was provided to the Registered Aboriginal Parties (RAPs) for comment during each of the consultation periods as well as during the EIS public exhibition. No comments received from the RAPs during any of the ACHA consultation periods identified any issues with the results of the scarred tree reassessments.
2K	2. *That the proponent submits the expert reports to the OEH AHIMS Registrar notifying the AHIMS Registrar of the expert findings and include outcomes of any on-site discussions with the RAPs.*	None of the possible scarred trees were entered into the Aboriginal Heritage Information Management System (AHIMS) database during the assessment undertaken by Hudson in 2012. Therefore the scarred tree reassessment reports (Kamminga and Lance, 2016; Burns, 2016), which concluded that none of the identified scarred trees were of Aboriginal cultural origin, do not need to be provided to the AHIMS Registrar as there are no AHIMS site cards to be updated.
2L	3. *Undertake adequate investigations of potentially sensitive areas associated with the Namoi River with reference to best practice procedures.*	OEH's comment that it is satisfied that the Project rail spur will not impact the 'chain of ponds' feature close to the Namoi River is noted. Surveys would be undertaken in accordance with the methodology outlined in Appendix G of the EIS and any requirements in the Heritage Management Plan prepared for the Project. As requested by OEH, and if determined to be required during survey, best practice salvage and/or excavation would be undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010).
2M	4. *The proposed cultural heritage management plan includes additional analysis of axe grinding groove site AHIMS 24-4-0009.*	Wilkinson Murray (2018) predicted vibration levels at the grinding groove site 'Wilga' (AHIMS 20-4-0009) would not exceed 6.3 mm/s (note the nominated vibration criteria is 80 mm/s) and therefore would not be indirectly impacted by the Project (Section 8.3.2 of Appendix D of the EIS). The grinding groove site would be inspected by a structural engineer prior to commencement of blasting to confirm the nominated blasting criteria. Blast vibration monitoring, including monitoring at the grinding groove site, would be undertaken for the Project and would be detailed in the Blast Management Plan.

	Recommendation	Response
		A detailed site inspection of the grinding groove site (including ground truthing and artefact identification) would be undertaken by a suitably qualified archaeologist to update the site card for the site, prior to commencement of Project blasting.
	Flooding and Hydrology	
2N	*1. OEH requests the opportunity to review the detailed design to ensure design objectives have been met.*	Please see response to Recommendation 1 in Table A (DPE Preliminary Issues Report Responses).
2O	*2. The impact of the rail line on flow distribution should be assessed for the 1% AEP (annual exceedance probability).*	Please see response to Recommendation 2 in Table A (DPE Preliminary Issues Report Reponses).
2P	*3. Further information regarding the cumulative impact assessment should be provided. Additional modelling may be required to assess cumulative impacts against pre-developed conditions.*	The TUFLOW model has been developed using the best available topography sources. The topography data across the model extent is sourced from an airborne laser survey (ALS) in 2000, and has been supplemented with more detailed data in the vicinity of the Project, including LiDAR survey data and a more detailed ALS, conducted in 2011 and 2015, respectively (Section 5.2.2 of Appendix C of the EIS). As the flood model has been developed using ALS and LiDAR data, it includes the floodplain infrastructure that was present at the time of the surveys. As the model includes both existing built infrastructure as well as proposed Project infrastructure, it is considered to represent a cumulative impact assessment (Section 6.4.5 of Appendix C of the EIS).
2Q	*4. An assessment of the impact of potential erosion should be considered for the areas where there is a measurable increase in flow velocity.*	The flood model results predicted an increase in velocity between 0.2 m/s and 0.5 m/s at the ends of embankment sections of the Project rail spur (Figure 6.13 of Appendix C of the EIS, reproduced below as Figure 7). Note that Whitehaven proposes to elevate all section of the Project rail spur west of the Namoi River on piers and/or pylons. The predicted increases to flood velocities in localised areas would comply with the velocity impact requirement set out in the *Draft Floodplain Management Plan for the Upper Namoi Valley Floodplain 2016* (Draft FMP), and would be constrained to Whitehaven-owned land. Appropriate erosion and sediment control measures will be implemented at locations of increased velocity, where required.

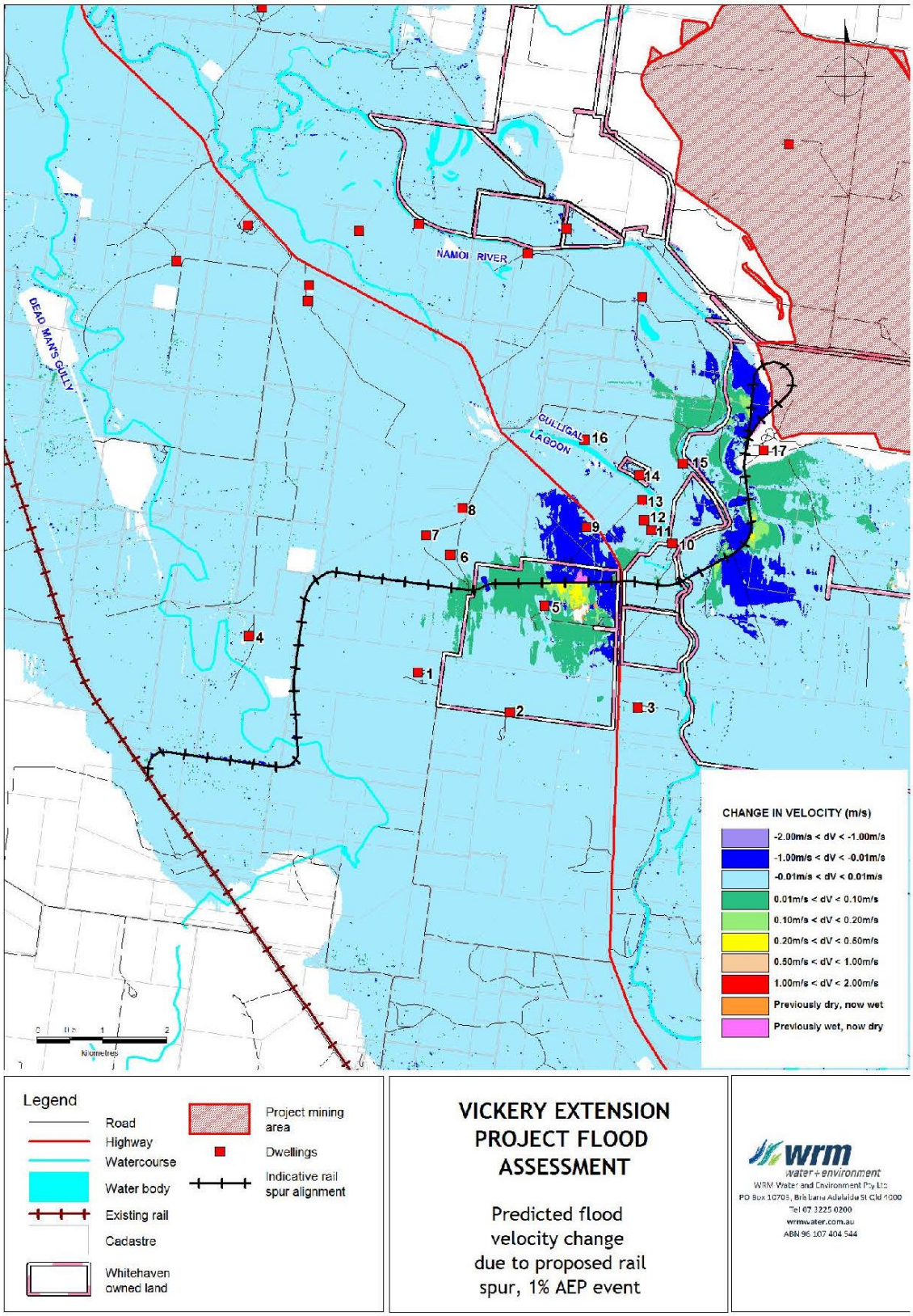
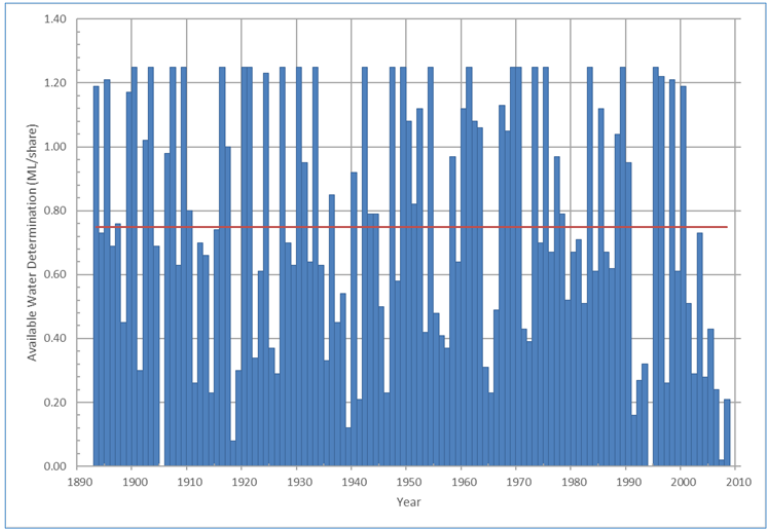


Figure 6.13 - Predicted flood velocity change due to Project rail spur, 1% AEP event

Figure 7: Predicted Flood Velocity Change Due to Project Rail Spur, 1% AEP Event

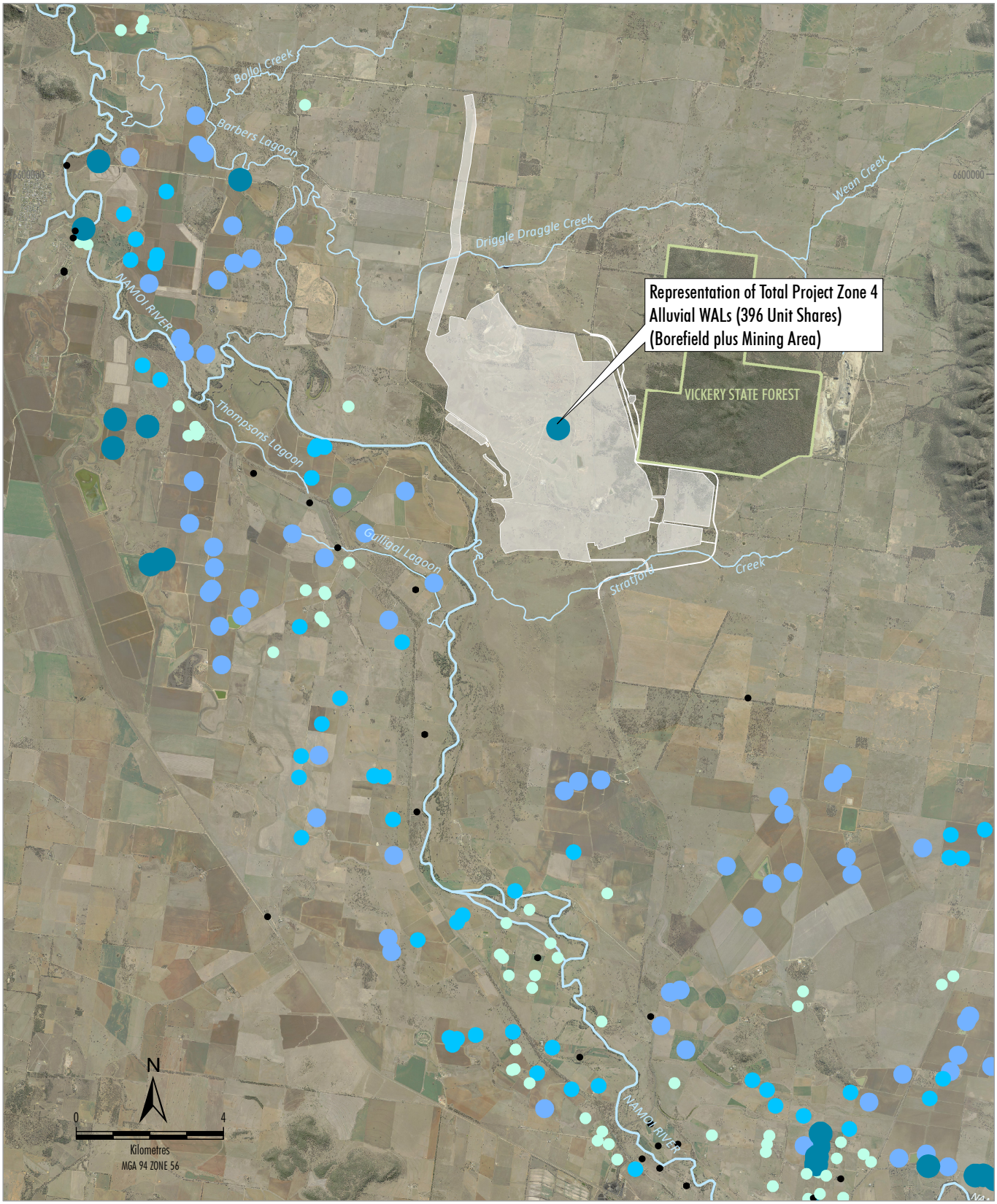
	Recommendation	Response
3	**NSW HERITAGE COUNCIL**	
3A	*Should the application be approved by DPE, it is recommended that conditions of approval require:* • *Implementation of the mitigation measures outlined in Section 7.4 of the Extent Report; and* • *The preparation and implementation of a Heritage Management Plan in accordance with the recommendations outlined in Section 7.4 of the Extent Report. In addition, the Heritage Management Plan should include a cyclical maintenance plan for both built and landscape elements.*	This comment regarding conditions of approval of the Project is directed at DPE. Whitehaven will prepare a Heritage Management Plan for the Project incorporating the recommended management measures in the Historic Heritage Assessment (Appendix K of the EIS). The Heritage Management Plan will also detail specific maintenance and management measures for the Kurrumbede Homestead Complex.
4	**ARTC**	
4A	*ARTC utilises existing mechanisms within the Hunter Valley Access Undertaking to identify, plan and increase capacity as and when required to meet contractual requirements ongoing. ARTC confirms that these mechanisms, including the associated commercial aspects, can enable sufficient capacity to be made available for the Vickery Extension Project.*	The Australian Rail Track Corporation's (ARTC's) comment that there is sufficient capacity on the Main Line for the Project requirements is noted. Whitehaven will continue to consult with the ARTC regarding Project-related rail transport.
5	***NSW HEALTH***	
	Water Quality	
5A	*Potential acid forming and sodic material discharges were assessed as medium risk and will be managed by a suitably sized water management system and regular monitoring as recommended in the Geochemistry Assessment and Geoenvironmental Management Plan 2018 (Appendix M to the EIS). A Water Management Plan should be prepared, implemented and regularly reviewed. The Plan should contain a complete water management risk assessment. The risk assessment should inform control strategies that can protect groundwater, surface water (on and off-site), potable water, process water and wastewater associated with this project and its ongoing operation.*	NSW Health's comment regarding content of the Water Management Plan is noted. A Water Management Plan will be prepared for the Project in consideration of the requirements of any relevant Development Consent and EPL conditions.

	Recommendation	Response
	Noise	
5B	*A Noise Management Plan (NMP) should be prepared to include control and avoidance measures and specifically note details of noise level 'triggers' that would result in operational noise controls being invoked. The NMP should include a register of noise complaints and response should be maintained.*	NSW Health's comment regarding content of the Noise Management Plan is noted. A Noise Management Plan will be developed for the Project in consideration of the requirements of any relevant Development Consent and EPL conditions.
	Air Quality	
5C	*The Air Quality Management Plan (AQMP) should include measures to monitor and reduce the generation and emission of particle matter. The AQMP should describe how the emissions will be managed in relation to the proposed extension to the mining operations, haulage of the coal, spontaneous combustion of coal stockpiles, adverse weather conditions and community complaints. The plan should also include condition/s for comprehensive ongoing and continuous monitoring for PM10, PM2.5 particles and TSP.*	NSW Health's comment regarding content of the Air Quality Management Plan is noted. An Air Quality Management Plan will be developed for the Project in consideration of the requirements of any relevant Development Consent and EPL conditions.
	Community Consultation	
5D	*It is important that the community is effectively and continually engaged throughout the approval process and if approved, during the ongoing operation of the development as suggested in the EIS.*	In accordance with the recommendations of the Social Impact Assessment (Appendix R of the EIS), Whitehaven will continue to engage with the community regarding the Project during the assessment process and throughout the construction and operation of the Project.

	Recommendation	Response
6	***DEPARTMENT OF INDUSTRY – CROWN LANDS AND WATER RESOURCES***	
	Prior to Project Determination	
	Crown Lands & Water Resources	
6A	*Confirmation is required that water entitlements currently held are sufficient to account for existing projects and the proposed project as relevant. Sufficient licensed water entitlements must be held in all relevant groundwater, regulated surface water and unregulated surface water sources. Where additional entitlement is required, the EIS should demonstrate how this will be acquired.*	Attachment 6 of the EIS details water licensing for the Project. Whitehaven holds sufficient surface water and groundwater access licences (net of licences required for groundwater inflows) to account for predicted operational water supply requirements and these water access licenses have been allocated to the Project. The site water balance modelling for the Project included consideration of changes in Available Water Determinations (AWDs) of general security river licences for the lower Namoi River due to changes in climatic conditions, based on AWDs reported in the NSW Department of Primary Industry's 2013 document "*Water availability in NSW Murray-Darling Basin regulated rivers, Appendix of annual data*" and contemporary AWD data (from 2013 onwards) (Plate 2) (Section 7.10 of Appendix B of the EIS).  ***Plate 2: Modelled Annual General Security Available Water Determination - Lower Namoi River***

	Recommendation	Response
		DPE's peer reviewer for surface water stated in regard to the site water balance modelling: *Based on the review, it is considered that the parameters and methodology adopted for the modelling of surface water are appropriate. The results obtained from the modelling can be used to consider the water balance of the mine…* The Surface Water Assessment was peer reviewed by Emeritus Professor Tom McMahon (University of Melbourne) (see Attachment 4 of the EIS). The peer review states: *…in Section 2 the Secretary's Environmental Assessment Requirements are discussed. As far as I can ascertain, all the requirements have been dealt with.* As stated above, the peer review undertaken by Professor Tom McMahon also states: *… overall, the study detailed in the Vickery Extension Project Surface Water Assessment Report was completed in a professional and detailed manner, and the conclusions in the Report are appropriately supplemented by suitable modelling studies carried out by the consultant.* Whitehaven also holds sufficient water access licences to account for groundwater inflows to the open cut and induced losses from the Namoi River and associated alluvium. These licenses are dedicated for use for the Project. Post-mining groundwater licensing requirements are well within Whitehaven's existing water access licence entitlements for the Project. Relevant entitlements under these licences could be retired at the completion of the Project to account for predicted groundwater losses to the final void.

	Recommendation	Response
6B	*The EIS should clearly state whether the use of dewatering bores to reduce pit inflows will result in additional impacts to those predicted. This should address the impacts to the groundwater source and any connected water sources, in addition to the requirement to manage the dewatered water.*	Any required dewatering bores would be located within the Project open cut footprint. As such they will have negligible drawdown impact in comparison to the effects of the open cut progression, which is modelled in the Groundwater Assessment. These dewatering bores would be progressively removed or destroyed as mining progresses (Section 5 of Appendix A of the EIS).
6C	*An impact assessment of the borefield against DoI Water groundwater dealing/new bore impact assessment criteria is required, in consultation with Department of Industry - Lands and Water.*	The northern borefield is proposed to provide a supplementary water source. The use of the Project borefield would be in accordance with Whitehaven's licensed entitlements and the extraction and positioning rules of Clause 36 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* (Section 6.4 of Appendix A of the EIS). Figure 8 shows the distribution of existing licenced allocations for the Zone 4 alluvium, based on Water Access Licence title searches. As shown, the Zone 4 alluvial licences held by Whitehaven for the Project are insignificant in the context of the currently licenced extraction in the vicinity of the Project (Figure 8). The northern borefield (i.e. water supply borefield) has been modelled cumulatively with drawdown due to Project mining (as well as other mining operations and agricultural users) to confirm predicted impacts to other water users are insignificant (Section 6.4 of Appendix A of the EIS). As shown on Figure 9, the northern borefield is located entirely on Whitehaven-owned land and is approximately: • 3.7 km from the boundary of the nearest privately-owned property. • 5 km from the closest privately-owned bore. • 6 km from the Boggabri town water supply bore.



