

APPENDIX A
ROAD TRANSPORT ASSESSMENT REVIEW

8 January 2014

WM Project Number: 09341-V2

Our Ref: RS080114RH_Ltr-eml

Danny Young
Whitehaven Coal Limited
PO Box 600
Gunnedah NSW 2380

Dear Danny

Re: Whitehaven ROM Coal Haulage Modification - Road Traffic Noise Review

INTRODUCTION

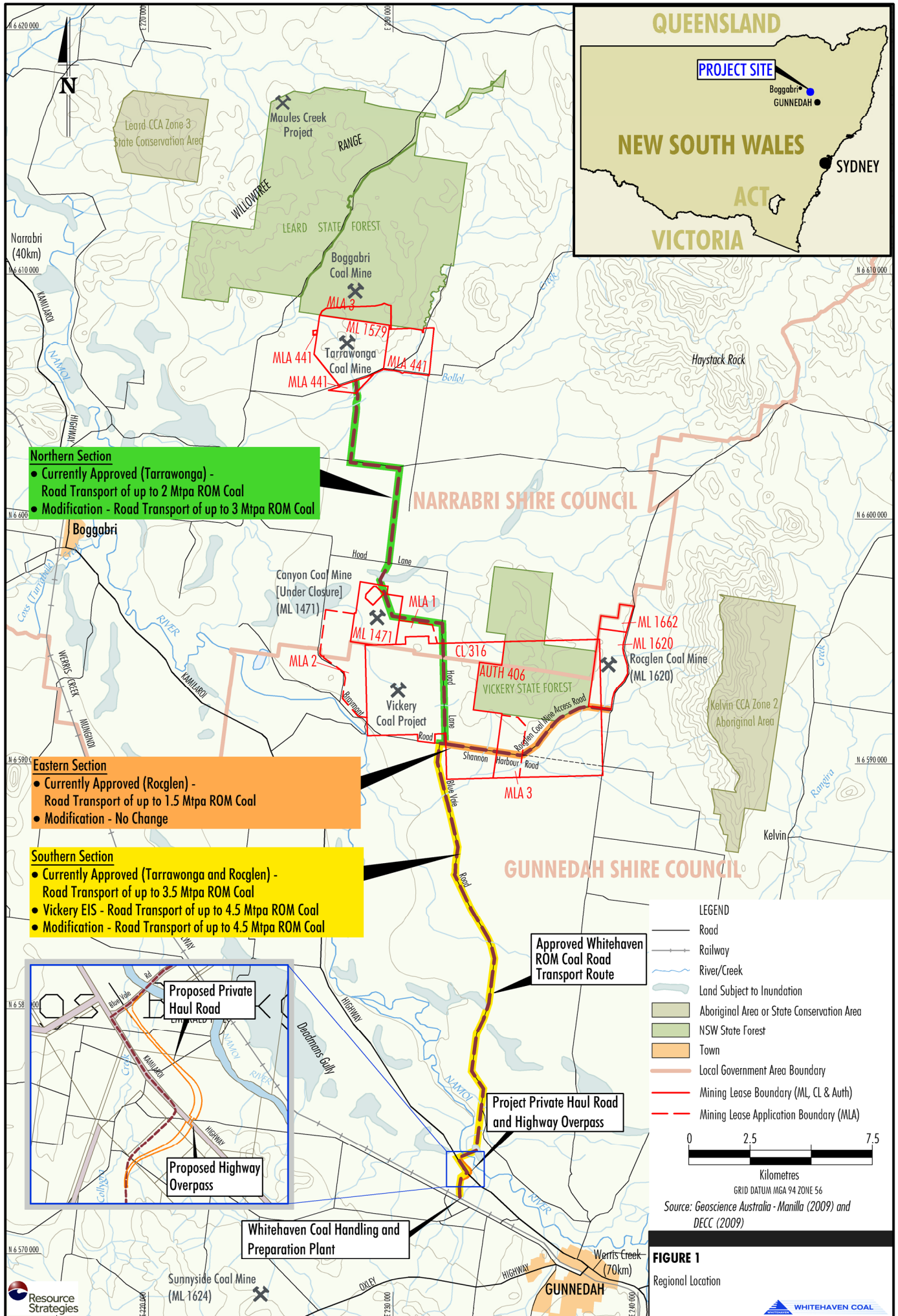
Background

Whitehaven Coal Limited (Whitehaven) is proposing to modify the run-of-mine (ROM) coal truck haulage rate for the Tarrawonga Coal Mine (TCM) on the Approved Whitehaven ROM Coal Road Transport Route (Approved Road Transport Route) between the TCM complex and the Whitehaven Coal Handling and Preparation Plant (CHPP).

The Approved Road Transport Route (**Figure 1**) is currently approved to transport up to 3.5 million tonnes per annum (Mtpa) of ROM coal from the TCM (2 Mtpa) and Rocglen Coal Mine (RCM) (1.5 Mtpa) to the CHPP between the hours of:

- 7.00 am to 10.00 pm Monday to Friday; and
- 7.00 am to 6.00 pm Saturday.

In addition, Whitehaven proposes to use the Approved Road Transport Route to transport up to a cumulative total of 4.5 Mtpa of ROM coal from the proposed Vickery Coal Project (VCP) (which is currently being assessed by the Department of Planning and Infrastructure [DP&I]) on a 24 hour per day, 7 day per week basis. The VCP also proposes to construct a private haul road and overpass over the Kamilaroi highway (**Figure 1**) prior to the cumulative ROM coal transported from Whitehaven coal mines to the CHPP along the Approved Road Transport Route exceeding the currently approved rate of 3.5 Mtpa. The private haul road and overpass over the Kamilaroi highway would avoid ROM coal haulage trucks having to use the Kamilaroi highway to enter the CHPP.



The Modification

Northern Section of the Approved Road Transport Route

The Modification involves an increase in TCM ROM coal haulage rate on the Approved Road Transport Route from the currently approved 2Mtpa to 3Mtpa.

This would result in an increase in ROM coal haulage vehicle movements on the northern section of the Approved Road Transport Route (between the TCM and VCP) in comparison to what is currently approved for the TCM.

In addition, it proposed that ROM coal haulage would occur between the hours of:

- 6.00 am to 10.00 pm Monday to Friday; and
- 7.00 am to 6.00 pm Saturday.

Southern Section of the Approved Road Transport Route

Notwithstanding the proposed increase in ROM coal haulage from the TCM, Whitehaven would manage the use of the Approved Road Transport Route such that the total cumulative annual ROM coal haulage from all Whitehaven mines (i.e. TCM, RCM and VCP) would not exceed:

- 3.5 Mtpa prior to the commissioning of the private haul road and Kamilaroi Highway overpass; and
- 4.5 Mtpa following the commissioning of the private haul road and Kamilaroi Highway overpass.

This is consistent with the maximum annual ROM coal haulage rate on the southern section of the Approved Road Transport Route described and assessed in the Vickery EIS.

However, rather than ROM coal haulage occurring 24 hours per day, 7 days per week (as per the Vickery EIS) it proposed that ROM coal haulage would only occur between the hours of:

- 6.00 am to 10.00 pm Monday to Friday; and
- 7.00 am to 6.00 pm Saturday.

Therefore, there would be an increase in the ROM coal haulage rate between 6.00am and 10.00pm on the southern section of the Approved ROM Coal Road Transport Route (between VCP and the CHPP) in comparison to what was described and assessed in the Vickery EIS.

ASSESSMENT OF MODIFICATION

For the Modification, ROM coal haulage along the Approved Road Transport Route would occur between the hours of:

- 6.00 am to 10.00 pm Monday to Friday; and
- 7.00 am to 6.00 pm Saturdays.

It is noted that the 'shoulder' period 6.00 to 7.00am forms part of the night-time period (10.00 pm to 7.00 am) as defined in the Road Noise Policy (RNP). However, Section 2.5.5 of the RNP recognises that it may be reasonable to vary the standard time period applied to the day (7.00 am to 10.00 pm) and night (10.00 pm to 7.00 am), and that appropriate noise levels for 'shoulder' periods may be negotiated with the determining or regulatory authority.

