MACHEnergy

Appendix B

Air Quality and Greenhouse Gas Assessment

MOUNT PLEASANT OPERATION
MINE OPTIMISATION MODIFICATION

AIR QUALITY AND
GREENHOUSE GAS ASSESSMENT

MACH Energy Australia

26 May 2017

Job Number 16070590

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Mount Pleasant Operation
Mine Optimisation Modification

Air Quality and
Greenhouse Gas Assessment

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DOCUMENT CONTROL

Report Version	Date	Prepared by	Reviewed by
WORKING DRAFT – 001	20/02/2017	P Henschke	
DRAFT - 001	01/03/2017	P Henschke & A Todoroski	A Todoroski
DRAFT - 002	03/03/2017	P Henschke & A Todoroski	
DRAFT - 003	10/04/2017	P Henschke & A Todoroski	
DRAFT - 004	11/05/2017	P Henschke & A Todoroski	
FINAL - 001	26/05/2017	P Henschke & A Todoroski	

EXECUTIVE SUMMARY

This assessment investigates the potential air quality effects and calculates the greenhouse gas emissions that may arise as a result of the proposed modification to the Mount Pleasant Operation located near Muswellbrook in the Hunter Valley Region of New South Wales.

MACH Energy Pty Ltd seeks an extension to the permitted period of mining operations at the Mount Pleasant Operation to provide for open cut mining to 22 December 2026. This assessment is prepared in accordance with the applicable regulatory requirements and guidelines and forms part of the environmental assessment prepared for the Mine Optimisation Modification application.

The prevailing wind flows in the area surrounding the Mount Pleasant Operation are influenced by the topography of the Hunter Valley region. The ambient air quality levels that are monitored at various locations surrounding the mining operation indicate that air quality in the area is generally good and is typically below the relevant New South Wales Environment Protection Authority goals with the exception of annual average particulate matter less than 2.5 micrometres in diameter ($PM_{2.5}$) levels.

Three indicative mine plan years have been assessed for the proposed modification and represent a range of potential likely worst-case air quality impacts over the life of the mining operation. The mine plan years were selected with reference to the location of activities and intensity of operations which would likely contribute to the highest dust levels at sensitive receptor locations in each year. Air dispersion modelling with the CALPUFF modelling suite is utilised in conjunction with estimated emission rates for the air pollutants generated by the various mining activities, including diesel plant.

The assessment predicts potential dust impacts are likely to occur at a number of privately-owned receptor locations due to the assessed 24-hour and annual average particulate matter less than 10 micrometres in diameter (PM_{10}) impacts. Overall, the predicted dust levels associated with the Mount Pleasant Operation incorporating the Mine Optimisation Modification would be less than the approved Mount Pleasant Operation.

The proposed modification is not seeking any change to rail movements, and the potential for any adverse air quality impacts associated with coal dust generated during rail transport is low; there would not be any change in air quality associated with this activity to what is already approved.

Air quality impacts associated with blasting at the Mount Pleasant Operation would be managed to minimise the risk of any impacts arising. Continual adjustments would be made to account for the progression of the mine position over time, and advancements in the available technology.

The nitrogen dioxide emissions generated from diesel powered equipment are not predicted to result in any adverse air quality impacts, consistent with the low ambient levels measured in the environment.

Using the conservative upper limit of the assumed maximum production throughout the life of the Mine Optimisation Modification (up to 2026), the estimated annual average greenhouse emission is 0.22 million tonnes of carbon dioxide equivalent material (Scope 1 and 2), which is calculated to be approximately 0.04 per cent of the Australian greenhouse emissions and approximately 0.17 per cent of the New South Wales greenhouse emissions for the 2014 period.

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1 INTRODUCTION

Todoroski Air Sciences has prepared this report for MACH Energy Australia Pty Ltd (hereafter referred to as the Proponent). It provides an assessment of the potential air quality impacts and greenhouse gas emissions associated with a proposed modification to the approved Mount Pleasant Operation.

1.1 Overview of the Mount Pleasant Operation

The Proponent acquired the Mount Pleasant Operation from Coal & Allied Operations Pty Ltd (Coal & Allied) on 4 August 2016.

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

The Mount Pleasant Operation will operate in accordance with Development Consent DA 92/97, granted by the (then) NSW Minister for Urban Affairs and Planning on 22 December 1999. When Development Consent DA 92/97 was granted in 1999, the mine was permitted to carry out mining operations for a period of 21 years (until 22 December 2020).

Development Consent DA 92/97 was subsequently modified by Coal & Allied in 2011, at which time various Consent Conditions were updated. However, the Consented time limit on mining operations (Condition 5, Schedule 2) was not updated to reflect the fact that mining had not commenced at that time.

A further very minor modification to Development Consent DA 92/97 (i.e. to relocate the South Pit Haul Road only) was proposed by the Proponent and subsequently approved in March 2017.

The Mount Pleasant Operation was also approved under the *Environment Protection and Biodiversity Conservation Act, 1999* in 2012 (EPBC 2011/5795).

The Proponent recommenced the construction of the Mount Pleasant Operation in November 2016 and will commence overburden and ROM coal mining operations in 2017, in accordance with Development Consent DA 92/97 and EPBC 2011/5795.

1.2 Overview of the Modification

The Mine Optimisation Modification (the Modification) would primarily comprise:

- An extension to the permitted period of mining operations at the Mount Pleasant Operation to provide for open cut mining to 22 December 2026.
- Extensions to the Eastern Out of Pit Emplacement 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 incorporates additional waste rock capacity.

The proposed extension to the Eastern Out of Pit Emplacement would enable the Proponent to avoid the need to emplace waste rock material in the approved South West Out of Pit Emplacement.

The Modification also involves some additional improvements to the final landform to be consistent with the Proponent's intended truck and excavator mining methodology (as opposed to Coal & Allied's intended combination of truck, excavator and dragline operations) and associated minor adjustments to the development sequence of the mine.

The Modification would not increase the approved annual maximum ROM coal and waste rock production rates.

1.3 Assessment of the Modification

This assessment investigates the potential scale of any changes in air quality that may be expected to arise due to the Modification, evaluates whether the resulting air quality levels would be acceptable by comparison with the applicable criteria, and specifically considers compliance with the current, more stringent Environment Protection Authority (EPA) criteria that was imposed in January 2017. The assessment also provides an estimate of the potential greenhouse gas emissions generated due to the Mount Pleasant Operation incorporating the Modification.

Three operational scenarios are assessed in detail by using an air dispersion model to determine the potential air quality impacts. The air dispersion modelling considers the proposed dust mitigation and management measures to demonstrate whether the Mount Pleasant Operation incorporating the Modification can operate in accordance with the existing Mount Pleasant Operation Development Consent conditions and Environmental Protection Licence (EPL 20850).

The modelling conducted is generally consistent with the most recent modelling for the Mount Pleasant Operation, however where relevant, the methodology was updated to consider the more recent and more comprehensive weather and dust monitoring data that has become available, to incorporate updated inventories for particulate matter ≤2.5 micrometres in diameter ($PM_{2.5}$) emissions, and to consider the changes in nearby projects.

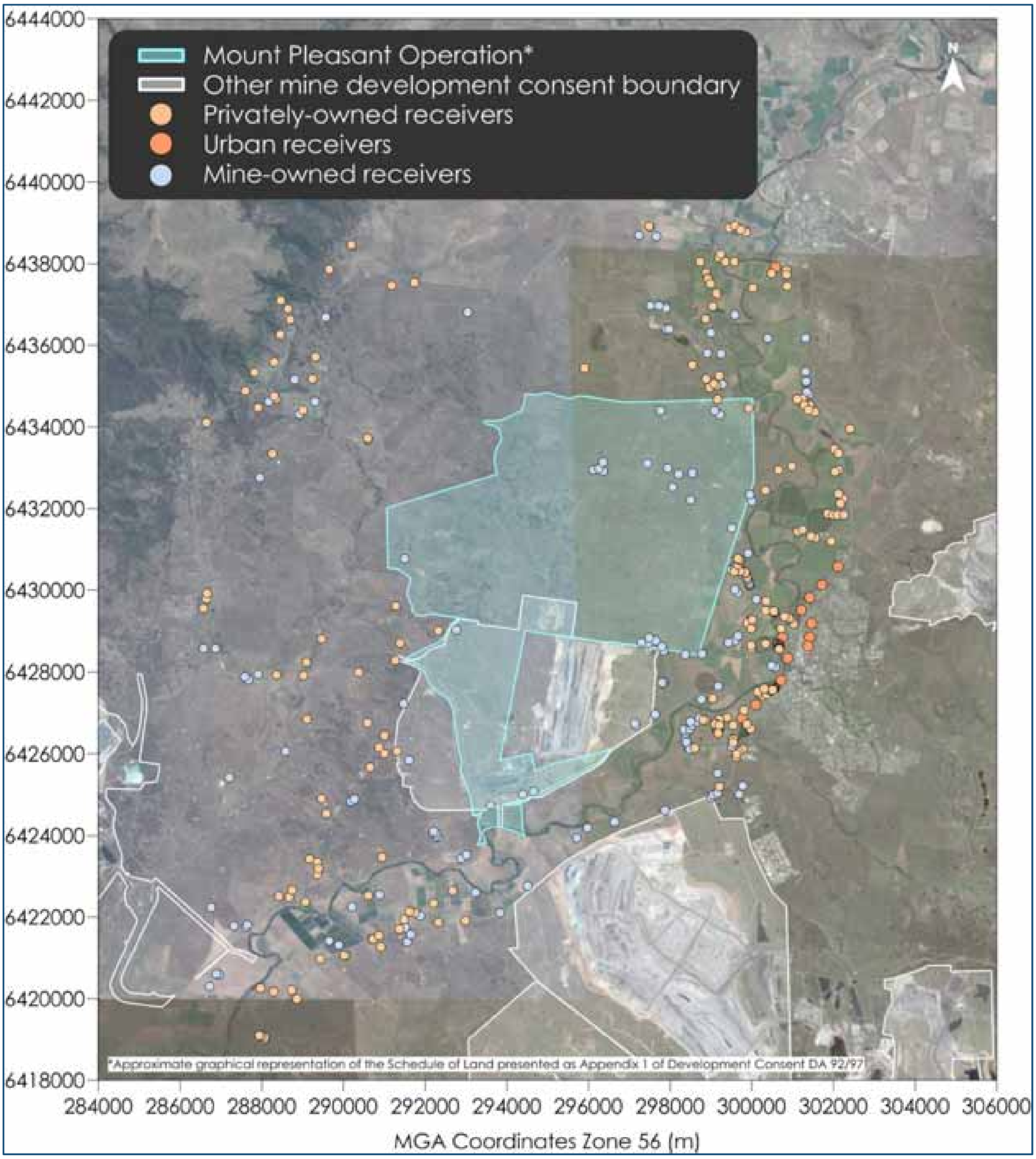
The potential greenhouse gas emissions generated by the Mount Pleasant Operation incorporating the Modification are estimated on the basis of the projected consumables for the mine and are compared with greenhouse gas emission estimates at a state and national level.