LEGEND

NSW State Forest

Project Mining Area and Borefield

Total Alluvial WAL Allocations

- 0 - 10 ML/year
- 10 - 50 ML/year
- 50 - 100 ML/year
- 100 - 250 ML/year
- 250 - 500 ML/year

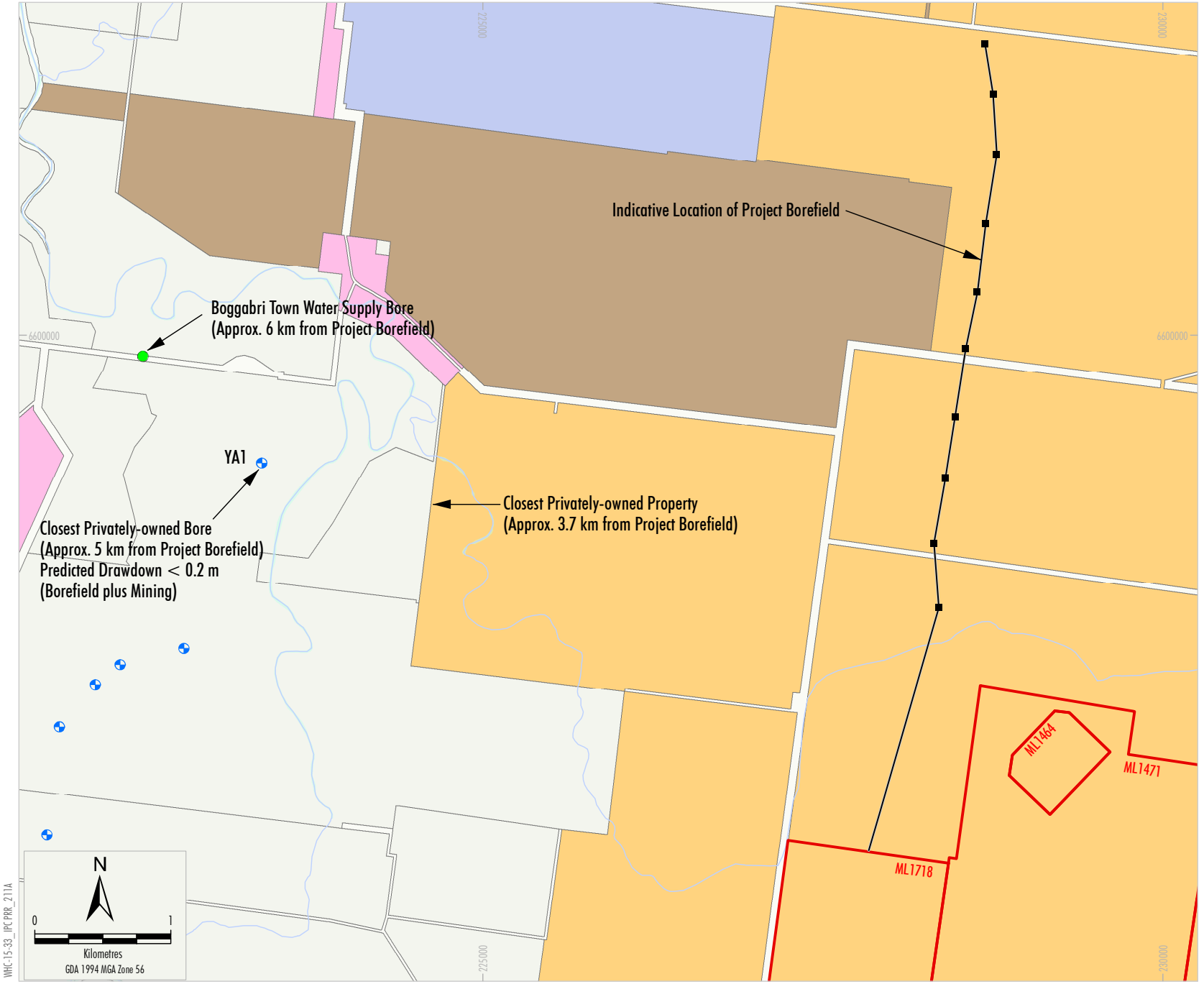
WHITEHAVEN COAL

VICKERY EXTENSION PROJECT

Alluvim Water Access Licences in the Vicinity of the Project

Source: Geoscience Australia (2006); DPI Water (2016); Whitehaven (2016)

Figure 8



LEGEND

- Mining Tenement Boundary (ML and CL)
- Crown Land
- Whitehaven Owned Land
- Whitehaven/Idemitsu Boggabri Coal Joint Owned Land
- Idemitsu Boggabri Coal Owned Land
- Privately Owned Land and Other Land
- Indicative Location of Groundwater Bores and Pipeline
- Privately-owned Groundwater Bore Identified During Bore Census (2012)

Source: Department of Land and Property Information - Land Tenure (2016); Department of Industry (2017); Whitehaven Coal (2016)

WHITEHAVEN COAL

VICKERY EXTENSION PROJECT

Privately-owned Bores in the Vicinity of the Project Borefield

Figure 9

WMC-15-33_IPC PRR_211A

	Recommendation	Response
6D	*An impact assessment should be provided of the proposed diversion of South Creek.*	There is no proposed diversion of South Creek for the Project (or for the Approved Mine). The secondary infrastructure area (previously the eastern emplacement for the Approved Mine) was designed to avoid South Creek, including a 40 m vegetation buffer to minimise impacts to flooding (see Figure 11 from the Approved Mine Surface Water Assessment, provided below as Figure 10).
6E	*The EIS should confirm the ability to achieve vegetated buffer requirements of 40m from the high bank to South Creek and Stratford Creek for all infrastructure proposed. This is not applicable for watercourse crossings.*	The secondary infrastructure area and flood protection bunds have been designed to maintain the 40 m vegetated buffer requirement along South Creek and Stratford Creek, consistent with the Approved Mine (see Figure 11 from the Approved Mine Surface Water Assessment, reproduced below as Figure 10).
6F	*The EIS should confirm the value of flow reduction to justify the conclusion that South Creek and Stratford Creek flow regimes will not be significantly affected by the project.*	The catchment of South Creek will not change significantly overall as a result of the Project. The catchment of Stratford Creek would reduce over the life of the Project by a maximum of 2%.
6G	*The EIS should assess the risk of the actively eroding river bend on the Namoi River to the long term stability of the rail infrastructure and potential impacts to the geomorphic stability and hydraulic characteristics of the river itself. This is to confirm whether location or design change is required and to inform future mitigation requirements.*	Detailed design of the Project rail spur would consider the placement of pylons required to span the Namoi River, including in consideration of the geomorphic stability and hydraulic characteristics of the river.
6H	*Development must not be undertaken on affected Crown reserves or Crown roads prior to purchase or other written authorisation of impact by the Department. This includes Reserves currently held under Licence 488324 to Coalworks (Vickery South) P/L for the purpose of Investigation.*	Relevant licenses or approvals under the NSW *Crown Land Management Act, 2016* would be obtained for the Project, in consultation with DPE and DI Water.

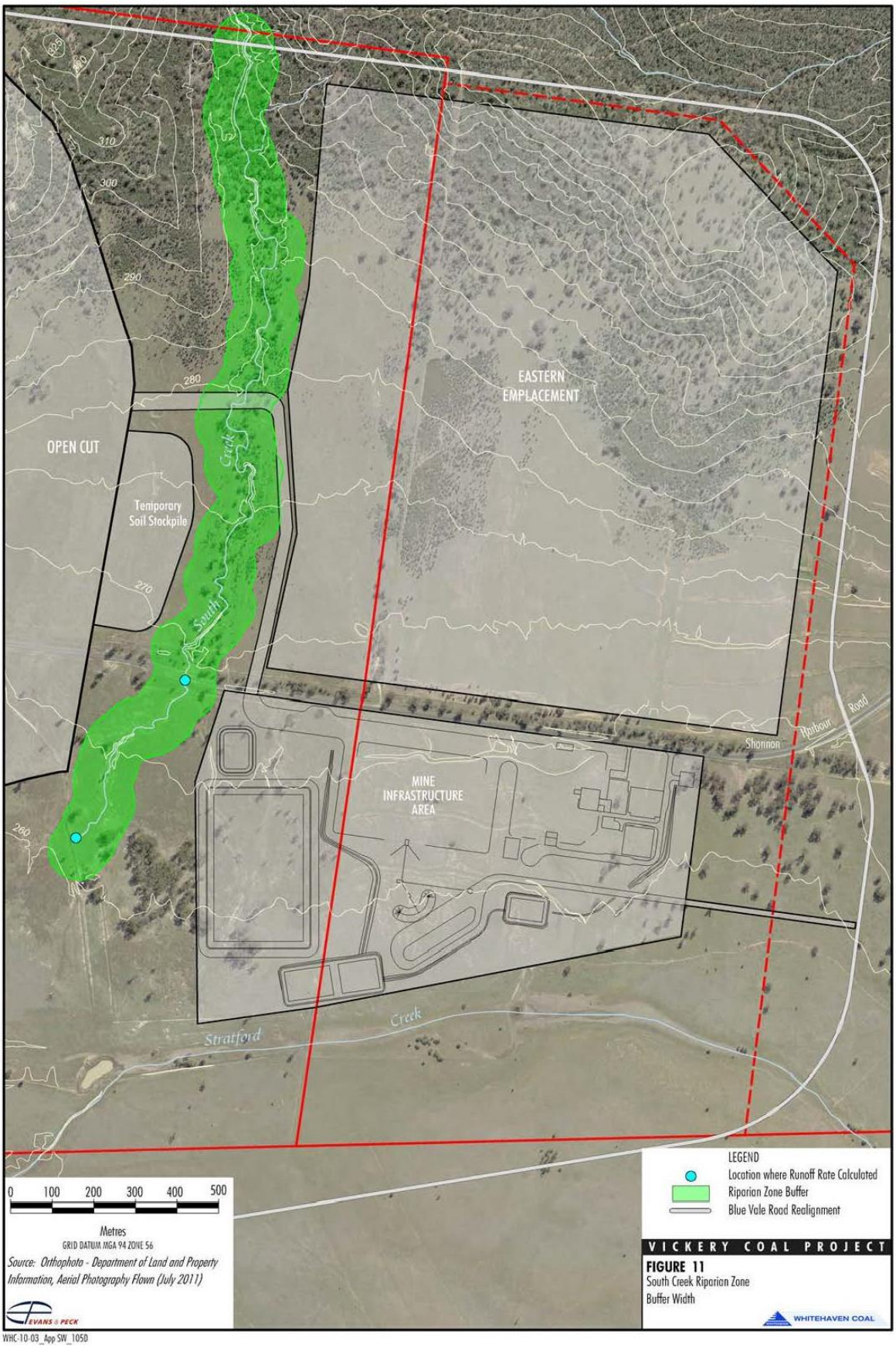


Figure 10: South Creek Riparian Zone Buffer Width

	Recommendation	Response
	Agricultural Resources	
6I	*The EIS should address the cumulative impact of the project on the industrialisation of regional BSAL in the context of other mining, solar farm and rail infrastructure developments in the region.*	On 8 February 2016, the Secretary for the DPE issued a Site Verification Certificate (SVC) certifying that the Project extension into MLA 1 is not located on Biophysical Strategic Agricultural Land (BSAL). The SVC is presented in Attachment 9 of the EIS. The Project rail spur is located on land owned by Whitehaven or where an existing land access agreement is in place. The alignment of the Project rail spur has been selected in consultation with landholders for which there is a local access agreement to minimise impacts to existing agricultural enterprises (i.e. by running along the edge of properties it traverses and avoiding irrigated cropping areas and water management infrastructure). Therefore, the contribution of the Project to cumulative impacts to regional BSAL would be negligible.
	Post Project Determination	
	Crown Lands & Water Resources	
6J	*Water Access Licences must be obtained for all water taken unless covered by an exemption.*	Please see response to Submission 6A.
6K	*Site specific triggers for water quality should be developed if monitoring data indicates that default trigger levels may be exceeded by current (pre-construction) monitoring. Water quality triggers should be cited and justified by available sources.*	Water quality trigger values will be developed based on ANZECC and/or site-specific baseline measurements both upstream and downstream of the Project to confirm negligible impacts to water quality from the Project. These triggers will be described in a Water Management Plan to be developed for the Project.
6L	*The potential impact of increased flow velocities on soil erosion and watercourse stability should be assessed. Where there is a measureable increase in velocity, an assessment of the potential for exceedance of soil erosion thresholds should be undertaken and relevant mitigating measures adopted as required.*	Please see response to Submission 2Q.
6M	*Any construction of piled foundations for the proposed rail bridge should include backup protection measures and consider a worst case scenario in which water levels rise above low/no-flow conditions due to unexpected discharges in the Namoi River.*	During detailed design of the Project rail spur, bridge supports and pylons will be located to minimise disturbance to the Namoi River bank and river bed as far as practicable. Erosion and sediment control measures would be implemented during construction, including contingency measures for potential increases in river flow.

	Recommendation	Response
6N	*The following should be included in future groundwater model reports:* • *A description of the recharge and discharge flow paths in the model.* • *Maps of the top and bottom model layer and cross sections showing model layer configuration.* • *A sensitivity and uncertainty analysis with respect to boundary conditions.* • *If the 'Middlemis' and 'Peeter's reference to "undertake an uncertainty analysis of model construction, data, conceptualisation and predictions…" is not available; an alternative reference should be used.*	DI Water's comments regarding future groundwater model reports are noted. The Project groundwater model confidence level classification was determined in accordance with the *Australian Groundwater Modelling Guidelines* (Barnett et.al, 2012). The Project was determined to have a Class 2 to Class 3 (i.e. medium to high) model confidence level, which is appropriate for the context of impact assessment and management (Section 4.1 of Appendix A of the EIS). DPE's Independent Peer Reviewer (Hugh Middlemis of Hydrogeologic) stated: *This review conducted an independent assessment of the model confidence level classification, consistent with the guidelines but based on the method outlined in Middlemis and Peeters (2018). This review finds that a Class 2-3 model confidence level is indeed justified … confirming the Extension model as suitable for impact assessment scenario modelling purposes.*
6O	*Identify the presence and volume of potentially acid-forming waste rock, fine-grained amorphous sulphide minerals and coal reject/tailings material and exposure pathways:* • *Present an acid-base mass balance, based on scheduled volumetric rock mixing, and kinetically effective acid-forming potential and acid neutralising capacity of rock materials.* • *Identify potential exposure pathways for acidity and trace metals.* • *Discuss conflicting analytical results with consideration of the effect of measurement error on interpretations.*	Coal rejects material is typically expected to be non-to-slightly saline and non-acid forming. Any potentially acid forming coal rejects are predicted to only have a low capacity to generate acid (Section 2.9.2 of the EIS). The majority of the overburden and interburden generated from the Project would generally be expected to have a low sulfur content and be non-acid forming with a low salinity risk (Section 2.8.3 of the EIS). Dewatered coal rejects would be co-disposed with waste rock. No reject material would be placed within 30 m of the edge of the western emplacement and reject material would be covered with at least 5 m of inert material on the outer surfaces of the waste rock emplacement (Section 2.9.3 of the EIS). Dewatered coal reject material would be co-disposed in locations such that infiltration and runoff would report to the mine water system (Appendix B of the EIS).
6P	*Ensure the surface water diversions are designed to convey the maximum discharge in a stable manner, and any downstream impacts are identified and mitigated. The use of natural channel design principles is recommended.*	These comments regarding detailed design of surface water diversions are noted. Consistent with Condition 29 of Schedule 3 of the Approved Mine Development Consent (SSD-5000), surface water diversions will be designed in accordance with the following performance measures: • *Design, install and maintain the clean water system to capture and convey the 100 year ARI flood* • *Maximise as far as reasonable and feasible the diversion of clean water around disturbed areas on-site*

	Recommendation	Response
6Q	*Ensure dams proposed to satisfy an exclusion from holding water entitlement in the Harvestable Right Zone are designed in accordance with the relevant exclusion, eg Schedule 1 (3) of the Water Management (General) Regulation 2018.*	Attachment 6 of the EIS details water licensing for the Project. Mine and coal contact water dams and sediment dams developed over the life of the Project would be designed to satisfy relevant harvestable rights exclusions. Alternatively, Whitehaven would confirm that any water held is within harvestable rights or suitable water access licenses would be held to account for any take. Water licensing requirements for the as-constructed Project would be described in the Water Management Plan for the Project.
6R	*Incorporate 'back-up protection measures' in the event that there is a rise in river discharge above the volume that proposed low/no flow sediment and erosion control measures are designed to deal with during bridge construction.*	Please see response to Submission 6M.
6S	*Ensure all works adhere to the Guidelines for Controlled Activities on Waterfront Land (NRAR 2018).*	The Project has been designed to comply with the *Guidelines for Controlled Activities on Waterfront Land,* where relevant.
6T	*Develop a Water Management Plan in consultation with Lands and Water; including:* • *An incident response plan with triggers for the National Water Quality Management Strategy (NWQMS) guidelines (ANZECC/ARMCANZ latest issue).* • *Identification of hydrochemistry recharge/discharge processes.* • *A modelling plan section that clarifies future model verification and schedule of plan updates etc.* • *The requirements/criteria as listed in Section 11.1 (Appendix B). Adequate adaptive management measures and management responses.* • *Surface and groundwater sampling schedule (including routine and event based).* • *Address overflows from sediment dams to ensure they will be properly monitored and if concentrations are in excess of Guidelines, appropriate action (including reporting) is taken.*	This comment regarding conditions of approval of the Project is directed at DPE. A Water Management Plan will be prepared for the Project in consideration of the requirements of any relevant Development Consent and EPL conditions.

	Recommendation	Response
6U	*Prepare a Construction Environmental Management Plan to address measures to manage and mitigate impacts to soil, water, erosion, and hydrology. This should be developed in consultation with DoI Water.*	The comment regarding conditions of approval of the Project is directed at DPE. The Water Management Plan to be developed for the Project would consider construction activities, as required, and would be developed in consultation with relevant regulatory authorities.
	Agricultural Resources	
6V	*The rehabilitation objectives should aim to maximise the total area to be returned to land suitable for agricultural use.*	Please see response to Recommendation 11 in Table A (DPE Preliminary Issues Report Responses).

	Recommendation	Response
7	***NARRABRI SHIRE COUNCIL***	
7A	1. *That the proponent prepare and submit a DSI* [Detailed Site Investigation] *prior to the determination of the Project.*	In accordance with Clause 7(1)(c) of *State Environmental Planning Policy No 55 – Remediation of Land* (SEPP 55), Whitehaven would prepare a Detailed Site Inspection prior to undertaking any surface disturbance works for the Project. This is consistent with the recommendations of the Preliminary Site Inspection (Appendix Q of the EIS). Any remediation works determined to be required as a result of the Detailed Site Inspection would also be undertaken prior to undertaking any surface disturbance works.
7B	2. *That the proponent address the above provisions of the Mining SEPP* [i.e. Clause 12(b), 12A, 16(3) and 18].	<u>Clause 12 of the Mining SEPP</u> Clause 12 of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) provides: *Before determining an application for consent for development for the purposes of mining … the consent authority must:* *(a) consider:* *(i) the existing uses and approved uses of land in the vicinity of the development, and* *(ii) whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development …* *(b) evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a)(i) and (ii) …* Clause 12(b) of the Mining SEPP does not impose requirements on Whitehaven to address in the Project EIS and is instead directed to the consent authority. Potential impacts to existing agricultural land surrounding the Project is described in the Agricultural Impact Statement (Appendix H of the EIS). The economic and social benefits of the Project are described in the Economic Assessment and Social Impact Assessment (Appendices J and R of the EIS, respectively). Therefore the information contained in the EIS allows the consent authority to discharge its duty under clause 12(b) of the Mining SEPP.

	Recommendation	Response
		Clause 12A of the Mining SEPP Clause 12A of the Mining SEPP provides: (1) *In this clause:* *voluntary land acquisition and mitigation policy means the Voluntary Land Acquisition and Mitigation Policy approved by the Minister and published in the Gazette on the date on which State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment (Air and Noise Impacts) 2018 is published on the NSW legislation website.* (2) *Before determining an application for consent for State significant development for the purposes of mining … the consent authority must consider any applicable provisions of the voluntary land acquisition and mitigation policy and, in particular:* *(a) any applicable provisions of the policy for the mitigation or avoidance of noise or particulate matter impacts outside the land on which the development is to be carried out, and* *(b) any applicable provisions of the policy relating to the developer making an offer to acquire land affected by those impacts.* Clause 12A of the Mining SEPP does not impose requirements on Whitehaven to address in the Project EIS and is instead directed to the consent authority. The *Voluntary Land Acquisition and Mitigation Policy* (VLAMP) was revised in September 2018, following submission of the Project EIS. The previous version of the VLAMP (NSW Government, 2014) was considered for the Project with respect to predicted noise and air quality impacts as determined in the Noise and Blasting Assessment and Air Quality and Greenhouse Gas Assessment (Appendices D and E of the EIS, respectively). Whitehaven considers that the EIS provides the consent authority with sufficient information about the Project's impacts to inform the consideration and application of the revised VLAMP. Notwithstanding, upon request from DPE, Whitehaven will prepare a report to address any additional matters raised in the revised VLAMP.

	Recommendation	Response
		Clause 16(3) of the Mining SEPP Clause 16(3) of the Mining SEPP provides: *(3) The consent authority:* *(a) must not determine the application until it has taken into consideration any submissions that it receives in response from any roads authority or the Roads and Traffic Authority within 21 days after they were provided with a copy of the application, and* *(b) must provide them with a copy of the determination.* Clause 16(3) of the Mining SEPP does not impose requirements on Whitehaven to address in the Project EIS and is instead directed to the consent authority. Whitehaven has consulted with the NSW Roads and Maritime Service (RMS), Transport for NSW, the Gunnedah Shire Council (GSC) and the Narrabri Shire Council (NSC) during the development of this EIS, and these authorities are aware of the proposed road transport of ROM coal on the public road network and modifications to the existing road network, as a component of the Project. RMS, NSC and GSC have provided submissions in the form of comments to DPE on the Project EIS. Clause 18 of the Mining SEPP Clause 18 of the Mining SEPP provides: *Nothing in this Policy makes permissible (with or without consent) the use of land for the receipt or disposal of waste brought on to the land from other land, even if that use is or may be ancillary or incidental to development that is permissible under this Policy.* *Disposal of Coal Reject Material from Project CHPP (including material sourced from other operations):* On-site deposition of coal reject material generated from processing of ROM coal at the Project CHPP does not involve the Project receiving waste from "other land" (i.e. the reject material is produced on-site). If Development Consent is granted for the Project, it will authorise the operation of the Project CHPP and deposition of associated coal reject material on-site, regardless of the location from which the ROM coal was originally transported to the Project.