Following consultation conducted by Whitehaven with the DP&I for the Modification in December 2013 (Section 3.5 of the EA), potential road traffic noise impacts associated with the Modification have been assessed against the relevant criteria for the day time period only (i.e. the 'shoulder' period 6.00 to 7.00 am is considered to be part of the day time period).

While ROM coal haulage would occur over a 16 hour period (6.00 am to 10.00 pm) on weekdays, it has been conservatively assumed that all ROM coal haulage would occur over a 15 hour period, with the resulting potential road traffic noise impacts compared against the relevant criteria of 60 dBA $L_{Aeq(15hour)}$ as defined in the RNP for the day time period.

Northern Section of Approved Road Transport Route between TCM and VCP

Previous Assessment – Tarrawonga EA

The Tarrawonga Coal Mine EA noise assessment report (*Tarrawonga Coal Project, Environmental Assessment, Noise and Blasting Impact Assessment*, Nov. 2011, WM) assessed haulage traffic noise levels on public road sections along the Approved Road Transport Route.

The EA noise report assessed noise levels at the Kyalla Residence (**Figure 2**) which was at the time of the assessment the closest residential receiver (i.e. 180m from the Approved Road Transport Route).

The Tarrawonga EA assessed the transportation of 2 Mtpa of ROM coal along the Approved Road Transport Route during Project Year 1 only, as following Year 1 it was assumed that ROM coal (up to 3 Mtpa) would be hauled directly to the adjacent Boggabri Coal Mine for processing and transport via upgraded Boggabri infrastructure.

The resultant daytime noise levels from the Tarrawonga EA noise assessment at the Kyalla Residence for Year 1, and the relevant traffic noise criterion at the time of the assessment (i.e. as per the *Environmental Criteria for Road Traffic Noise* [ECRTN]), have been reproduced in **Table 1**. As shown, it was predicted that road traffic noise would comply with the ECRTN criteria of 60 dBA $L_{Aeq,1 hour}$ for the daytime period during Project Year 1 (i.e. for the transportation 2 Mtpa of ROM coal along the Approved Road Transport Route) at the Kyalla Residence (which is now owned by Whitehaven and Boggabri Coal).

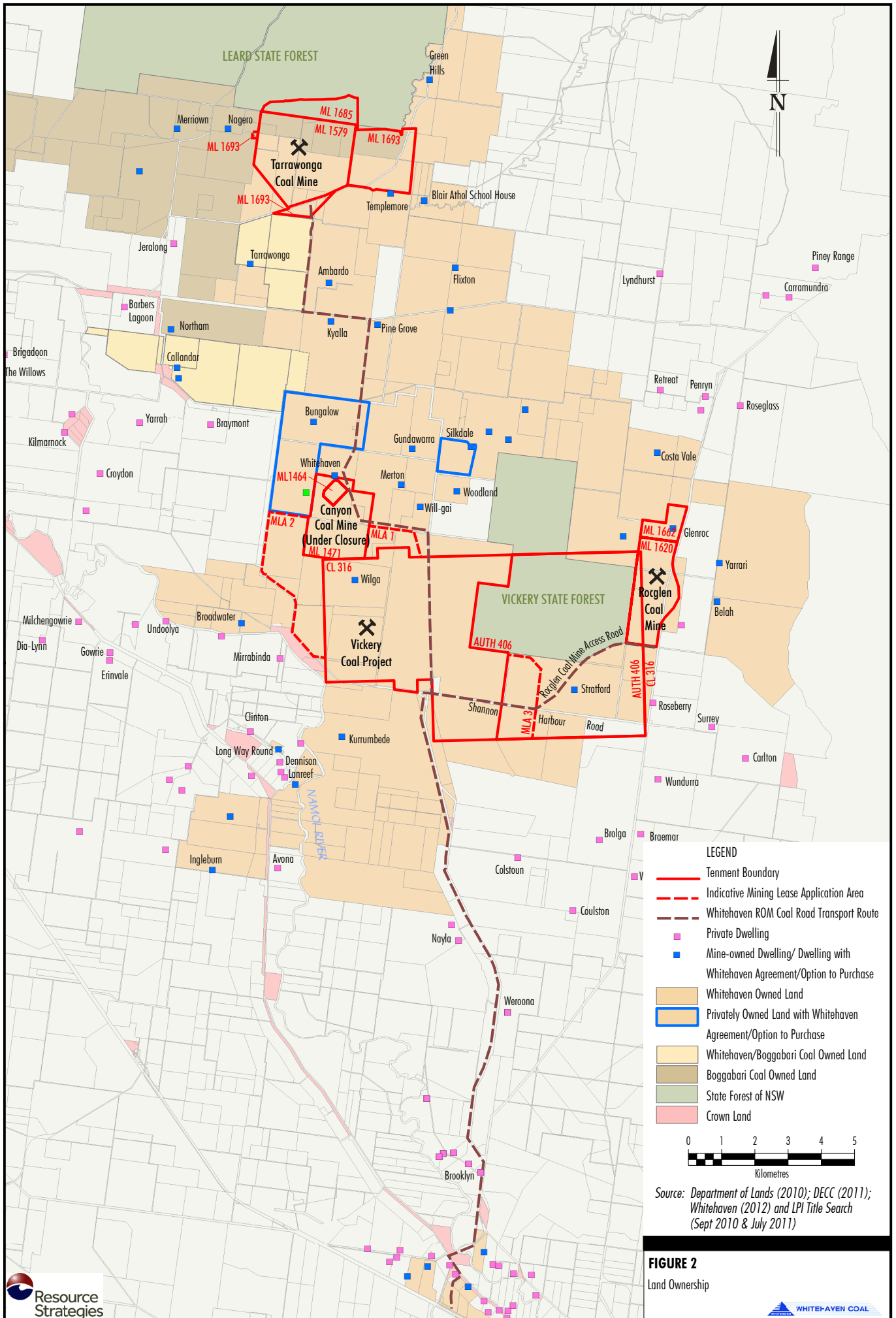


Table 1 Calculated Daytime Traffic Noise Levels at the Kyalla Residence – Tarrawonga EA (ROM Coal Transport of 2 Mtpa)

	Tarrawonga EA	
	Year 1 (2 Mtpa ROM coal transport)	
	Daytime (dBA $L_{Aeq,1\text{ hour}}$)	
Non – Project Traffic Noise	0	
Project Traffic Noise	49	
Total	49	
Daytime Criterion	60	
Compliance	Yes	

The relevant road traffic noise criteria specified in the Tarrawonga Project Approval (11_0047) is 60 dBA $L_{Aeq(\text{period})}$ for the daytime and evening, consistent with the *Road Noise Policy*, which has replaced the ECRTN. This criteria in Project Approval (11_0047) is less stringent than the ECRTB criteria of 60 dBA $L_{Aeq,1\text{ hour}}$ used in the Tarrawonga EA.

Modification Assessment

The Modification involves an increase in TCM ROM coal haulage rate on the Approved Road Transport Route from the currently approved 2Mtpa to 3Mtpa, as it is no longer considered economically viable to process and transport TCM ROM coal via Boggabri infrastructure.

Since the Tarrawonga EA, Whitehaven has purchased, or has entered into purchase agreements, with a number of properties proximal to the Approved Road Transport Route (**Figure 2**), including the Kyalla Residence (which is now owned by Whitehaven and Boggabri Coal).

As a result, the closest privately-owned residential receivers to the northern section of the Approved Road Transport Route are currently the Braymont and Jeralong Residences, which are located over 4.0km away from the Approved Road Transport Route (**Figure 1**) (by comparison, the Kyalla Residence is located approximately 180m away).

Noise calculations in the Tarrawonga EA demonstrated compliance with the ECRTN criteria of 60 dBA $L_{Aeq,1\text{ hour}}$ at the Kyalla Residence, with noise levels found to be approximately 11dB lower than the daytime criteria for the transport of 2 Mtpa of ROM coal along the Approved Road Transport Route.

