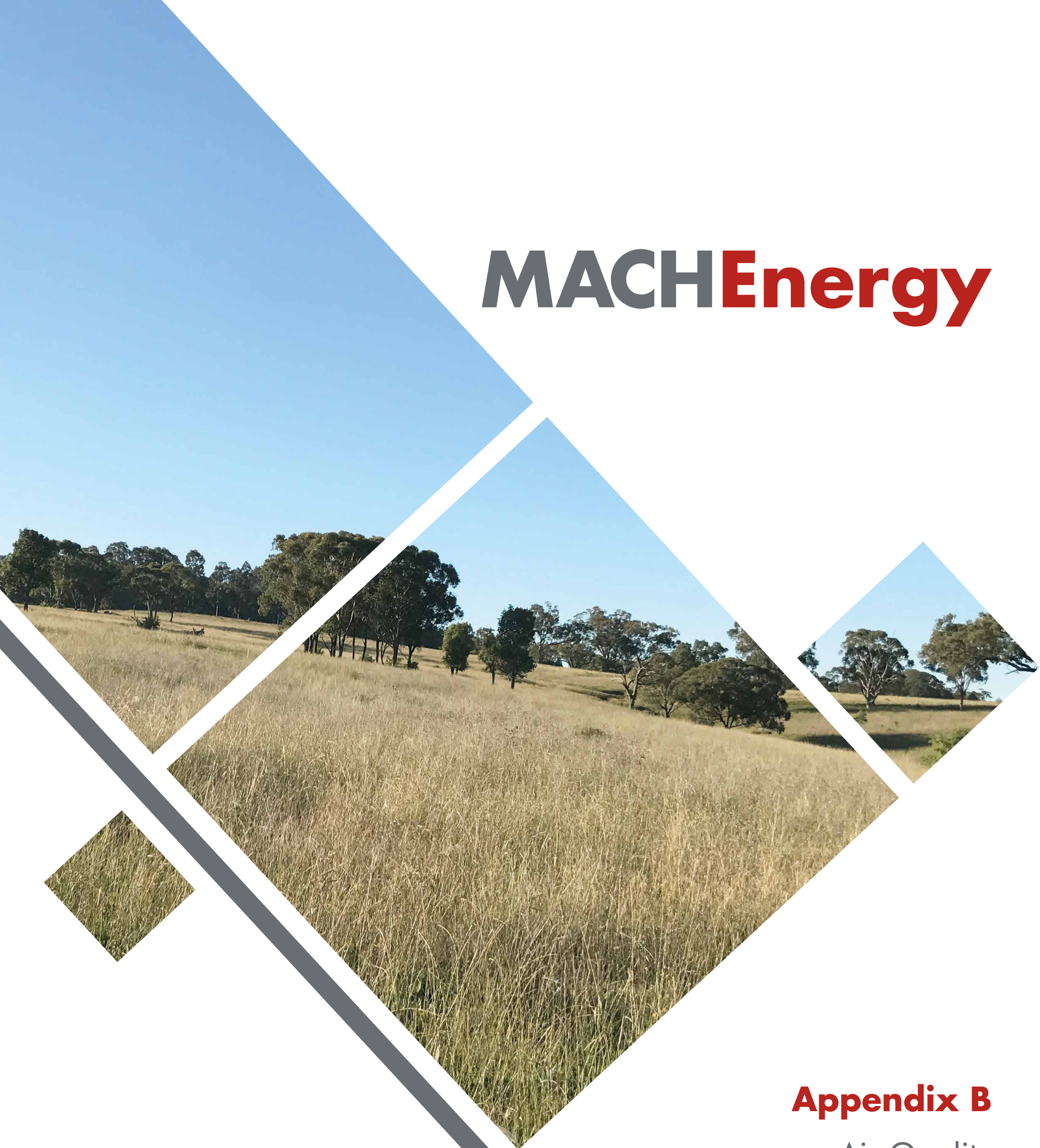

MACHEnergy

Appendix B

Air Quality Assessment

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14 December 2017

Chris Lauritzen
General Manager – Resource Development
MACH Energy Australia Pty Ltd

RE: Air Quality Assessment – Mount Pleasant Operation Rail Modification

Dear Chris,

Todoroski Air Sciences has assessed the potential air quality impacts associated with the proposed Mount Pleasant Operation Rail Modification (hereafter referred to as the Modification).

This report assesses the potential change in dust impacts associated with the Modification relative to the predicted impacts presented in the most recent air quality impact assessment for the operation, the *Mount Pleasant Operation Mine Optimisation Modification Air Quality and Greenhouse Gas Assessment* (**Todoroski Air Sciences, 2017**).

Overview of Mount Pleasant Mine

The approved Mount Pleasant Operation includes the construction and operation of an open cut coal mine and associated infrastructure located approximately 3 kilometres north-west of Muswellbrook in the Upper Hunter Valley of New South Wales. The mine is approved to produce up to 10.5 million tonnes per annum of run-of-mine (ROM) coal.