	Recommendation	Response
		Disposal of Coal Reject Material at the Project from Whitehaven CHPP: The land on which the Project mining area is located is zoned as RU1 (Primary Production) under both the *Gunnedah Local Environment Plan 2012* (Gunnedah LEP) and the *Narrabri Local Environment Plan 2012* (Narrabri LEP). Under the Gunnedah LEP, the receival and disposal of coal reject material within RU1 zoned land from "other land", is permissible with Development Consent. This is evidenced in that the Whitehaven CHPP, located in the Gunnedah LGA, is approved to receive coal products from the Tarrawonga and Rocglen Coal Mines. Under the Narrabri LEP, the receival and disposal of coal reject material within RU1 zoned land from "other land", such as from the Whitehaven CHPP, would be prohibited. Notwithstanding, DPE may overrule the prohibition of disposal of coal reject material on-site under section 4.38(3) of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act), which states: … *(3) Development consent may be granted despite the development being partly prohibited by an environmental planning instrument.*
7C	*3. That* the *proponent address the above provisions of the Infrastructure SEPP* [i.e. Clause 85, 101 and 104].	<u>Clause 85 of the Infrastructure SEPP</u> Clause 85 of the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) provides: *(1) This clause applies to development on land that is in or adjacent to a rail corridor, if the development:* *(a) is likely to have an adverse effect on rail safety, or* *(b) involves the placing of a metal finish on a structure and the rail corridor concerned is used by electric trains, or* *(c) involves the use of a crane in air space above any rail corridor, or* *(d) is located within 5 metres of an exposed overhead electricity power line that is used for the purpose of railways or rail infrastructure facilities.* *…* *(2) Before determining a development application for development to which this clause applies, the consent authority must:*

	Recommendation	Response
		(a) within 7 days after the application is made, give written notice of the application to the rail authority for the rail corridor, and *(b) take into consideration:* *(i) any response to the notice that is received within 21 days after the notice is given, and* *(ii) any guidelines that are issued by the Secretary for the purposes of this clause and published in the Gazette.* *(3) Land is adjacent to a rail corridor for the purpose of this clause even if it is separated from the rail corridor by a road or road related area within the meaning of the Road Transport Act 2013.* Clause 85 of the Infrastructure SEPP does not impose requirements on Whitehaven to address in the Project EIS and is instead directed to the consent authority. <u>Clause 101 of the Infrastructure SEPP</u> Clause 101 of the Infrastructure SEPP provides: *(1) The objectives of this clause are:* *(a) to ensure that new development does not compromise the effective and ongoing operation and function of classified roads, and* *(b) to prevent or reduce the potential impact of traffic noise and vehicle emission on development adjacent to classified roads.* *(2) The consent authority must not grant consent to development on land that has a frontage to a classified road unless it is satisfied that:* *(a) where practicable and safe, vehicular access to the land is provided by a road other than the classified road, and* *(b) the safety, efficiency and ongoing operation of the classified road will not be adversely affected by the development as a result of:* *(i) the design of the vehicular access to the land, or* *(ii) the emission of smoke or dust from the development, or* *(iii) the nature, volume or frequency of vehicles using the classified road to gain access to the land, and*

	Recommendation	Response
		(c) the development is of a type that is not sensitive to traffic noise or vehicle emissions, or is appropriately located and designed, or includes measures, to ameliorate potential traffic noise or vehicle emissions within the site of the development arising from the adjacent classified road. Clause 101 of the Infrastructure SEPP does not impose requirements on Whitehaven to address in the Project EIS and is instead directed to the consent authority. Potential impacts to the safety and efficiency of the road network in the vicinity of the Project are addressed in detail in the Road Transport Assessment (Appendix I to the EIS). <u>Clause 104 of the Infrastructure SEPP</u> Sub-clause (3) of clause 104 of the Infrastructure SEPP provides: *(3) Before determining a development application for development to which this clause applies, the consent authority must:* *(a) give written notice of the application to RMS within 7 days after the application is made, and* *(b) take into consideration:* *(i) any submission that RMS provides in relation to that notice within 21 days after the notice was given (unless, before the 21 days have passed, RMS advises that it will not be making a submission), and* *(ii) the accessibility of the site concerned, including:* *(A) the efficiency of movement of people and freight to and from the site and the extent of multi-purpose trips, and* *(B) the potential to minimise the need for travel by car and to maximise movement of freight in containers or bulk freight by rail, and* *(iii) any potential traffic safety, road congestion or parking implications of the development.* Clause 104(3) of the Infrastructure SEPP does not impose requirements on Whitehaven to address in the Project EIS and is instead directed to the consent authority. Potential impacts to the road network in the vicinity of the Project are addressed in the Road Transport Assessment (Appendix I of the EIS), and the road and rail impacts associated with the Project are also addressed in Section 4 of the EIS.

	Recommendation	Response
7D	*4. That the proponent update the PHA to provide detail on the location and quantities of hazardous materials to be stored on site in accordance with the above points.*	Whitehaven will prepare a revised version of the Preliminary Hazard Assessment consistent with the requirements of the *Assessment Guideline: Multi-level Risk Assessment (2011)*.
7E	*5. That the proponent address the above provisions of the Narrabri LEP and Gunnedah LEP.*	Please see response to Submission 7B.
7F	*6. That the Department of Planning and Environment (DPE) ensure that the Project is ecologically sustainable from an economic, environmental and social perspective.* *7. That DPE apply the precautionary principle in the assessment of the economic, environmental and social impact of the Project.*	These comments are directed at DPE. Notwithstanding, the Project EIS was prepared having regard to biophysical, economic and social considerations, including consideration of alternatives, the principles of ecologically sustainable development (ESD) and the consistency of the Project with the objects of the EP&A Act. Section 6.1.4 of the EIS addresses the consideration and application of ESD principles and the precautionary principle to the Project.
	Agriculture	
7G	*8. That the rehabilitation outcomes and proposed post-mining land uses associated with the Project be amended to ensure that a greater proportion of the Project area is returned to agricultural land use with at least 900 ha returned to Class 3 Agricultural Suitability i.e. "Grazing land or land well suited to pasture improvement."*	Please see response to Recommendation 11 in Table A (DPE Preliminary Issues Report Responses).
	Bushfire	
7H	*9. That the proponent prepare a Bush Fire Assessment Report in accordance with the NSW Rural Fire Services Planning for Bush Fire Protection 2006 prior to the determination of the Project.*	The Project is located partially on land mapped as Bush Fire Prone by the NSW Rural Fire Service (Section 4.3.1 of the EIS). Bushfire management measures would be developed and implemented in accordance with the 'plan and prepare' materials available on the NSW RFS website and the aims and objectives of *Planning for Bushfire Protection* (NSW RFS, 2006) (Section 4.3.3 of the EIS). Whitehaven would continue to consult with the NSW RFS and provide assistance as required.

	Recommendation	Response
	Groundwater	
7I	*10. That the appropriate NSW Government Agency satisfy itself that the cumulative impacts of the Project and other extractive industries (operating and proposed) in the region on groundwater has been accurately modelled in the EIS.*	It is noted DPE's Independent Peer Reviewer (Hugh Middlemis of Hydrogeologic) stated: *Cumulative impacts have been adequately considered for the Vickery Extension, by also including dewatering at the nearby mines at Rocglen and Tarrawonga that lie within the Vickery model domain. A separate simulation also considered the cumulative effects of all mines and the water supply borefield north of Vickery …* The Groundwater Assessment was peer reviewed by Kalf and Associates (Dr Frans Kalf) (see Attachment 4 of the EIS). The peer review undertaken by Kalf and Associates states: *… The hydrogeological description, conceptualisation, model design, simulations and reporting have been conducted in a professional manner and described in detail.* *All predicted drawdown lies within the mine boundaries. No significant water table drawdown occurs within the alluvial sediments.* *Predictions of drawdown due to the proposed Extension together with the existing approved mine plan and cumulative effects will have minimal influence on the environment. No private bores would be detrimentally affected by the Extension mining proposal.* In addition, the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) stated in their advice to DPE: *The IESC notes that a number of the studies completed for this project such as the surface water assessments and the studies to determine the extent of the alluvium have been completed to a high standard. The proponent should be commended for these studies and for obtaining peer reviews of many of the major reports provided in the assessment.*

	Recommendation	Response
7J	*11. That DPE require as a condition of consent that:* *a) The proponent shall implement a groundwater monitoring plan.* *b) The groundwater monitoring network include the use of telemetric meters and the proponent shall ensure that real-time results are published in a publically accessible and transparent way.* *c) The proponent review the groundwater model two years after commencement of operations.* *d) The proponent undertake validation and recalibration of the groundwater modelling.* *e) The proponent review and revise relevant management plans to ensure early prediction of impacts and the implementation of adequate monitoring, management and contingency measures.*	This comment regarding conditions of approval of the Project is directed at DPE. NSC's recommendations regarding groundwater monitoring is generally consistent with what is proposed in the EIS (Section 4.4.3 of the EIS).
7K	*12. That DPE require as a condition of consent ongoing monitoring of groundwater impacts and that that real-time results are published in a publically accessible and transparent way for a period of 5 years. At the end of this time, independent expert review shall be undertaken to determine whether on going monitoring is required.*	This comment regarding conditions of approval of the Project is directed at DPE.
7L	*13. That DPE require as a condition of consent that the proponent implement any and all necessary 'make good' provisions, nominated by the affected party, at any privately-owned or publically-owned groundwater bore impacted by the Project including but not limited to:* *a) deepening the affected groundwater bore (including lowering pump set and/or provision of new pump set and power supply if required);* *b) construction of a new groundwater bore (including provision of new pump set and power supply if required); and/or* *c) provision of an alternative water supply of appropriate quality and quantity; and/or* *d) provision of compensation.*	This comment regarding conditions of approval of the Project is directed at DPE. NSC's recommendations regarding groundwater "make-good" provisions is generally consistent with what is proposed in the EIS (Section 4.4.3 of the EIS).

	Recommendation	Response
7M	*14. That the proponent model the impact on Boggabri's town bore (and future augmentation) depicted below and that Council have the opportunity to review the model and provide comment.*	The predicted cumulative drawdown at all privately-owned bores in the vicinity of the Project is less than 0.2 m, with the exception of 'RB1' (predicted drawdown of approximately 0.6 m) located to the south of the Rocglen Coal Mine (shown on Figure 4-8 of the EIS, reproduced as Figure 11 below). The incremental drawdown associated with the Project borefield only (compared to Project mining drawdown and other cumulative sources) is negligible at all privately-owned bores. The Boggabri town water supply bore location is shown on Figure 9. Based on the conservative predictions at privately-owned bores which are closer to the Project borefield (i.e. 'YA1', approximately 5 km from the Project borefield), predicted cumulative drawdown from the Project is expected to be less than 0.2 m at the Boggabri town water supply bore. On this basis, modelling of the potential groundwater drawdown at the Boggabri town bore is not considered to be necessary.
	Water Balance	
7N	*15. That DPE satisfy itself that the site water balance is adequate to meet with operational requirements of the Project including any additional environmental management and rehabilitation requirements.*	It is noted DPE's Independent Peer Reviewer (Martin Giles of BMT) stated: *Based on the review, it is considered that the parameters and methodology adapted for the modelling of surface water are appropriate. The results obtained from the modelling can be used to consider the water balance of the mine and the likelihood of discharges occurring from the mine to receiving downstream watercourses.* The Surface Water Assessment was peer reviewed by Emeritus Professor Tom McMahon (University of Melbourne) (see Attachment 4 of the EIS). The peer review states: *…in Section 2 the Secretary's Environmental Assessment Requirements are discussed. As far as I can ascertain, all the requirements have been dealt with.* As stated above, the peer review undertaken by Professor Tom McMahon also states: *… overall, the study detailed in the Vickery Extension Project Surface Water Assessment Report was completed in a professional and detailed manner, and the conclusions in the Report are appropriately supplemented by suitable modelling studies carried out by the consultant.*

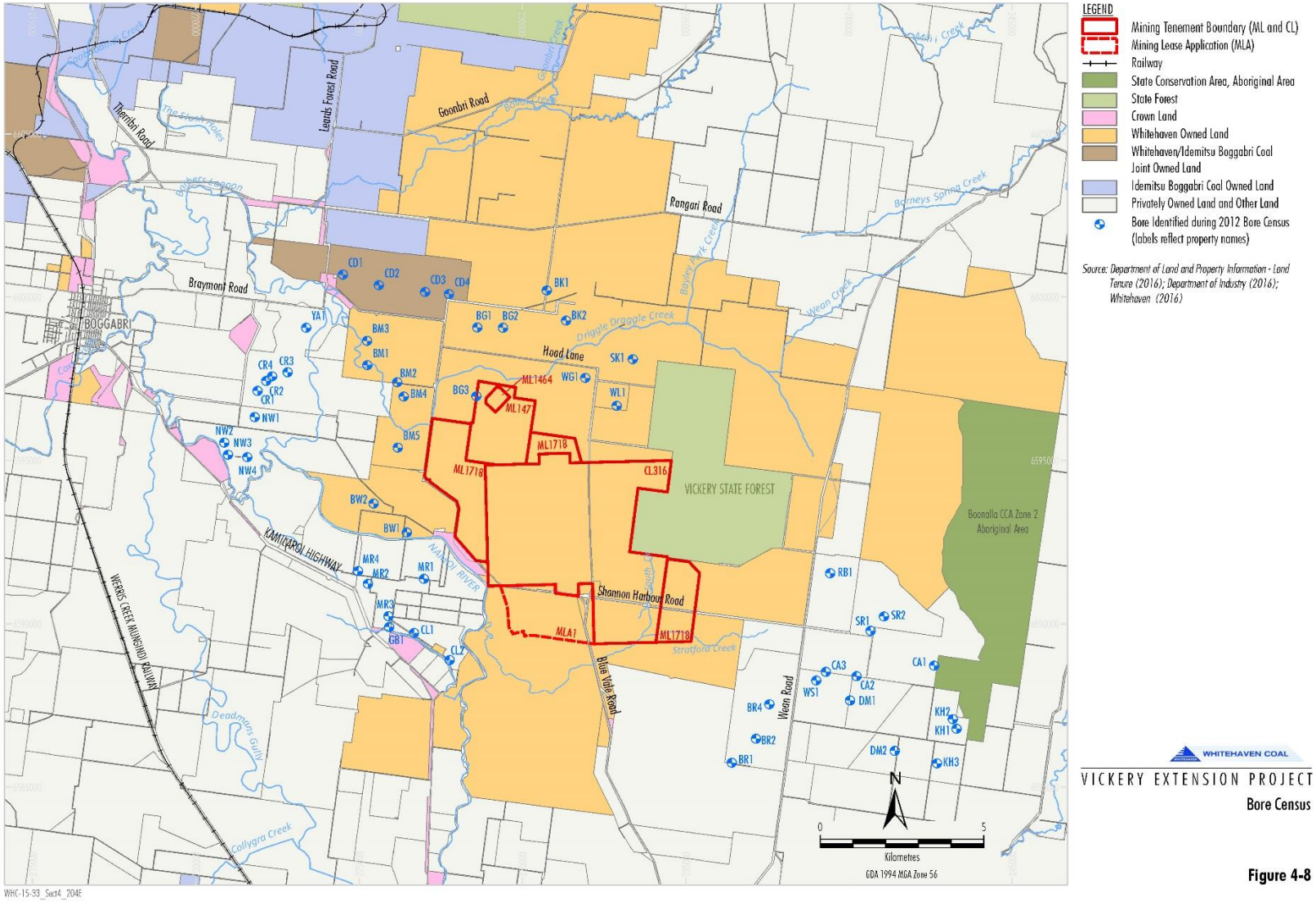


Figure 11: Bore Census

	Recommendation	Response
7O	16. *That DPE require as a condition of consent that:* *a) The proponent shall implement a water management plan which as a minimum includes the annual review of the site water balance over the life of the Project.* *b) Results of the annual review of the site water balance are published in a publically accessible and transparent way.*	This comment regarding conditions of approval of the Project is directed at DPE.
	Runoff and discharge of mine water	
7P	17. *That the EPA satisfy itself that proposed discharges from the Project sediment dams will have an acceptable impact on receiving waters.*	A response to the EPA's query regarding sediment dams is provided in the response to Recommendation 7 in Table A (DPE Preliminary Issues Report Responses). Whitehaven will continue to consult with the EPA in regard to its submission.
7Q	18. *That the appropriate NSW Government Agency specify criteria that discharge water shall meet to ensure an acceptable impact on receiving waters.*	Whitehaven understands discharge criteria would be specified in an EPL for the Project, issued under the PoEO Act.
7R	19. *That DPE require as a condition of consent that:* *a) The proponent shall ensure no discharge of water that has been in contact with coal.* *b) The proponent shall sample and analyse proposed discharge water to ensure that it meets EPA requirements.* *c) The proponent shall ensure the results are published in an accessible and transparent way.* *d) The proponent shall ensure no discharge of water from sediment dams unless the conditions at receiving waters are adequate to ensure appropriate dilution of discharge water.* *e) The proponent shall record each discharge, the results of testing and publish them in a publicly accessible and transparent way.*	This comment regarding conditions of approval of the Project is directed at DPE.

	Recommendation	Response
	Final Voids	
7S	*20. That the proponent model and assess the impacts of filling in the void, and then conduct a cost-benefit analysis of the 'final void' and 'no final void' scenarios.*	Please see response to Recommendation 10 in Table A (DPE Preliminary Issues Report Responses).
7T	*21. That DPE satisfy itself that the final void lake will not overfill under any scenario including but not limited to in the probable maximum flood event.*	This comment is directed at DPE. Please see also the response to Recommendation 10 in Table A (DPE Preliminary Issue Report Responses).
	Flood	
7U	*22. That DPE require as a condition of consent that the impacts shown in the Flood Assessment should form the basis for acceptable impacts for the detailed design of the rail spur.*	This comment regarding conditions of approval of the Project is directed at DPE. Please see also the response to Recommendation 1 in Table A (DPE Preliminary Issue Report Responses).
7V	*23. That DPE require as a condition of consent that Blue Vale Road be designed to be above the 1% AEP flood subject to satisfactory assessment of the impacts on the floodplain.*	This comment regarding conditions of approval of the Project is directed at DPE. The Blue Vale Road realignment is an approved component of the Approved Mine. The approved Blue Vale Road realignment would be designed with the same flood immunity as the existing road (i.e. 20% AEP flood event) (Section 2.12.3 of the EIS).
	Noise	
7W	*24. That the EPA satisfy itself that the cumulative and Project specific noise levels are within acceptable amenity criteria.*	Responses to the EPA's queries regarding cumulative and Project-specific noise levels are provided in the response to submissions 1C to 1I. Whitehaven will continue to consult with the EPA regarding its submissions.
7X	*25. That DPE require as a condition of consent that:* *a) The proponent shall implement an extensive real-time noise monitoring plan.* *b) That the noise monitoring network include the use of telemetric meters and the proponent shall ensure that real-time results are published in a publically accessible and transparent way.* *c) The proponent shall implement all necessary mitigation measures to ensure noise levels are within acceptable criteria.*	This comment regarding conditions of approval of the Project is directed at DPE.

	Recommendation	Response
7Y	*26. That the DPE in consultation with the EPA consider whether a 'regional' approach to noise management and monitoring is required given the cumulative impact of mines operating in the locality. This could include a coordinated noise management approach between mines.*	This comment is directed at DPE and EPA.
	Blasting	
7Z	*27. That the DPE satisfy itself that airblast overpressure and vibration levels for the Project have been accurately modelled in the EIS.*	This comment is directed at DPE.
7AA	*28. That NSW Health and / or other appropriate NSW Government Agency satisfy itself that airblast overpressure and vibration levels from the Project will not result in unacceptable human health impacts.*	Potential impacts related to human health and amenity have been assessed in the Air Quality and Greenhouse Gas Assessment and Noise and Blasting Assessment, which conclude there are no modelled exceedances of air quality criteria designed to protect human health (e.g. TSP, PM_{10} and $PM_{2.5}$), sleep disturbance criteria or blast criteria at any existing private dwelling locations.
	Air Quality	
7AB	*29. That the EPA satisfy itself that air quality impacts have been accurately modelled in the EIS.*	Responses to the EPA's queries regarding air quality impacts are provided in the response to Submissions 1A and 1B. Whitehaven will continue to consult with the EPA regarding its submissions.
7AC	*30. That NSW Health and / or other appropriate NSW Government Agency satisfy itself that air quality impacts including but not limited to the physical and chemical properties of PM from the Project will not result in unacceptable human health impacts.*	Please see response to Submission 7AA.
7AD	*31. That an on-going independent monitoring program carried out by experts in their fields be implemented under the direction of the NSW Health and / or other appropriate NSW Government Agency at the proponent's expense for increased presence of health impacts as a result of the Project.*	This comment is directed at NSW Health and the NSW Government.

	Recommendation	Response
7AE	32. *That DPE require as a condition of consent that:* *a) The proponent shall implement an extensive real-time air quality monitoring plan including but not limited to real-time air quality monitoring of $PM_{2.5}$ and PM_{10}.* *b) That real-time air quality monitoring results are published in a publically accessible and transparent way.* *c) The proponent shall implement all necessary mitigation measures to ensure emission levels are within acceptable criteria.*	This comment regarding conditions of approval of the Project is directed at DPE.
7AF	33. *That the EPA expand the Namoi Region Air Quality Monitoring Project (NRAQMP) to include stations at Curlewis and Boggabri to monitor $PM_{2.5}$ and PM_{10} emissions and undertake quarterly compositional analysis to determine the level of contribution from coal mines to the local air quality.*	This comment is directed at the EPA.
	Biodiversity	
7AG	34. *That the DPE require the submission of the KPoM as part of the State Significant Development Application and make it available for review prior to determination of the Project.*	Please see response to Submission 2C.
	Employment estimates	
7AH	35. *That the proponent provide more information with respect to baseline data that has been used to estimate projected employment statistics.*	Whitehaven's experience with workforce requirements for existing mining operations (e.g. Maules Creek Coal Mine) have been used as the basis for the employment estimations provided in the Project EIS.
	Local Government Rates Estimates	
7AI	36. *That the proponent work with Council to provide a more accurate investigation into projected rates income and counterfactual scenario.*	Whitehaven is happy to work with NSC in this regard.

	Recommendation	Response
	Cost benefit analysis	
7AJ	*37. That the proponent include production related costs in the cost benefit analysis.* *38. That the proponent amend Net Present Value calculations following investigation and expected revisions of baseline figures.*	Production related costs are included in the Economic Assessment (Appendix J of the EIS). Amending the Net Present Value calculations is not considered to be required.
	Local effects analysis	
7AK	*39. That the proponent undertake further Local Effects Analysis, which is specific to the Narrabri Local Government Area.*	Whitehaven is happy to work with Council in this regard and to provide additional relevant information regarding Local Effects Analysis.
	Tourism Impacts	
7AL	*40. That the proponent acknowledge the value and potential of tourism within the Narrabri Local Government Area in an updated Local Effects Analysis, which is specific to the Narrabri Local Government Area.*	Please see response to Submission 7AK.
	Social Impacts	
7AM	*41. That the Proponent provide a more detail assessment of its workforce required for the Project, including measures to address gender balance in smaller communities.*	Further detail regarding the Project workforce would be provided to Councils and other relevant stakeholders during the resourcing stage of the Project, to allow for adequate community infrastructure planning. Significant impacts to gender balance in smaller communities are likely to only occur in the short-term (i.e. during the construction period [approximately 12 months]). Whitehaven would encourage the Project operational workforce, including their families, to relocate permanently to within the Project region.
7AN	*42. That the overall impacts on the Narrabri Local Government Area are properly assessed and that cumulative labour impacts resulting from other major construction projects in the region have been properly considered.*	Cumulative impacts of other proposed major projects in the region have been assessed in Section 4.8 of the Social Impact Assessment (Appendix R) and Section 2.4 of the Economic Assessment (Appendix J) during both construction and operational phases of the Project.