An increase in ROM coal transport from 2Mtpa to 3Mtpa would result in an increase in noise levels of less than 2dB (i.e. based on the increase in the overall increase in the sound power level of trucks required to transport 3 Mtpa of ROM coal). As such, noise levels would comply with the more stringent road noise criteria of 60 dBA $L_{Aeq,1\text{ hour}}$ at the Kyalla Residence for a ROM coal haulage rate of 3 Mtpa.

Therefore, compliance with the Project Approval (11_0047) road noise criteria of 60 dBA $L_{Aeq(\text{period})}$ would be also expected at the Braymont and Jeralong Residences, which are located over 4.0km away from the Approved Road Transport Route.

Southern Section of Approved ROM Coal Road Transport Route between VCP and CHPP

Previous Assessment – Vickery EIS

The Vickery EIS noise assessment report (*Vickery Coal Project, Environmental Impact Statement, Noise and Blasting Impact Assessment*, Nov. 2012, WM) assessed road traffic noise levels at the Weroona and Brooklyn Residences (**Figure 2**), which represent the closest residential receivers to the southern section of the Approved Road Transport Route. A ROM coal haulage rate of 4.5 Mtpa was assumed for the Vickery EIS.

The maximum predicted road traffic noise levels at both the Weroona and Brooklyn Residences for the Vickery EIS, together with the relevant daytime traffic noise criterion, are summarised in **Table 2**. As shown, it was predicted that road traffic noise associated with the transportation of 4.5 Mtpa of ROM coal (on a 24 hour per day, seven day per week basis) would comply with the criteria of 60 dBA $L_{Aeq,15\text{ hour}}$ for the daytime at both residences.

In addition, the Vickery EIS predicted there would be no exceedance of the night-time road traffic noise criteria of 55 dBA $L_{Aeq,9\text{ hour}}$ at either the Weroona or Brooklyn Residences.

It should be noted that predicted levels at both residences as assessed in the Vickery EIS noise assessment were calibrated with the measured levels during compliance traffic noise monitoring conducted in September 2012 (Spectrum Acoustics).

Table 2 **Calculated Traffic Noise Levels at the Weroona and Brooklyn Residences – Vickery EIS (ROM Coal Transport of 4.5 Mtpa 24 hours per day, 7 days per week)**

	Maximum Predicted Noise Level (Year 7/17)	
	Day (dBA $L_{Aeq,15\text{hr}}$)	
	Weroona Residence	Brooklyn Residence
Non – Project Traffic Noise	30	51
Project Traffic Noise	44	51
Total	44	54
Daytime Criterion	60	60
Compliance	Yes	Yes

Modification Assessment

For the purpose of this Modification assessment, truck movements between 6.00am and 7.00am were conservatively assessed as part of the daytime 15 hour traffic noise assessment (i.e. all truck movements required for the transport of 4.5 Mtpa of ROM are assumed to take place within a 15 hour period as opposed to a 16 hour period).

Road noise predictions at the Brooklyn and Weroona Residences for the Modification, together with the relevant daytime traffic noise criterion of 60 dBA $L_{Aeq,15\text{hour}}$, are summarised in **Table 3**.

The predictions in Table 3 are based on traffic scenarios presented in the Vickery EIS (with updates to ROM coal haulages hours for the Modification), and consider:

- Cumulative ROM coal haulage of 4.5 Mtpa;
- Cumulative employee movements and deliveries associated with the TCM, RCM and VCP;
- Relevant road traffic generated by other mining projects, such as the Boggabri Coal Mine and Maules Creek Coal Mine; and
- Other (non-mining) background traffic.

Table 3 **Calculated Traffic Noise Levels at the Weroona and Brooklyn Residences – The Modification (ROM Coal Transport of 4.5 Mtpa during daytime hours only)**

	Maximum Predicted Noise Level for the Modification	
	Day (dBA L _{Aeq,15hr})	
	Weroona Residence	Brooklyn Residence
Non – Project Traffic Noise	30	51
Project Traffic Noise	46	53
Total	46	55
Daytime Criterion	60	60
Compliance	Yes	Yes

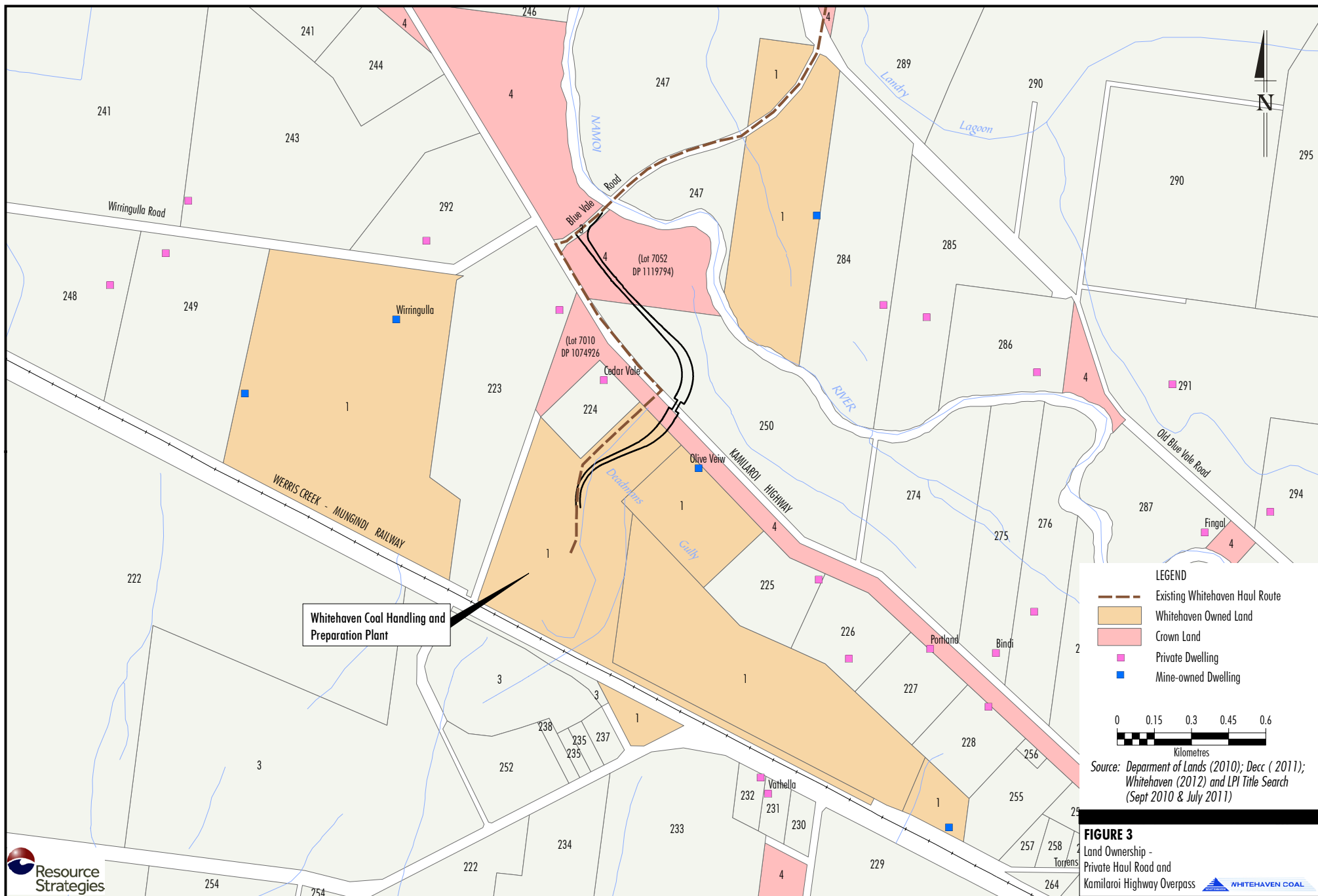
Based on the results summarised in **Table 3**, it was found that noise levels associated with the Modification are expected to comply with the relevant traffic noise criteria at the Brooklyn and Weroona Residences, which are the closest privately-owned receivers to the southern section of the Approved Road Transport Route. Therefore, compliance with the relevant traffic noise criteria is expected at all private dwellings along the southern section of the Approved Road Transport Route.