A recent modification application to the approved Mount Pleasant Operation in June 2017 (Modification 3) sought an extension to the permitted period of mining operations at the Mount Pleasant Operation to provide for open cut mining to 22 December 2026. Modification 3 also included an emplacement extension to better align with the underlying topography and facilitate development of a final landform that is more consistent with the characteristics of the local topography and to incorporate additional waste rock capacity. Modification 3 is currently awaiting determination.

Modification description

The Mount Pleasant Operation is seeking approval in the Modification to relocate the approved rail infrastructure from south of Wybong Road, where it will be intersected by Bengalla Mine in the future, to the east of the Bengalla Mine, and north of Wybong Road. The Modification would also involve the relocation of the pump station and water pipeline from the Hunter River, however this has no operational air quality emission significance.

An overview of the key elements of the Modification is presented in **Figure 1**.

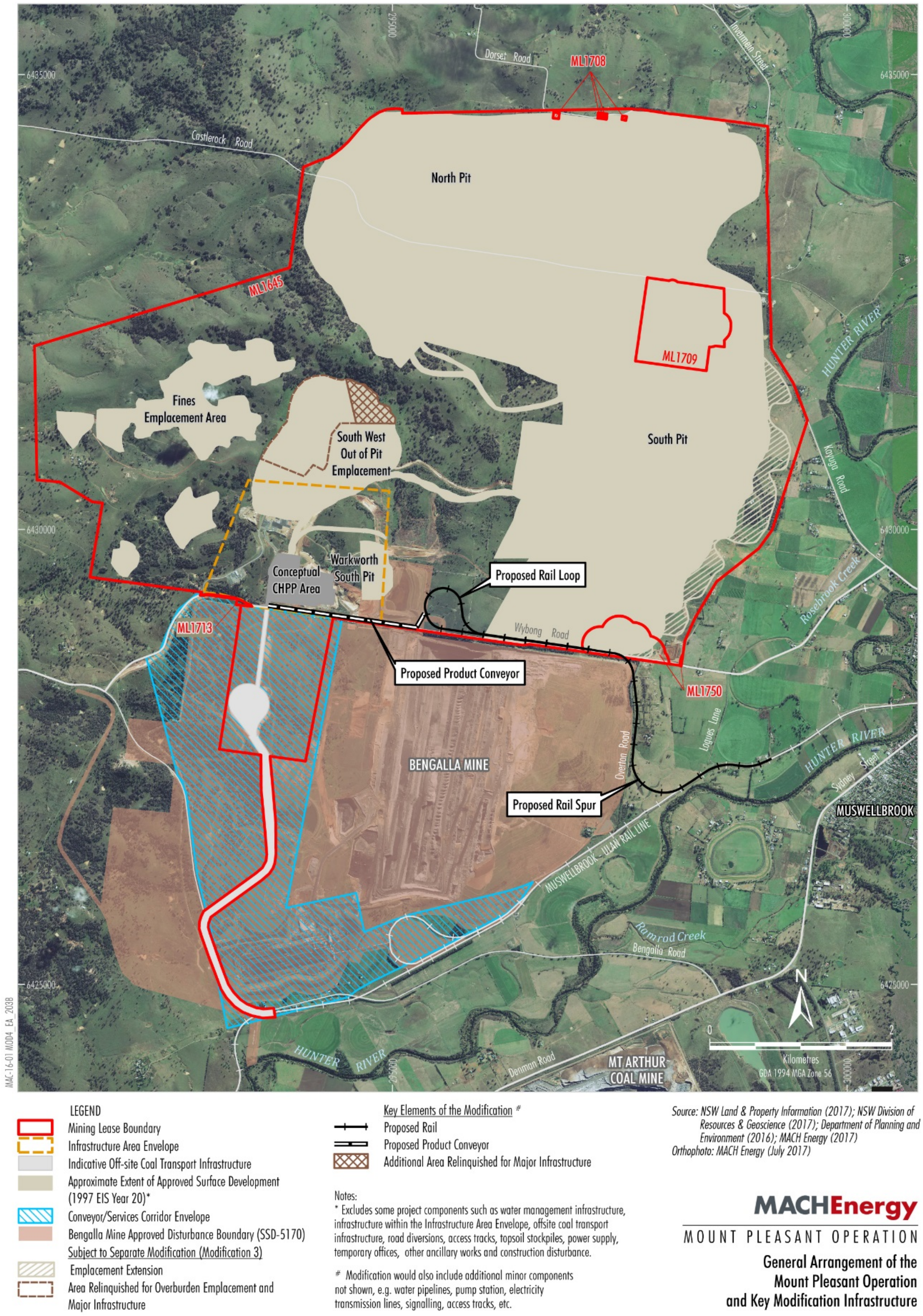

Figure 1: General Arrangement of the Mount Pleasant Operation and Key Modification Infrastructure

Assessment of potential operational air quality impacts

The relocation of the rail infrastructure to the east of Bengalla Mine and north of Wybong Road would result in one additional transfer point and a slight increase to the overall conveyor length between the Coal Handling and Preparation Plant (CHPP) and rail loading facility, compared to the approved rail infrastructure. The train load-out facilities would be similar and there would be no additional dust likely to be generated from this activity, but it would be generated in a different location.