2 LOCAL SETTING

The general area surrounding the Mount Pleasant Operation is comprised of various open cut coal mining operations, agricultural land, rural residential areas and the townships of Muswellbrook to the south-east and Aberdeen to the north-east.

Figure 2-1 presents the location of the Mount Pleasant Operation in relation to the neighbouring coal mining operations and the identified privately-owned and mine-owned receivers of relevance to this study. **Appendix A** provides a detailed list of all the privately-owned and mine-owned receivers considered in this assessment. A number of additional receptors have also been included in the assessment to generally represent the most proximal areas of the townships of Muswellbrook and Aberdeen.

Figure 2-2 presents a three-dimensional visualisation of the topography in the vicinity of the Modification. The surrounding topography is characterised by the mountainous region of the Barrington Tops to the east and the open Hunter Valley region to the south-east. The Hunter River and associated floodplain separates the Mount Pleasant Operation to the east from Muswellbrook as it travels north to south along the boundary. Steep escarpments and defined valleys are characteristic features of the topography to the west and south. The terrain features of the surrounding area have a significant effect on the local wind distribution patterns and flows, as discussed further in **Section 4.1**.



Note: m = metres

Figure 2-1: Local setting for the Modification

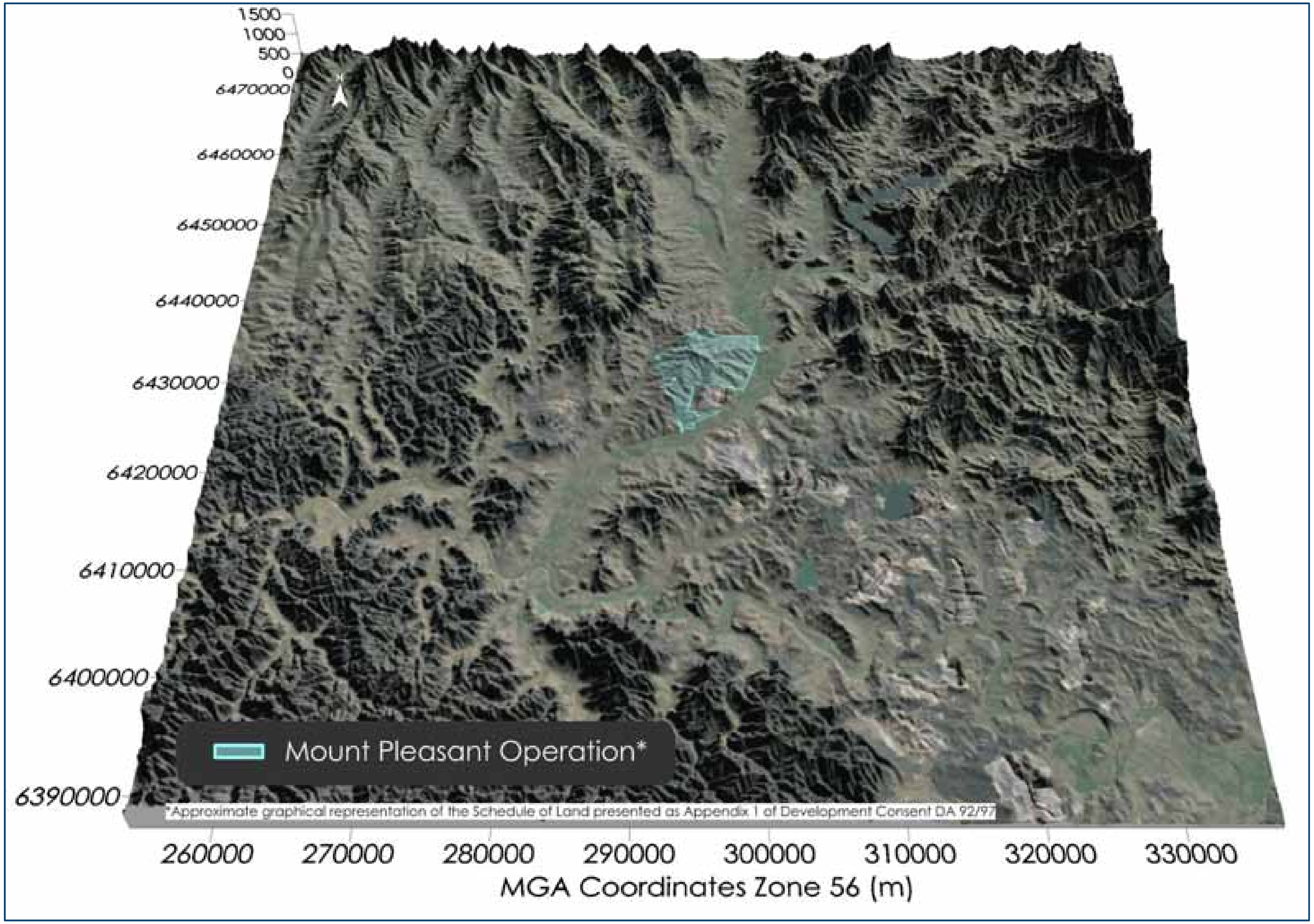


Figure 2-2: Topography surrounding the Modification

3 AIR QUALITY ASSESSMENT CRITERIA

Air quality criteria are benchmarks set to protect the general health and amenity of the community in relation to air quality. The sections below identify the applicable air quality criteria for the Mount Pleasant Operation incorporating the Modification and the applicable air quality criteria.

3.1 Development Consent limits

A summary of the applicable air quality criteria for the Mount Pleasant Operation as outlined in Development Consent DA 92/97 is presented in **Table 3-1**. The air quality criteria apply to any residence on privately-owned land or on more than 25 per cent of any privately-owned land.

Table 3-1: Summary of applicable air quality criteria

Pollutant	Averaging period	Impact assessment	
		Criterion	Basis [a,b]
Total suspended particulates (TSP) [c]	Annual	90µg/m³	Total
Particulate matter ≤10µm (PM_{10}) [c]	Annual	30µg/m³	Total
	24-hour	50µg/m³	Incremental
Deposited dust [d]	Annual	2g/m²/month	Incremental
		4g/m²/month	Total

Notes:

a. *Total impact - Incremental increase in concentrations due to the development plus background concentrations due to all other sources.*

b. *Incremental impact - Incremental increase in concentrations due to the development on its own.*

c. *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Director-General.*

d. *Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003 methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.*

µg/m³ = micrograms per cubic metre, µm = micrometres and g/m²/month = grams per square metres per month.

3.2 EPL conditions

Air quality criteria and other air quality related conditions stipulated in EPL 20850 are generally consistent with those prescribed in Development Consent DA 92/97, with the exception of Conditions O3.4 to O3.8, which state:

O3 Dust

O3.4 The licensee must cease all dust generating activities during adverse conditions being the occurrence of both the adverse wind conditions set out in Condition O3.5 (b) and the adverse PM_{10} concentrations set out in Condition O3.5(c).

O3.5 For the purpose of Condition O3.4 the following definitions apply.

(a) 'dust generating activities' means drilling, blasting, earthworks, construction activities, all hauling activities on unsealed haul roads, all overburden and coal extraction operations including loading and dumping activities and grader, loader, dozer and dragline operations.

(b) 'adverse wind conditions' means a rolling 1-hour average wind direction between 270 degrees and 360 degrees (inclusive) measured at the meteorological station (EPA Identification No.4). Australian Standard AS3580.14-2014 is to be used to calculate the rolling 1 hour average wind direction

(c) 'adverse PM_{10} concentrations' means a rolling 24-hour average PM_{10} concentration of equal to or greater than 44 micrograms per cubic metre measured at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network monitor.

(d) Operation of watercarts is permitted at all times.

O3.6 Shutdown of dust generating activities required by Condition O3.4 must be completed within 1 hour of receiving data that triggers action required by Condition O3.4.

O3.7 The licensee may resume dust generating activities at the premises when:

(a) adverse wind conditions as defined in Condition O3.5(b); or

(b) adverse PM_{10} concentrations as defined in Condition O3.5(c)

are not measured for a minimum time period of 1 hour from the time that cessation of dust generation activities is completed.

O3.8 The licensee must cease dust generating activities at the premises at any time when there is no access to the meteorological monitoring data required by Condition M5.1 and / or when there is no access to the PM10 monitoring data at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network monitor.

Note: An alternate PM10 monitor location and associated trigger value is to be negotiated with the EPA. This alternate monitor and PM10 trigger value is to be used for Condition O3.5(c), in the event that there is no access to the PM10 monitoring data at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network.

3.3 NSW EPA impact assessment criteria

Table 3-2 summarises the air quality goals that are relevant to this assessment as outlined in the NSW EPA document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA, 2017**).

The air quality goals for total impact relate to the total dust burden in the air and not just the dust from the Mount Pleasant Operation incorporating the Modification. Consideration of background dust levels needs to be made when using these goals to assess potential impacts.

Table 3-2: NSW EPA air quality impact assessment criteria

Pollutant	Averaging period	Impact	Criterion
TSP	Annual	Total	90µg/m^3
PM_{10}	Annual	Total	25µg/m^3
	24 hour	Total	50µg/m^3
$PM_{2.5}$	Annual	Total	8µg/m^3
	24 hour	Total	25µg/m^3
Deposited dust	Annual	Incremental	2g/m^2/month
		Total	4g/m^2/month
Nitrogen dioxide (NO_2)	1 hour	Total	246µg/m^3
	Annual	Total	62µg/m^3

Source: NSW EPA, 2017

The *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA, 2017**) was gazetted on 20 January 2017, and updates the criteria set out in the former August 2005 Approved Methods. The updates relate to inclusion of $PM_{2.5}$ in the impact assessment criteria and a reduction in the annual average PM_{10} level from 30µg/m³ to 25µg/m³.