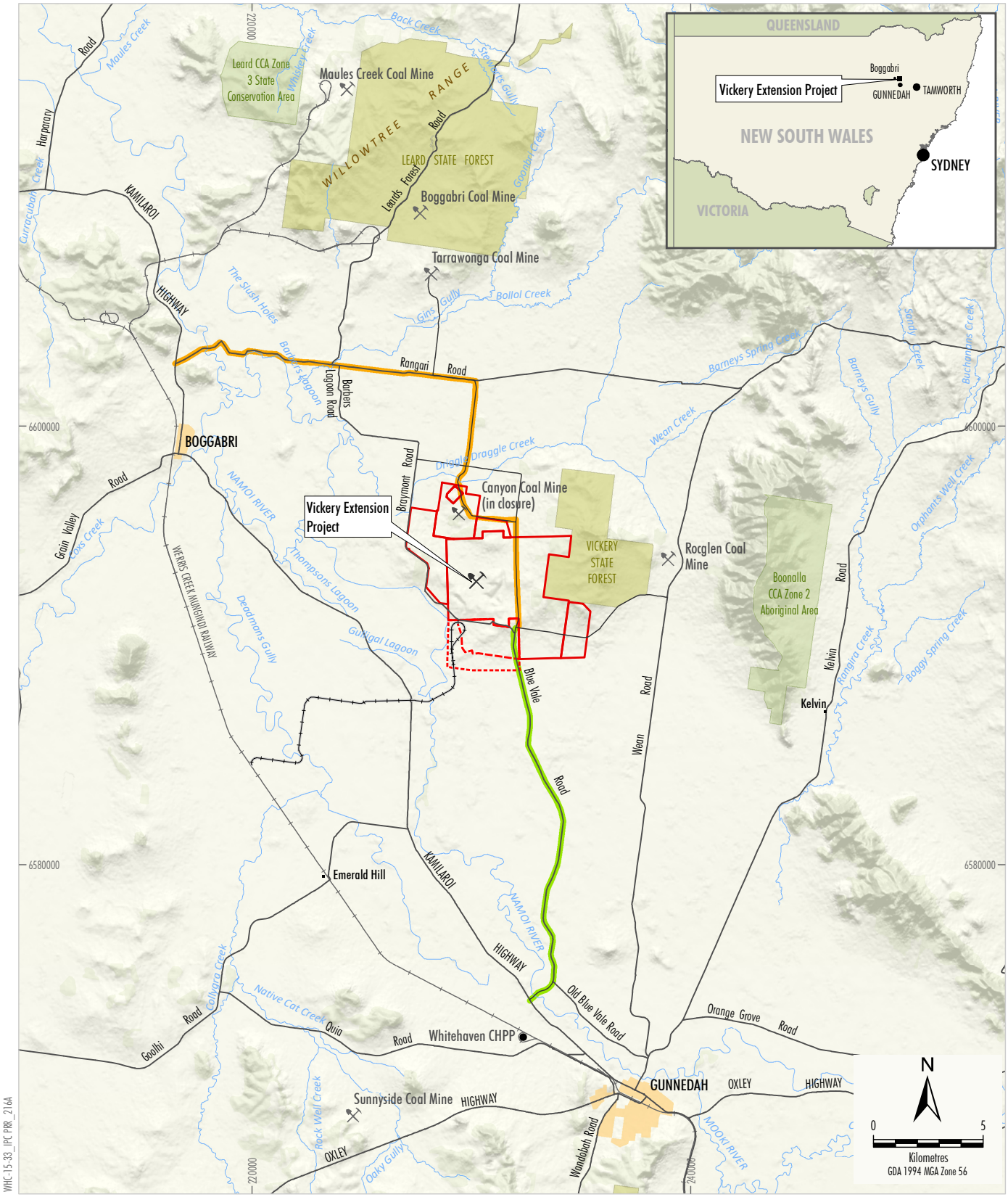
	Recommendation	Response
	Employment benefits	
7AO	*43. That the DPE require as a condition of consent that 50% of the operational workforce reside in Narrabri Shire Local Government Area.* *44. To provide long term career pathways for locals and ensure that an appropriately skilled workforce is employed, that the DPE require as a condition of consent that the proponent provide scholarships and develop suitable training and apprenticeship programs in consultation with local TAFE and other training institutions aimed at providing school leavers and other locals with a pathway to employment in extractive industries.*	The comment regarding conditions of approval of the Project is directed at DPE, however Whitehaven does not support such a condition as it is ultimately dependant on individual preference where Project personnel and their families choose to reside within the region. Note for the purposes of impact assessment it was assumed that approximately 34% of the operational workforce would reside in the Narrabri Local Government Area. Whitehaven would continue to support the provision of school-based traineeships, scholarships, apprenticeships and graduate programs in accordance with the housing and workforce management strategy outlined in the Social Impact Assessment (Section 5.4 of Appendix R of the EIS).
7AP	*45. That the proponent prepare a workforce management plan for the life of the Project that specifically addresses the use of automation and the impacts on the Project workforce requirement and employment benefits.*	Whitehaven has no current plans for the Project to include an automated fleet.
	Aboriginal employment	
7AQ	*46. That the proponent adopt a more ambitious target for the employment of local Aboriginal people, including additional support and training for local Aboriginal apprentices and workers.*	Whitehaven would target employment of 10% of the operational workforce being of Aboriginal and/or Torres Strait Islander descent within five years of commencement of operations. This is representative of the demographics of the regional population and in accordance with Whitehaven's Stretch Reconciliation Action Plan (prepared in consultation with the community). Whitehaven's Stretch Reconciliation Action Plan (which includes an Aboriginal Employment Strategy) details Indigenous employment targets and strategies for ongoing Aboriginal training and apprenticeships in the region, including continued support for the Winanga-Li Aboriginal Child and Family Centre and partnership with the Girls Academy at Gunnedah High School.

	Recommendation	Response
	Boggabri Community	
7AR	*47. That the Proponent reconsider its approach to donations and contributions to ensure that the impact of this Project on Boggabri is minimised and / or offset.*	Whitehaven is currently discussing Voluntary Planning Agreements (VPAs) for the Project with the NSC and GSC. Whitehaven's Donations and Sponsorship Policy, which provides support to local charities and community organisations, including within Boggabri, would continue to be implemented over the life of the Project. Whitehaven would also continue to consult with the GSC, NSC and relevant community infrastructure providers throughout the life of the Project to assist with service planning and determine opportunities to maximise benefits and offset impacts of the Project.
7AS	*48. That the Proponent outline specific long-term plans, in addition to transition arrangements, for the township Boggabri once mine operations have ceased.*	Whitehaven would prepare a Mine Closure Plan three to five years in advance of the Project's anticipated closure date to accurately inform mine closure planning and management of potential social impacts. The Mine Closure Plan would be prepared in consultation with GSC, NSC and relevant community stakeholders, including within the Boggabri township.
	Rehabilitation	
7AT	*49. That the DPE satisfy itself that the state holds sufficient financial assurance to cover the estimated costs of rehabilitation.*	This comment is directed at DPE.

	Recommendation	Response
7AU	*50. That DPE require as a condition of consent that:* *a) the proponent shall pay a security deposit in the form of a cash bond or bank guarantee of an appropriate amount that covers the true cost of rehabilitation.* *b) the Proponent shall carry pollution legal liability insurance that covers pollution and natural resource damage both on-site and off-site including groundwater contamination and for the benefit of the insured, third parties, and contractors.* ***c)*** *the Proponent shall contribute to an Environmental Fund (similar to the Western Australian Government Mining Rehabilitation Fund) established to cover off-site remediation and rehabilitation including groundwater contamination and other long term, gradual onset damage.*	This comment regarding conditions of approval of the Project is directed at DPE.
7AV	*51. That the appropriate NSW Government Agency monitor and enforce compliance with progressive rehabilitation targets if the Project is approved.*	This comment is directed at the NSW Division of Resources and Geoscience (DRG).
7AW	*52. That the DPE require as a condition of consent that the Proponent shall prepare a mining plan that minimises the active mining footprint.*	This comment regarding conditions of approval of the Project is directed at DPE.
	Voluntary planning agreement and developer contributions	
7AX	*53. That the proponent enter into a VPA with Council that reflects the socio-economic impacts in, and immediately around, Boggabri and provides a lasting net economic benefit to Boggabri, the wider Narrabri Shire and Gunnedah Shire.*	Whitehaven is currently discussing Voluntary Planning Agreements (VPAs) for the Project with the NSC (and GSC).

	Recommendation	Response
	Waste	
7AY	*54. That the proponent prepare a waste management plan structured around the waste management hierarchy defined under the Protection of the Environment Operations Act 1997 and including measures to avoid, reduce, reuse, recycle and treat waste would be investigated in order to reduce the volumes waste and minimise potential environmental impacts.*	Please see response to Submission 1R.
	Aboriginal Heritage	
7AZ	*55. That consultation with the Aboriginal community should continue during the Project, including during the preparation of the Aboriginal Heritage Management Plan.* *56. That Aboriginal access to traditional lands and the Namoi River should be maintained as far as is practicable throughout the operational phase of the Project.*	The Registered Aboriginal Parties for the Project would be given an opportunity to provide comments on the draft Heritage Management Plan prior to submission to DPE for approval. Please see response to Submission 8V regarding ongoing consultation and access to traditional lands.
	Historic Heritage	
7BA	*57. That the proponent be required to work with Gunnedah Shire to manage and mitigate the impacts on the weatherboard dwelling noted as having heritage significance.*	Please see response to Submission 8AD.
	Visual Impact	
7BB	*58. That the visual impacts, including impacts at night due to light, should be managed and mitigated as far as practicable throughout the operational phase of the Project.*	Impacts to visual amenity from the Project landforms, infrastructure and lighting would be mitigated as far as practicable throughout the life of the Project. Mitigation measures will include progressive rehabilitation, design of the final landform to maximise integration with the existing landscape, visual screening and implementation of good lighting principles as described in the *Dark Sky Planning Guideline* (DP&E, 2016) (Appendix L of the EIS).

	Recommendation	Response
	Road Transport	
7BC	*59. That the proponent provide information that satisfies Council that the proposed access route can be practically and legally enforced. If the access route cannot be assured to Council's satisfaction, that the proponent should submit a revised transport assessment to consider the impact on the Braymont Road and any other affected adjoining roads.*	Condition 43 of the Approved Mine Development Consent (SSD-5000) provides that Braymont Road would not be used by any mine-related traffic to get to or from the site, except in an emergency to avoid the loss of lives, property and/or environmental harm. It is expected a similar condition would be included in any Development Consent for the Project. Project employees and contractors would not use local unsealed roads to access the Project. Employee and contractor access from the north would be via Hoad Lane (sealed) and from the south would be via Blue Vale Road (sealed) (Figure 12). Whitehaven's existing Traffic Management Plan, which would be revised for the Project, will detail the prescribed site access route for mine-related traffic, access restrictions (i.e. no use of Braymont Road) and access route management measures (e.g. personnel inductions and signage).



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LEGEND

- Mining Tenement Boundary (ML and CL)
- Exploration Licence Boundary (EL)
- Mining Lease Application (MLA)
- State Forest
- State Conservation Area, Aboriginal Area
- Major Roads
- Railway
- Indicative Project Rail Spur
- Project Access Route from North (Sealed)
- Project Access Route from South (Sealed)

Source: LPMA - Topographic Base (2010); NSW Department of Industry (2015)

WHITEHAVEN COAL

VICKERY EXTENSION PROJECT

Project Employee and Contactor Access Routes

Figure 12

	Recommendation	Response
7BD	*60. Many local roads within the Narrabri Shire area east of Boggabri are likely to require sealing or upgrading of the existing sealed road width and bridge/culvert repair/widening as a result of the cumulative mine generated daily traffic volumes from multiple coal mining projects, namely:* • *Braymont Road;* • *Therribri Road;* • *Leards Forest Road (or replacement road) following the Boggabri Mine expansion;* • *Barbers Lagoon Road; and* • *Hoad Lane.* *61. That the proponent be required to enter into discussions with Council regarding the upgrade requirements for impacted Council managed roads and that the upgrades be required as a condition of consent.*	The Road Transport Assessment (Appendix I of the EIS) considered potential impacts to the safety and efficiency of the road network as a result of the Project. No upgrades to existing infrastructure were recommended due to Project-related traffic. Notwithstanding, Whitehaven currently has road maintenance agreements with the GSC and NSC. It is anticipated that similar agreements would continue to be maintained over the life of the Project, based on the levels of traffic generated.
7BE	*62. That DPE impose a condition on any project approval requiring the proponent to enter into a road maintenance agreement with Narrabri Shire for the maintenance of public roads affected by the project (construction, operation and rehabilitation), to the satisfaction of Narrabri Shire.*	Any works to public roads required for the Project, such as the approved Blue Vale Road realignment, would be conducted at Whitehaven cost. Whitehaven does not agree that a road maintenance agreement is required for the use of public roads by Project employees given the conclusions of the Road Transport Assessment (Appendix I of the EIS).
7BF	*63. Confirmation on the timing of cessation of use of haul road and replacement with rail.*	Once the Project CHPP, train load-out facility and rail spur infrastructure reach full operational capacity, the portion of the Approved Road Transport Route from the Project to the Whitehaven CHPP would no longer be required to haul Project ROM coal. It is anticipated that construction of the Project CHPP, train load-out facility and rail spur would be completed approximately 12 months following Project commencement. Actual timing would be dependent on Whitehaven obtaining all necessary approvals, however, Whitehaven would inform Council of the likely timing of construction in advance.

	Recommendation	Response
8	**GUNNEDAH SHIRE COUNCIL**	
	Exhibition Details	
8A	*Documentation should be updated to include details of the property address of each of the development allotments. The Environmental Impact Statement (EIS) and Exhibition of the development proposal does not include any development allotment identification in the form of property Lot and DP numbers.*	Attachment 3 of the EIS details the Project Development Application area and contains Lot and DP information for all properties within the Development Application area. Figure A3-1, which details property information for the Project area, is reproduced below as Figure 13.
8B	➢ *Staging of construction: The development should be amended to include the exact staging of all infrastructure construction and stages or triggers at which certain works are required to occur.*	The major construction period for key Project infrastructure (i.e. the mine infrastructure area and rail spur) would be completed approximately 12 months following Project commencement. Actual timing would be dependent on Whitehaven obtaining all necessary approvals, however, Whitehaven would inform Council of the likely timing of construction in advance.
8C	➢ *Extraction Limits: The development EIS indicated that extraction limits will be approximately 10 million tonnes per annum (Mtpa) and approximately 179 million tonnes over the life of the mine. Council believes that these extraction limits should be limited to 10 Mtpa and 179 million tonnes definitively, for the life of the development. Assessment of this application should be made on an exact figure to ensure that appropriate infrastructure and natural impacts are assessed in accordance with these maximums and that no further additional impact may occur.*	This comment regarding conditions of approval of the Project is directed at DPE.
8D	➢ *Number of Voids: Clarify the number of final voids created. Page 3 of the Executive Summary, makes reference to reducing the number of voids from two (2) to one (1), however the table present on page 5 of the Executive Summary notes reduction from five (5) voids to two (2) voids.*	The current landscape of the Project mining area contains five final voids remaining from past mining activities (i.e. Canyon, Red Hill, Blue Vale, Greenwood and Shannon Hill final voids). Two final voids were proposed for the Approved Mine, in addition to the existing Blue Vale final void. The Project final landform would include only one final void, in addition to the existing Blue Vale final void.

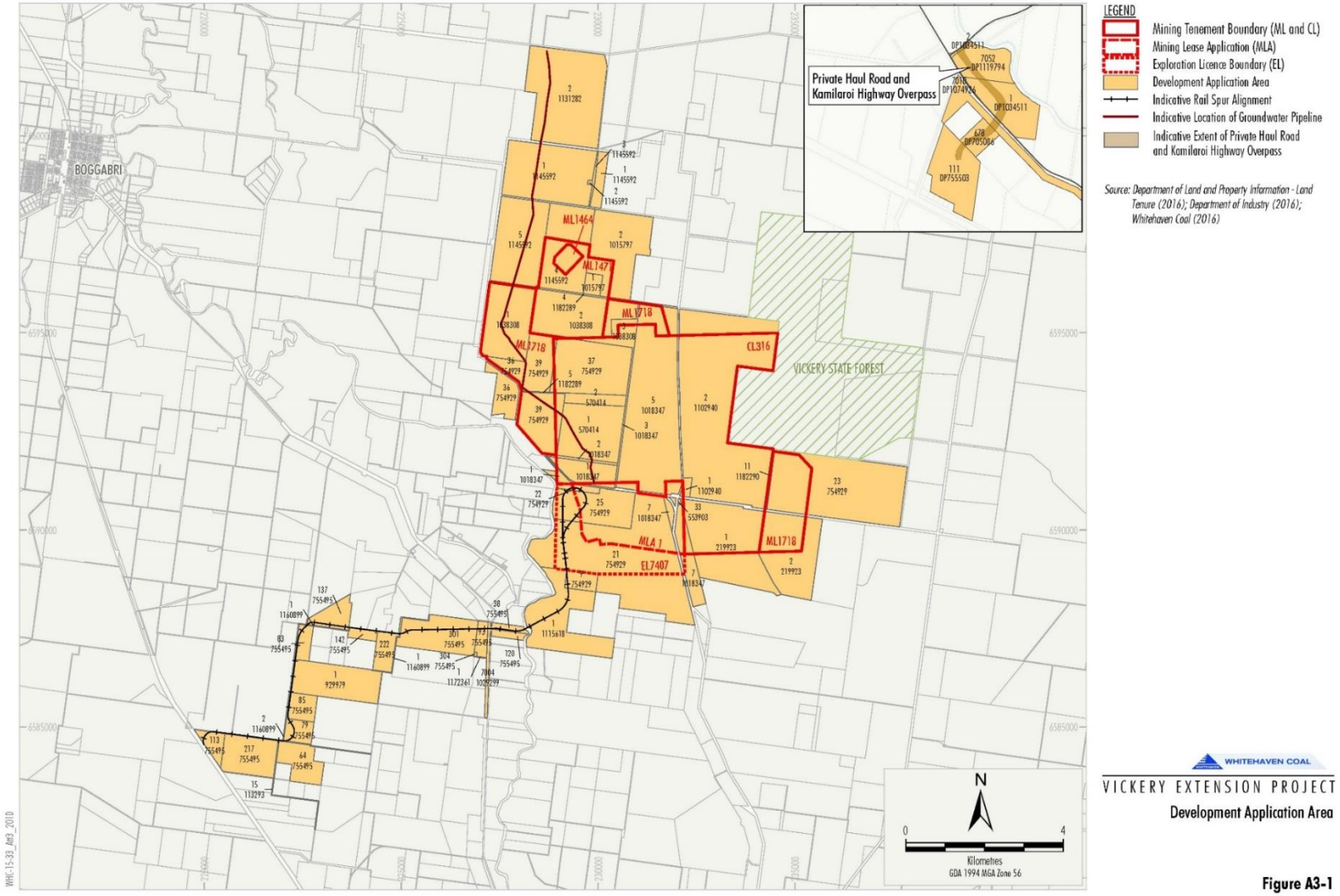

Figure 13: Development Application Area

	Recommendation	Response
8E	➢ *Clarify the alluvial ground water accessed: clarify references to a resulting drawdown or access to the alluvial groundwater system associated with the Namoi River Floodplain despite the statement that the proposed mine site is located entirely over the Maules Creek groundwater system. Confirm that ground water table access is only sourced from Maules Creek groundwater system.*	Cumulative groundwater modelling shows that the 1 m drawdown associated with the Project open cut does not extend from the Maules Creek Formation into the Namoi River alluvium, both during and post-mining. Incidental losses through enhanced leakage (i.e. vertical loss) from the Upper Namoi Alluvium to the underlying Maules Creek Formation are predicted to be less than 0.1 ML/day. The northern borefield is situated within the Zone 4 water source of the Upper Namoi Alluvium. The volume of groundwater pumped from the bores would be within Whitehaven's licensed entitlements.
8F	➢ *Impacts of flood heights: The Flood Assessment makes reference to the rail spur loop impacting on flood water heights up to a distance of 1.5km and that all land affected is Whitehaven owned land. Figure 1-5a of the Executive Summary and Figure 6.10 of the Flood Assessment report, note private properties within the impacted areas. This statement that changed flood heights only impact on Whitehaven owned land is incorrect.*	Relevant objectives of the Draft FMP were assessed against the predicted 20% AEP, 5% AEP and 1% AEP flood events incorporating the conceptual rail spur design. Changes to flood levels on privately-owned land as a result of the Project rail spur are predicted to comply with the Draft FMP objectives (i.e. less than 20 cm). A negligible impact is predicted at one privately-owned residence (i.e. approximately 1 cm) for the 1% AEP event. There are no other predicted flooding impacts to privately-owned residences. Detailed design of the rail spur (including locations of openings and bunds) would be consistent with the objectives of the Draft FMP.
	Development Consent No. SSD 5000	
8G	*It has been indicated that in the event development consent is granted for the extension project (SSD 7480), that the previous development consent (SSD 5000) will be surrendered. Mechanisms need to be imposed that require this development consent to operate under the limitations and imposed conditions, where appropriate, of the previous consent where stated in this EIS that management will be ensured through adherence under previous consent.*	This comment is directed at DPE.
	Submitted Plans	
8H	*The EIS does not appear to contain any specific plans or documents for the proposed Coal Handling and Preparation Plant (CHPP) and visual screening landscaping plans. These plans should be provided for consideration prior to the application being determined.*	Construction and operation of the Project CHPP would be detailed in a MOP (or equivalent), subject to approval by DRG, following determination of the Project.