The potential change in total dust emissions for the Mount Pleasant Operation as a result of the Modification is expected to be small. However, as the modified sources would be relocated, they may influence the spatial distribution of dust levels from the site. To investigate the extent of this potential effect, air dispersion modelling was performed using the comprehensive and detailed model previously developed for the *Mount Pleasant Operation Mine Optimisation Modification Air Quality and Greenhouse Gas Assessment* (**Todoroski Air Sciences, 2017**), which was updated to reflect the Modification conveyors and rail load-out facility.

The air dispersion model is setup identically to allow for a direct comparison with the previous assessment. Further details regarding the air dispersion model setup can be found in the *Mount Pleasant Operation Mine Optimisation Modification Air Quality and Greenhouse Gas Assessment* (**Todoroski Air Sciences, 2017**). Until the relocated rail alignment is constructed and commissioned, the approved rail infrastructure would continue to be utilised.

A comparison of the estimated total annual dust emission for Year 2021 (the closest scenario assessed in **Todoroski Air Sciences [2017]** to the estimated operation of the relocated rail alignment) for the Mount Pleasant Operation and the Modification is presented in **Table 1**. The cells highlighted in orange indicate the activities associated with the Modification, while bold typeface indicates an increase in estimated emissions.

It is calculated that the total annual dust emissions associated with the Modification would increase dust emissions by approximately 0.03% relative to the previously assessed Mount Pleasant Operation incorporating Modification 3. The small increase in total annual dust emissions due to the Modification arises from the additional transfer points and the longer section of product coal conveyor. It should be noted, however, that the sources to be modified are being relocated, and these new, modified or relocated sources comprise approximately 0.08% of the total emissions generated by the Mount Pleasant Operation.

Table 1: Comparison of estimated TSP emission rate for the proposed modification (kg/year)

Activity	Scenario 2 – Modification 3	Scenario 2 - Proposed Modification (MOD4)
OB - Topsoil removal with dozer	18,234	18,234
OB - Excavator loading topsoil to haul truck	249	249
OB - Hauling topsoil to dump	2,065	2,065
OB - Emplacing topsoil at dump	249	249
OB - Drilling overburden	14,028	14,028
OB - Blasting overburden	136,831	136,831
OB - Excavator loading OB to haul truck	105,496	105,496
OB - Hauling to dump (Day period)	359,163	359,163
OB - Hauling to dump (Evening/ night period)	310,066	310,066
OB - Emplacing at dump	105,496	105,496
OB - Rehandle OB	10,550	10,550
OB - Dozers on OB in pit	173,225	173,225
OB - Dozers on OB working on dump	173,225	173,225
CL - Dozers ripping/pushing/clean-up	82,223	82,223
CL - Loading ROM coal to haul truck	436,040	436,040
CL - Hauling ROM to hopper - CHPP	273,886	273,886
CHPP - Unloading ROM to hopper	65,406	65,406
CHPP - Rehandle ROM at hopper	87,208	87,208
CHPP - Primary crushing	28,350	28,350
CHPP - Transfer	768	768
CHPP - Conveying to secondary crusher	6	6
CHPP - Secondary crushing	28,350	28,350
CHPP - Tertiary crushing	28,350	28,350
CHPP - Transfer	768	768
CHPP - Conveying to 1000t bin	9	9
CHPP - Transfer	768	768
CHPP - Conveying to CHPP	5	5
CHPP - Transfer	437	437
CHPP - Conveying to Product stockpile	27	27
CHPP - Unloading to Product stockpile	1,094	1,094
CHPP – Transfer point 1	437	437
CHPP – Transfer point 2	-	**437**
CHPP - Conveying to train load-out	80	**157**
CHPP – Transfer point 3	-	**437**
CHPP - Loading coal to train	1,458	1,458
CHPP - Dozers on ROM stockpiles	82,223	82,223
CHPP - Dozers on Product stockpiles	63,343	63,343
OB - Loading Reject to haul truck	1,685	1,685
OB - Hauling Reject to dump	29,997	29,997
OB - Emplacing Reject at dump	1,685	1,685
WE - Overburden emplacement areas	104,148	104,148
WE - Open pit	210,287	210,287
WE - ROM stockpiles	8,395	8,395
WE - Product stockpiles	4,324	4,324
WE - Topsoil stockpiles	7,106	7,106
WE – Initial Rehab	50,069	50,069
OB - Grading roads	57,361	57,361
Locomotive idling	515	515
Diesel powered equipment	4,275	4,275
Total TSP emissions	**3,069,964**	**3,070,915**
% Change in total TSP emissions		**0.03**
% of emissions from changed, new or relocated sources		**0.08**

TSP – Total Suspended Particulates, kg/year – kilograms per year, OB – overburden, CL – coal, t – tonnes, WE – wind erosion

*With proposed haul route to CHPP

Dispersion modelling predictions

The predicted air quality levels due to the Modification are overlaid with the predictions for Scenario 2 of Modification 3 (**Todoroski Air Sciences, 2017**).