Since the Modification would result in no ROM coal haulage during the night - and thus, less acoustic impact at night compared to what was assessed in the Vickery EIS - the night time traffic noise assessment between VCP and the CHPP is no longer required as compliance with the night-time road noise criteria would occur.

Private Overpass and Kamilaroi Highway

Previous Assessment – Vickery EIS

The Vickery EIS assessed potential traffic noise impacts associated with ROM coal haulage trucks using the private haul road and Kamilaroi Highway overpass at the closest privately owned receivers (**Figure 3**).



Since the road is technically a Private Haul Road, it would normally be assessed against the criteria for industrial noise in the Industrial Noise Policy (INP). However, because the private haul road and Kamilaroi Highway overpass is being constructed to improve safety and in its absence the trucks would have to use the existing Kamilaroi Highway, which is adjacent, it was considered appropriate in the Vickery EIS to assess the total traffic noise at the surrounding receivers against the criteria specified in the RNP. That is, noise from the private haul road and Kamilaroi Highway overpass alone should achieve the criteria for a new arterial road (55 dBA $L_{Aeq,15hr}$ in the daytime) and the combined noise from all traffic (i.e. traffic on Blue Vale Road, the Kamilaroi Highway and the private haul road and Kamilaroi Highway Overpass) should meet the RNP road traffic noise criteria of 60 dBA $L_{Aeq,15hr}$ in the daytime.

The predicted noise levels from the Vickery EIS are summarised in **Table 4**. As shown, the combined noise from all traffic was predicted to meet the 60dBA $L_{Aeq,15hr}$ daytime road noise criterion. Noise from the private haul road and Kamilaroi Highway overpass alone was predicted to meet the 55 dBA $L_{Aeq,15hr}$ daytime criterion for a new arterial road.

In addition, the Vickery EIS predicted there would be no exceedance of the relevant night-time road traffic noise criteria at any privately-owned residence due to noise from the private haul road and Kamilaroi Highway overpass alone, or in combination with other traffic.

Table 4 Calculated Traffic Noise Levels at the Closest Receivers to Private Haul Road and Kamilaroi Highway Overpass – Vickery EIS (ROM Coal Transport of 4.5 Mtpa 24 hours per day, 7 days per week)

Rec ID	Vickery EIS					
	Year 7			Year 17		
	Day $L_{Aeq,15hr}$			Day $L_{Aeq,15hr}$		
	Non-Project	Project	Total	Non-Project	Project	Total
223	55	48	56	56	48	56
224	54	48	55	54	48	55
225	54	44	54	54	44	54
284	44	40	46	44	40	46
285	43	39	45	44	39	45
286	42	37	43	42	37	43
292	48	40	48	48	40	49
Daytime Criterion	N/A	55	60	N/A	55	60

Modification Assessment

As above, for the purpose of this Modification assessment, all truck movements required for the transport of 4.5 Mtpa of ROM are conservatively assumed to take place over a 15 hour period, as opposed to a 16 hour period.

The predicted noise levels for the Modification are summarised in **Table 5**.

As shown, the combined noise from all traffic (i.e. traffic on Blue Vale Road, the Kamlaroi Highway and the Highway Overpass) is predicted to meet the 60dBA $L_{Aeq,15hr}$ daytime road noise criterion. It should be noted that the adopted background traffic levels for the Modification assessment are consistent with those for Year 17 of the Vickery EIS (i.e. the maximum background levels adopted for the Vickery EIS assessment).

In addition, noise from the private haul road and Kamlaroi Highway overpass alone is predicted to meet the 55 dBA $L_{Aeq,15hr}$ daytime criterion for a new arterial road.

Since the Modification would result in no ROM coal haulage during the night - and thus, less acoustic impact at night in comparison to the Vickery EIS - the night time traffic noise assessment of the private haul road and Kamlaroi Highway overpass is no longer required as compliance with the night-time road noise criteria would occur.

Table 5 **Calculated Traffic Noise Levels at the Closest Receivers to Private Haul Road and Kamlaroi Highway Overpass – The Modification (ROM Coal Transport of 4.5 Mtpa during daytime hours only)**

Rec ID	Maximum Predicted Noise Level for the Modification		
	Day $L_{Aeq,15hr}$		
	Background	Modification ROM coal	Total
223	56	49	57
224	54	50	55
225	54	45	55
284	44	42	46
285	44	41	46
286	42	38	43
292	48	42	49
Daytime Criterion	N/A	55	60

CONCLUSION

Whitehaven is proposing to modify ROM coal truck haulage rate for TCM on the Approved ROM Coal Road Transport Route between the TCM complex and the Whitehaven CHPP.

However, Whitehaven would manage the use of the Approved Road Transport Route such that the total cumulative annual ROM coal haulage from all Whitehaven mines (i.e. TCM, RCM and VCP) would not exceed:

- 3.5 Mtpa prior to the commissioning of the private haul road and Kamilaroi Highway overpass; and
- 4.5 Mtpa following the commissioning of the private haul road and Kamilaroi Highway overpass.

This Road Traffic Noise Assessment Review has assessed potential road traffic noise impacts due to the following changes associated with the Modification (i.e. in comparison with those currently approved, or previously assessed for the VCP):

- An increase in TCM ROM coal haulage rate on the Approved Road Transport Route from the currently approved 2Mtpa to 3Mtpa.
- An increase in the cumulative ROM coal haulage from all Whitehaven coal mines of up to 4.5 Mtpa between 6.00am and 10.00pm on the Approved Road Transport Route between VCP and the CHPP (i.e. in comparison to the Vickery EIS, which assessed 4.5 Mtpa of ROM coal haulage occurring 24 hours per day, seven days per week).

It is predicted that road traffic noise levels associated with the Modification would comply with the relevant traffic noise criteria at all private dwellings along the Approved Road Transport Route.

I trust this information is sufficient.

Yours faithfully

WILKINSON MURRAY



Roman Haverkamp
Senior Engineer

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AAAC

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APPENDIX B
ROAD TRAFFIC NOISE ASSESSMENT REVIEW

Our Ref: 14S9026000

9 January 2014

Whitehaven Coal Limited
PO Box 600
GUNNEDAH NSW 2380

Attention: Mr. Danny Young

Dear Danny,

RE: WHITEHAVEN ROAD HAULAGE MODIFICATION – ROAD TRANSPORT ASSESSMENT REVIEW

This letter sets out GTA Consultants' review assessment of the road transport implications of a proposed Modification to the road haulage operations at the Tarrawonga Coal Mine (Tarrawonga) along the Approved Whitehaven ROM Coal Road Transport Route (Approved Road Transport Route).

This review draws on information and data presented in *Tarrawonga Coal Project Road Transport Assessment* (Halcrow, 2011), and *Vickery Coal Project Gunnedah Basin, NSW Road Transport Assessment* (GTA Consultants, 2012).