	Recommendation	Response
	Flooding Implications	
8I	*The development site is partially subject to flood inundation during a 1% ARL flood. It is noted that the developer is proposing the construction of flood contours to protect the development site in the event up to a maximum predicted flood event level and construct a rail spur including culverts and urban banks in its construction. It is noted that these works will have an impact on the flood characteristics and flowrates in the immediate area. Any change to the extent of flood waters during a 1 in 100 year flood event level or greater should be updated on the Gunnedah Local Environmental Plan 2012, flood mapping. The costs of updating these documents should be born exclusively by the developer and should be completed prior to flood mitigation works being conducted.*	The Project rail spur is not predicted to change the extent of the 1% AEP flood event in the Namoi River Floodplain. The Project includes the construction of flood protection levees along the southern extent of the open cut and the secondary infrastructure areas where they border South Creek and Stratford Creek. These levees are within the 1% AEP flood event for Stratford Creek (not the Namoi River). If these levees are constructed, Whitehaven would provide GSC with updated flood mapping of Stratford Creek and South Creek.
8J	*It is noted that a Flood Assessment was submitted as part of the EIS. However, this assessment does not appear to adequately address the implications of alterations to flood heights and the impacts that this will have on the safety of surrounding residences. The development should be designed in such a way that it has no impact on flood levels at existing residences. Alternatively, in the event that flood heights are altered, such as residences 5 and 15 (noted in Figure 6.10 of this assessment), further assessment should be conducted and measures proposed to ensure that the risk to life and property are not adversely impacted and flood planning levels {being 500mm freeboard above the 1 in 100 flood level) are retained where previously adhered to or imposed. This assessment should also be updated to investigate the provision of safe wading depths at each residence, property accesses or internal access ways, in accordance with Figure L 1 of the Flood Planning Manual.*	One privately-owned residence (No. 15) is predicted to experience a negligible increase (i.e. approximately 1 cm) in flood levels during the 1% AEP flood event. Residence No. 5 is Whitehaven-owned and located in a high hazard flood area, with flood levels exceeding 1 m for the 1% AEP flood under existing conditions (i.e. without the Project rail spur). Residence No. 5 is not occupied and access to and from this property is not available during a 1% AEP flood event under existing conditions. Consideration of safe wading depths at residences and property access ways is not necessary due to the negligible change in flood depths and velocities predicted for the Project.

	Recommendation	Response
8K	*Upon completion of final rail spur loop design, an updated flood assessment should be completed and provided to Council for review to ensure that no additional impact on surrounding residences will occur. In the event further implications arise, mitigation measures should be instigated where required. Council should be provided with a flood impact analysis to ensure that the resulting final impacts to flood heights at each of the measured flood events are recorded for future reference.*	Whitehaven will present updated flood modelling results (including predicted flood heights) following detailed design of the Project rail spur.
	Road Infrastructure	
8L	*Council acknowledges that the intent of the construction of the rail spur is to reduce the number of haulage vehicles on the public road network. It should be a condition of consent that haulage along Council's local road network should not exceed the 4.5Mtpa limit of the previous consent (SSD 5000) to ensure that there is no increased impacts on Council's road network in exceedance of previous assessed implications. It is Council's understanding this would include a requirement for the Blue Vale Road overpass of the Kamilaroi Highway at a haulage limit of 3.5Mtpa, in the event that the construction of the CHPP and rail spur is not completed in the timeframe expected.*	Please see response to Submission 12F.
8M	*Until such time as the rail spur is constructed and the use of Council's road network as the haul route is discontinued, the road maintenance agreement for the upkeep and maintenance of Council's local road network, including Blue Vale Road, shall be retained. Any changes to the haul routes beyond the current agreement shall be renegotiated with Council as the road authority.*	GSC's comment that the road maintenance agreement will remain in force until the Project rail spur is operational is noted.
8N	*The project requires the realignment of sections of Blue Vale Road where they are located within the Project disturbance area. The Blue Vale Road realignment is proposed to be constructed adjacent to the western and southern boundaries of the Vickery State Forest, and around the East of the development impact area to allow continued public access within the area. It should be noted that Council is the Road Authority for this local road network.*	GSC's comment that the GSC is the Roads Authority for the portion of the Blue Vale Road realignment within the Gunnedah Local Government Area is consistent with the submission received from RMS and is noted.

	Recommendation	Response
8O	*Council requires all realignments and adjustments to the public road network as a consequence of this development to be completed as part of the construction phase of the project, to be funded by the Proponent and designed and constructed subject to Council's approval. All road construction should be designed and constructed to the relevant Ausroad design standards.*	The approved Blue Vale Road realignment would be designed and constructed in accordance with Ausroad Guidelines and in consultation with the GSC and NSC, and funded by Whitehaven.
	Noise	
8P	*Council believes that the mitigation measures that are proposed for the development area are insufficient and that further mitigation measures should be proposed or a change to the development proposal should be proposed to ensure that there is no noise impact at adjoining residences. The noise assessment did not appear to include an investigation into the noise generated from rail activates such as shunting. It is recommended that the noise assessment be updated to include the potential impacts of these activities within the rail spur. As a minimum, adherence with the Rail Infrastructure Noise Guidelines (NSW EPA) should be conditioned.*	The Noise and Blasting Assessment (Appendix D of the EIS) was prepared in accordance with the NSW *Noise Policy for Industry* (EPA, 2017), which requires an assessment of potential noise impacts following the implementation of all reasonable and feasible mitigation measures. In addition, the Noise and Blasting Assessment adopted indicative SWLs consistent with current leading practice mining equipment for noise performance. Noise mitigation measures implemented for the Project include modification of pit progression direction, design of the waste rock emplacement, haul road realignments and removal of the Blue Vale open cut. Rail activities with the potential to cause instantaneous noise (e.g. shunting) would be unlikely to occur on the rail spur, but may occur at the rail loop, immediately adjacent to the mine infrastructure area. The Noise and Blasting Assessment conducted for the Project included consideration of potential instantaneous noise impacts (Section 5.12 of Appendix D of the EIS). This instantaneous noise assessment included a maximum noise level of 125 dBA associated with impact noise at the mine infrastructure area. It is noted the *Mount Pleasant Operation Rail Modification Noise Assessment* (Wilkinson Murray, 2017) describes that rail activities such as bunching and stretching could potentially produce noise levels of up to 119 dBA. This is within the range of instantaneous noise levels assessed for the Project. Whitehaven notes that potential noise impacts from the Project rail spur are predicted to comply with the *Rail Infrastructure Noise Guideline* (EPA, 2013) at all privately-owned residences when considering local noise-enhancing meteorology (Section 4.13.1 of the EIS).

	Recommendation	Response
8Q	*The noise impact assessment that was provided as Appendix D of the EIS, indicates that noise levels are exceeded during evening and night periods for up to 5 residences by year 21. Two of these residences are affected as early as year 3. These dwellings are occupied and noise levels should not be exceeded at any residential receiver during any time period. The exceedance of noise levels during evening and night periods are particularly concerning because this can affect occupants health through disruption to sleep patterns and loss of amenity. Council does not believe that any exceedances of noise levels are acceptable regardless of being secondary or primary (main) residences within any property. Land owners and residential occupants have the right to a suitable amenity both inside and outside of their homes. It is suggested that the proposed real time monitoring that is identified within Section 7 Summary of Management, Mitigation, Monitoring and Reporting of the EIS, Clause 7.3.3, should be undertaken at these adjoining residences to ensure that no exceedance of operational noise levels occur.* *Further testing and modification to the development and possible relocation of high noise generating activities should be relocated to such a position that will ensure that predicted noise levels are not exceeded at any residential receiver at any period of the day. The mine will be a 24 hour 7 days a week operation and if excessive noise levels are experienced at nearby receivers this could result in a loss of amenity and potential health implications that can be attributed to this loss of amenity and sleep disturbance with little to no respite.*	Noise mitigation measures implemented for the Project are described in the response to submission 8P above. The Noise and Blasting Assessment also gave consideration to the VLAMP. The VLAMP provides that in those cases where the NPfI Project-specific noise criteria are exceeded, it does not automatically follow that all people exposed to the noise would find the noise noticeable or unacceptable. One receiver on Property ID 127 is predicted to experience noise levels within the 'Noise Acquisition Zone' (i.e. > 5 dBA exceedance of the project-specific noise criteria) under noise enhancing meteorological conditions during the evening and night-time, which would occur infrequently. It is noted that this property has the right to acquisition upon request in accordance with the Development Consent conditions for the Approved Mine (SSD-5000). A separate receiver on the same property is predicted to experience noise levels within the 'Noise Management Zone' (i.e. 3-5 dBA exceedance of the project-specific noise criteria). All other noise level exceedances under noise enhancing meteorological conditions during the evening and night-time (3 dwellings on Property IDs 131 and 132) are considered negligible (i.e. exceedance is within 1-2 dBA of the project-specific noise criteria) and would not be discernible by the average listener. It is noted noise level exceedances were predicted during particularly adverse meteorological conditions, which the noise modelling predicts would occur infrequently. It should be noted that under P10 noise levels (i.e. the level that is exceeded 10% of the time), receivers on private Property IDs 131 and 132 comply with the operational noise criteria and predicted exceedances at the receiver on Property ID 127 are considered 'moderate' (according to the *Voluntary Land Acquisition and Mitigation Policy – For State Significant Mining, Petroleum and Extractive Industry Developments* [NSW Government, 2014]). The real-time noise monitoring and management system will be used to maintain noise levels consistent with EIS predictions.

	Recommendation	Response
	Social and Economic Impacts	
8R	*The social and economic assessment of the development does not provide adequate detail. The assessment provides insufficient evidence with regard to the ability for the surrounding local centres to accommodate an increase in population, taking into consideration the current demand.* ➢ *The Social Impact Assessment (SIA) appears to reference outdated health profiles and suggests that there is a broad level of access to health professionals in Gunnedah. The assessment makes no reference to existing wait lists and the capacity of services to accept new patients. In addition there is a causal link to health care, schools and local housing and rental stock post construction due to increases in population from new settlements. The assessment identifies that 54% of the operational workforce will be drawn from Gunnedah which has the potential to increase population numbers by approximately 243 workers excluding families and relatives.*	The health profile information used in the Social Impact Assessment was sourced from the most recent available data. Section 4.7.1 of Appendix R of the EIS describes potential impacts to the capacity of health services as a result of the Project. Relevant health professionals in the region (including the Hunter New England-Gunnedah Hospital and Health Service Manager and Emergency Service providers) were consulted with during the Social Impact Assessment engagement process. Whitehaven would consult with the GSC, NSC and relevant community infrastructure providers to pre-empt gaps in the provision of health services to local residents due to new patients as a result of the Project. Based on Whitehaven's experience with the existing workforce in the region, for the purposes of impact assessment, it was anticipated that approximately 30% of the operational workforce would migrate to the region, of which 54% would reside in Gunnedah. Therefore approximately 73 operational personnel are expected to move to Gunnedah, excluding their families (i.e. not 243, as suggested in GSC's submission).

	Recommendation	Response
8S	➢ *The Project has the capacity to be a significant economic driver for the region however it is noted that the use of external workforces to such a large scale will reduce its potential for economic generation and jobs growth for the Gunnedah and Narrabri Shires. The SIA states that due to the level of professional skills required only 10% in the construction phase will be drawn from Boggabri and Gunnedah, with the remaining 90% to be drawn from outside the area. Therefore, with the creation of approximately 500 construction jobs, only 50 would be sourced locally from either Boggabri, Gunnedah or both with 450 sourced outside the Shire. The assessment goes further to indicate that to relieve suggested pressure on local rental stock, all non-local construction workers in the 12 month construction phase would be encouraged to live in the Civeo Boggabri Accommodation Village. Council suggests that a higher emphasis be given to the use of local workforce during both the construction and the operational phases of the mine and that consideration be given to strategies that yield a greater balance between village accommodation and town based accommodation to support local investment and social cohesion.* ➢ *In the event that some staffing is unable to be accommodated through the local employment opportunities, Council requests that non-local construction and permanent staff be encouraged not to utilise the Civeo Boggabri Accommodation Village, but to source local accommodation within the surrounding local communities.*	As a result of the specialised construction workforce force required, Whitehaven is predicting that the majority of construction personnel would be non-local (i.e. sourced from outside the Project region). This prediction is based on Whitehaven's experience with existing operations in the region, including the Maules Creek Coal Mine. These non-local personnel would be required only during the construction phase of the Project (approximately a 12 month period). However, construction personnel would be preferentially hired from within the Project region where possible. Non-local construction personnel would be encouraged by Whitehaven to use the Boggabri Accommodation Camp to relieve short-term pressure on local housing prices and availability, consistent with feedback from the local community. Notwithstanding, approximately 70% of the operational workforce is expected to be sourced from within the region. Non-local operational personnel would be encouraged to settle permanently within the Gunnedah and Narrabri Local Government Areas.

	Recommendation	Response
8T	➢ *Council acknowledges the efforts by the Project to engage with key stakeholders across the region however, notes it could have been strengthened with the inclusion of quantifiable data around consultation with key stakeholders in the Gunnedah Shire, rather than a strong reliance on broad motherhood statements. The SIA suggests broad support for the mining project however fails to provide indications of the numbers of those consulted, key feedback etc. which would have been helpful. For example on page 24, the SIA indicates that community surveys were conducted in June 2017 and included responses from 600 participants across 4 Shires. Of those respondents, 43% indicated support for coal mining and 28% did not. The SIA does not isolate responses relevant to each Shire and provides Gunnedah Shire Council with no clarity regarding the level of support or non-support relevant to the Shire. With the absence of supporting information and despite information regarding additional smaller community engagement activities, it could be argued by some within the community that with a total population across four (4) Shires of approximately 94,986, the views of 600 does not constitute a representative sample (0.63%).*	GSC's comment acknowledging the stakeholder engagement undertaken for the Project is noted. Community consultation undertaken for the Project is detailed within Section 3.1.8 of the EIS and Section 2.4 of Appendix R of the EIS. Whitehaven would be happy to share the results of the community survey with GSC.

	Recommendation	Response
8U	➢ *The SIA outlines a number of additional stakeholders consulted however there appears to be a gap in consultation with key emergency services and first response agencies. The SIA identifies that road works during the construction phase could potentially leading to a 15 minute delay and that mitigation strategies involve keeping stakeholders informed. It is suggested that further consultation with all key stakeholders be undertaken as a joint activity to determine if the strategies are sufficient.*	Emergency service personnel (including NSW Ambulance, Police and the Rural Fire Service) were provided an opportunity to participate in consultation during the Social Impact Assessment engagement process (Section 2.4 of Appendix R of the EIS). The EIS (including the SIA) did not identify any delays along local roads as a result of road works during the construction or operations phase of the Project. The Social Impact Assessment identified that temporary blasting related road closures may result in up to a 15 minute delay along local roads. Approvals would be sought from the GSC and/or NSC to temporarily close sections of local roads to allow blasting to occur. Local emergency service providers and potentially affected local residents would be notified of blasting related road closures in advance. Whitehaven would continue to consult with key stakeholders, including emergency service providers, throughout the assessment, construction and operations phases of the Project to assist with service planning.
8V	➢ *The SIA makes reference to community engagement activities with Traditional Custodians and that a significant number of submissions received by traditional custodians regarding the Project which is noteworthy and commendable. The SIA notes that representatives from Red Chief LALC emphasised during consultations the importance of maintaining access through Crown Land and Travelling Stock Routes on, to and from, Crown Land and that in this context, the project's construction and operations are unlikely to adversely affect or change existing Aboriginal social uses of land, or access to the Namoi River. However, in the actions on page 138 (4.3.2) there are references to the project limiting access by Kamilaroi Peoples due to safety issues, with the resultant strategy to notify stakeholders when the route will be open or closed. With the potential for the safety considerations to extend the length of time and number of periods where access is limited, it is suggested that a communication strategy be considered to ensure all Traditional Custodian groups are informed of key impacts throughout the life of the project.*	GSC's acknowledgment of the consultation undertaken with Aboriginal community members regarding the Project is noted. Ongoing consultation with the Aboriginal community would be detailed within the Heritage Management Plan and may include meetings and any required fieldwork. Access to the Namoi River and associated land would be maintained as far as practicable throughout the Project life. The Aboriginal community would be consulted regarding potential safety-related access restrictions during blast events/construction etc.

	Recommendation	Response
8W	➢ *Council acknowledges that Whitehaven has made a commitment to promote training programs and apprenticeships as well as promoting employment opportunities for indigenous persons within their organisation. Council requests that this development consent require ongoing commitment to these practices. It is suggested that Whitehaven commit to achieving a target of at least 10% staff indigenous employment and that efforts be made to source trainees and apprentices from within the surrounding local communities.*	GSC's acknowledgment of Whitehaven's contribution to Indigenous employment and training to date is noted. The comment regarding conditions of approval of the Project is directed at DPE. Please see response to Submission 7AQ regarding Indigenous employment at the Project.
8X	➢ *While Council acknowledges references throughout the document for the need to support locally based workforce employment programs, there is limited detail regarding the realisation of the potential for delivering training programs within the local community. The availability of skilled workers has not been considered based on current availability of contractors within the surrounding communities. It is suggested that a skills and employment strategy be developed in consultation with key stakeholders from the affected Shires, prior to the commencement of works.*	The location of the skilled workforce required for construction was estimated based on Whitehaven's current workforce and experience from existing operations in the region. Construction personnel would be preferentially hired from within the region where possible. Whitehaven currently supports the provision of school-based traineeships, scholarships, apprenticeships and graduate programs in the region. Whitehaven would continue to support these programs consistent with the workforce management strategy outlined in the Social Impact Assessment and in consultation with the GSC and NSC and key education/trainee providers.

	Recommendation	Response
8Y	➢ *Displacement of employment opportunities from agricultural sector needs to be considered within the social and economic assessments. A suggestion would be to update the EIS to address the reduction in economic activity that would occur due to the displacement of agriculture as a result of the proposed activity. This should be expanded to consider displacement from other industries. Gunnedah is currently experiencing a relatively low unemployment rate and a skills shortage. It would be expected that the increased demand as a result of the expansion of Vickery South would drive up incomes and displace workforce from other industries in addition to agriculture including but not limited to construction and manufacturing. It would be relevant to see the displacement to other key industries as this will be where the bigger impact will be.*	Labour draw from the agricultural sector as a result of the Project is predicted to be negligible (Section 3.3.7 of Appendix J of the EIS). However, stakeholders consulted as part of the Social Impact Assessment engagement noted that mining recruitment exacerbated local shortages of tradespeople in the construction and manufacturing industries (Section 4.2.1 of Appendix R of the EIS). Potential labour draw as a result of the Project is predicted to be a temporary impact as the labour market equalises. Whitehaven would continue to support the provision of school-based traineeships, scholarships, apprenticeships and graduate programs in the region and consult with the GSC and NSC regarding current employment and training trends in the region.
	State Environmental Planning Policy No. 44 - Koala Protection (SEPP 44)	
8Z	*The assessment provided within the EIS has identified that the development site is regarded as being Core Koala Habitat and that a Koala Plan of Management (KPoM) is proposed to be completed for the site. Council believes that this KPoM should be prepared prior to the development being determined to ensure that management practices are consistent with management of Core Koala Habitat and resident Koala populations within the Gunnedah Shire LGA.* *Council would also like to request to be consulted and given the opportunity to comment and endorse this plan to ensure that the objectives and measures within this document are consistent with previous individual KPoM documents that have been implemented within the Gunnedah LGA. The Gunnedah community prides itself on being the Koala Capital of the world. The potential for any core habitat loss to result in a further reduction in Koala Population numbers could impact on that identity with a further reduction of an already drastically reduced population.*	Please see response to Submission 2C.

	Recommendation	Response
	Habitat and Biodiversity Loss	
8AA	*Council acknowledges that the development will require the removal of 380ha of vegetation which includes 78ha of native vegetation and that the developer has Biodiversity offset credits available to be retired and can purchase further credits from the market to offset the loss of this habitat from the development site. It is also acknowledged that further reinstatement of habitat will be completed during rehabilitation efforts. However, the loss of habitat will impact on the following endangered fauna species identified within the Biodiversity Assessment Report and Biodiversity Offset Strategy, which may rely on the habitat contained within the site, being the Honeyeater, Squirrel Glider and Koala populations.* *Council implores the developer to consider implementing suitable biodiversity offsets within the development site itself or on immediate adjoining allotments, to ensure that the endangered ecological communities present within the immediate area are not faced with destruction and reduction in available habitat. Replanting should be conducted onsite and should be enacted at the commencement of operations. Trees should be monitored and unsuccessful planting should be replaced. Trees species should be characteristic of plant communities within the site prior to clearing and should include a high percentage of Koala fee trees.*	The post-mining land used in the Project area would be consistent with the surrounding existing land uses (i.e. vegetation and fauna habitat in the Vickery State Forest and along the Namoi River and cattle grazing on flatter, lower lying areas). The Project Biodiversity Offset Strategy proposes to secure suitable offsets, both off-site via biodiversity offset areas and within the Project mining area using rehabilitation. The waste rock emplacement would be rehabilitated to woodland/forest in order to contribute towards Federal and State biodiversity offset requirements for the Project. Rehabilitation of the waste rock emplacement to woodland/forest has been strategically selected to provide a biodiversity corridor connecting the Vickery State Forest to the Namoi River. Rehabilitation of the Project landforms would be undertaken progressively over the Project life and include the establishment of native vegetation and fauna habitat. Planned progressive rehabilitation measures and the rehabilitation monitoring program would be detailed in a MOP (or equivalent). Measures to be included in the rehabilitation monitoring program are described in Section 5.5 of the EIS.

	Recommendation	Response
	Other Impacts	
8AB	• *Visual Impacts - Statements within the EIS identify minimal visual impact following rehabilitation works. Council acknowledges that the visual impacts of the development will be mitigated upon completion of remediation works however, the visual impacts of the proposal should be considered for the operational life of the mine activity including the CHPP, during all stages. Visual impact assessment should also be conducted of the proposed rail spur over the floodplain and Kamilaroi Highway. Council considers it should be mandatory requirement that the proponent develop a tree screening program, including implementation of temporary screening barriers until vegetation has reached maturity, as a priority to be implemented as part of the construction phase of the project.*	The Visual Assessment prepared for the Project (Appendix L of the EIS) considers the potential visual impact of key Project infrastructure, including the mine infrastructure area and Project rail spur, to privately-owned residences and public road users during the construction and operations phases of the Project. Visual screening at residences would be implemented by Whitehaven upon receiving a request from an owner of a privately-owned residence, and where the Project is concluded to be resulting in a high visual impact at the residence (Section 4.14.3 of the EIS).
8AC	• *Rail Spur - As stated previously through this response, the development proposal does not contain any specific designs for the construction of the Rail Spur to the CHPP. The EIS currently contains vague comments about the use of pylons throughout the spur construction with the provision of culverts and earth embankments where appropriate. Council believes that detailed plans and designs of the Rail Spur construction should be provided prior to the determination of this development proposal to ensure that the design is compatible with the surrounding landscape and does not have any detrimental impacts to adjoining land holders and the wider community.*	Detailed design of the Project rail spur would occur following determination of the Project. The Project rail spur detailed design would have no further impacts to the flooding regime than predicted in the Flood Assessment and would comply with the objectives of the draft FMP. The potential visual impact of the Project rail spur to privately-owned residences in the vicinity has been considered in the Visual Assessment (Appendix L of the EIS). The Project rail spur design would be visually similar to the existing rail spur for the Maules Creek and Boggabri Coal Mines, to the north-west of the Project.