The dispersion modelling results comparing the predicted 24-hour average and annual average $PM_{2.5}$, 24-hour average and annual average PM_{10}, annual average TSP and annual average dust deposition levels for Scenario 2 are presented as isopleth diagrams in **Figure 2** to **Figure 7**. Contour plots for $PM_{2.5}$, PM_{10} and TSP concentrations are presented in units of micrograms per cubic metre ($\mu g/m^3$), while dust deposition levels are presented in grams per square metre per month (g/m^2/month).

The results indicate that the Modification has a negligible effect at the privately-owned and mine-owned receptor locations (only some very minor differences in the isopleth locations near the relocated sources can be seen upon close inspection of the figures). Note that where the isopleths are the same, only the pink linework (this Modification) can be seen.

As there is no measurable change in the incremental modelling predictions, it is reasonable to conclude that the proposed Modification would not tangibly change the predicted cumulative impacts. It is thus expected that no additional privately-owned receptor locations would exceed criteria as a result of the Modification in comparison with the results presented in the **Todoroski Air Sciences (2017)** assessment.

Assessment of potential construction air quality emissions

The establishment and construction of related infrastructure associated with the Modification has the potential to generate dust emissions.

Potential construction dust emissions will be primarily generated due to material handling, vehicle movements and windblown dust generated from exposed areas. Particulate emissions would also be generated from the exhaust of construction vehicles and plant.

The potential air quality impacts due to these activities are difficult to accurately quantify on any given day due to the short sporadic periods of dust generating activity which may occur over the construction time frame. The sources of dust are temporary in nature during the construction period.

The total amount of dust generated from the construction process is unlikely to be significant given the nature of the activities proposed in comparison to other activities at the Mount Pleasant Operation. As the construction activities would occur for a limited period, no significant or prolonged effect at any off-site receiver is predicted.

To ensure dust generation during the construction activities is controlled and the potential for off-site impacts is reduced, appropriate (operational and physical) mitigation measures may be implemented such as those listed in **Table 2**.

Table 2: Potential construction dust mitigation options

Source	Mitigation Measure
General	Activities to be assessed during adverse weather conditions and modified as required (e.g. cease activity where reasonable levels of dust cannot be maintained)
	Engines to be switched off when not in use for any prolonged period
	Vehicles and plant would be fitted with pollution reduction devices where practical
	Maintain and service vehicles according to manufacturer's specifications
	Haul roads/ transport routes to be sited away from sensitive receivers where possible
Exposed areas and Stockpiles	Minimise area of exposed surfaces
	Water suppression on exposed areas and stockpiles
	Minimise amount of stockpiled material
	Locate stockpiles away from sensitive receivers
	Apply barriers, covering or temporary rehabilitation
	Progressive staging of construction activities
	Rehabilitation of completed sections as soon as practicable
	Keep ancillary vehicles off exposed areas
Material handling	Reduce drop heights from loading and handling equipment
Hauling activities	Watering of haul roads (fixed or mobile) when required
	Sealed haul roads to be cleaned regularly
	Restrict vehicle traffic to designated routes that can be managed by regular watering
	Impose speed limits
	Wheel wash, grids or coarse aggregate near exit points to minimise dirt track out
	Street cleaning to remove dirt tracked onto sealed roads
	Covering vehicle loads when transporting material off- site

Potential coal dust from train wagons

As described in Appendix E of the **Todoroski Air Sciences (2017)** assessment, the potential for any adverse air quality impacts associated with coal dust generation during rail transport would be low and would not make any appreciable difference to local air quality.