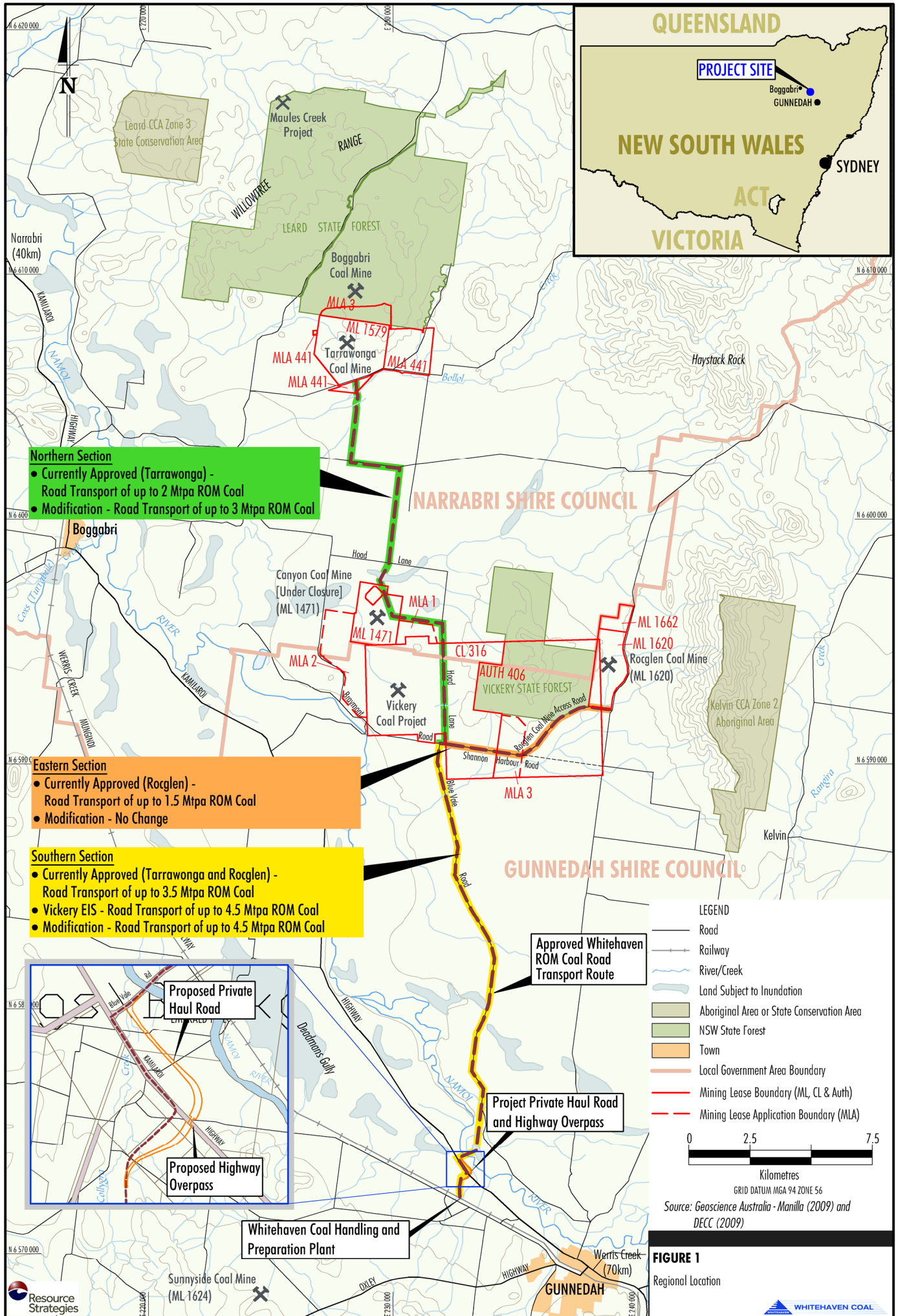
Existing Situation

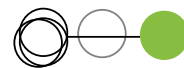
Whitehaven Coal Limited's (Whitehaven) operations within the Gunnedah Basin include Tarrawonga, the Rocglen Coal Mine (Rocglen) and a Coal Handling and Preparation Plant and rail loader near Gunnedah (Whitehaven CHPP). Construction has also commenced at Whitehaven's Maules Creek Project, and approval is being sought for the Vickery Coal Project (Vickery).

Tarrawonga is located approximately 15 kilometres (km) north-east of Boggabri and 42km north-northwest of Gunnedah in New South Wales (Figure 1). Rocglen is located approximately 22 km north of Gunnedah (Figure 1). The CHPP is located on the north-western outskirts of Gunnedah (Figure 1). Vickery is located approximately 22 km north-north-west of Gunnedah and 6 km west of Rocglen (Figure 1).

Approved Road Transport Route

The current Project Approvals for Tarrawonga (11_0047) and Rocglen (10_0015) permit road transport of up to a combined total of 3.5 million tonnes per annum (Mtpa) of Run-of-Mine (ROM) coal from Tarrawonga (2 Mtpa) and Rocglen (1.5 Mtpa) to the Whitehaven CHPP using the Approved Road Transport Route (Figure 1).





The Approved Road Transport Route includes a combination of public and private roads and provides the shortest and least trafficked route from Tarrawonga/Rocglen to the Whitehaven CHPP. It is not used by Whitehaven's other operational mines, however, the southern section is proposed to be used by the Vickery Coal Project.

In accordance with the requirements of the Tarrawonga Project Approval 11_0047, Whitehaven has entered into road maintenance agreements with the Narrabri Shire Council and Gunnedah Shire Council in relation to the Approved Road Transport Route. The road maintenance agreement with Narrabri Shire Council requires the roads and intersections along the Approved Road Transport Route within the Narrabri local government area to be maintained in good condition at all times at Whitehaven's cost. The road maintenance agreement with Gunnedah Shire Council requires Whitehaven to pay 95 percent of road maintenance costs incurred by the Gunnedah Shire Council for Hoad Lane and Blue Vale Road.

Tarrawonga

The current Project Approval for Tarrawonga (11_0047) permits extraction of up to 3.0 Mtpa ROM coal from Tarrawonga, and transport of up to 2.0 Mtpa ROM coal from Tarrawonga to the Whitehaven CHPP, using the Approved Road Transport Route until three months after commissioning of the Boggabri Rail Spur Line and Boggabri CHPP.

For the period starting three months after commissioning of the Boggabri Rail Spur Line and Boggabri CHPP, Tarrawonga is required to transport up to 3.0 Mtpa ROM coal from the Tarrawonga Coal Mine directly to the Boggabri Coal Mine facilities, for subsequent despatch via the Boggabri rail spur.

The assessment of the road transport implications of the currently approved operations at Tarrawonga (Halcrow, 2011) anticipated that the haulage of up to 2.0 Mtpa ROM coal from Tarrawonga to the Whitehaven CHPP along the Approved Road Transport Route would occur only until such time as suitable approvals and upgrades were in place to allow the aforementioned transfer of ROM coal to the Boggabri Coal Mine. The assessment assumed that the transfer would occur after Year 1 of the Tarrawonga Project. Thereafter, the Approved Road Transport Route would be used only by trucks associated with coal haulage from Rocglen.

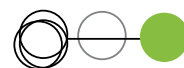
The Tarrawonga road transport assessment concluded that *"no significant impacts on the performance, capacity, efficiency and safety of the road network are expected to arise as a result of the Project and no specific management or mitigation measures are considered to be warranted."*

Rocglen

The Project Approval for Rocglen (10_0045) permits transport of up to 1.5 Mtpa ROM coal from Rocglen to the Whitehaven CHPP along the Approved Road Transport Route. The Rocglen haulage trucks use the Rocglen Coal Mine Access Road and a section of Shannon Harbour Road to travel from Rocglen to the southern section of the Approved Road Transport Route (Figure 1), the use of which is shared with Tarrawonga haulage trucks.

Vickery Coal Project

The road transport assessment undertaken for the Vickery Coal Project application (GTA Consultants, 2012) assessed the implications of the haulage of up to a cumulative total of 4.5 Mtpa of ROM coal (i.e., from Vickery and Whitehaven's other coal mines) to the Whitehaven



CHPP along the southern section of the Approved Road Transport Route, which includes Blue Vale Road. The Vickery EIS assessed Vickery's ROM coal road transport (up to 4.5 Mtpa) occurring up to 24 hours a day, seven days a week.

The Vickery EIS also considered the construction of a private haul road and overpass over the Kamilaroi highway, which would remove the need for ROM coal haulage trucks from Whitehaven's coal mines to use the Kamilaroi Highway to enter the Whitehaven CHPP. The private haul road and Kamilaroi highway overpass would be constructed prior to the cumulative transport of ROM coal from Whitehaven's coal mines exceeding the currently approved rate of 3.5 Mtpa.

The Vickery application is currently under assessment by the NSW Department of Planning & Infrastructure.