	Recommendation	Response
8AD	• *Heritage - The developer should make attempts to preserve the weatherboard dwelling that is directly impacted noted as having heritage significance. Relocation of the residence and archival records of its previous location could be a possible alternative to marginally preserving the heritage significance of this residence in the event that it is unable to be preserved in its current location. The development should also make consideration to the heritage significance of the Kurrambede Homestead. Council requests that this property be preserved and maintained in a manner consistent with the national heritage significance of this item and that greater access of it be made available to the community.*	The weatherboard home (Site 22) is situated within the Project disturbance footprint. The structure is in a poor state of repair and is currently unoccupied (Appendix K of the EIS). The weatherboard home was assessed as having potential local significance and as such direct disturbance would constitute a low-level adverse heritage impact (Appendix K of the EIS). The weatherboard home would be subject to archival recording prior to disturbance, as recommended by the Historic Heritage Assessment (Appendix K of the EIS) and in accordance with relevant NSW Government guidelines. The Kurrumbede Homestead and its associated outbuildings would not be directly impacted by the Project and no exceedances of the nominated building damage airblast or vibration criteria are predicted (Section 4.8.2 of the EIS). Consistent with the recommendations of the Project Historic Heritage Assessment (Appendix K of the EIS), Whitehaven will implement the following management measures for the Kurrumbede Homestead: • blast monitoring to demonstrate blast levels remain below building damage criteria; • maintenance of the landscaping surrounding the Homestead; and • maintenance of the Homestead and associated outbuildings to ensure they are safe and weatherproof. A Heritage Management Plan would be developed for the Project, including measures specific to the Kurrumbede Homestead (see response to Submission 3A). Whitehaven has also recently advised the Dorothea Mackellar Society of a significant financial contribution to enhance the landscaping surrounding the Kurrumbede Homestead. Whitehaven will continue to consult with the Dorothea Mackellar Society regarding the implementation of the enhancement works. Any enhancement works would also be detailed in the Heritage Management Plan.

	Recommendation	Response
8AE	• *Ground Water Impacts - the submitted EIS does not appear to include any ongoing ground water testing or mitigation measures should any degradation or contamination of the ground water table occur throughout the life of the development.*	The existing groundwater monitoring network is described in Section 2.11 of Appendix A of the EIS. The existing groundwater monitoring network would be reviewed as part of preparation of the Water Management Plan with consolidation of the network as required. Due to the open cut acting as a localised groundwater sink, no impacts to groundwater quality are predicted for the Project. Notwithstanding, groundwater management measures would be detailed in the Water Management Plan.
8AF	• *Surface Water Impacts - Mine water dams should be constructed in such a way as to ensure no potential leakage of water into ground water tables. The EIS did not appear to contain any measures to be implemented to ensure that there is no change to water quality in receiving water courses.*	Mine water dams and coal contact water dams would be designed and constructed to ensure no leakage into the surrounding groundwater source. Water quality monitoring and management measures for receiving water courses would be detailed in the Water Management Plan.
8AG	• *Water Resources - There is no detail provided that ensures suitable water allocation and no source for water in the event water cannot be sourced from the Namoi River or groundwater tables. There is also no assessment as to the impact of removing water allocation from the Namoi River system and the impacts on environmental (natural) flow rates. Aquatic species that rely on environmental flow may be inadvertently impacted. An assessment needs to be made as to the capabilities of the natural environment is within the capabilities of the natural environment.*	The Project would use runoff collected in mine water storage (e.g. sediment dams, mine water dams, coal contact water dams and the open cut) as the primary source of water for operational purposes. External water supply may be required when supply from the mine water storages is insufficient to meet demands. Whitehaven holds sufficient surface water and groundwater licences to account for predicted external water supply requirements (Attachment 6 of the EIS). As all extraction from the Namoi River would be conducted in accordance with the licensed entitlements issued by DI Water and the rules in the relevant water sharing plan, impacts to the Namoi River water source and aquatic ecology are predicted to be negligible.

	Recommendation	Response
8AH	• *Air Quality - Council believes that the development presents an opportunity to expand the Namoi Region Air Quality Monitoring Program, with the potential for new monitoring stations to be created in Boggabri and the Curlewis villages.*	The NSW air quality monitoring network is managed by OEH and includes monitoring stations in Gunnedah, Narrabri and Tamworth. The Namoi Regional Air Quality Monitoring Program (NRAQMP) is managed by the EPA and includes four Tapered Element Oscillating Micro Balance (TEOM) industry monitoring stations (Maules Creek, Wil-gai, Breeza and Werris Creek) (Figure 14). Data from the NRAQMP is reported weekly on the EPA's website. In addition, the Namoi Region Air Quality Advisory Committee has been established and comprises representatives from community environmental groups, local councils, NSW Farmers, Indigenous communities, DPE and industry (e.g. Whitehaven). The terms of reference for the Advisory committee are available at: https://www.epa.nsw.gov.au/working-together/community-engagement/community-news/namoi-air-quality-advisory-committee/terms-of-reference. An existing NRAQMP tapered element oscillating microbalance (TEOM) monitoring location ('Wil-gai'), located within the Project mining area, is considered by the EPA to be representative of the ambient air quality at Boggabri and other rural residences in the region[1]. Air quality monitoring would continue to be conducted at the on-site Wil-gai TEOM station throughout the duration of Project operations. Monitoring measures would be detailed in an Air Quality Management Plan. A monitor in Boggabri would not be able to reasonably measure dust from the mine, therefore following Project commencement, real-time air quality monitoring would be conducted at locations significantly closer to the Project than Boggabri, where dust from the mine may potentially be measurable, in order to demonstrate compliance with air quality limits. The Project monitoring, in addition to OEH, EPA and other industry monitoring, is considered to provide sufficient information to confirm there would be no tangible air quality impacts from the Project at Boggabri.

[1] https://www.epa.nsw.gov.au/your-environment/air/regional-air-quality/namoi-air-quality-monitoring-project

	Recommendation	Response
8AI	• *Rehabilitation - The rehabilitation report should include the requirement for a final site validation report for the entire impacted development area. Testing should not be only limited to the final fill voids. The rehabilitation works should attempt to return as much of the project area back to a sustainable agricultural use as possible. The ongoing management of final voids in perpetuity is to be adequately addressed within the updated rehabilitation plan.*	Rehabilitation would be reported in the MOP (or equivalent), including the rehabilitation monitoring program, rehabilitation parameters and completion criteria. The MOP (or equivalent) will include detailed and quantifiable performance measures and completion criteria that are specific, measureable, achievable, realistic and time-bound in order to validate that rehabilitation across the site has been completed prior to closure. Please see also response to Recommendation 11 in Table A (DPE Preliminary Issues Report Responses) regarding the proposed final land use of the Project area. It is considered GSC's comment that "rehabilitation works should attempt to return as much of the project area back to a sustainable agricultural use as possible" contradicts their previous comment that "Council implores the developer to consider implementing suitable biodiversity offsets within the development site itself" (see submission 8AA).

LEGEND

- Mining Tenement Boundary (ML and CL)
- Mining Lease Application (MLA)
- Highway
- Major Railway
- OEH Air Quality Monitoring Site
- Industry Air Quality Monitoring Site

Source: Geoscience Australia (2011)

WHITEHAVEN COAL

VICKERY EXTENSION PROJECT

Air Quality Monitoring Sites
in Namoi/ North-West Slopes Region

Figure 14

	Recommendation	Response
8AJ	***Preparation of Reports*** *There are several Management Plans that are yet to be completed for inclusion in this development proposal. The following Management Plans should be provided to ensure that the matters raised within these Management Plans meet the required and acceptable level of management to ensure that the development reduces or mitigates the impacts on the development for each area. The reports that should be provided for endorsement area:* ➢ *Water Management Plan;* ➢ *Noise Management Plan;* ➢ *Blast Management Plan;* ➢ *Air Quality Management Plan;* ➢ *Heritage Management Plan;* ➢ *Traffic Management Plan;* ➢ *Koala Plan of Management; and* ➢ *Mine Closure Strategy;* *Council is unsure how any determination can be made to the direct impacts of this development without the provision of some of the documents identified above, as these matters are considered by Council to be crucial integral management practices for the ongoing operation of the mine to ensure compliance and reduce ongoing impacts. It is requested that Council be given the opportunity to review each of these documents and be given the opportunity to provide comments on the content and recommendations of each of these plans and strategies prior to approval by the Department of Planning and Environment.*	Please see response to Submission 2C regarding the Koala Plan of Management. In accordance with best practice, other management plans would be prepared for the Project as required by any Development Consent conditions and in consultation with the relevant regulatory authorities and subject to approval by the Secretary.

	Recommendation	Response
8AK	***Expert Review*** *Council is extremely conscious of the critical importance of the implications that this development may have on flooding, critical habitat and the amenity of the surrounding area. Council believes that where there may be adverse impacts from developments such as coal projects that rigorous scientific appraisal of those impacts is undertaken by appropriately qualified, independent experts. Accordingly reports such as Noise Impacts, Air Quality, Ground and Surface Water and Biodiversity Assessments, should be subject to a thorough review by independent scientific experts engaged by the relevant State Government authorities.*	This comment is directed at DPE and other relevant NSW Government Agencies. Notwithstanding, peer reviews were undertaken of the Noise and Blasting Assessment, Air Quality and Greenhouse Gas Assessment, Biodiversity Assessment Report and Biodiversity Offset Strategy, Groundwater Assessment and Surface Water Assessment prior to submission of the EIS (Attachment 4 of the EIS). DPE requested an independent peer review of key assessments as listed below: • Flooding – Erin Askew (WMAwater). • Groundwater – High Middlemis (Hydrogeologic). • Surface water – Martin Giles (BMT). • Economics – Gavan Dwyer (Marsden Jacob Associates). The Independent Peer Reviews undertaken for DPE, as well as the peer reviews undertaken for the EIS (see Attachment 4 of the EIS), have contributed to the scientific appraisal of the project.
8AL	***Financial Contribution to Gunnedah Shire Council*** *It is noted that Gunnedah Shire Council is currently in discussions with the proponent with regard to a Voluntary Planning Agreement (VPA). At the time of this correspondence no final preparation of any such document has occurred. Council supports these discussions as a potential agreement to offset the economic and social implications that this development may incur on the wider Gunnedah Community. Approval should not be granted until such time as this matter has been settled.*	Whitehaven is currently negotiating VPAs for the Project with the GSC and NSC.

	Recommendation	Response
9	**LIVERPOOL PLAINS SHIRE COUNCIL**	
9A	*1.1 Compliance should be ensured with any business and community support mechanisms detailed in project approval allied Social Impact Assessments (SIAs) and commensurate Social Impact Management Strategies (SIMS).*	This comment relating to approval of the Project is directed at DPE.
9B	*1.2 In respect of 1.1 above, the definition of local procurement should be clearly defined and applied within an appropriate and reasonable geographical context in any local procurement strategies.*	Please see response to Submission 9E.
9C	*1.3 It is noted that the project is predicted to require a construction workforce of up to 500 personnel and operational workforce of up to 450 personnel. A local recruitment hierarchy should be developed with preference provided to locally-based candidates. It is noted from the SIA that no significant impact is predicted on the Liverpool Plains LGA, however, appropriate engagement should continue to be undertaken with local government to ensure that pressure is not created on Council's abilities to upskill personnel and achieve desired staff retention rates.*	The operations recruitment strategy for the Project would focus on employment of local residents and implementation of the Whitehaven Workforce Diversity Policy. Whitehaven would also encourage contractors and suppliers to preferentially employ residents from within the local region. Whitehaven would continue to consult with local Councils regarding workforce requirements.
9D	*1.4 Council, in its local experience with directly engaging with the mining sector, has found the operational outcomes to be generally positive. Whitehaven, in its operation of the Werris Creek Coal Mine within the Liverpool Plains local Government Area (LGA) has supported a broad variety of initiatives and events ranging from community-led environmental initiatives to the installation of community infrastructure such as playgrounds and educational training facilities. Local community organisations including service clubs and charities have also been supported. In all major community projects, Council has been actively engaged and partnered with in the process. This collaborative approach has also been underpinned by the contents of Council's adopted Community Strategic Plan (CSP) and a philosophy of 'buying local'. This approach has also ensured that businesses are supported in any local investment opportunities to the highest degree possible.*	Whitehaven's existing operations support a number of local, regional and National suppliers. Whitehaven will continue to implement their Local Content Strategy, including maintenance of a local supplier database to support ongoing and preferential use of local and regional businesses in the Project supply chain (Section 5.5 of Appendix R of the EIS). Whitehaven's Donations and Sponsorship Policy, which provides support to local charities and community organisations, would also continue to be implemented over the life of the Project.

	Recommendation	Response
9E	*1.5 Increased support and commitment is always sought from the mining sector to buying locally. The benefits to communities and the ability for them to share in prosperity and wealth generated by mining activity cannot be understated. Should the project be approved the SIMS should own local procurement policies and support, to the highest degree practicable, the communities that they reside in directly and impinge upon. Examples of local business and service providers in the Liverpool Plains that benefit from this sector includes, but is not limited to, real estate agencies, steel fabrication industries, vehicle and equipment sales and repairs, professional consultancy services, financial professionals, hospitality and food service industries, fuel distribution outlets, and the like.*	Please see response to Submissions 9E regarding local procurement. Whitehaven will also encourage all contractors and suppliers to preferentially hire within the Project region where possible, in accordance with the housing and workforce management strategy outlined in the Social Impact Assessment (Section 5.4 of Appendix R of the EIS).
9F	*1.6 The mining industry, State and Federal Governments have an obligation to support regional economies by ensuring appropriate digital, air, rail and road connectivity and appropriately funding these critical infrastructure needs. From a cumulative impact perspective, should the project be approved, it is likely that increased pressure will be placed on regional freight 'pinch points' within the Liverpool Plains LGA. These include at Gap Road, Werris Creek and the Werris Creek Road Railway crossing. The Department's attention is drawn in this regard to the contents of the Namoi Regional Freight Strategy (Rhelm Consulting, 2018).*	This comment is directed at DPE.

	Recommendation	Response
10	***DIVISION OF RESOURCES AND GEOSCIENCE***	
10A	*In view of the constraints outlined in the Proponent's EIS, the Division considers the Project to be an efficient development and utilisation of coal resources which will provide an appropriate return to the state. The Division is satisfied that, given the Proponent's mine design and mining method submissions, the Project presents an improvement to the current approved mine plan and final landform. It is, however, recommended that an independent expert examination of the project be carried out, focusing on whether the final landform is the best alternate option given there is already an existing project approval.*	Please see response to Recommendation 10 in Table A (DPE Preliminary Issues Report Responses).
10B	*The Division wishes to bring to the attention of the Proponent that while extraction is intended to occur within Mining Lease 1718 (Act 1992) (ML 1718), this lease was granted for mining purposes (now ancillary mining activities) only. Therefore, the extraction of coal is not currently permissible within ML 1718 and a new mining lease is required for extraction.*	Whitehaven will consult with DRG in regard to this comment.
10C	*The Project requires a biodiversity offset strategy and proposes a number of offset areas. The Division notes that all proposed biodiversity offset areas are located within land owned by the Proponent, and upon assessment and raise no resource sterilisation concerns. It is, however, requested that the Division be consulted on any supplementary biodiversity measures to ensure there is no consequent reduction in access to prospective land for mineral exploration or potential for the sterilisation of mineral and extractive resources.*	DRG's comment that it is satisfied with the location of the proposed biodiversity offset areas is noted. Whitehaven will consult with DRG if any changes to the Project biodiversity offset areas are required.
10D	*AnalytEcon has also estimated royalties to the New South Wales Government of $671 million in Net Present Value (NPV) terms, which is slightly less than the independent royalty calculation conducted by the Division ($695 million). The difference relates to slightly higher coal price assumptions used by the Division.*	The DRG's estimates of NSW Government royalty payments over the life of the Project are slightly higher than that calculated in the Project EIS. This is due to DRG assuming a higher coal price than what was used in the Economic Assessment (Appendix J of the EIS). The royalties calculated in the Economic Assessment for the Project are considered to be a conservative estimate.

	Recommendation	Response
11	**RESOURCES REGULATOR**	
11A	*The Resource Regulator has determined that sustainable rehabilitation outcomes can be achieved as a result of the project and that any identified risks or opportunities can be effectively regulated through the conditions of the mining authorities under the Mining Act 1992.*	The Resources Regulator's comment that rehabilitation outcomes can be achieved is noted.
11B	*The Resources Regulator requests a review of the draft development consent conditions prior to finalisation and any granting of development consent.*	This comment regarding conditions of approval of the Project is directed at DPE.
12	**NSW ROADS AND MARITIME SERVICES**	
12A	• *The key interests for Roads and Maritime are the safety and efficiency of the road network, traffic management, the integrity of infrastructure and the integration of land use and transport.*	RMS' comment regarding key interests with regard to the Project is noted.
12B	• *The Kamilaroi Highway (HW29) is a classified (State) road (a Highway). Gunnedah Shire Council and Narrabri Shire Council are the Roads Authorities for all public roads in the respective local government areas in accordance with Section 7 of the NSW Roads Act 1993 (Roads Act). Roads and Maritime is the Roads Authority for freeways and has responsibilities for classified roads in accordance with the Roads Act.* • *Rangari Road (MR357) is a classified (Regional) road. Narrabri Shire Council is the Roads Authority and is responsible for setting standards, determining priorities and carrying out works on this road. Roads and Maritime's concurrence would be required, prior to Council approval, for works on this road in accordance with s138 of the Roads Act.*	RMS' comment that RMS is the Roads Authority for the Kamilaroi Highway is noted. RMS' comment that GSC and NSC are the Roads Authorities' for local roads in their respective local government areas is noted (in particular NSC is the Roads Authority for Rangari Road).

	Recommendation	Response
12C	• *The Developer would be required to enter into a Works Authorisation Deed (WAD) with Roads and Maritime for any works deemed necessary on a classified (State) road (Kamilaroi Highway). The developer would be responsible for all costs associated with the works and administration for the WAD. The WAD and associated agreements will apply for the life of the mine project and will address construction, maintenance and any necessary decommissioning of road related assets such as the proposed Kamilaroi Highway rail-over-road overpass.*	Whitehaven would enter into a Works Authorisation Deed (WAD) for any works on classified roads (e.g. Kamilaroi Highway), if determined to be required.
12D	• *Any Traffic Control Plans (TCPs) required to be included in the Traffic Management Plan (TMP) must be prepared and approved by suitably qualified persons in accordance with the RTA Traffic Control at Work Sites manual. Should traffic control be required on the classified (State) road (Kamilaroi Highway) then a Road Occupancy Licence (ROL) must be obtained from Roads and Maritime.*	RMS' comment regarding preparation of Traffic Control Plans and requirement for Road Occupancy Licences is noted.
12E	*Roads and Maritime considers that in our technical assessment of the EIS, specifically the documents: Section 2 – Project Description, Appendix I – Road Transport Assessment and Appendix L – Visual Assessment, that the 'baseline' for impact assessment is generally reasonable and the predictions of impact are robust (and conservative) with suitable sensitivity testing and the proposal includes all reasonably feasible mitigation options. However it should be noted that:* • *Details for the proposed rail loop and spur including the proposed Kamilaroi Highway rail-overroad overpass, shown in both the EIS, Section 2 - Figure 2.8 and Appendix L – Figure 17, are indicative conceptual drawings only and would need to be constructed under a WAD. Detailed design plans, including a Road Safety Audit, will be required as part of the WAD process.*	The RMS' comment that the Road Transport Assessment and Visual Assessment predictions are considered robust and that all reasonable and feasible mitigation measured have been incorporated is noted. Whitehaven would enter into a WAD with RMS for construction of the approved Kamilaroi Highway overpass and/or the Kamilaroi Highway rail overpass. The WAD would incorporate detailed design plans and a Road Safety Audit. Detailed design of the Project rail spur, including the Kamilaroi Highway overpass, would be conducted post Project determination.

	Recommendation	Response
12F	• *It is unclear if the proposed rail-over-road overpass goes ahead, that the previously approved road-over-road overpass near the Whitehaven Coal Handling Processing Plant will still be required. This needs to be clarified.*	Until the Project CHPP, train load-out facility and rail spur infrastructure reach full operational capacity, the Approved Road Transport Route would continue to be used to transport Project ROM coal to the Whitehaven CHPP. If, prior to reaching full operational capacity of the Project CHPP and rail spur infrastructure, combined transport of ROM coal from the Project, Tarrawonga Coal Mine and Rocglen Coal Mine to the Whitehaven CHPP exceeds 3.5 Mtpa, construction of the approved private haul road and Kamilaroi Highway overpass would be required, in accordance with the relevant conditions of the Development Consent (SSD-5000). Once the Project CHPP, train load-out and rail spur infrastructure reach full operational capacity, ROM coal from the Project would no longer be processed at the Whitehaven CHPP.
12G	*The assessed impact is considered acceptable within the policy context of Roads and Maritime for the following reasons:*	RMS' comment that the assessed impact is considered acceptable is noted.
12H	• *In accordance with Austroads guidelines the existing intersections appear adequate for the proposed use, noting that the proposed traffic using the two intersections of Kamilaroi Highway / Blue Vale Road and Kamilaroi Highway / Rangari Road will be addressed under an updated Construction Traffic Management Plan.* • *Section 2 of the in the Environmental Impact Statement (EIS) advises the existing Traffic Management Plan (TMP) for Whitehaven operations is to be revised for the project. This revised TMP, including relevant Traffic Control Plans (TCPs) should include all construction and operational activities. Heavy vehicle drivers will be required to read and sign a Driver Code of Conduct. The Code of Conduct should include but not be limited to:* *a. A map of the primary transport route/s highlighting critical locations.* *b. Safety initiatives for transport through residential areas and/or school zones.* *c. An induction process for vehicle operators and regular toolbox meetings.* *d. A complaints resolution and disciplinary procedure.* *e. Any community consultation measures for peak transport periods.*	RMS' comment that existing intersections appear adequate for the proposed Project traffic is noted. Whitehaven's existing Traffic Management Plan would be revised for the Project in consultation with RMS, the GSC and NSC. Among other things, the revised Traffic Management Plan will: • address proposed construction traffic at intersections of Kamilaroi Highway/Blue Vale Road and Kamilaroi Highway/Rangari Road; • include Traffic Control Plans; and • incorporate a Driver Code of Conduct that addresses the requirements identified by RMS.