Please note that these updates are not reflected in the Development Consent and EPL conditions for the Mount Pleasant Operation (or any other project in the vicinity) and therefore are not used to evaluate compliance for the existing operations.

3.4 NSW Voluntary Land Acquisition and Mitigation Policy (VLAMP)

Part of the NSW VLAMP dated 15 December 2014 and gazetted on 19 December 2014 describes the NSW Government's policy for voluntary mitigation and land acquisition to address particulate matter impacts from state significant mining, petroleum and extractive industry developments.

Voluntary mitigation rights may apply per the VLAMP where, even with best practice management, the development contributes to exceedances of the criteria in **Table 3-3** at any residence or workplace. [1]

Table 3-3: Particulate matter mitigation criteria

Pollutant	Averaging period	Mitigation criterion		Impact type
PM_{10}	Annual	30µg/m³*		Human health
PM_{10}	24 hour	50µg/m³**		Human health
TSP	Annual	90µg/m³*		Amenity
Deposited dust	Annual	2g/m²/month**	4g/m²/month*	Amenity

Source: NSW Government (2014)

*Cumulative impact (i.e. increase in concentration due to the development plus background concentrations due to all other sources).

**Incremental impact (i.e. increase in concentrations due to the development alone), with zero allowable exceedances of the criteria.

Voluntary acquisition rights may apply per the VLAMP where, even with best practice management, the development contributes to exceedances of the criteria in **Table 3-4** at any residence, workplace or on more than 25 per cent of any privately owned land where there is an existing dwelling or where a dwelling could be built under existing planning controls (vacant land).

Table 3-4: Particulate matter acquisition criteria

Pollutant	Averaging period	Acquisition criterion		Impact type
PM_{10}	Annual	30µg/m³*		Human health
PM_{10}	24-hour	50µg/m³**		Human health
TSP	Annual	90µg/m³*		Amenity
Deposited dust	Annual	2g/m²/month**	4g/m²/month*	Amenity

Source: NSW Government (2014)

*Cumulative impact (i.e. increase in concentration due to the development plus background concentrations due to all other sources).

**Incremental impact (i.e. increase in concentrations due to the development alone), with up to five allowable exceedances of the criteria over the life of the development.

[1] Where any exceedance would be unreasonably detrimental to workers health or carrying out of the business.

4 EXISTING ENVIRONMENT

This section provides only a brief summary of the existing environment. The local climate and ambient air quality in the area surrounding the Mount Pleasant Operation is described in detail in **Appendix B**.

4.1 Local meteorological conditions

Three weather stations are located in close proximity to the Mount Pleasant Operation and the data recorded at these stations have been reviewed.

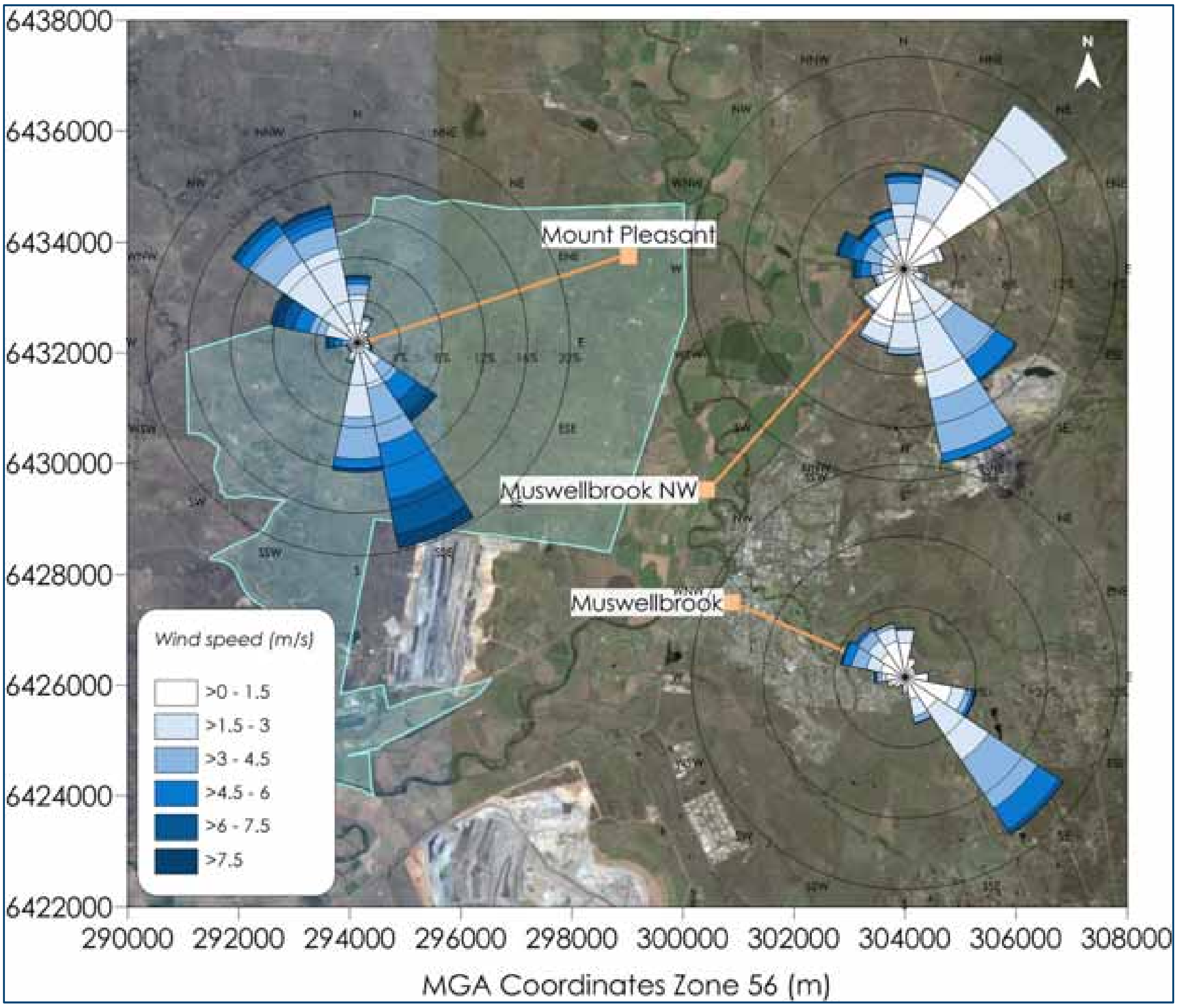
Figure 4-1 presents the locations of these stations overlaid with the annual windroses from the available data during 2015, which is typical of the data from 2012 to 2015, as presented in **Appendix B**.

It can be seen that the annual windroses for each station show similar inter-annual patterns in each year, and indicate the expected variability in the measured meteorological data due to the location of the weather station in the surrounding terrain.

For the Mount Pleasant Operation weather station, on an annual basis, winds typically flow along a north-northwest/ north-west to a south-southeast axis with very few winds arising from the north-east and south-west quadrants.

At the Muswellbrook NW weather station, winds are more varied and wind speeds are relatively lower in comparison to the Mount Pleasant Operation weather station. Winds from the south-southeast and north-east dominate the distribution. Winds from the north-east are identified as drainage flows along the Hunter River floodplain.

The Muswellbrook weather station indicates that winds are typically from south-east with fewer winds from the north-west quadrant. Very few winds occur from the north-east and south-west quadrants.



Note: m/s = metres per second

Figure 4-1: Annual windroses for 2015

4.2 Local air quality monitoring

The main sources of particulate matter in the wider area include active mining, agricultural activities, emissions from local anthropogenic activities such as motor vehicle exhaust and domestic wood heaters, urban activity and various other commercial and industrial activities including power generation associated with the Liddell, Bayswater and Redbank power stations.

This section summarises the available ambient air quality monitoring data in the local area, as detailed in **Appendix B**.

4.2.1 PM_{10} and TSP monitoring

Ambient PM_{10} and TSP monitoring data sourced from 30 stations have been reviewed. **Figure 4-2** shows the approximate location of each of the monitoring stations with reference to the Mount Pleasant Operation. The type of air quality monitors used to measure ambient PM_{10} and TSP include Tapered Element Oscillating Microbalances (TEOMs) and High Volume Air Samplers (HVAS).