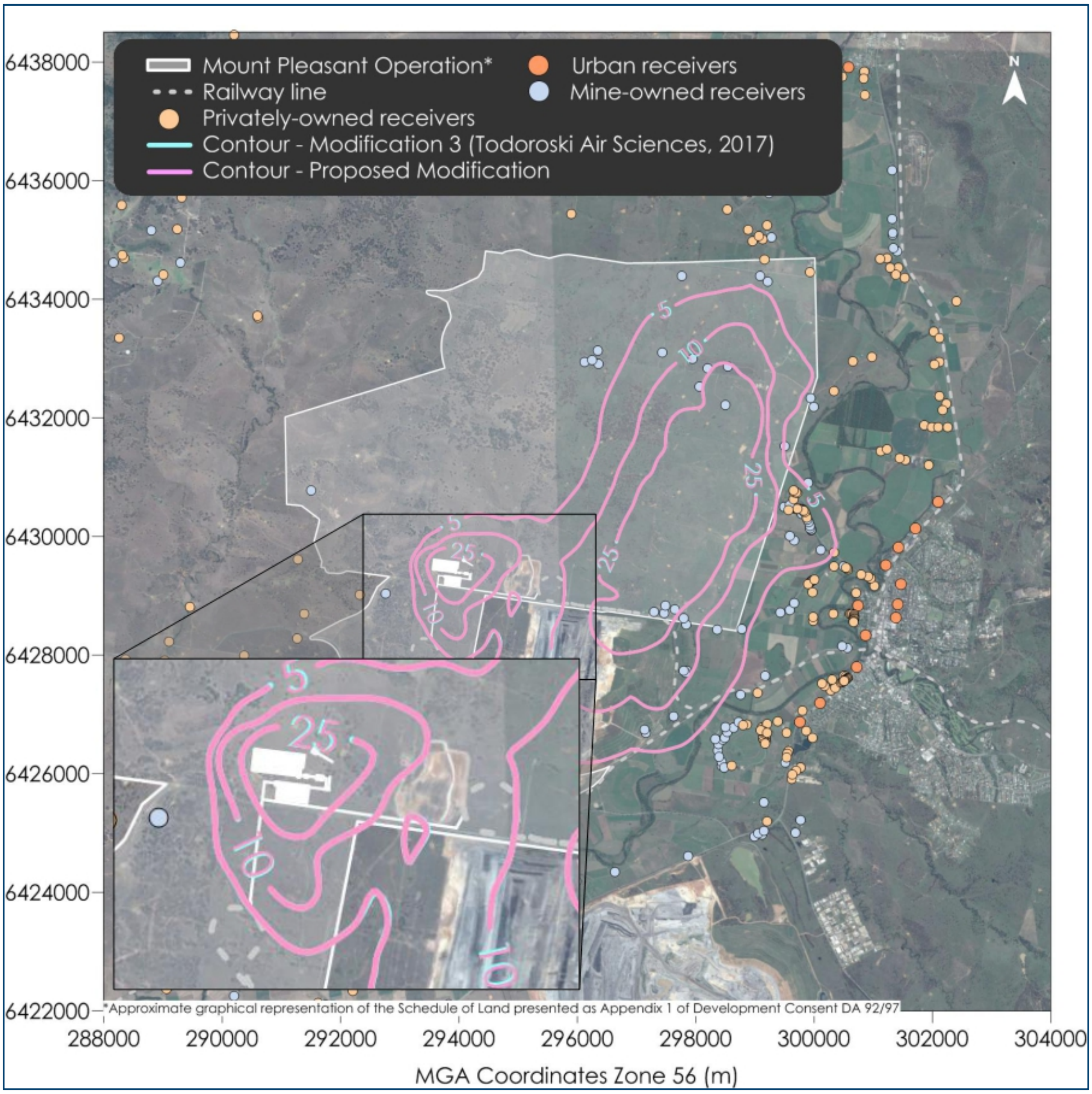

Figure 2: Comparison of predicted incremental maximum 24-hour average $PM_{2.5}$ concentrations for the Modification and Modification 3 in Scenario 2 (µg/m³)

Figure 3: Comparison of predicted incremental annual average $PM_{2.5}$ concentrations for the Modification and Modification 3 in Scenario 2 (µg/m³)