	Recommendation	Response
13	**NSW RURAL FIRE SERVICE**	
13A	*The NSW RFS has reviewed the EIS documentation and cannot find any reference to bush fire or the information that addresses the above mention NSW RFS requirements.* *As such the NSW RFS is not in a position to provide comments on the development proposal.*	Please see response to Submission 7H.
14	**SIDING SPRINGS OBSERVATORY**	
14A	*We would like Whitehaven Coal to consider additional measures that reduce upward light spill* *• Use of Shielded fitting to avoid upward light spill* *• Use energy efficient bulbs* *• Avoid lighting highly reflective surfaces* *• Switch off lights when not required.*	Potential night-lighting controls for the Project include (but are not limited to) implementation of good lighting principles in accordance with the *Dark Sky Planning Guideline* (DPE, 2016) (Section 4.14.3 of the EIS and the Visual Assessment [Appendix L]). This includes consideration of the additional measures to reduce upward light spill as requested by the Siding Springs Observatory, where practicable and without compromising operational safety.
14B	*We request that Whitehaven Coal compute the impact of their project on the natural, moon free skyglow at 550nm at 30 degrees above the horizon in the direction of the mine from the Observatory.*	This level of modelling is not considered necessary as all reasonable and feasible night-lighting mitigation measures will be implemented for the Project. Whitehaven will continue to consult with the Siding Springs Observatory in regard to the implementation of feasible and reasonable night-lighting mitigation measures at the Project (see response to Submission 14A).

Attachment 1 – Project Emissions Inventories

Vickery Extension - Year 3 TSP emission estimates

Pit	Activity	Emission estimate (kg/year)	Intensity	Units	Emission Factor	Units	Variable 1		Variable 2		Variable 3		Variable 4		Variable 5		Control %	Control
Topsoil Stripping																		
Vickery OC	Stripping	2,213	76,315	t/y	0.029	kg/t	11	area in ha	0.3	depth stripped in m								
	Ex/FEL loading trucks	20	76,315	t/y	0.0003	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Hauling	817	76,315	t/y	0.107	kg/t	220	t/load	274	Vehicle gross mass (t)	5	km/return trip	5.1	kg/VKT	4	% silt content	90	watering
	Unloading trucks	20	76,315	t/y	0.0003	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
Overburden removal and dumping																		
Vickery OC	Drilling	21,447	36,350	holes/y	0.59	kg/hole												
	Blasting	17,277	169	blast/y	102.2	kg/blast	6,000	Area of blast (m2)										
	Ex/FEL loading trucks	88,462	78,200,000	t/y	0.0006	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3	2	times re-handled						
	Hauling	465,876	78,200,000	t/y	0.060	kg/t	315	t/load	371	Vehicle gross mass (t)	3	km/return trip	5.8	kg/VKT	4	% silt content	90	watering
	Unloading trucks	44,231	78,200,000	t/y	0.0006	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Dozers - Pit	62,417	28,476	h/y	2.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
	Dozers - Dump	20,806	9,492	h/y	2.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
Coal removal																		
Vickery OC	Dozer ripping	276,735	23,730	h/y	11.7	kg/h	4.7	moisture content in %	2.4	silt content in %								
	Ex/FEL loading trucks	240,278	2,653,409	t/y	0.0906	kg/t	4.7	moisture content in %										
	Hauling	86,654	2,653,409	t/y	0.327	kg/t	220	t/load	274	Vehicle gross mass (t)	14	km/return trip	5.1	kg/VKT	4	% silt content	90	watering
Coal processing																		
Vickery coal	Unload to hopper / ROM pad	868	2,653,409	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Rehandle - ROM to hopper	9,992	2,856	h/y	11.7	kg/h	4.7	moisture content in %	2.4	silt content in %							70	enclosure (3 sides and roof)
	Crushing	1,592	2,653,409	t/y	0.0006	kg/t												controlled EF (wet supression)
	Screening	2,919	2,653,409	t/y	0.0011	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	2,045	1,459,375	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water sprays
	Transfer 45% to Bypass circuit	167	1,194,034	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water sprays
	Loading product stockpile from CHPP	325	1,215,254	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	558	1,194,034	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	644	2,409,288	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	644	2,409,288	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
Tarrawonga coal	Unload to hopper / ROM pad	981	3,000,000	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Crushing	1,800	3,000,000	t/y	0.0006	kg/t												controlled EF (wet supression)
	Screening	3,300	3,000,000	t/y	0.0011	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	2,313	1,650,000	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water sprays
	Transfer 45% to Bypass circuit	189	1,350,000	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water sprays
	Loading product stockpile from CHPP	354	1,324,950	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	631	1,350,000	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	715	2,674,950	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	715	2,674,950	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
Rocglen coal	Unload to hopper / ROM pad	213	650,000	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Crushing	390	650,000	t/y	0.0006	kg/t												controlled EF (wet supression)
	Screening	715	650,000	t/y	0.0011	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	501	357,500	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water sprays
	Transfer 45% to Bypass circuit	41	292,500	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water sprays
	Loading product stockpile from CHPP	77	287,073	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	137	292,500	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	155	579,573	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	155	579,573	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
All coal	Product stockpile reclaim (dozers)	95,064	14,238	h/y	6.7	kg/h	7.0	moisture content in %	2.4	silt content in %								
Coarse rejects																		
Coarse rejects	Ex/FEL loading trucks	22,106	244,121	t/y	0.0906	kg/t	4.7	moisture content in %										
	Hauling	7,972	244,121	t/y	0.327	kg/t	220	t/load	274	Vehicle gross mass (t)	14	km/return trip	5.1	kg/VKT	4	% silt content	90	watering
	Unload to dump	114	244,121	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
Wind erosion of exposed ground																		
Vickery OC	Pre-strip	9,401	11	ha	850	kg/ha/yr												
	Active pit	41,824	49	ha	850	kg/ha/yr												
	Active dump	292,507	344	ha	850	kg/ha/yr												
	Inactive dump	0	0	ha	850	kg/ha/yr											85	crusting
	Active rehab	0	0	ha	850	kg/ha/yr											95	seeding
	Soil stockpiles	1,832	6	ha	850	kg/ha/yr											65	crusting
Stockpile wind erosion and maintenance																		
	ROM stockpiles	255,442	12	ha	4.86	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
	Product Stockpiles	170,294	8	ha	4.86	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
Miscellaneous																		
	Grading roads	58,420	189,840	km	0.615	kg/km	8	speed of graders in km/h	23,730	grader hours							50	watering
	Total (kg/yr)	**2,315,367**																

Vickery Extension - Year 3 PM_{10} emission estimates

Pit	Activity	Emission estimate (kg/year)	Intensity	Units	Emission Factor	Units	Variable 1		Variable 2		Variable 3		Variable 4		Variable 5		Control %	Control
Topsoil Stripping																		
Vickery OC	Stripping	1,107	76,315	t/y	0.015	kg/t	11	area in ha	0.3	depth stripped in m								
	Ex/FEL loading trucks	9	76,315	t/y	0.0001	kg/t	7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Hauling (controlled wheel generated emis	207	76,315	t/y	0.026	kg/t	220	t/load	273.5	Vehicle gross mass (t	4.6	km/return trip	1.25	kg/VKT	4	% silt content	90	watering
	Unloading trucks	9	76,315	t/y	0.0001	kg/t	7	moisture content in %	1.3	(wind speed/2.2)^1.3								
Overburden removal and dumping																		
Vickery OC	Drilling	11,152	36,350	holes/y	0.31	kg/hole	0											
	Blasting	8,984	169	blast/y	53.2	kg/blast	6,000	Area of blast (m2)										
	Ex/FEL loading trucks	41,840	78,200,000	t/y	0.0003	kg/t	4	moisture content in %	1.3	(wind speed/2.2)^1.3	2	times re-handled						
	Hauling (controlled wheel generated emis	120,271	78,200,000	t/y	0.015	kg/t	315	t/load	370.5	Vehicle gross mass (t	3.2	km/return trip	1.44	kg/VKT	4	% silt content	90	watering
	Unloading trucks	20,920	78,200,000	t/y	0.0003	kg/t	4	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Dozers - Pit	10,665	28,476	h/y	0.4	kg/h	4	moisture content in %	4.0	silt content in %								
	Dozers - Dump	3,555	9,492	h/y	0.4	kg/h	4	moisture content in %	4.0	silt content in %								
Coal removal																		
Vickery OC	Dozer ripping	63,985	23,730	h/y	2.7	kg/h	4.7	moisture content in %	2.4	silt content in %								
	Ex/FEL loading trucks	29,459	2,653,409	t/y	0.0111	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	21,491	2,653,409	t/y	0.080	kg/t	220.0	t/load	273.5	Vehicle gross mass (t	14.1	km/return trip	1.25	kg/VKT	4	% silt content	90	watering
Coal processing																		
Vickery coal	Unload to hopper / ROM pad	410	2,653,409	t/y	0.00022	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Rehandle - ROM to hopper	2,310	2,856	h/y	2.7	kg/h	4.7	moisture content in %	2.4	silt content in %							70	enclosure (3 sides and roof)
	Crushing	716	2,653,409	t/y	0.00027	kg/t												controlled EF (wet supression)
	Screening	982	2,653,409	t/y	0.00037	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	967	1,459,375	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water sprays
	Transfer 45% to Bypass circuit	79	1,194,034	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water sprays
	Loading product stockpile from CHPP	154	1,215,254	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	264	1,194,034	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	305	2,409,288	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	305	2,409,288	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
Tarrawonga coal	Unload to hopper / ROM pad	464	3,000,000	t/y	0.00022	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Crushing	810	3,000,000	t/y	0.00027	kg/t												controlled EF (wet supression)
	Screening	1,110	3,000,000	t/y	0.00037	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	1,094	1,650,000	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water sprays
	Transfer 45% to Bypass circuit	89	1,350,000	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water sprays
	Loading product stockpile from CHPP	168	1,324,950	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	298	1,350,000	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	338	2,674,950	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	338	2,674,950	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
Rocglen coal	Unload to hopper / ROM pad	101	650,000	t/y	0.00022	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Crushing	176	650,000	t/y	0.00027	kg/t												controlled EF (wet supression)
	Screening	241	650,000	t/y	0.00037	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	237	357,500	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water sprays
	Transfer 45% to Bypass circuit	19	292,500	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water sprays
	Loading product stockpile from CHPP	36	287,073	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	65	292,500	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	73	579,573	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	73	579,573	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
All coal	Product stockpile reclaim (dozers)	21,980	14,238	h/y	1.5	kg/h	7.0	moisture content in %	2.4	silt content in %								
Coarse rejects																		
Coarse rejects	Ex/FEL loading trucks	2,710	244,121	t/y	0.0111	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	1,977	244,121	t/y	0.080	kg/t	220.0	t/load	273.5	Vehicle gross mass (t	14.1	km/return trip	1.25	kg/VKT	4	% silt content	90	watering
	Unload to dump	54	244,121	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
Wind erosion of exposed ground																		
Vickery OC	Pre-strip	4,701	11	ha	425	kg/ha/yr												
	Active pit	20,912	49	ha	425	kg/ha/yr												
	Active dump	146,254	344	ha	425	kg/ha/yr												
	Inactive dump	0	0	ha	425	kg/ha/yr											85	crusting
	Active rehab	0	0	ha	425	kg/ha/yr											95	seeding
	Soil stockpiles	916	6	ha	425	kg/ha/yr											65	crusting
Stockpile wind erosion and maintenance																		
	ROM stockpiles	127,721	12	ha	2.43	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
	Product Stockpiles	85,147	8	ha	2.43	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
Miscellaneous																		
	Grading roads	20,412	189,840	km	0.215	kg/km	8	speed of graders in km	23,730	grader hours							50	watering
	Total (kg/yr)	**778,661**																

Vickery Extension - Year 3 $PM_{2.5}$ emission estimates

Pit	Activity	Emission estimate (kg/year)	Intensity	Units	Emission Factor	Units	Variable 1		Variable 2		Variable 3		Variable 4		Variable 5		Control %	Control
Topsoil Stripping																		
Vickery OC	Stripping	232	76,315	t/y	0.003	kg/t	11	area in ha	0.3	depth stripped in m								
	Ex/FEL loading trucks	1	76,315	t/y	0.0000	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Hauling (controlled wheel generated emis	25	76,315	t/y	0.003	kg/t	220	t/load	274	Vehicle gross mass (t	4.6	km/return trip	0.13	kg/VKT	4	% silt content	90	watering
	Unloading trucks	1	76,315	t/y	0.0000	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
Overburden removal and dumping																		
Vickery OC	Drilling	643	36,350	holes/y	0.02	kg/hole												
	Blasting	518	169	blast/y	3.1	kg/blast	6,000	Area of blast (m2)										
	Ex/FEL loading trucks	6,336	78,200,000	t/y	0.0000	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3	2	times re-handled						
	Hauling (controlled wheel generated emis	17,062	78,200,000	t/y	0.001	kg/t	315	t/load	371	Vehicle gross mass (t	3.2	km/return trip	0.14	kg/VKT	4	% silt content	90	watering
	Unloading trucks	3,168	78,200,000	t/y	0.0000	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Dozers - Pit	6,554	28,476	h/y	0.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
	Dozers - Dump	2,185	9,492	h/y	0.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
Coal removal																		
Vickery OC	Dozer ripping	6,088	23,730	h/y	0.3	kg/h	4.7	moisture content in %	2.4	silt content in %								
	Ex/FEL loading trucks	4,565	2,653,409	t/y	0.0017	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	2,320	2,653,409	t/y	0.008	kg/t	220	t/load	274	Vehicle gross mass (t	14.1	km/return trip	0.13	kg/VKT	4	% silt content	90	watering
Coal processing																		
Vickery coal	Unload to hopper / ROM pad	62	2,653,409	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Rehandle - ROM to hopper	220	2,856	h/y	0.3	kg/h	4.7	moisture content in %	2.4	silt content in %							70	enclosure (3 sides and roof)
	Crushing	133	2,653,409	t/y	0.00005	kg/t												controlled EF (wet supression)
	Screening	66	2,653,409	t/y	0.00003	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	146	1,459,375	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water spray
	Transfer 45% to Bypass circuit	12	1,194,034	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water spray
	Loading product stockpile from CHPP	23	1,215,254	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	40	1,194,034	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	46	2,409,288	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	46	2,409,288	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
Tarrawonga coal	Unload to hopper / ROM pad	70	3,000,000	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Crushing	150	3,000,000	t/y	0.00005	kg/t												controlled EF (wet supression)
	Screening	75	3,000,000	t/y	0.00003	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	166	1,650,000	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water spray
	Transfer 45% to Bypass circuit	14	1,350,000	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water spray
	Loading product stockpile from CHPP	25	1,324,950	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	45	1,350,000	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	51	2,674,950	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	51	2,674,950	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
Rocglen coal	Unload to hopper / ROM pad	15	650,000	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Crushing	33	650,000	t/y	0.00005	kg/t												controlled EF (wet supression)
	Screening	16	650,000	t/y	0.00003	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	36	357,500	t/y	0.00003	kg/t	4.7	moisture content in %	1.31	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water spray
	Transfer 45% to Bypass circuit	3	292,500	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water spray
	Loading product stockpile from CHPP	5	287,073	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	10	292,500	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	11	579,573	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	11	579,573	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
All coal	Product stockpile reclaim (dozers)	2,091	14,238	h/y	0.1	kg/h	7.0	moisture content in %	2.4	silt content in %								
Coarse rejects																		
Coarse rejects	Ex/FEL loading trucks	420	244,121	t/y	0.0017	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	213	244,121	t/y	0.008	kg/t	220	t/load	274	Vehicle gross mass (t	14.1	km/return trip	0.13	kg/VKT	4	% silt content	90	watering
	Unload to dump	8	244,121	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
Wind erosion of exposed ground																		
Vickery OC	Pre-strip	705	11	ha	64	kg/ha/yr												
	Active pit	3,137	49	ha	64	kg/ha/yr												
	Active dump	21,938	344	ha	64	kg/ha/yr												
	Inactive dump	0	0	ha	64	kg/ha/yr											85	crusting
	Active rehab	0	0	ha	64	kg/ha/yr											95	seeding
	Soil stockpiles	137	6	ha	64	kg/ha/yr											65	crusting
Stockpile wind erosion and maintenance																		
	ROM stockpiles	19,158	12	ha	0.36	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
	Product Stockpiles	12,772	8	ha	0.36	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
Miscellaneous																		
	Grading roads	1,811	189,840	km	0.019	kg/km	8	speed of graders in km	23,730	grader hours							50	watering
	Total PM (kg/yr)	**113,675**																

Vickery Extension - Year 7 TSP emission estimates																			
Pit	**Activity**	**Emission estimate (kg/year)**	**Intensity**	**Units**	**Emission Factor**	**Units**	**Variable 1**		**Variable 2**		**Variable 3**		**Variable 4**		**Variable 5**		**Control %**	**Control**
Topsoil Stripping																		
Vickery OC	Stripping	1,437	49,547	t/y	0.029	kg/t	7	area in ha	0.3	depth stripped in m								
	Ex/FEL loading trucks	13	49,547	t/y	0.0003	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Hauling	1,849	49,547	t/y	0.373	kg/t	220	t/load	274	Vehicle gross mass (t	16	km/return trip	5.1	kg/VKT	4	% silt content	90	watering
	Unloading trucks	13	49,547	t/y	0.0003	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
Overburden removal and dumping																		
Vickery OC	Drilling	56,139	95,152	holes/y	0.59	kg/hole												
	Blasting	45,225	442	blast/y	102.2	kg/blast	6,000	Area of blast (m2)										
	Ex/FEL loading trucks	231,562	204,700,000	t/y	0.0006	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3	2	times re-handled						
	Hauling	2,314,846	204,700,000	t/y	0.113	kg/t	315	t/load	371	Vehicle gross mass (t	6	km/return trip	5.8	kg/VKT	4	% silt content	90	watering
	Unloading trucks	115,781	204,700,000	t/y	0.0006	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Dozers - Pit	83,223	37,968	h/y	2.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
	Dozers - Dump	31,209	14,238	h/y	2.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
Coal removal																		
Vickery OC	Dozer ripping	332,082	28,476	h/y	11.7	kg/h	4.7	moisture content in %	2.4	silt content in %								
	Ex/FEL loading trucks	757,695	8,367,274	t/y	0.0906	kg/t	4.7	moisture content in %										
	Hauling	211,996	8,367,274	t/y	0.253	kg/t	220	t/load	274	Vehicle gross mass (t	11	km/return trip	5.1	kg/VKT	4	% silt content	90	watering
Coal processing																		
Vickery coal	Unload to hopper / ROM pad	2,736	8,367,274	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Rehandle - ROM to hopper	9,992	2,856	h/y	11.7	kg/h	4.7	moisture content in %	2.4	silt content in %							70	enclosure (3 sides and roof)
	Crushing	5,020	8,367,274	t/y	0.0006	kg/t												controlled EF (wet supression)
	Screening	9,204	8,367,274	t/y	0.0011	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	6,450	4,602,001	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water spray
	Transfer 45% to Bypass circuit	528	3,765,273	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water spray
	Loading product stockpile from CHPP	1,017	3,802,493	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	1,759	3,765,273	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	2,024	7,567,766	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	2,024	7,567,766	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
Tarrawonga coal	Unload to hopper / ROM pad	981	3,000,000	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Crushing	1,800	3,000,000	t/y	0.0006	kg/t												controlled EF (wet supression)
	Screening	3,300	3,000,000	t/y	0.0011	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	2,313	1,650,000	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water spray
	Transfer 45% to Bypass circuit	189	1,350,000	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water spray
	Loading product stockpile from CHPP	354	1,324,950	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	631	1,350,000	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	715	2,674,950	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	715	2,674,950	t/y	0.0003	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
All coal	Product stockpile reclaim (dozers)	95,064	14,238	h/y	6.7	kg/h	7.0	moisture content in %	2.4	silt content in %								
Coarse rejects																		
Coarse rejects	Ex/FEL loading trucks	79,299	875,705	t/y	0.0906	kg/t	4.7	moisture content in %										
	Hauling	22,187	875,705	t/y	0.253	kg/t	220	t/load	274	Vehicle gross mass (t	11	km/return trip	5.1	kg/VKT	4	% silt content	90	watering
	Unload to dump	409	875,705	t/y	0.0005	kg/t	4.7	moisture content in %	1.31	(wind speed/2.2)^1.3								
Wind erosion of exposed ground																		
Vickery OC	Pre-strip	6,104	7	ha	850	kg/ha/yr												
	Active pit	144,919	170	ha	850	kg/ha/yr												
	Active dump	367,009	432	ha	850	kg/ha/yr												
	Inactive dump	82,577	648	ha	850	kg/ha/yr											85	crusting
	Active rehab	1,056	25	ha	850	kg/ha/yr											95	seeding
	Soil stockpiles	2,400	8	ha	850	kg/ha/yr											65	crusting
Stockpile wind erosion and maintenance																		
	ROM stockpiles	255,442	12	ha	4.86	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
	Product Stockpiles	170,294	8	ha	4.86	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
Miscellaneous																		
	Grading roads	70,104	227,808	km	0.615	kg/km	8	speed of graders in km	28476	grader hours							50	watering
	Total (kg/yr)	**5,531,688**																