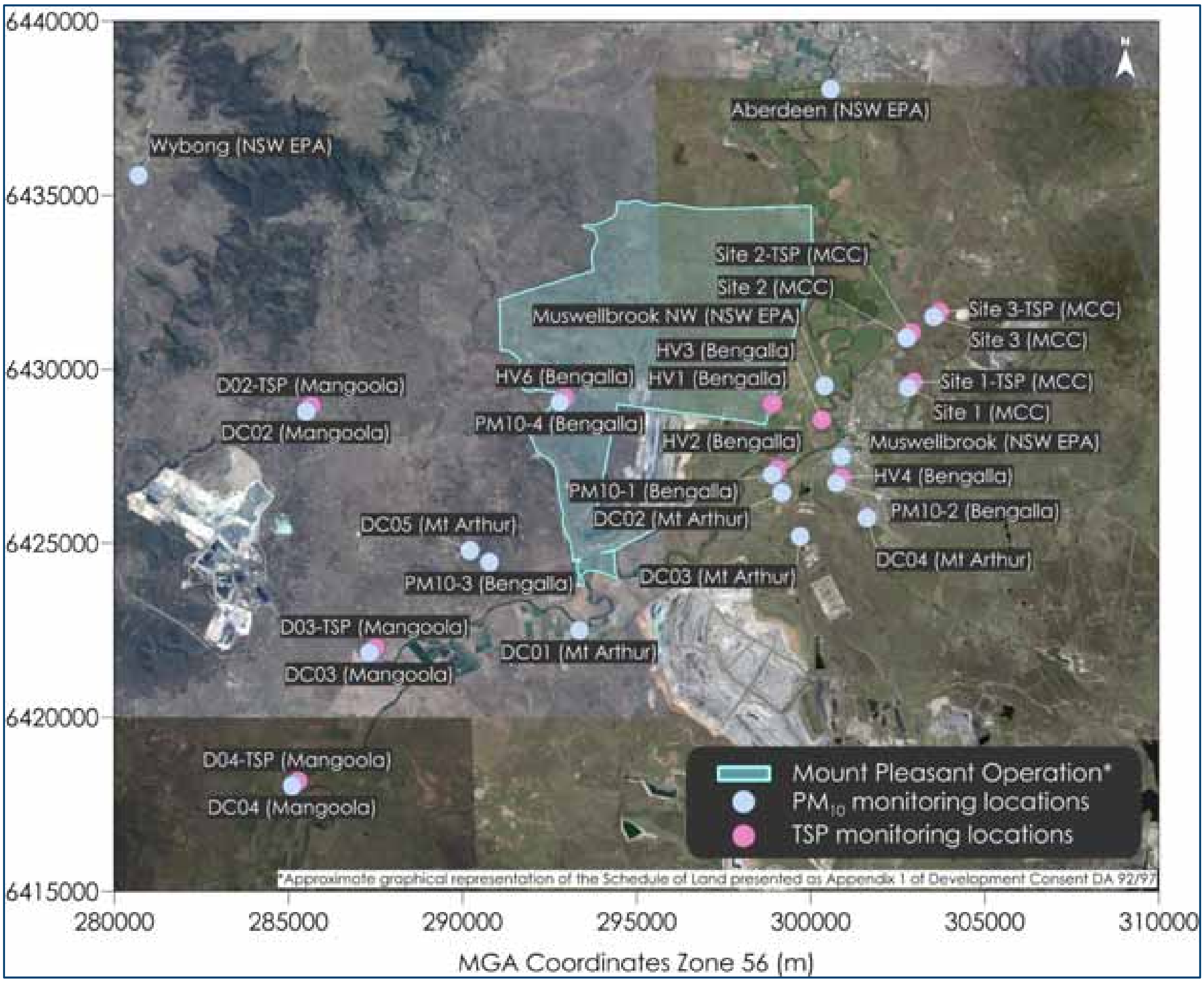


Figure 4-2: Ambient PM_{10} and TSP monitoring locations

The available PM_{10} monitoring data from the Upper Hunter air quality monitoring network (UHAQMN) monitoring stations is summarised in **Table 4-1**, and indicates that the annual average PM_{10} concentrations are below the relevant criterion of 25µg/m³. The maximum 24-hour average PM_{10} concentrations recorded at these stations exceed the relevant criterion of 50µg/m³ at times during the review period.

Table 4-1: Summary of ambient PM_{10} levels from UHAQMN (µg/m³)

Location	Annual average				Maximum 24-hour average			
	2012	2013	2014	2015	2012	2013	2014	2015
Muswellbrook NW	19.1	18.9	19.2	16.7	55.8	52.4	50.8	72.9
Muswellbrook	21.8	22.6	21.4	19.1	51.0	55.6	53.0	72.6
Aberdeen	17.0	17.3	17.9	15.2	45.8	42.7	50.4	64.8
Wybong	15.4	15.5	17.0	14.8	54.4	83.0	67.7	79.5

The recorded 24-hour average PM_{10} concentrations include the contribution from all emission sources in the vicinity, and are presented graphically in **Figure 4-3**.

The figure shows that PM_{10} concentrations are nominally highest in the spring and summer months with the warmer weather raising the potential for drier ground elevating the occurrence of windblown dust, bushfires and pollen levels.

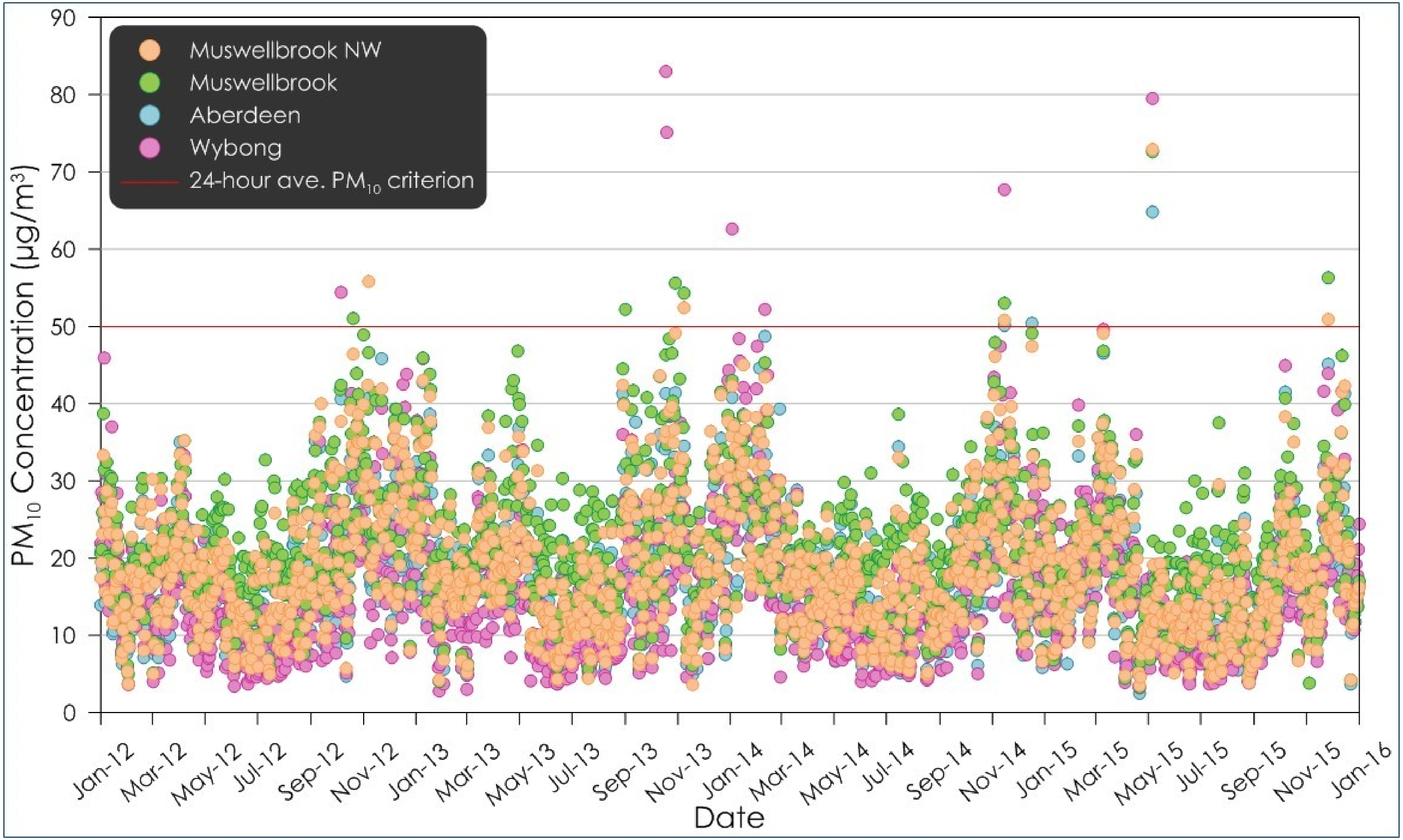


Figure 4-3: 24-hour average PM_{10} concentrations at UHAQMN monitoring stations

Appendix B outlines the annual average PM_{10} levels from monitoring stations operated by nearby mining operations, including; Mt Arthur Coal Mine, Mangoola Coal, Bengalla Mine and Muswellbrook Coal Company (MCC).

For the 2012 to 2015 period, all monitoring stations recorded levels below 25µg/m^3 with the exception of the PM10-1 station operated by Bengalla Mine which recorded a level of 26.0µg/m^3 in 2013.

The recorded annual average levels at these monitors typically show similar levels to those recorded at the UHAQMN stations for the same period. Monitoring stations located closer to mining operations generally indicate high levels of PM_{10} compared to those located further away.

Appendix B outlines the available annual average TSP levels for monitoring stations operated by nearby mining operations. For the 2012 to 2015 period, all monitoring stations recorded levels below 90µg/m^3.

4.2.2 $PM_{2.5}$ monitoring

A summary of the available $PM_{2.5}$ monitoring data from the UHAQMN Muswellbrook monitoring station is tabled in **Table 4-2**, and is presented graphically in **Figure 4-4**.

Table 4-2 indicates that the annual average $PM_{2.5}$ concentrations in Muswellbrook were above the relevant criterion of 8µg/m^3 for the periods reviewed, and that the maximum 24-hour average $PM_{2.5}$ concentrations exceeded the relevant criterion of 25µg/m^3 at times during the period reviewed.

Table 4-2: Summary of ambient $PM_{2.5}$ levels (µg/m^3)

	Annual average				Maximum 24-hour average			
	2012	2013	2014	2015	2012	2013	2014	2015
Muswellbrook	10.1	9.4	9.7	8.7	26.4	36.6	27.4	31.2

A clear seasonal trend in 24-hour average $PM_{2.5}$ concentrations can be seen in **Figure 4-4** with elevated levels occurring in the cooler months. This is opposite to the seasonal trend for PM_{10} concentrations which has elevated levels during the warmer months.

Ambient $PM_{2.5}$ levels at the Muswellbrook monitoring station would be governed by non-mining background sources such as wood heaters. The wintertime peak in $PM_{2.5}$ levels would arise due to emissions from urban wood heaters in the nearby residential areas.

$PM_{2.5}$ monitors located near mining operations (away from towns) are found to have little seasonal trend in comparison to the Muswellbrook monitoring station (**Todoroski Air Sciences, 2014**). This suggests the influence of anthropogenic sources on $PM_{2.5}$ levels is localised to the towns and does not significantly affect the areas that are sparsely populated.