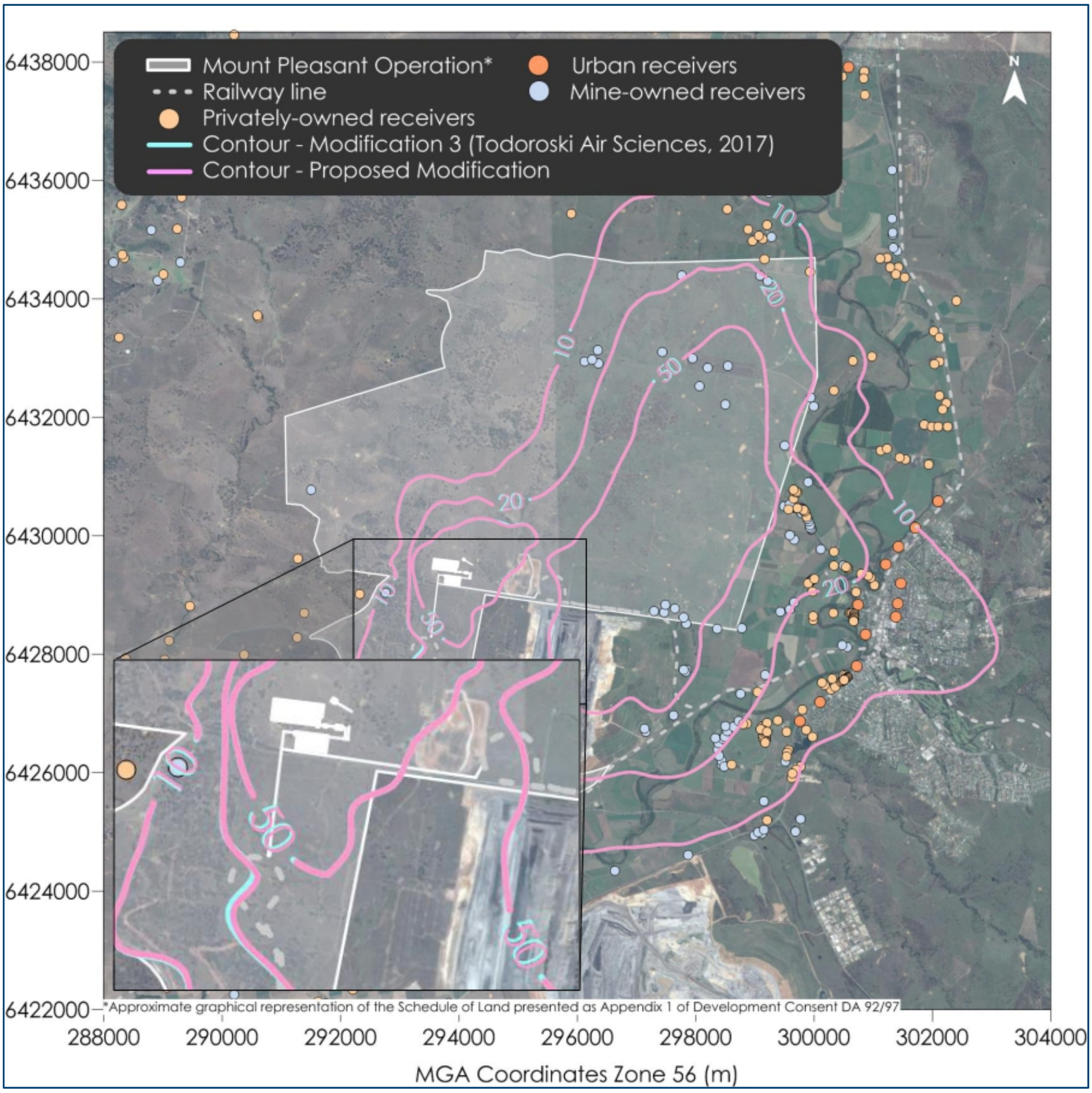

Figure 4: Comparison of predicted incremental maximum 24-hour average PM_{10} concentrations for the Modification and Modification 3 in Scenario 2 (µg/m³)

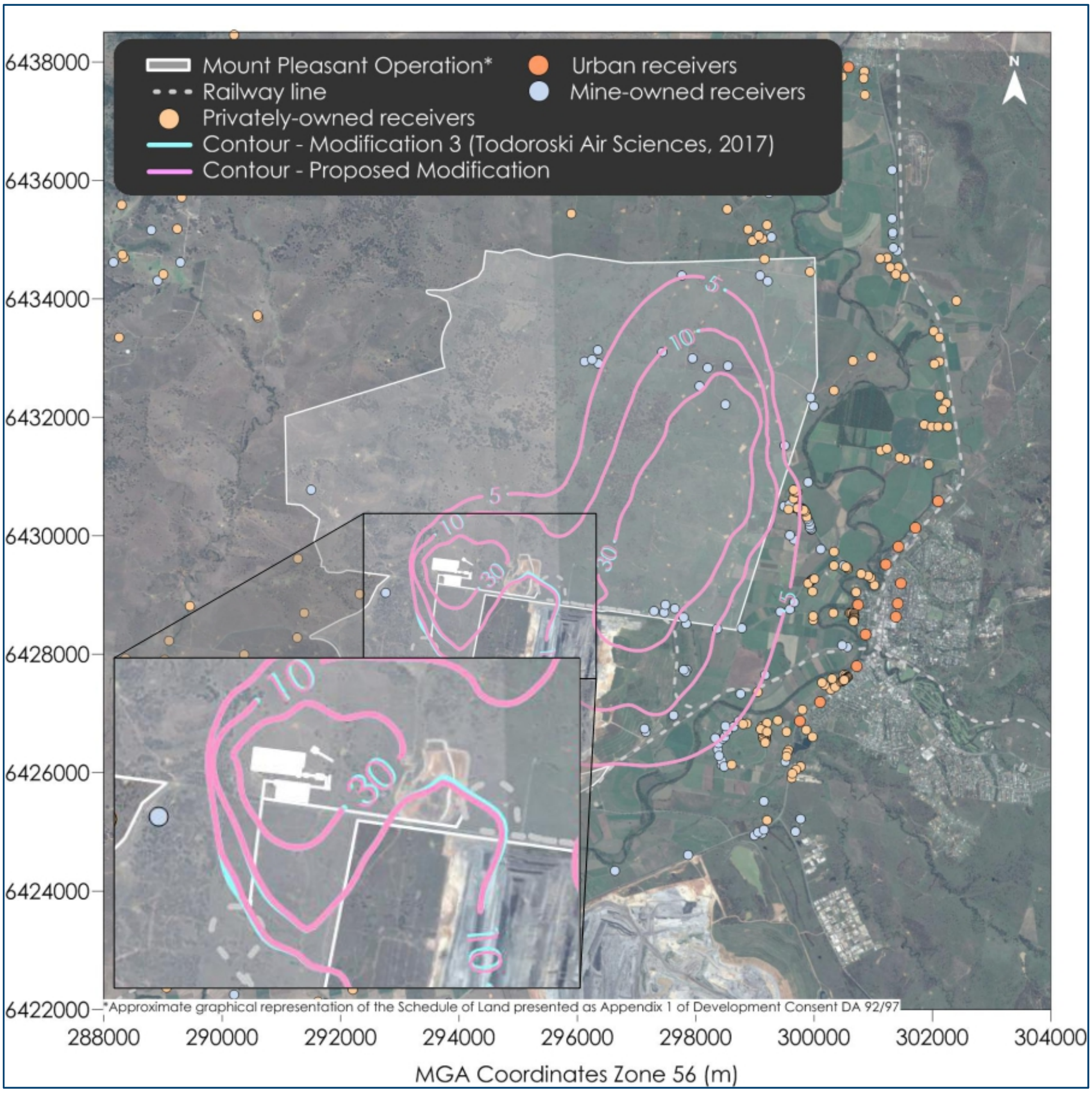

Figure 5: Comparison of predicted incremental annual average PM_{10} concentrations for the Modification and Modification 3 in Scenario 2 (µg/m³)