Vickery Extension - Year 7 PM_{10} emission estimates

Pit	Activity	Emission estimate (kg/year)	Intensity	Units	Emission Factor	Units	Variable 1		Variable 2		Variable 3		Variable 4		Variable 5		Control %	Control
Topsoil Stripping																		
Vickery OC	Stripping	718	49,547	t/y	0.015	kg/t	7	area in ha	0.3	depth stripped in m								
	Ex/FEL loading trucks	6	49,547	t/y	0.0001	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Hauling (controlled wheel generated emis	459	49,547	t/y	0.092	kg/t	220	t/load	274	Vehicle gross mass (t	16.1	km/return trip	1.25	kg/VKT	4	% silt content	90	watering
	Unloading trucks	6	49,547	t/y	0.0001	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
Overburden removal and dumping																		
Vickery OC	Drilling	29,193	95,152	holes/y	0.31	kg/hole												
	Blasting	23,517	442	blast/y	53.2	kg/blast	6,000	Area of blast (m2)										
	Ex/FEL loading trucks	109,523	204,700,000	t/y	0.0003	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3	2.0	times re-handled						
	Hauling (controlled wheel generated emis	586,966	204,700,000	t/y	0.028	kg/t	315	t/load	371	Vehicle gross mass (t	6.1	km/return trip	1.44	kg/VKT	4	% silt content	90	watering
	Unloading trucks	54,761	204,700,000	t/y	0.0003	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Dozers - Pit	14,219	37,968	h/y	0.4	kg/h	4.1	moisture content in %	4.0	silt content in %								
	Dozers - Dump	5,332	14,238	h/y	0.4	kg/h	4.1	moisture content in %	4.0	silt content in %								
Coal removal																		
Vickery OC	Dozer ripping	76,783	28,476	h/y	2.7	kg/h	4.7	moisture content in %	2.4	silt content in %								
	Ex/FEL loading trucks	92,897	8,367,274	t/y	0.0111	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	52,836	8,367,274	t/y	0.062	kg/t	220	t/load	274	Vehicle gross mass (t	10.9	km/return trip	1.25	kg/VKT	4	% silt content	90	watering
Coal processing																		
Vickery coal	Unload to hopper / ROM pad	1,294	8,367,274	t/y	0.00022	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Rehandle - ROM to hopper	2,310	2,856	h/y	2.7	kg/h	4.7	moisture content in %	2.4	silt content in %							70	enclosure (3 sides and roof)
	Crushing	2,259	8,367,274	t/y	0.00027	kg/t												controlled EF (wet supression)
	Screening	3,096	8,367,274	t/y	0.00037	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	3,051	4,602,001	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water sprays
	Transfer 45% to Bypass circuit	250	3,765,273	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water sprays
	Loading product stockpile from CHPP	481	3,802,493	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	832	3,765,273	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	957	7,567,766	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	957	7,567,766	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
Tarrawonga coal	Unload to hopper / ROM pad	464	3,000,000	t/y	0.00022	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Crushing	810	3,000,000	t/y	0.00027	kg/t												controlled EF (wet supression)
	Screening	1,110	3,000,000	t/y	0.00037	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	1,094	1,650,000	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water sprays
	Transfer 45% to Bypass circuit	89	1,350,000	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water sprays
	Loading product stockpile from CHPP	168	1,324,950	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	298	1,350,000	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	338	2,674,950	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	338	2,674,950	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
All coal	Product stockpile reclaim (dozers)	21,980	14,238	h/y	1.54	kg/h	7	moisture content in %	2.4	silt content in %								
Coarse rejects																		
Coarse rejects	Ex/FEL loading trucks	9,722	875,705	t/y	0.0111	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	5,530	875,705	t/y	0.062	kg/t	220	t/load	274	Vehicle gross mass (t	10.9	km/return trip	1.25	kg/VKT	4	% silt content	90	watering
	Unload to dump	193	875,705	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
Wind erosion of exposed ground																		
Vickery OC	Pre-strip	3,052	7	ha	425	kg/ha/yr												
	Active pit	72,460	170	ha	425	kg/ha/yr												
	Active dump	183,504	432	ha	425	kg/ha/yr												
	Inactive dump	41,288	648	ha	425	kg/ha/yr											85	crusting
	Active rehab	528	25	ha	425	kg/ha/yr											95	seeding
	Soil stockpiles	1,200	8	ha	425	kg/ha/yr											65	crusting
Stockpile wind erosion and maintenance																		
	ROM stockpiles	127,721	12	ha	2.43	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
	Product Stockpiles	85,147	8	ha	2.43	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
Miscellaneous																		
	Grading roads	24,494	227,808	km	0.215	kg/km	8	speed of graders in km	28,476	grader hours							50	watering
	Total (kg/yr)	**1,644,234**																

Vickery Extension - Year 7 $PM_{2.5}$ emission estimates

Pit	Activity	Emission estimate (kg/year)	Intensity	Units	Emission Factor	Units	Variable 1		Variable 2		Variable 3		Variable 4		Variable 5		Control %	Control
Topsoil Stripping																		
Vickery OC	Stripping	151	49,547	t/y	0.003	kg/t	7	area in ha	0.3	depth stripped in m								
	Ex/FEL loading trucks	1	49,547	t/y	0.0000	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Hauling (controlled wheel generated emis	50	49,547	t/y	0.009	kg/t	220	t/load	274	Vehicle gross mass (t	16.1	km/return trip	0.13	kg/VKT	4	% silt conten	90	watering
	Unloading trucks	0.9	49,547	t/y	0.0000	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
Overburden removal and dumping																		
Vickery OC	Drilling	1,684	95,152	holes/y	0.02	kg/hole												
	Blasting	1,357	442	blast/y	3.1	kg/blast	6,000	Area of blast (m2)										
	Ex/FEL loading trucks	16,585	204,700,000	t/y	0.0000	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3	2	times re-handled						
	Hauling (controlled wheel generated emis	74,463	204,700,000	t/y	0.003	kg/t	315	t/load	371	Vehicle gross mass (t	6.1	km/return trip	0.14	kg/VKT	4	% silt conten	90	watering
	Unloading trucks	8,292	204,700,000	t/y	0.0000	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Dozers - Pit	8,738	37,968	h/y	0.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
	Dozers - Dump	3,277	14,238	h/y	0.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
Coal removal																		
Vickery OC	Dozer ripping	7,306	28,476	h/y	0.3	kg/h	4.7	moisture content in %	2.4	silt content in %								
	Ex/FEL loading trucks	14,396	8,367,274	t/y	0.0017	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	5,928	8,367,274	t/y	0.006	kg/t	220	t/load	274	Vehicle gross mass (t	10.9	km/return trip	0.13	kg/VKT	4	% silt conten	90	watering
Coal processing																		
Vickery coal	Unload to hopper / ROM pad	196	8,367,274	t/y	0.00003	kg/t	4.7	moisture content in %	1.31	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Rehandle - ROM to hopper	220	2,856	h/y	0.3	kg/h	4.7	moisture content in %	2.4	silt content in %							70	enclosure (3 sides and roof)
	Crushing	418	8,367,274	t/y	0.00005	kg/t												controlled EF (wet supression)
	Screening	209	8,367,274	t/y	0.00003	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	462	4,602,001	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water spra
	Transfer 45% to Bypass circuit	38	3,765,273	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water spra
	Loading product stockpile from CHPP	73	3,802,493	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	126	3,765,273	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	145	7,567,766	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	145	7,567,766	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
Tarrawonga coal	Unload to hopper / ROM pad	70	3,000,000	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Crushing	150	3,000,000	t/y	0.00005	kg/t												controlled EF (wet supression)
	Screening	75	3,000,000	t/y	0.00003	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	166	1,650,000	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water spra
	Transfer 45% to Bypass circuit	14	1,350,000	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water spra
	Loading product stockpile from CHPP	25	1,324,950	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	45	1,350,000	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	51	2,674,950	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	51	2,674,950	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
All coal	Product stockpile reclaim (dozers)	2,091	14,238	h/y	0.1	kg/h	7.0	moisture content in %	2.4	silt content in %								
Coarse rejects																		
Coarse rejects	Ex/FEL loading trucks	1,507	875,705	t/y	0.0017	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	620	875,705	t/y	0.006	kg/t	220	t/load	274	Vehicle gross mass (t	10.9	km/return trip	0.13	kg/VKT	4	% silt conten	90	watering
	Unload to dump	29	875,705	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
Wind erosion of exposed ground																		
Vickery OC	Pre-strip	458	7	ha	64	kg/ha/yr												
	Active pit	10,869	170	ha	64	kg/ha/yr												
	Active dump	27,526	432	ha	64	kg/ha/yr												
	Inactive dump	6,193	648	ha	64	kg/ha/yr											85	crusting
	Active rehab	79	25	ha	64	kg/ha/yr											95	seeding
	Soil stockpiles	180	8	ha	64	kg/ha/yr											65	crusting
Stockpile wind erosion and maintenance																		
	ROM stockpiles	19,158	12	ha	0.36	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
	Product Stockpiles	12,772	8	ha	0.36	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
Miscellaneous																		
	Grading roads	2,173	227,808	km	0.019	kg/km	8	speed of graders in km	28,476	grader hours							50	watering
	Total (kg/yr)	**228,564**																

Vickery Extension - Year 21 TSP emission estimates

Pit	Activity	Emission estimate (kg/year)	Intensity	Units	Emission Factor	Units	Variable 1		Variable 2		Variable 3		Variable 4		Variable 5		Control %	Control
Topsoil Stripping																		
Vickery OC	Stripping	6,395	220,516	t/y	0.029	kg/t	32	area in ha	0.3	depth stripped in m								
	Ex/FEL loading trucks	58	220,516	t/y	0.0003	kg/t	7.1	moisture content in %	1.305	(wind speed/2.2)^1.3								
	Hauling	4,059	220,516	t/y	0.184	kg/t	220	t/load	274	Vehicle gross mass (t	8	km/return trip	5.1	kg/VKT	4	% silt content	90	watering
	Unloading trucks	58	220,516	t/y	0.0003	kg/t	7.1	moisture content in %	1.305	(wind speed/2.2)^1.3								
Overburden removal and dumping																		
Vickery OC	Drilling	59,924	101,566	holes/y	0.59	kg/hole												
	Blasting	48,274	472	blast/y	102.2	kg/blast	6,000	Area of blast (m2)										
	Ex/FEL loading trucks	247,173	218,500,000	t/y	0.0006	kg/t	4.1	moisture content in %	1.31	(wind speed/2.2)^1.3	2	times re-handled						
	Hauling	1,986,030	218,500,000	t/y	0.091	kg/t	315	t/load	371	Vehicle gross mass (t	5	km/return trip	5.8	kg/VKT	4	% silt content	90	watering
	Unloading trucks	123,587	218,500,000	t/y	0.0006	kg/t	4.1	moisture content in %	1.31	(wind speed/2.2)^1.3								
	Dozers - Pit	83,223	37,968	h/y	2.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
	Dozers - Dump	31,209	14,238	h/y	2.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
Coal removal																		
Vickery OC	Dozer ripping	332,082	28,476	h/y	11.7	kg/h	4.7	moisture content in %	2.4	silt content in %								
	Ex/FEL loading trucks	892,481	9,855,724	t/y	0.0906	kg/t	4.7	moisture content in %										
	Hauling	139,170	9,855,724	t/y	0.141	kg/t	220	t/load	274	Vehicle gross mass (t	6	km/return trip	5.1	kg/VKT	4	% silt content	90	watering
Coal processing																		
Vickery coal	Unload to hopper / ROM pad	3,223	9,855,724	t/y	0.0005	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Rehandle - ROM to hopper	9,992	2,856	h/y	11.7	kg/h	4.7	moisture content in %	2.4	silt content in %							70	enclosure (3 sides and roof)
	Crushing	5,913	9,855,724	t/y	0.0006	kg/t												controlled EF (wet supression)
	Screening	10,841	9,855,724	t/y	0.0011	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	7,597	5,420,648	t/y	0.0005	kg/t	4.7	moisture content in %	1.31	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water sprays
	Transfer 45% to Bypass circuit	622	4,435,076	t/y	0.0005	kg/t	4.7	moisture content in %	1.31	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water sprays
	Loading product stockpile from CHPP	1,167	4,361,337	t/y	0.0003	kg/t	7.0	moisture content in %	1.31	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	2,072	4,435,076	t/y	0.0005	kg/t	4.7	moisture content in %	1.31	(wind speed/2.2)^1.3								
	Product coal transfer station	2,353	8,796,413	t/y	0.0003	kg/t	7.0	moisture content in %	1.31	(wind speed/2.2)^1.3								
	Loading trains	2,353	8,796,413	t/y	0.0003	kg/t	7.0	moisture content in %	1.31	(wind speed/2.2)^1.3								
All coal	Product stockpile reclaim (dozers)	95,064	14,238	h/y	6.7	kg/h	7.0	moisture content in %	2.4	silt content in %								
Coarse rejects																		
Coarse rejects	Ex/FEL loading trucks	95,926	1,059,311	t/y	0.0906	kg/t	4.7	moisture content in %										
	Hauling	14,958	1,059,311	t/y	0.141	kg/t	220	t/load	274	Vehicle gross mass (t	6	km/return trip	5.1	kg/VKT	4	% silt content	90	watering
	Unload to dump	495	1,059,311	t/y	0.0005	kg/t	4.7	moisture content in %	1.31	(wind speed/2.2)^1.3								
Wind erosion of exposed ground																		
Vickery OC	Pre-strip	27,165	32	ha	850	kg/ha/yr												
	Active pit	168,968	199	ha	850	kg/ha/yr												
	Active dump	329,610	388	ha	850	kg/ha/yr												
	Inactive dump	74,162	582	ha	850	kg/ha/yr											85	crusting
	Active rehab	5,985	141	ha	850	kg/ha/yr											95	seeding
	Soil stockpiles	2,400	8	ha	850	kg/ha/yr											65	crusting
Stockpile wind erosion and maintenance																		
	ROM stockpiles	255,442	12	ha	4.86	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
	Product Stockpiles	170,294	8	ha	4.86	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
Miscellaneous																		
	Grading roads	70,104	227,808	km	0.615	kg/km	8	speed of graders in km	28,476	grader hours							50	watering
	Total (kg/yr)	**5,310,428**																

Vickery Extension - Year 21 PM_{10} emission estimates

Pit	Activity	Emission estimate (kg/year)	Intensity	Units	Emission Factor	Units	Variable 1		Variable 2		Variable 3		Variable 4		Variable 5		Control %	Control
Topsoil Stripping																		
Vickery OC	Stripping	3,197	220,516	t/y	0.015	kg/t	32	area in ha	0.3	depth stripped in m								
	Ex/FEL loading trucks	27	220,516	t/y	0.0001	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Hauling (controlled wheel generated emis	1,019	220,516	t/y	0.045	kg/t	220	t/load	274	Vehicle gross mass (t	7.9	km/return trip	1.25	kg/VKT	4	% silt content	90	watering
	Unloading trucks	27	220,516	t/y	0.0001	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
Overburden removal and dumping																		
Vickery OC	Drilling	31,161	101,566	holes/y	0.31	kg/hole												
	Blasting	25,103	472	blast/y	53.2	kg/blast	6,000	Area of blast (m2)										
	Ex/FEL loading trucks	116,906	218,500,000	t/y	0.0003	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3	2.0	times re-handled						
	Hauling (controlled wheel generated emis	509,274	218,500,000	t/y	0.022	kg/t	315	t/load	371	Vehicle gross mass (t	4.9	km/return trip	1.44	kg/VKT	4	% silt content	90	watering
	Unloading trucks	58,453	218,500,000	t/y	0.0003	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Dozers - Pit	14,219	37,968	h/y	0.4	kg/h	4.1	moisture content in %	4.0	silt content in %								
	Dozers - Dump	5,332	14,238	h/y	0.4	kg/h	4.1	moisture content in %	4.0	silt content in %								
Coal removal																		
Vickery OC	Dozer ripping	76,783	28,476	h/y	2.7	kg/h	4.7	moisture content in %	2.4	silt content in %								
	Ex/FEL loading trucks	109,423	9,855,724	t/y	0.0111	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	35,157	9,855,724	t/y	0.035	kg/t	220	t/load	274	Vehicle gross mass (t	6.1	km/return trip	1.25	kg/VKT	4	% silt content	90	watering
Coal processing																		
Vickery coal	Unload to hopper / ROM pad	1,524	9,855,724	t/y	0.00022	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Rehandle - ROM to hopper	2,310	2,856	h/y	2.7	kg/h	4.7	moisture content in %	2.4	silt content in %							70	enclosure (3 sides and roof)
	Crushing	2,661	9,855,724	t/y	0.00027	kg/t												controlled EF (wet supression)
	Screening	3,647	9,855,724	t/y	0.00037	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	3,593	5,420,648	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water sprays
	Transfer 45% to Bypass circuit	294	4,435,076	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water sprays
	Loading product stockpile from CHPP	552	4,361,337	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	980	4,435,076	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	1,113	8,796,413	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	1,113	8,796,413	t/y	0.0001	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
All coal	Product stockpile reclaim (dozers)	21,980	14,238	h/y	1.5	kg/h	7.0	moisture content in %	2.4	silt content in %								
Coarse rejects																		
Coarse rejects	Ex/FEL loading trucks	11,761	1,059,311	t/y	0.0111	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	3,779	1,059,311	t/y	0.035	kg/t	220	t/load	274	Vehicle gross mass (t	6.1	km/return trip	1.25	kg/VKT	4	% silt content	90	watering
	Unload to dump	234	1,059,311	t/y	0.0002	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
Wind erosion of exposed ground																		
Vickery OC	Pre-strip	13,583	32	ha	425	kg/ha/yr												
	Active pit	84,484	199	ha	425	kg/ha/yr												
	Active dump	164,805	388	ha	425	kg/ha/yr												
	Inactive dump	37,081	582	ha	425	kg/ha/yr											85	crusting
	Active rehab	2,992	141	ha	425	kg/ha/yr											95	seeding
	Soil stockpiles	1,200	8	ha	425	kg/ha/yr											65	crusting
Stockpile wind erosion and maintenance																		
	ROM stockpiles	127,721	12	ha	2.43	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
	Product Stockpiles	85,147	8	ha	2.43	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
Miscellaneous																		
	Grading roads	24,494	227,808	km	0.215	kg/km	8	speed of graders in km	28,476	grader hours							50	watering
	Total (kg/yr)	**1,583,130**																

Vickery Extension - Year 21 $PM_{2.5}$ emission estimates																			
Pit	**Activity**	**Emission estimate (kg/year)**	**Intensity**	**Units**	**Emission Factor**	**Units**	**Variable 1**		**Variable 2**		**Variable 3**		**Variable 4**		**Variable 5**		**Control %**	**Control**
Topsoil Stripping																		
Vickery OC	Stripping	671	220,516	t/y	0.003	kg/t	32	area in ha	0.3	depth stripped in m								
	Ex/FEL loading trucks	4	220,516	t/y	0.0000	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Hauling (controlled wheel generated emis	121	220,516	t/y	0.005	kg/t	220	t/load	274	Vehicle gross mass (t	7.9	km/return trip	0.13	kg/VKT	4	% silt content	90	watering
	Unloading trucks	4	220,516	t/y	0.0000	kg/t	7.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
Overburden removal and dumping																		
Vickery OC	Drilling	1,798	101,566	holes/y	0.02	kg/hole												
	Blasting	1,448	472	blast/y	3.1	kg/blast	6,000	Area of blast (m2)										
	Ex/FEL loading trucks	17,703	218,500,000	t/y	0.0000	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3	2	times re-handled						
	Hauling (controlled wheel generated emis	69,400	218,500,000	t/y	0.002	kg/t	315	t/load	371	Vehicle gross mass (t	4.9	km/return trip	0.14	kg/VKT	4	% silt content	90	watering
	Unloading trucks	8,851	218,500,000	t/y	0.0000	kg/t	4.1	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Dozers - Pit	8,738	37,968	h/y	0.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
	Dozers - Dump	3,277	14,238	h/y	0.2	kg/h	4.1	moisture content in %	4.0	silt content in %								
Coal removal																		
Vickery OC	Dozer ripping	7,306	28,476	h/y	0.3	kg/h	4.7	moisture content in %	2.4	silt content in %								
	Ex/FEL loading trucks	16,957	9,855,724	t/y	0.0017	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	4,349	9,855,724	t/y	0.003	kg/t	220	t/load	274	Vehicle gross mass (t	6.1	km/return trip	0.13	kg/VKT	4	% silt content	90	watering
Coal processing																		
Vickery coal	Unload to hopper / ROM pad	231	9,855,724	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							30	minimise drop ht (10m to 5m)
	Rehandle - ROM to hopper	220	2,856	h/y	0.3	kg/h	4.7	moisture content in %	2.4	silt content in %							70	enclosure (3 sides and roof)
	Crushing	493	9,855,724	t/y	0.00005	kg/t												controlled EF (wet supression)
	Screening	246	9,855,724	t/y	0.00003	kg/t												controlled EF (wet supression)
	Transfer 55% to processing plant (CHPP)	544	5,420,648	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3	10	transfer points					70	40% for wind shielding plus 50% for water sprays
	Transfer 45% to Bypass circuit	45	4,435,076	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3							70	40% for wind shielding plus 50% for water sprays
	Loading product stockpile from CHPP	84	4,361,337	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading product stockpile from Bypass	148	4,435,076	t/y	0.00003	kg/t	4.7	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Product coal transfer station	169	8,796,413	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
	Loading trains	169	8,796,413	t/y	0.00002	kg/t	7.0	moisture content in %	1.3	(wind speed/2.2)^1.3								
All coal	Product stockpile reclaim (dozers)	2,091	14,238	h/y	0.1	kg/h	7.0	moisture content in %	2.4	silt content in %								
Coarse rejects																		
Coarse rejects	Ex/FEL loading trucks	1,823	1,059,311	t/y	0.0017	kg/t	4.7	moisture content in %										
	Hauling (controlled wheel generated emis	467	1,059,311	t/y	0.003	kg/t	220	t/load	274	Vehicle gross mass (t	6.1	km/return trip	0.13	kg/VKT	4	% silt content	90	watering
	Unload to dump	35	1,059,311	t/y	0.00003	kg/t	4.7	moisture content in %	1.31	(wind speed/2.2)^1.3								
Wind erosion of exposed ground																		
Vickery OC	Pre-strip	2,037	32	ha	64	kg/ha/yr												
	Active pit	12,673	199	ha	64	kg/ha/yr												
	Active dump	24,721	388	ha	64	kg/ha/yr												
	Inactive dump	5,562	582	ha	64	kg/ha/yr											85	crusting
	Active rehab	449	141	ha	64	kg/ha/yr											95	seeding
	Soil stockpiles	180	8	ha	64	kg/ha/yr											65	crusting
Stockpile wind erosion and maintenance																		
	ROM stockpiles	19,158	12	ha	0.36	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
	Product Stockpiles	12,772	8	ha	0.36	kg/ha/h	8,760	h/y	2.7	ave wind speed (m/s)							50	watering
Miscellaneous																		
	Grading roads	2,173	227,808	km	0.019	kg/km	8	speed of graders in km	28,476	grader hours							50	watering
	Total (kg/yr)	**227,117**																