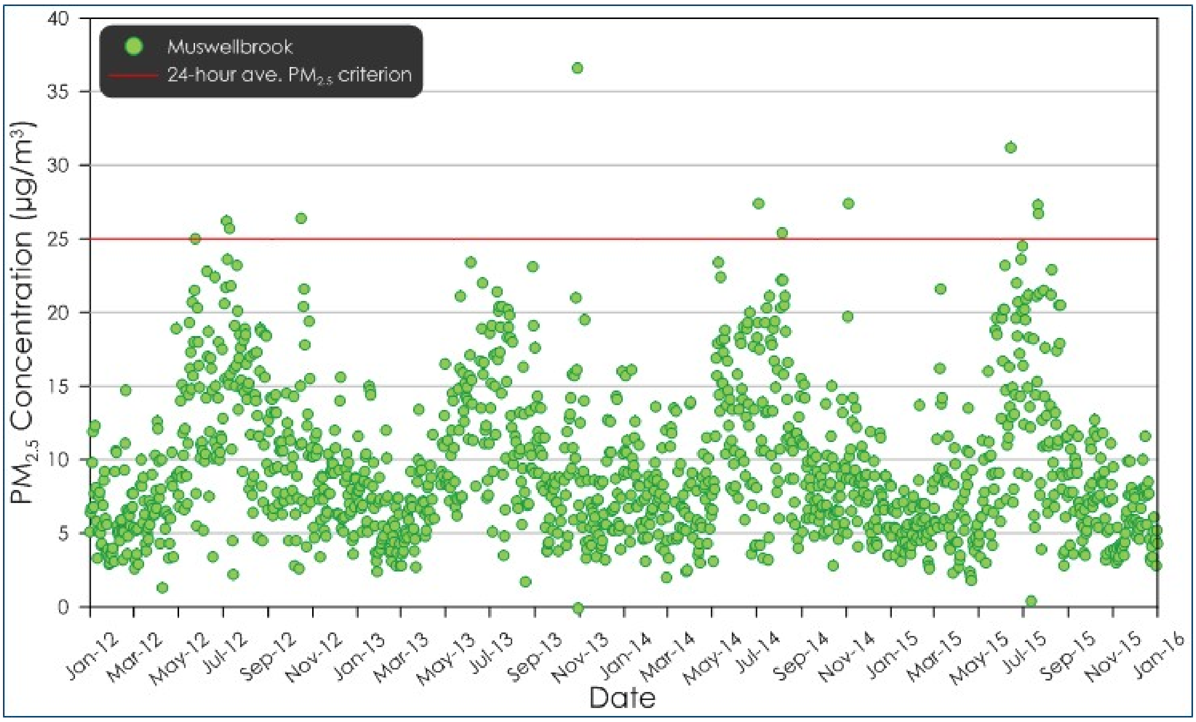


Figure 4-4: 24-hour average $PM_{2.5}$ concentrations from UHAQMN Muswellbrook monitoring station

4.2.3 Dust deposition monitoring

Dust deposition monitoring conducted by the Mount Pleasant Operation, Bengalla Mine, Mangoola Coal and MCC have been reviewed. The monitoring data is interpolated graphically as presented in **Appendix B**, and indicates that dust deposition levels are typically highest near mining activity.

4.2.4 Nitrogen dioxide monitoring

NO_2 monitoring is conducted at the UHAQMN Muswellbrook monitoring station. The monitoring data is graphically presented in **Appendix B**, and indicates that NO_2 are relatively low compared to the criterion level.

5 DISPERSION MODELLING APPROACH

The dispersion modelling approach applies the CALPUFF modelling suite, as per previous assessments for the Mount Pleasant Operation and similar recent projects conducted by Todoroski Air Sciences. The approach used is described in detail in **Appendix C**, and is only summarised in this section.

The CALPUFF modelling suite was used for the dispersion modelling. The model was setup in general accordance with methods provided in the NSW EPA document *Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia'* (**TRC Environmental Corporation**, **2011**).

5.1 Meteorological modelling

The meteorological modelling methodology applied a 'hybrid' approach which includes a combination of prognostic model data from The Air Pollution Model (TAPM) with surface observations. TAPM was applied to generate prognostic upper air data for use in CALMET, as detailed in **Appendix C**.

The 2015 calendar year is selected as the period for modelling the Modification.

5.2 Meteorological modelling evaluation

The outputs of the CALMET modelling was evaluated using visual analysis of the wind fields and extracted data and also through a statistical evaluation.

Figure 5-1 presents a visualisation of the wind field generated by CALMET for a single hour of the modelling period. The wind fields follow the terrain well and indicate that the modelling simulation produces realistic fine scale flow fields (such as terrain forced flows) in the surrounding areas.

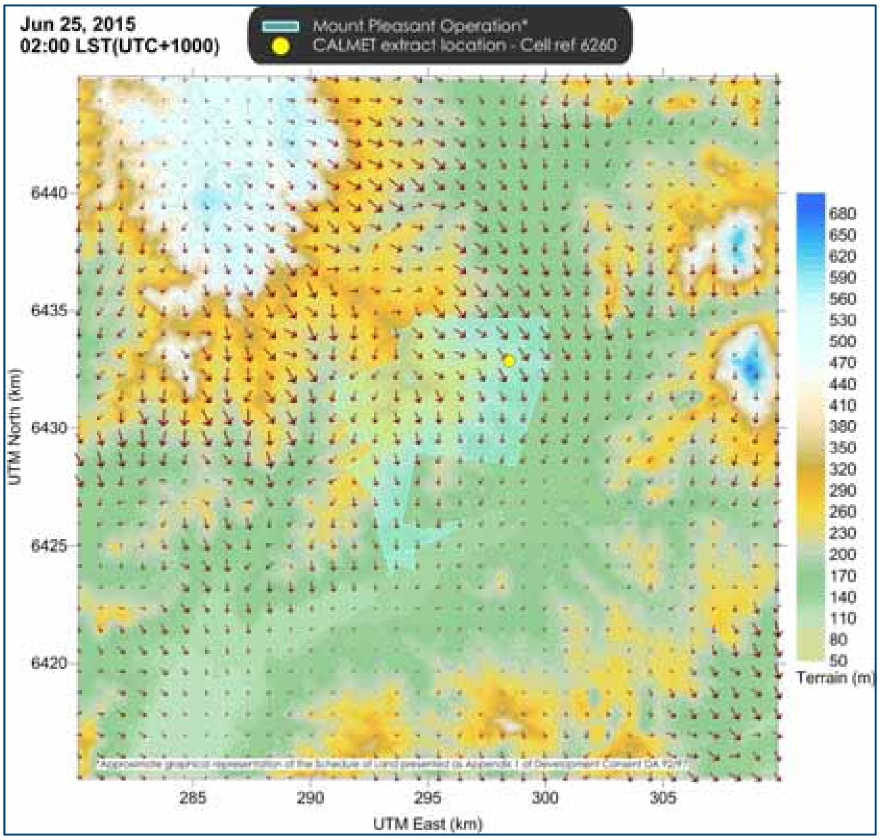


Figure 5-1: Example of the wind field for one of the 8,760 hours of the year that are modelled

CALMET generated meteorological data were extracted at a location within the CALMET domain and are analysed in **Appendix C.**

Overall the windroses generated in the CALMET modelling reflect the expected wind distribution patterns of the area as determined based on the available measured data and the expected terrain effects on the prevailing winds. This is evident as the windroses based on the CALMET data also compare well with the windroses generated with the measured data, as presented in **Appendix C.**

The statistical evaluation of the data is also presented in **Appendix C** and shows that the data exhibit all of the expected traits commensurate with valid modelling results, suitable to represent the meteorology in the locality.

5.3 Dispersion modelling

CALPUFF modelling is based on the distribution of particles for each particle size category derived from the applied emission factor equations. Emissions from each activity were represented by a series of volume sources and were included in the CALPUFF model via an hourly varying emission file. Meteorological conditions associated with dust generation (such as wind speed) and levels of dust generating activity were considered in calculating the hourly varying emission rate for each source.

5.4 Modelling scenarios

The assessment considers three indicative mine plan years (scenarios) to represent the Mount Pleasant Operation incorporating the Modification. The scenarios were chosen to represent potential worst-case impacts in regard to the quantity of material extracted and handled in each year, the location of the activity and the potential to generate dust at the sensitive receptor locations.

Mining operations would consist of a drill and blast, truck and shovel operation to remove overburden material and extract the coal resources. Mining activity would commence in the south-east corner of the site and progress to the north and the west away from Muswellbrook. Overburden emplacement would typically occur behind the progression of the mine extraction with rehabilitation of emplacement areas progressing as they are completed. The active mining areas and exposed areas are to be kept to a minimum for the efficiency of the operation and this also has a positive effect in minimising the potential amount of dust levels generated from the operations.

The three scenarios nominally represent when the mining activity is closest to Muswellbrook (Scenario 1 - approximately Year 2018), when the activity reaches its peak for the Modification (Scenario 2 -approximately Year 2021) and when activity is at a peak level and the active pit has reached its full extent within the Modification period (Scenario 3 - approximately Year 2025).

Indicative mine plans for each of the respective scenarios are presented in **Figure 5-2** to **Figure 5-4**.