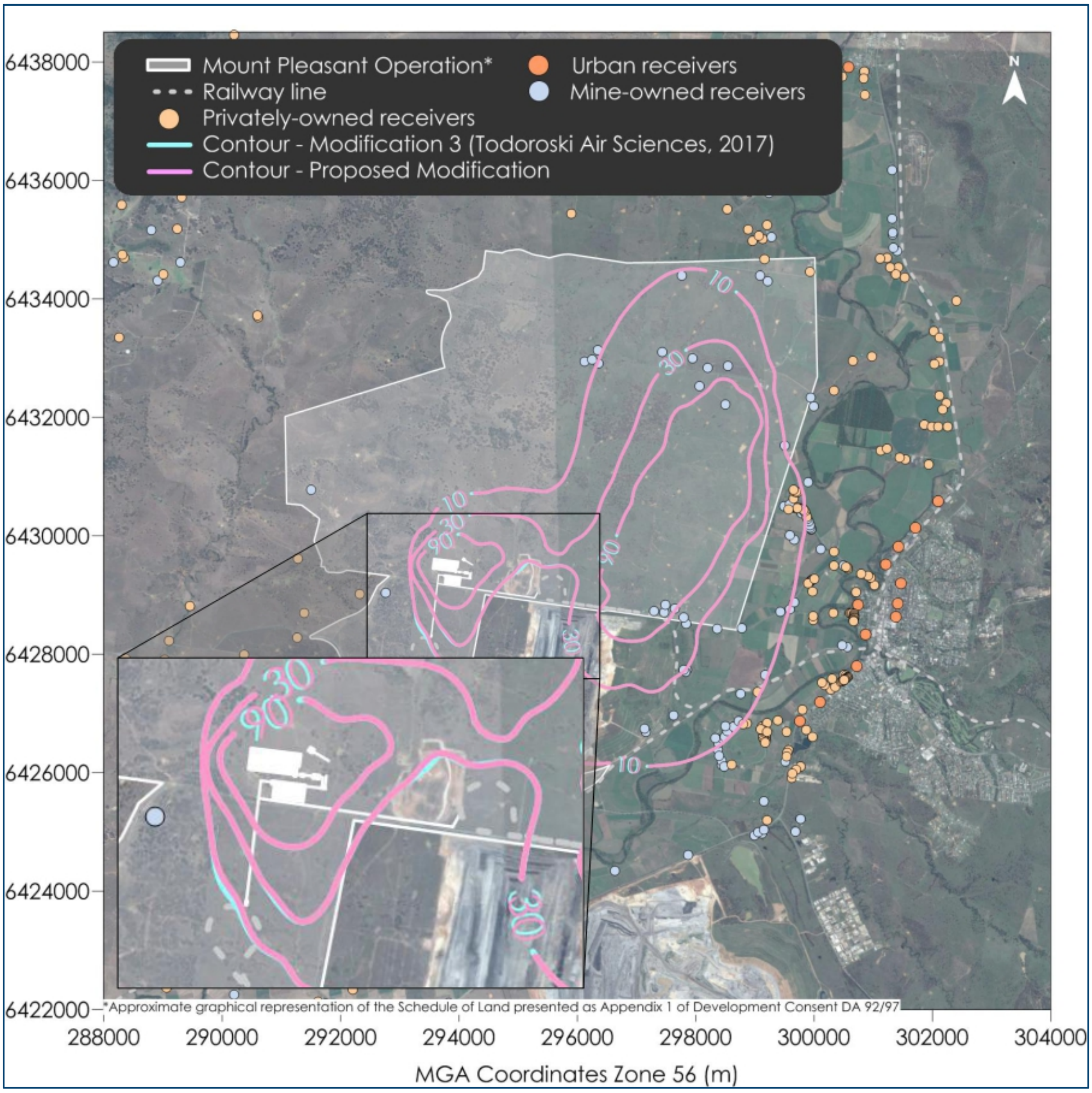

Figure 6: Comparison of predicted incremental annual average TSP concentrations for the Modification and Modification 3 in Scenario 2 (µg/m³)