The Vickery road transport assessment concluded that "*no significant impacts on the performance, capacity, efficiency and safety of the road network are expected to arise as a result of [Vickery]*".

Estimate of Currently Approved ROM Coal Haulage Movements

In summary, the current Tarrawonga and Rocglen approvals permit the transport of up to (Figure 1):

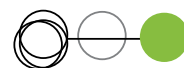
- 2.0 Mtpa ROM coal on the northern section of the Approved Road Transport Route (between Tarrawonga and Shannon Harbour Road);
- 1.5 Mtpa ROM coal on the eastern section of the Approved Road Transport Route (Rocglen Coal Mine Access Road and Shannon Harbour Road from Rocglen to Blue Vale Road); and
- 3.5 Mtpa of ROM coal on the southern section of the Approved Road Transport Route (between Shannon Harbour Road and the Whitehaven CHPP).

ROM coal is despatched from Tarrawonga and Rocglen between 7.00am and 9.15pm Monday to Friday, and 7.00am and 5.15pm Saturdays, excluding public holidays. Coal is transported using trucks with a capacity of 42 tonnes. On this basis, the average weekday truck trip generated by the transport of ROM coal from Tarrawonga and Rocglen as approved has been estimated, noting that the departure trip by a loaded truck would be matched by the return of an empty vehicle.

Table 1 summarises the average weekday daily haulage truck trips generated by Whitehaven as currently approved, as calculated using the transport characteristics described above. It is noted that the assessment for Tarrawonga (Halcrow, 2011) estimated the number of haulage truck trips based on a review of historic trip/tonnage rates, which results in a slightly lower number of trips to fulfil the transport task. Adopting the higher rate for this assessment is therefore considered to conservatively overestimate the number of trips required.

Table 1 demonstrates that in the short term, coal haulage from Tarrawonga may generate up to an average of 348 truck trips per weekday and coal haulage from Rocglen may generate up to 260 truck trips per weekday, and together they generate up to an average of 608 truck trips per weekday.

This haulage is currently approved to occur only until such time as the suitable approvals and upgrades were in place to allow the transfer of Tarrawonga's ROM coal to the Boggabri Coal Mine. After that time, only Rocglen would continue to use the haul route, generating up to an



average 260 truck trips per day between Rocglen and the Whitehaven CHPP along the Approved Road Transport Route.

Table 1: Weekday Average Whitehaven ROM Coal Haulage Truck Trips As Approved (vehicles/day) (No Transport of Tarrawonga Coal via Boggabri Infrastructure)

Location on Approved Road Transport Route	Tarrawonga 2.0 Mtpa ROM Coal	Rocglen 1.5 Mtpa ROM Coal	Total 3.5 Mtpa ROM Coal
Northern Section			
Tarrawonga Access Road	348	0	348
Haul Route South of Goonbri Road	348	0	348
Eastern Section			
Rocglen Access Road and Shannon Harbour Road east of Blue Vale Rd	0	260	260
Southern Section			
Blue Vale Rd south of Shannon Harbour Rd	348	260	608
Blue Vale Rd northeast of Kamilaroi Hwy	348	260	608
Kamilaroi Hwy between Blue Vale Rd and CHPP	348	260	608
CHPP Access Rd	348	260	608

It is noted that the approved levels of ROM coal transport from Tarrawonga includes up to 150,000 tonnes for direct distribution to domestic markets, transported using the Approved Road Transport Route to the Kamilaroi Highway. This equates to an average of 13 truck loads per day, generating 26 truck trips on the haulage route. Such trips would use the Approved Road Transport Route but would not enter the Whitehaven CHPP, and so would not use the proposed private haul road and Kamilaroi Highway overpass once constructed. As the number of these trips is small in the context of the overall coal haulage task, they have been ignored for the purpose of this review assessment, and all coal haulage trucks generated by Tarrawonga are assumed to travel directly between Tarrawonga and the Whitehaven CHPP. This assumption will have negligible impact on the conclusions of the review.

The Modification

ROM Coal Haulage Rate

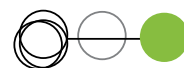
It is no longer considered by Whitehaven to be economically viable to process and transport Tarrawonga ROM coal via Boggabri infrastructure. As a result, the Modification proposes the continued transport of Tarrawonga ROM coal at a rate of up to 3.0 Mtpa along the Approved Road Transport Route to the Whitehaven CHPP.

However, consistent with the Vickery EIS, Whitehaven would manage the use of the Approved Road Transport Route such the cumulative ROM coal transported from all Whitehaven coal mines (i.e. Tarrawonga, Rocglen and Vickery) to the Whitehaven CHPP would not exceed:

- 3.5 Mtpa (the currently approved rate) prior to the commissioning of the proposed private haul road and Kamilaroi Highway overpass; and
- 4.5 Mtpa (the maximum annual rate assessed in the Vickery EIS) following the commissioning of the proposed private haul road and Kamilaroi Highway overpass.

Thus with the Modification, the following maximum transport rates would occur along the Approved Road Transport Route:

- Northern section – up to 3.0 Mtpa of Tarrawonga ROM coal (increase from currently approved rate of up to 2.0 Mtpa);



- Eastern section – up to 1.5 Mtpa of Rocglen ROM coal (no change to currently approved);
- Southern section:
 - up to 3.5 Mtpa of ROM coal from Tarrawonga, Rocglen and Vickery (no change to currently approved) prior to the commissioning of the proposed private haul road and Kamilaroi Highway overpass; and
 - up to 4.5 Mtpa of ROM coal from Tarrawonga, Rocglen and Vickery (no change to maximum annual haulage rate assessed in the Vickery EIS) following the commissioning of the proposed private haul road and Kamilaroi Highway overpass.

Notwithstanding the above, should financial circumstances improve, Tarrawonga ROM coal would be transported to the Boggabri Coal Mine for processing and transportation as described in the Tarrawonga EA.

ROM Coal Haulage Hours

It is proposed that for the Modification ROM coal from the Tarrawonga Coal Mine would be despatched between:

- 6.00am and 9.15pm Monday to Friday, i.e., one additional hour between 6.00am and 7.00am in comparison to the currently approved hours; and
- 7.00am and 5.15pm Saturdays, i.e., no change to currently approved hours.

Consistent with the current approval, there would be no ROM coal haulage on Sundays or public holidays.

Allowing time for departing trucks to reach their destination, haulage trucks would be on the Approved Road Transport Route for the Modification between 6.00am and 10.00pm Monday to Friday and 7.00am to 6.00pm on Saturdays.

It is noted that the Vickery EIS assessed the transport of up to 4.5 Mtpa along the southern section of the Approved Road Transport Route on a 24 hours per day, 7 days per week basis. However, for the Modification, the transport of up to cumulative total of 4.5 Mtpa would occur only between the hours described above.

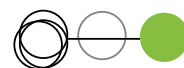
Other Vehicle Movements

The Modification would not change the peak number of employees at the Tarrawonga Coal Mine, nor the number of visitors and deliveries to the Tarrawonga Coal Mine.

Therefore, with the exception of ROM coal haulage movements described above, no material change in vehicle movements is expected due to the Modification in comparison to what has been described and assessed in both the Tarrawonga EA and Vickery EIS.

Traffic Generation Implications of the Modification

The impacts of the Modification would occur only on the Approved Road Transport Route, not on the other roads in the region which are used by other mine-related traffic, e.g. employees, visitors. This assessment therefore considers the implications of the Modification along the Approved Road Transport Route only.



Based on the aforementioned coal haulage characteristics, the number of ROM coal haulage truck trips expected to be generated by the Modification has been estimated and is described below.

Table 2 summarises the daily haulage truck trips expected to be generated by Whitehaven along the Approved Road Transport Route for the Modification, and provides a comparison to those currently approved (as presented in Table 1).