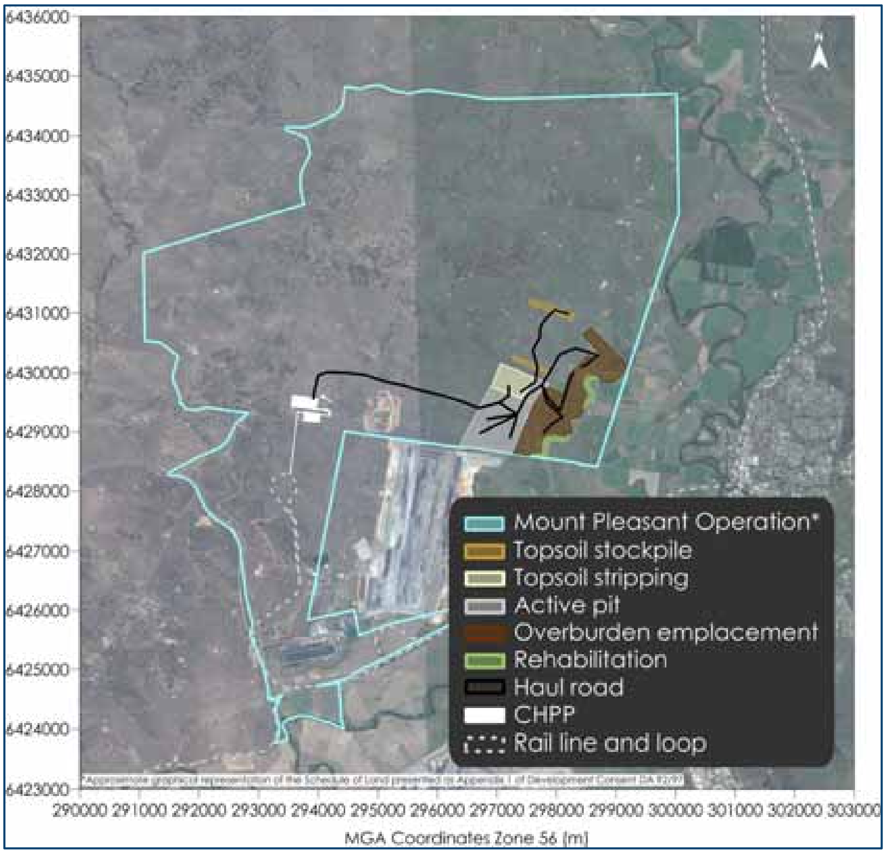


Figure 5-2: Indicative mine plan for Scenario 1

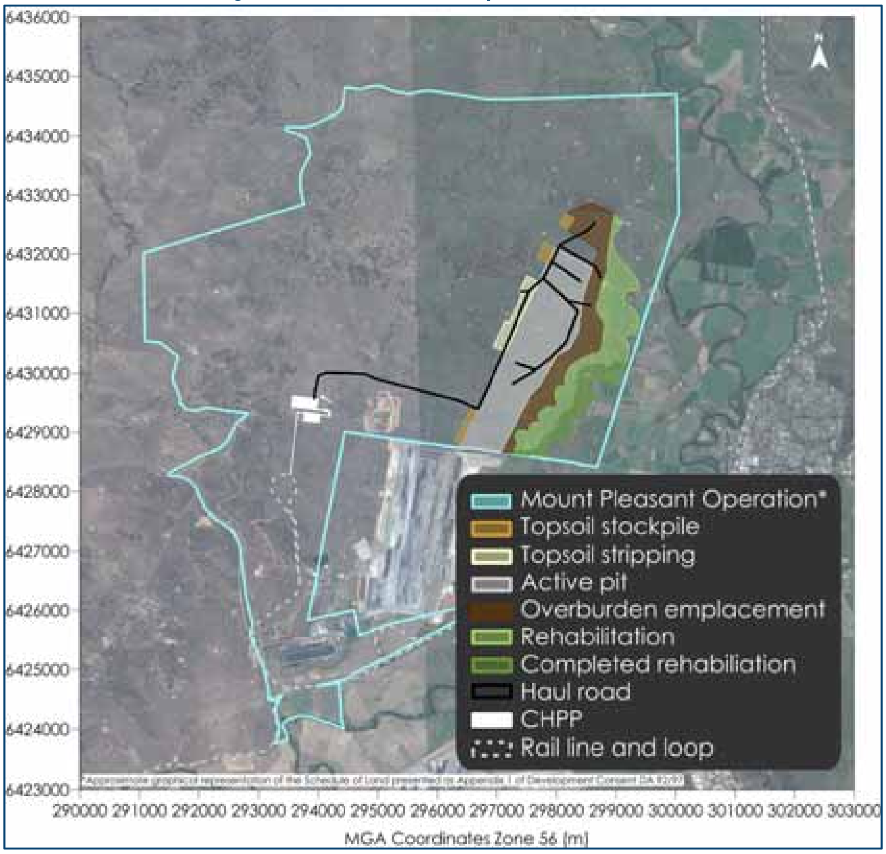


Figure 5-3: Indicative mine plan for Scenario 2

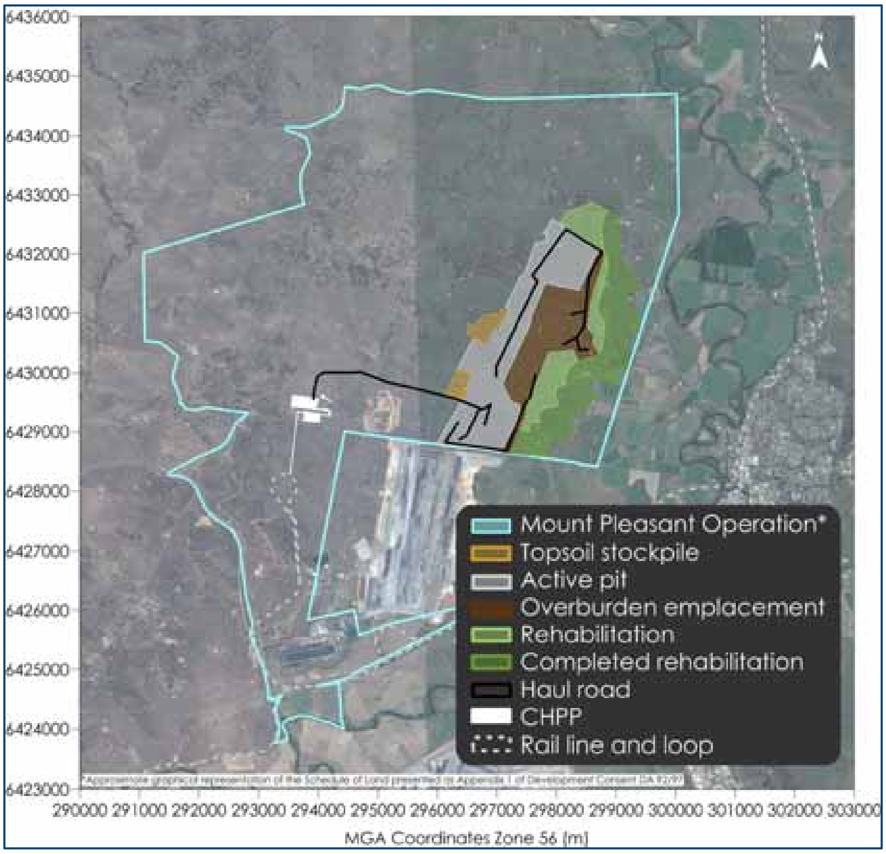


Figure 5-4: Indicative mine plan for Scenario 3

5.4.1 Approved haul route to Coal Handling and Preparation Plant (CHPP)

During the air dispersion modelling phase of this assessment, the Proponent was granted approval for a separate modification application that sought to optimise the alignment of the haul road from the active pit area to the CHPP. The newly approved haul road (assessed in the separate modification) is shown in **Figure 5-5** with the indicative mine plan for Scenario 2.

Comparing **Figure 5-5** with the modelled mine plan in **Figure 5-3** it can be seen that the modelled haul route is further south than the newly approved haul route.

The approved haul route is also shorter which would reduce dust emissions generated by hauling activities. The potential reduction in dust emissions is set out in **Table 5-1** which presents an emissions inventory for Scenario 2 both with and without the newly approved haul road. The activities where reductions in dust emissions would occur are shaded in orange, and show that the approved haul route would result in a reduction in the total estimated dust emission of approximately 0.4 percent (%).

As a conservative measure, the dispersion modelling for the Mount Pleasant Operation incorporating the Modification is based on the original haul route option.

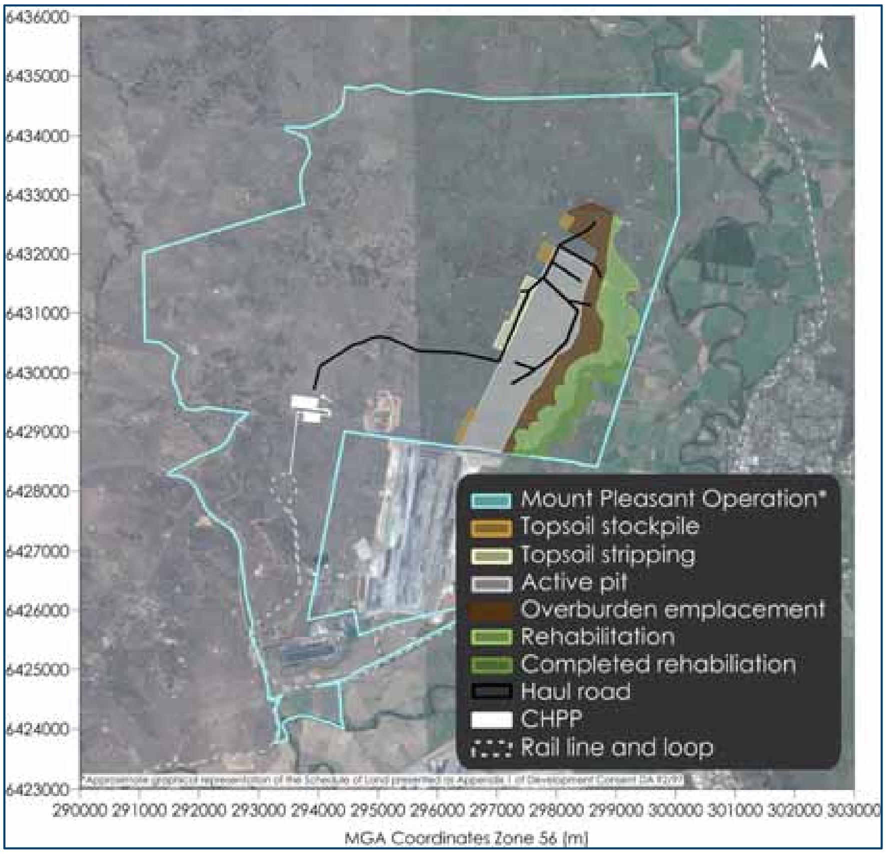


Figure 5-5: Indicative mine plan for Scenario 2 showing Approved CHPP haul road

5.4.2 Emission estimation

For each of the chosen modelling scenarios, emission estimates have been calculated by analysing the various types of dust generating activities taking place and utilising suitable emission factors.

The emission factors were sourced from both locally developed and United States Environmental Protection Agency (US EPA) developed documentation. Total TSP emissions from all significant activities for the Mount Pleasant Operation incorporating the Modification are presented in **Table 5-1**. Estimated $PM_{2.5}$ emissions from diesel powered equipment are presented in **Table 5-2**. Full emission inventories for TSP, PM_{10} and $PM_{2.5}$ and associated calculations are presented in **Appendix D**.

The estimated emissions presented in **Table 5-1** are commensurate with a mining operation utilising reasonable and feasible best practice dust mitigation applied where applicable. Further details on the dust control measures applied for the Mount Pleasant Operation incorporating the Modification are outlined in **Section 5.5**.