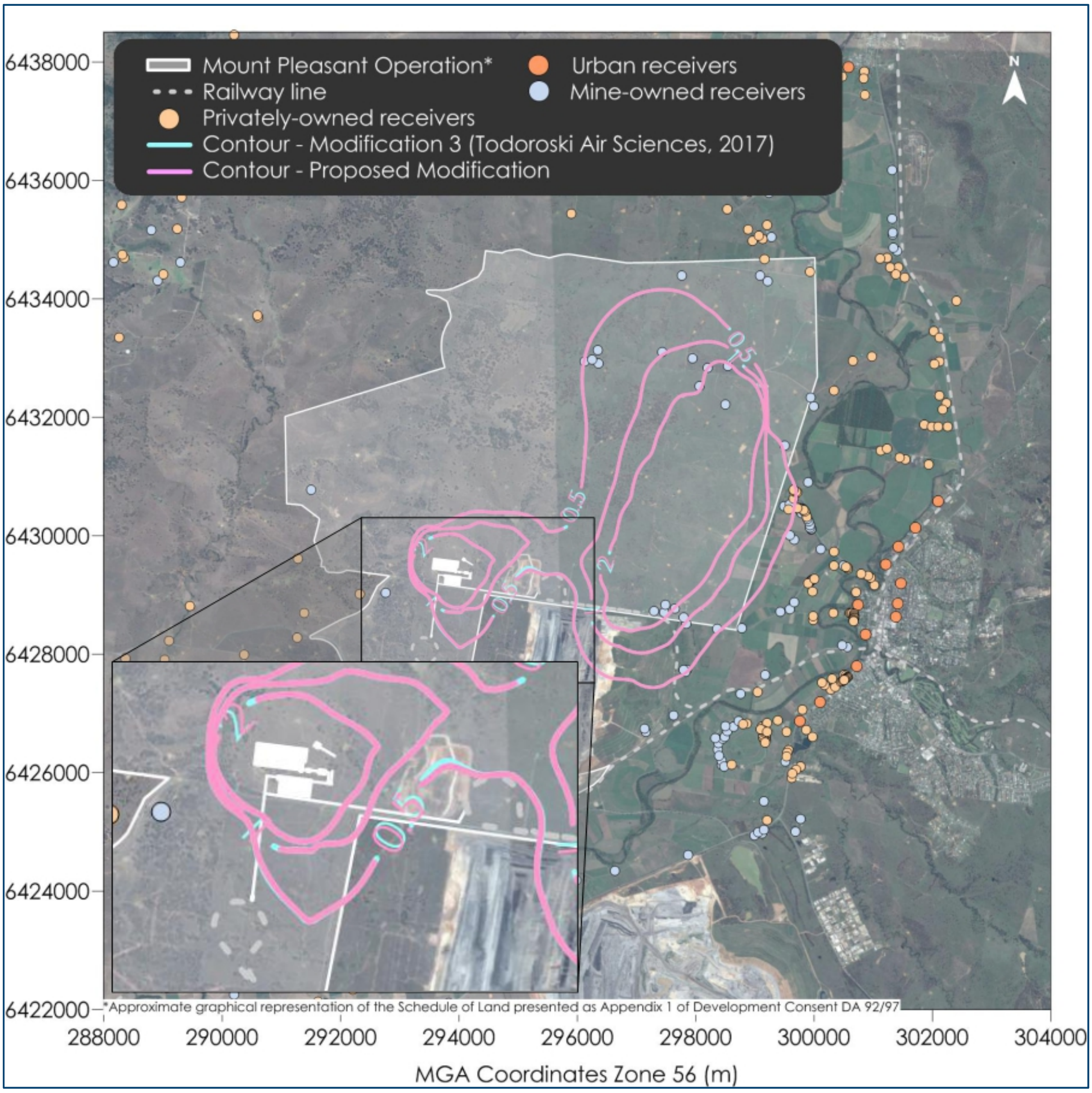

Figure 7: Comparison of predicted incremental annual average dust deposition levels for the Modification and Modification 3 in Scenario 2 (g/m^2/month)

Summary and Conclusions

The activities associated with the Modification are predicted to generate less than one tenth of one per cent more dust relative to Modification 3. This change is well within the modelling accuracy and the range of daily or annual variation that naturally occurs in background dust levels.

Direct modelling of the Modification was conducted and compared with the predicted levels for the same scenario modelled in Modification 3 (**Todoroski Air Sciences, 2017**).

The comparison shows that the Modification would not significantly change the dust levels at any off-site receptor. The cumulative levels, including background levels and the emissions from all other mines, would also show no discernible change. No additional privately-owned receptor locations are predicted to exceed any of the relevant air quality criteria as a result of the Modification.

Potential construction emissions associated with the Modification would be temporary in nature during the construction period and would be effectively managed through standard mitigation measures such as minimising disturbance areas.

Consistent with the assessment of coal dust from rail transport presented in **Todoroski Air Sciences (2017)**, the potential for any adverse air quality impacts associated with coal dust generated during rail transport would be low and would not make any appreciable difference to local air quality.

It is concluded that the proposed relocation of the approved rail infrastructure will not result in any discernible additional impact above that presented in the **Todoroski Air Sciences (2017)** assessment at any receptor locations.

Please feel free to contact us if you need to discuss (or require clarification on) any aspect of this assessment.

Yours faithfully,

Todoroski Air Sciences

Aleks Todoroski

Philip Henschke

References

Todoroski Air Sciences (2017)

"Mount Pleasant Operation Mine Optimisation Modification Air Quality and Greenhouse Gas Assessment", prepared for MACH Energy Australia Pty Ltd by Todoroski Air Sciences, May 2017.