Table 2: Approved and Modification Weekday Average ROM Coal Haulage Trips (vehicles/day)

Location on Approved Road Transport Route	Approved Haulage (up to 3.5 Mtpa) ^A	Modification Haulage	
		Without Overpass (up to 3.5 Mtpa) ^B	With Overpass (up to 4.5 Mtpa) ^B
Northern Section			
Tarrawonga Access Road	348	520	520
Haul Route South of Goonbri Road	348	520	520
Eastern Section			
Rocglen Access Road and Shannon Harbour Road east of Blue Vale Rd	260	260	260
Southern Section			
Blue Vale Rd south of Shannon Harbour Rd	608	608	780
Blue Vale Rd northeast of Kamilaroi Hwy	608	608	0
Kamilaroi Hwy between Blue Vale Rd and CHPP	608	608	0
CHPP Access Rd	608	608	0
Private Haul Road and Highway Overpass	0	0	780

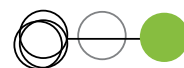
A Maximum approved rates Tarrawonga 2.0 Mtpa and Rocglen 1.5 Mtpa

B Maximum rates cumulatively for Whitehaven operations (Tarrawonga, Rocglen, Vickery)

Table 2 shows that the Modification would not have any impact on truck trips on the eastern section of the Approved Road Transport Route (Rocglen Coal Mine Access Road and Shannon Harbour Road), which is used by coal haulage trucks to and from Rocglen, therefore the assessment which follows does not consider Shannon Harbour Road or the Rocglen Coal Mine Access Road any further.

The key impacts of the Modification compared with the approved conditions are therefore summarised below:

- Increase in weekday average truck trips from 348 trucks per weekday to up to 520 trucks per weekday on the northern section of the Approved Road Transport Route (between Tarrawonga and Shannon Harbour Road). This increase is associated with the proposed increase in Tarrawonga ROM coal transport from 2.0 Mtpa to up to 3.0 Mtpa.
- Increase in weekday average truck trips from 608 trucks per weekday to up to 780 trucks per weekday on the Approved Road Transport Route south of Shannon Harbour Road with the proposed private haul road and highway overpass. This increase would be associated with the cumulative increase in ROM coal haulage from 3.5 Mtpa to 4.5 Mtpa.
- Decrease in weekday average truck trips from 608 trucks to 0 trucks per weekday on the existing Approved Road Transport Route between the Whitehaven CHPP and the intersection of Blue Vale Road, including Blue Vale Road and the Kamilaroi Highway. This decrease would occur following the commissioning of the proposed private haul road and Kamilaroi Highway overpass.



Road Transport Environment without Modification

Surveys of traffic volumes were undertaken in the region as part of the assessment of the Tarrawonga and Vickery Projects, and the results presented in Halcrow (2011) and GTA Consultants (2012). Using those surveyed traffic volumes, future traffic volumes were estimated on the Approved Road Transport Route as part of the assessments for Tarrawonga and Vickery, which took into account the expected traffic increases as a result of growth in background (non-mining) traffic and as a result of the movement of vehicles associated with Tarrawonga and other mining developments in the region, specifically Maules Creek and Boggabri Coal Mines.

Table 3 summarises the expected increases in traffic not associated with the haulage of ROM coal. These increases are those expected to occur above surveyed levels as a result of the combined effects of non-specific background growth, the Maules Creek and Boggabri projects (combined as “Non-TCM” traffic in Table 3), Tarrawonga (as currently approved) and Vickery. Such traffic includes the movement of employees, deliveries, visitors, and gravel sales from Tarrawonga. The future year scenarios assume Tarrawonga and Vickery are both fully operational, with construction work completed.

Table 3: Average Weekday Background Traffic Excluding Whitehaven Coal Haulage (vehicles/day)

Location on Approved Road Transport Route	Non-TCM ^A	Tarrawonga ^B	Vickery ^C	Total
Year 2016				
Tarrawonga Access Road	0	108	0	108
Haul Route South of Goonbri Road	0	100	0	100
Blue Vale Rd south of Shannon Harbour Rd	4	42	404	450
Blue Vale Rd northeast of Kamilaroi Hwy	1,101	42	404	1,547
Kamilaroi Hwy between Blue Vale Rd and CHPP	2,876	42	404	3,322
CHPP Access Rd	383	0	0	383
Year 2029				
Tarrawonga Access Road	0	108	0	108
Haul Route South of Goonbri Road	0	100	0	100
Blue Vale Rd south of Shannon Harbour Rd	4	42	404	450
Blue Vale Rd northeast of Kamilaroi Hwy	1,235	42	404	1,681
Kamilaroi Hwy between Blue Vale Rd and CHPP	3,228	42	404	3,674
CHPP Access Rd	430	0	0	430

A Halcrow, 2011, Table 4.1, includes Maules Creek and Boggabri Mine projects traffic increases and non-specific growth

B Halcrow, 2011 Table 4.4

C GTA Consultants, 2012, Page B-3, without highway overpass

These forecasts did not separately consider the traffic generation of Rocglen at the time of the surveys in 2010. The “Non-TCM” traffic in Table 3 therefore includes surveyed coal haulage trucks associated with Rocglen, with minor increases over time consistent with the non-specific background traffic growth. The assessment which follows assumes that the haulage of up to 1.5 Mtpa of ROM coal from Rocglen is in addition to the background traffic calculated in Table 3, and therefore will overestimate the future transport task on the southern section of the Approved Road Transport Route from Shannon Harbour Road to the Whitehaven CHPP.

Table 4 summarises the expected two way daily volumes combining the background traffic with the Whitehaven haulage truck trips as approved, assuming that these rates of haulage continue to 2029.

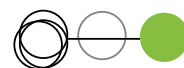


Table 4: Future Average Weekday Traffic with Approved Haulage – No Overpass (vehicles/day)

Location on Approved Road Transport Route	Background		Whitehaven ROM Coal (up to 3.5 Mtpa)	Total	
	2016	2029		2016	2029
Northern Section					
Tarrawonga Access Road	108	108	348	456	456
Haul Route South of Goonbri Road	100	100	348	448	448
Southern Section					
Blue Vale Rd south of Shannon Harbour Rd	450	450	608	1,058	1,058
Blue Vale Rd northeast of Kamilaroi Hwy	1,547	1,681	608	2,155	2,289
Kamilaroi Hwy between Blue Vale Rd and CHPP	3,322	3,674	608	3,930	4,282
CHPP Access Rd	383	430	608	991	1,038

Assumes no transport of Tarrawonga ROM coal offsite via Boggabri infrastructure

Road Transport Environment with Modification

Prior to Commission of Private Haul Road and Kamilaroi Highway Overpass

As noted above, prior to the commissioning of the private haul road and Kamilaroi Highway overpass, the cumulative ROM coal transported from Whitehaven coal mines would not exceed 3.5 Mtpa (i.e. the currently approved rate) for the Modification.

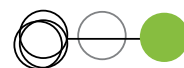
Combining the background non-coal haulage trips (Table 3) and the Whitehaven coal haulage trips associated with the Modification (Table 2), Table 5 summarises the expected two way daily volumes associated with the Modification prior to construction of the private haul road and Kamilaroi Highway overpass. As noted above, this is considered to overestimate the future traffic, as the coal haulage trips from Rocglen surveyed in 2010 are potentially double-counted.

Table 5: Future Average Weekday Traffic with Modification – No Overpass (vehicles/day)

Location on Approved Road Transport Route	Background		Whitehaven ROM Coal (up to 3.5 Mtpa)	Total and Change from Approved	
	2016	2029		2016	2029
Northern Section					
Tarrawonga Access Road	108	108	520	628 (+172)	628 (+172)
Haul Route South of Goonbri Road	100	100	520	620 (+172)	620 (+172)
Southern Section					
Blue Vale Rd south of Shannon Harbour Rd	450	450	608	1,058 (0)	1,058 (0)
Blue Vale Rd northeast of Kamilaroi Hwy	1,547	1,681	608	2,155 (0)	2,289 (0)
Kamilaroi Hwy between Blue Vale Rd and CHPP	3,322	3,674	608	3,930 (0)	4,282 (0)
CHPP Access Rd	383	430	608	991 (0)	1,038 (0)

Note: Values in parentheses represent change in total traffic due to the Modification compared with the approved Whitehaven Operations (Table 4)

Comparison of the results in Table 4 and Table 5 indicates the Modification would increase total average weekday truck numbers only on the northern section of the Approved Road Transport Route (i.e. in comparison to the approved Whitehaven operations).