It is also noted that the estimated emissions presented in **Table 5-1** are significantly less than (i.e. less than a third of) the total emissions assessed for the approved Mount Pleasant Operation (**PAEHolmes, 2010**). These reductions are due to changes in the mine plan, as well as improvements to emission controls.

Table 5-1: Estimated emission for the Mount Pleasant Operation incorporating the Modification (kg of TSP)

Activity	Scenario 1	Scenario 2	Scenario 2*	Scenario 3
OB - Topsoil removal with dozer	11,690	18,234	18,234	-
OB - Excavator loading topsoil to haul truck	244	249	249	-
OB - Hauling topsoil to dump	1,758	2,065	2,065	-
OB - Emplacing topsoil at dump	244	249	249	-
OB - Drilling overburden	10,764	14,028	14,028	14,028
OB - Blasting overburden	43,790	136,831	136,831	136,831
OB - Excavator loading OB to haul truck	52,916	105,496	105,496	96,059
OB - Hauling to dump (Day period)	280,292	359,163	359,163	715,824
OB - Hauling to dump (Evening/ night period)	276,423	310,066	310,066	740,355
OB - Emplacing at dump	52,916	105,496	105,496	96,059
OB - Rehandle OB	5,292	10,550	10,550	9,606
OB - Dozers on OB in pit	87,674	173,225	173,225	218,811
OB - Dozers on OB working on dump	87,674	173,225	173,225	218,811
CL - Dozers ripping/pushing/clean-up	52,713	82,223	82,223	82,223
CL - Loading ROM coal to haul truck	168,602	436,040	436,040	436,040
CL - Hauling ROM to hopper - CHPP	60,408	273,886	264,198	126,983
CHPP - Unloading ROM to hopper	25,290	65,406	65,406	65,406
CHPP - Rehandle ROM at hopper	33,720	87,208	87,208	87,208
CHPP - Primary crushing	10,962	28,350	28,350	28,350
CHPP - Transfer	297	768	768	768
CHPP - Conveying to secondary crusher	6	6	6	6
CHPP - Secondary crushing	10,962	28,350	28,350	28,350
CHPP - Tertiary crushing	10,962	28,350	28,350	28,350
CHPP - Transfer	297	768	768	768
CHPP - Conveying to 1000t bin	9	9	9	9
CHPP - Transfer	297	768	768	768
CHPP - Conveying to CHPP	5	5	5	5
CHPP - Transfer	161	437	437	431
CHPP - Conveying to Product stockpile	27	27	27	27
CHPP - Unloading to Product stockpile	403	1,094	1,094	1,077
CHPP - Transfer	161	437	437	431
CHPP - Conveying to train loadout	80	80	80	80
CHPP - Loading coal to train	538	1,458	1,458	1,436
CHPP - Dozers on ROM stockpiles	52,713	82,223	82,223	82,223
CHPP - Dozers on Product stockpiles	40,609	63,343	63,343	63,343
OB - Loading Reject to haul truck	747	1,685	1,685	1,773
OB - Hauling Reject to dump	7,588	29,997	28,936	14,633
OB - Emplacing Reject at dump	747	1,685	1,685	1,773
WE - Overburden emplacement areas	85,075	104,148	104,148	112,676
WE - Open pit	80,820	210,287	210,287	211,582
WE - ROM stockpiles	8,395	8,395	8,395	8,395
WE - Product stockpiles	4,324	4,324	4,324	4,324
WE - Topsoil stockpiles	4,042	7,106	7,106	11,672
WE – Initial Rehab	3,432	50,069	50,069	40,845
OB - Grading roads	36,774	57,361	57,361	57,361
Locomotive idling	515	515	515	515
Diesel powered equipment	9,360	4,275	4,275	4,586
Total TSP emissions	**1,622,722**	**3,069,964**	**3,059,214**	**3,750,801**

OB – overburden, CL – coal, WE – wind erosion, kg = kilograms

*With proposed haul route to CHPP

Table 5-2: Estimated $PM_{2.5}$ emissions from diesel powered equipment (kg/year)

Type	Make	Model	Scenario 1	Scenario 2	Scenario 3
Trucks	Cat	789C	273	814	1,119
Trucks	Cat	789C coal	1,559	581	581
Trucks	Hitachi	EH4500	3,575	1,332	1,184
Excavators	Liebherr	996	1,049	391	391
Excavators	Hitachi	EX3600	340	253	379
Dozer (CHPP)	Cat	D11T	317	118	118
Dozers	Cat	D10T	447	48	60
Wheel Dozers	Cat	854G	155	115	115
Loader	Cat	994F	278	104	104
Grader	Cat	24M	95	10	10
Graders	Cat	16M	52	5	5
Water Truck	Cat	777C	142	53	53
Water Trucks	Komatsu	HD785	177	66	66
Blasthole Drill	Terex	Reedrill SK-F	117	60	60
Blasthole Drill	Drilltech	D75KS-AU	117	60	60
Blasthole Drill	Sandvik	DP1100i	-	-	7
Excavator	Cat	336	27	3	3
Truck	Cat	793	361	134	134

5.4.3 Emissions from other mining operations

In addition to the estimated dust emissions from the Mount Pleasant Operation incorporating the Modification, emissions from all nearby approved mining operations were also modelled, as detailed in **Appendix D**.

5.4.4 Emissions from construction activities

Dust emissions associated with construction activities are typically from a large range of different, short duration activities and arise from a small construction area. The dust emissions can be managed effectively through commonly applied mitigation measures such as water sprays and progressive rehabilitation. As such, emissions associated with construction activities would generally be too low relative to the rest of the operational coal mine to generate any significant off-site concentrations and are impractical to model in detail in this study. These emissions would be managed per a construction management plan, as necessary on a day by day basis depending on the activity.

5.4.5 Potential coal dust emissions from train wagons

Coal produced by the Mount Pleasant Operation incorporating the Modification would be transported off-site via rail to the Port of Newcastle for export. This activity has the potential to generate coal dust emissions from train wagons during the transportation. The scale of the potential emissions would depend on various factors including the material properties of the product coal, meteorological factors and train/wagon specific factors. These factors have been considered in the assessment of potential impacts, presented in **Appendix E**.

Appendix E shows that due to the relatively small effects associated with rail transport (a maximum change in the 24-hour PM_{10} concentration of 1.4µg/m^3 50m from the rail centreline), the potential for any adverse air quality impacts associated with coal dust generated during rail transport (including cumulative impacts) would likely be low and would not make any appreciable difference to existing air quality levels.

5.5 Dust mitigation and management

Consideration has been made of the possible range of mitigation measures that can be applied for the Mount Pleasant Operation incorporating the Modification.

The measures applied are commensurate with those for the approved Mount Pleasant Operation, and outlined in the NSW EPA document, *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining*, prepared by Katestone Environmental (**Katestone Environmental, 2010**).

A summary of the key dust controls for the approved Mount Pleasant Operation, which would continue to be applied, is shown in **Table 5-3**. Where applicable these controls have been applied in the dust emission estimates shown in **Table 5-1**. Further specific detail on the level of control applied is set out in **Appendix D**.

Table 5-3: Dust mitigation measures applied at the Mount Pleasant Operation

Activity	Dust control
Drilling	Use of water (i.e. wet suppression) to minimise dust emissions.
Loading/ emplacing overburden material	Minimise fall height of materials where practicable.
Hauling on unsealed surfaces	Application of water and regular maintenance of unsealed surfaces.
Dozer activity	Keep travel routes and work areas moist.
Unloading ROM to hopper at CHPP	Three-sided enclosure and activation fogging sprays during unloading process.
Conveyors and transfers	Enclosures for conveyors and transfer points with application of water sprays at transfer points.
Stacking coal to stockpiles	Luffing stacker to reduce fall height of materials at stockpiles.
Wind erosion on stockpiles	Water application to stabilise surface of stockpile and vegetative wind breaks to reduce wind speed over surface of stockpile.
Wind erosion of exposed surfaces	Water application to stabilise surface of inactive exposed surfaces and primary rehabilitation on areas inactive for extended periods.

In addition to the physical mitigation measures described above, reactive operational dust mitigation strategies and management measures would be implemented per the EPL conditions, to minimise potential for dust impacts during mining operations in the surrounding environment.

Reactive dust mitigation strategies include high dust concentration alarms to alert staff of the potential for dust impacts to arise. High dust concentration alarms trigger the implementation of dust management actions that appropriately modify any mining activities depending on weather conditions. The actions can include temporarily ceasing the on-site operations causing levels at dust monitors to reach the criterion level, or ceasing operations that are likely to have a significant off-site impact due to adverse weather conditions. For example, the reactive dust mitigation strategies would also incorporate the condition outlined in EPL 20850 requiring all dust generating activities to be ceased during specific adverse conditions.

5.6 Accounting for background dust levels

To account for the contribution from other non-mining sources of particulate matter in the wider area an allowance has been added to the modelling predictions to fully assess the total potential impact, as detailed in **Appendix D**.

6 DISPERSION MODELLING RESULTS

The dispersion modelling predictions for each of the assessed scenarios are presented in this section. The results presented include those for the operation in isolation (incremental impact) and the operation with other sources and background levels (total (cumulative) impact).

Each of the privately-owned and mine-owned receivers of relevance to this study shown in **Figure 2-1**, and detailed in **Appendix A**, were assessed individually as discrete receptors with the predicted results presented in tabular form for each of the assessed years in **Appendix F**. Associated isopleth diagrams of the dispersion modelling results are presented in **Appendix G**.

The isopleth diagrams in **Appendix G** show significantly reduced air quality impacts to those associated with the approved Mount Pleasant Operation (**Coal & Allied, 1997**). The predicted lower level of impacts are expected given the reduced emissions in comparison to those assessed for the approved Mount Pleasant Operation, as described in **Section 5.4.2**.

6.1 Compliance with criteria

The following presents the potential impacts identified for the Mount Pleasant Operation incorporating the Modification. No impacts are predicted to arise for annual average $PM_{2.5}$, TSP and deposited dust at the most proximal privately-owned receptors.

6.1.1 Consent criteria

Cumulative annual average PM_{10} impacts at the privately-owned receptors are predicted in two of the three scenarios. The number of privately-owned receptors predicted to experience cumulative annual average PM_{10} levels above 30µg/m^3 is as follows:

- Scenario 1 – no privately-owned receptors;
- Scenario 2 – privately-owned receptor 488a (location affected by other sources); and
- Scenario 3 – privately-owned receptors 43, 488a and 488b (locations affected by other sources).