Following Commission of Private Haul Road and Kamilaroi Highway Overpass

As noted above, following the commissioning of the private haul road and Kamilaroi Highway overpass, the cumulative ROM coal transported from Whitehaven coal mines would not exceed 4.5 Mtpa (i.e. the maximum annual rate assessed in the Vickery EIS) for the Modification.

Table 6 presents the expected two way daily volumes with the Modification after construction of the private haul road and Kamilaroi Highway overpass, by combining the background non-coal haulage trips (Table 3) with the Modification coal haulage trips (Table 2). As noted above, this is considered to overestimate the future traffic.

Table 6: Future Average Weekday Traffic with Modification – With Overpass (vehicles/day)

Location on Approved Road Transport Route	Background		Whitehaven ROM Coal (up to 4.5 Mtpa)	Total and Change from Approved	
	2016	2029		2016	2029
Northern Section					
Tarrawonga Access Road	108	108	520	628 (+172)	628 (+172)
Haul Route South of Goonbri Road	100	100	520	620 (+172)	620 (+172)
Southern Section					
Blue Vale Rd south of Shannon Harbour Rd	450	450	780	1,230 (+172)	1,230 (+172)
Blue Vale Rd northeast of Kamilaroi Hwy	1,547	1,681	0	1,547 (-608)	1,681 (-608)
Kamilaroi Hwy between Blue Vale Rd and CHPP	3,322	3,674	0	3,322 (-608)	3,674 (-608)
CHPP Access Rd	383	430	0	383 (-608)	430 (-608)
Private Haul Road and Highway Overpass	0	0	780	780 (+780)	780 (+780)

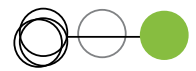
Note: Values in parentheses represent change in total traffic due to the Modification compared with the approved Whitehaven Operations (Table 4)

Comparison of the results in Table 4 and Table 6 indicates that the Modification would increase total average weekday traffic by approximately 172 vehicles per day on the northern section of the Approved Road Transport Route, and on Blue Vale Road to the south of Shannon Harbour Road in comparison to the approved Whitehaven operations.

However, total average weekday traffic numbers are expected to decrease by approximately 608 vehicles in comparison to the currently approved Whitehaven operations on the southernmost section of Blue Value Road and the Kamilaroi Highway due to the use of the private haul road and Kamilaroi Highway overpass.

Impacts of Modification

The Austroads (2013) *Guide to Traffic Management Part 3: Traffic Studies and Analysis* provides guidelines for the capacity and Levels of Service (LOS) of two lane, two way rural roads, which in turn, refers to the Highway Capacity Manual (Transportation Research Board, 2010). As noted in the Tarrawonga assessment report (Halcrow, 2011), the LOS is a qualitative measure describing the operational conditions along a traffic stream as perceived by drivers and/or passengers. LOS A provides the best traffic conditions, with no restriction on desired travel speed or overtaking. LOS B to D describes progressively worse traffic conditions. LOS E occurs when traffic conditions



are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre in the traffic stream. The service flow rate for LOS E is taken as the capacity of a lane or roadway.

Class I are roads on which motorists expect to travel at relatively high speeds. They most often serve long-distance trips or provide connecting links between facilities that serve long-distance trips. Class II roads are those on which motorists do not necessarily expect to travel at high speeds, and may function as access routes to Class I facilities, serve as scenic or recreational routes or pass through rugged terrain. Class III roads serve moderately developed areas, and may be portions of a Class I or Class II highway that pass through small towns or developed recreational areas, where local traffic mixes with through traffic. The Approved Road Transport Route would generally be considered a Class II road, for which LOS is determined based on Percent-Time-Spent-Following (PTSF). The short section of Kamilaroi Highway between Blue Vale Road and the Whitehaven CHPP may be considered as a Class I road due to its arterial nature. LOS for Class I roads is determined based on a combination of PTSF and Average Travel Speed.

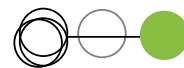
The Highway Capacity Manual presents detailed methods of calculating PTSF, however also presents a basic relationship between traffic flow and PTSF for base conditions on a two way road. This indicates that based on PTSF thresholds for Class II roads, Level of Service A would occur for a two way peak hourly volume of around 650 passenger car units per hour (pc/h), and Level of Service B would occur up to a two way peak hourly volume of about 1,000 pc/h. Based on PTSF thresholds for Class I roads, Level of Service A would occur for a two way peak hourly volume of around 550 pc/h, and Level of Service B would occur up to a two way peak hourly volume of about 900 pc/h.

The original traffic survey results demonstrate that the peak hourly traffic volumes on the Approved Road Transport Route were between 7.5 percent and 11.5 percent of the total daily volume (Table 3.2, Halcrow, 2011). The coal haulage trips would generally be spread evenly throughout the day, so on average, approximately 7 percent or less of coal haulage trips may occur in any one hour. Assuming as a robust comparison, that the overall future peak hourly volume is 10 percent of the daily totals presented in Tables 5 and 6, and allowing for the higher passenger-car-equivalent factor for the haulage trucks and other heavy vehicles on the route, the peak hourly volume with the Modification would remain significantly below 650 passenger car units per hour along the Approved Road Transport Route and may reach approximately 550 pc/h on Kamilaroi Highway without the overpass or remain well below 550 pc/h with the overpass. Thus the Level of Service along the route would be good based on this basic relationship comparison.

The resulting volumes would be sufficiently low that a more detailed assessment of the capacity and Levels of Service along the route, which would take into account the various factors which can influence the behaviour of the traffic stream, is not considered to be warranted.

The operation of the intersections of Kamilaroi Highway with Blue Vale Road and with the Whitehaven CHPP access road would not be impacted by the Modification, as the number of trucks passing through these intersections would not increase above the currently approved levels as a result of the Modification. Use of these intersections would be avoided altogether following commissioning of the private haul road and Kamilaroi Highway overpass.

A school bus route, Blue Vale to Gunnedah, operates along and across the Approved Road Transport Route. This bus route operates between 7.50am and 8.40am, and between 3.20pm and 3.58pm on school days. The Modification would result in a small increase in average hourly truck trips during the periods that school buses operate on the Approved Road Transport Route.



During an average hour, the Modification would result in an average of an additional 11 to 12 trucks travelling on the Approved Road Transport Route in one hour to the north of Shannon Harbour Road irrespective of the private haul road and highway overpass, and by the same amount to the south of Shannon Harbour Road once the private haul road and highway overpass are constructed. This is equivalent to approximately one additional truck in either direction every five minutes. On average this would be equivalent to one additional southbound truck every ten minutes and one additional northbound truck every ten minutes. One school bus operates southbound in the morning and one northbound in the afternoon. The increase in potential interaction between school buses and coal haulage trucks is considered to be sufficiently small that no additional measures would be warranted to reduce risk beyond the existing protocols for Whitehaven's truck drivers.

The existing road maintenance agreements with Narrabri Shire Council and Gunnedah Shire Council cover the maintenance of roads used by Whitehaven in association with their mines and facilities in the region. With the Modification, Whitehaven coal haulage trucks would continue to use the same routes covered by the existing maintenance agreements (with the exception of the southernmost part of the route once the private haul road and highway overpass are constructed). The existing maintenance agreements are therefore considered to remain an appropriate method of ensuring that the roads are maintained to the standard required for safe operation. Minor amendment to the agreement with Gunnedah Shire Council may be required should the Vickery Coal Project be approved.

Conclusions

This review of the proposed Modification to coal haulage associated with Whitehaven's Tarrawonga Coal Mine has found that the Modification would result in no significant impacts on the performance, efficiency and safety of the road network and no additional management or mitigation measures are considered to be warranted.

Yours sincerely

GTA CONSULTANTS

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