The receptor locations at which levels above the consent criteria are predicted to arise are all far removed from the Mount Pleasant Operation and the impact occurs irrespective of the proposed Modification, i.e. the background levels including other projects already exceed the criteria at all of the potentially affected receptors. It is also noted that these receptors are subject to acquisition upon request based on the predicted air quality impacts of Bengalla Mine and Mt Arthur Coal Mine.

6.1.2 New EPA impact assessment criteria

Further analysis of the predicted cumulative annual average PM_{10} impacts for each scenario is presented in **Table 6-1** to **Table 6-3**. The tables present the contribution from each of the modelled sources with the applied background levels.

Scenario 1 - The results in **Table 6-1** indicate the approved Mount Pleasant Operation incorporating the Modification would generally contribute approximately 19% to the predicted cumulative level at all receptors with the exception of Receptor 488a, and shows that the majority of the impact arises due to other existing mining operations and ambient air quality (however would remain below the consent criterion of 30µg/m^3 for annual average PM_{10}).

Scenario 2 - **Table 6-2** indicates the approved Mount Pleasant Operation incorporating the Modification is predicted to contribute approximately 2% to the predicted cumulative level at Receptor 43 with only minimal contribution at Receptor 488a and 488b.

Scenario 3 - **Table 6-3** shows the predicted contribution due to the approved Mount Pleasant Operation incorporating the Modification is only 2% of the predicted cumulative level at Receptor 43 with minimal contribution at Receptors 487a, 487b, 488a and 488b.

Table 6-1: Summary of modelling predictions where predicted cumulative annual average PM_{10} levels exceed assessment criteria in Scenario 1 (µg/m³)

Receptor ID	Approved Mount Pleasant Operation incorporating the Modification	Other mines + background	Cumulative total impact
4	3	23	26
6	5	24	29
20	5	21	26
21	5	21	27
43	1	25	26
488a	0	25	26

Table 6-2: Summary of modelling predictions where predicted cumulative annual average PM_{10} levels exceed assessment criteria in Scenario 2 (µg/m³)

Receptor ID	Approved Mount Pleasant Operation incorporating the Modification	Other mines + background	Cumulative total impact
43	1	25	26
488a	0	33	34
488b	0	28	29

Table 6-3: Summary of modelling predictions where predicted cumulative annual average PM_{10} levels exceed assessment criteria in Scenario 3 (µg/m³)

Receptor ID	Approved Mount Pleasant Operation incorporating the Modification	Other mines + background	Cumulative total impact
43	1	32	32
487a	0	27	27
487b	0	26	26
488a	0	42	42
488b	0	34	34

6.2 Assessment of 24-hour average $PM_{2.5}$ and PM_{10} concentrations

The results for incremental (operation in isolation) 24-hour average $PM_{2.5}$ and PM_{10} concentrations indicate there are no predicted exceedances of relevant criteria at the privately-owned receptors for the assessed scenarios.

It is important to note that when assessing impacts per the maximum 24-hour average $PM_{2.5}$ and PM_{10} criteria, the predictions show the highest predicted 24-hour average concentrations that were modelled at each point within the modelling domain for the worst day (a 24-hour period). When assessing the total (cumulative) 24-hour average impacts based on model predictions, challenges arise with identification and quantification of emissions from non-modelled sources over the 365 separate 24-hour periods modelled in the year.

Due to these factors, an assessment of cumulative 24-hour average $PM_{2.5}$ and PM_{10} impacts was undertaken in accordance with Section 11.2 of the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA**, **2017**). The "Level 2 assessment - Contemporaneous impact and background approach" was applied to assess potential impacts.

The analysis has focussed on the privately-owned assessment locations at which the data required to conduct this assessment are available, and represent the closest and most likely impacted privately-owned assessment locations surrounding the Mount Pleasant Operation.

There are three surrounding PM_{10} monitoring stations which are part of the UHAQMN where suitable ambient monitoring data are available. Only the Muswellbrook $PM_{2.5}$ monitoring station, which is part of the UHAQMN, has $PM_{2.5}$ data available for use in this assessment. The assessment of cumulative impacts uses the monitoring data from the closest monitor.

Figure 6-1 shows the location of each of these monitors in relation to the Mount Pleasant Operation and surrounding assessment locations.

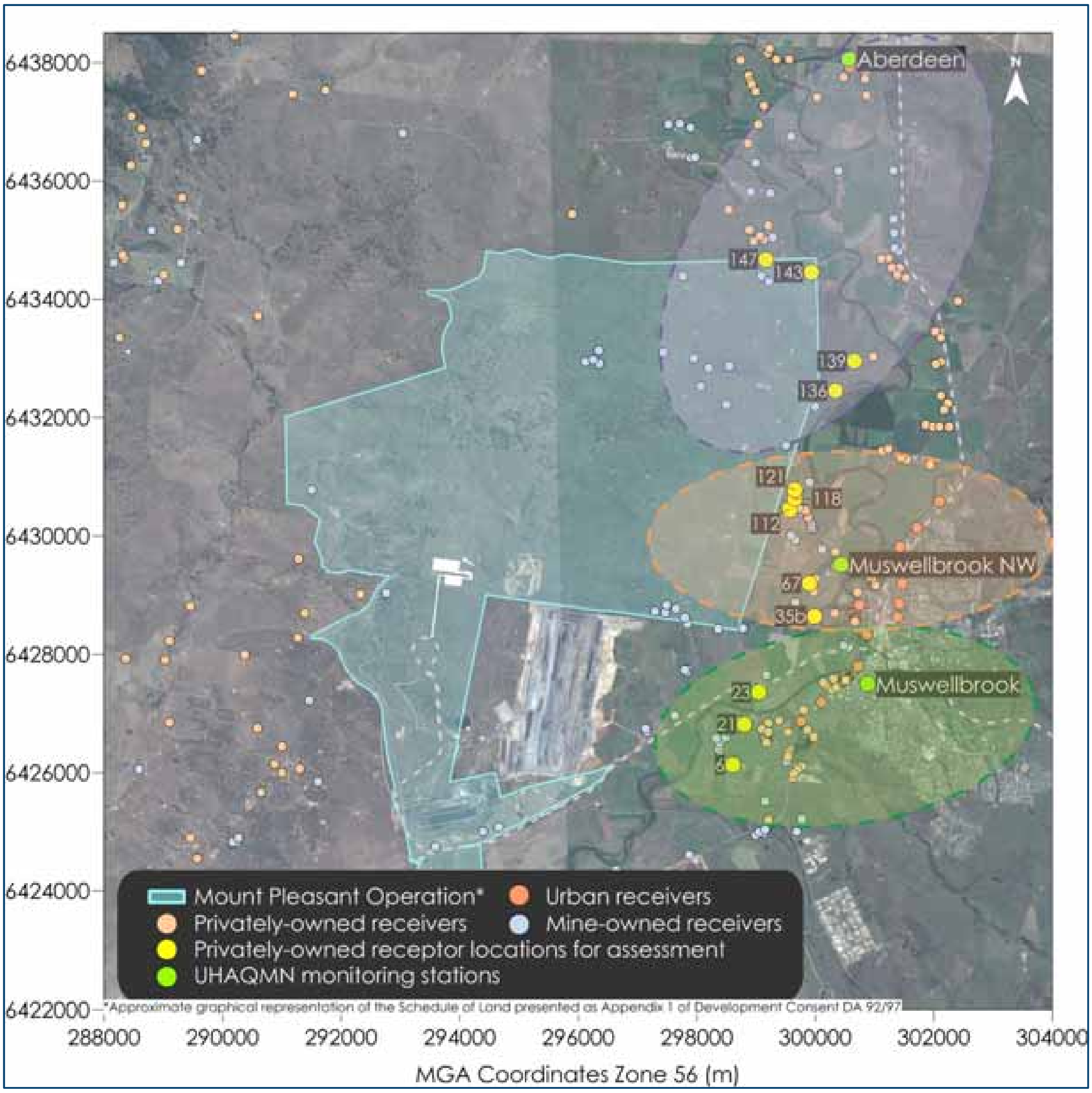


Figure 6-1: Locations available for contemporaneous cumulative impact assessment

6.2.1 Impacts without implementation of predictive/ reactive measures.

Table 6-4 provides a summary of the contemporaneous assessment at each assessed sensitive receptor location. The results in **Table 6-4** indicate that for the assessed sensitive receptors, potential cumulative 24-hour average $PM_{2.5}$ and PM_{10} impacts may occur without proactive/ reactive mitigation.

Detailed tables of the full assessment results are provided in **Appendix H** and **Appendix I**.

Table 6-4: NSW EPA contemporaneous assessment - maximum number of additional days in a year above 24-hour average criterion depending on background level at monitoring sites

Receptor ID	$PM_{2.5}$ analysis			PM_{10} analysis		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
6	2	2	2	0	0	0
21	2	2	2	0	0	0
23	2	2	3	0	0	0
35b	1	1	1	0	0	0
67	1	1	1	0	1	1
112	1	3	7	1	1	4
118	1	2	5	1	1	3
121	1	2	5	1	1	3
136	1	1	1	0	0	1
139	1	0	1	0	0	0
143	1	1	1	0	0	0
147	1	1	1	1	1	2

Further analysis of the predicted cumulative PM_{10} impacts at Receptor 23, 112 and 136 are presented in **Figure 6-2** to **Figure 6-4**. The figures show time series plots of the 24-hour average PM_{10} concentrations predicted to be experienced as a result of the Mount Pleasant Operation incorporating the Modification. The orange bars represent the existing ambient background level at the monitoring location and the blue bars represent the predicted incremental contribution due to the Modification.

6.2.2 Impacts with adoption of predictive/ reactive measures

To demonstrate the effectiveness of the implementation of predictive/ reactive measures at the Modification, the dispersion modelling was re-run to consider the effects of temporarily pausing activities in the pit and overburden areas during periods of elevated dust.

Only the activities that can be controlled in the pit and overburden areas were ceased in the model, and dust from other sources such as wind erosion was still assumed for the purpose of the revised modelling.

Table 6-5 outlines the maximum number of additional days in a year predicted to exceed the 24-hour criterion with the implementation of reactive measures.

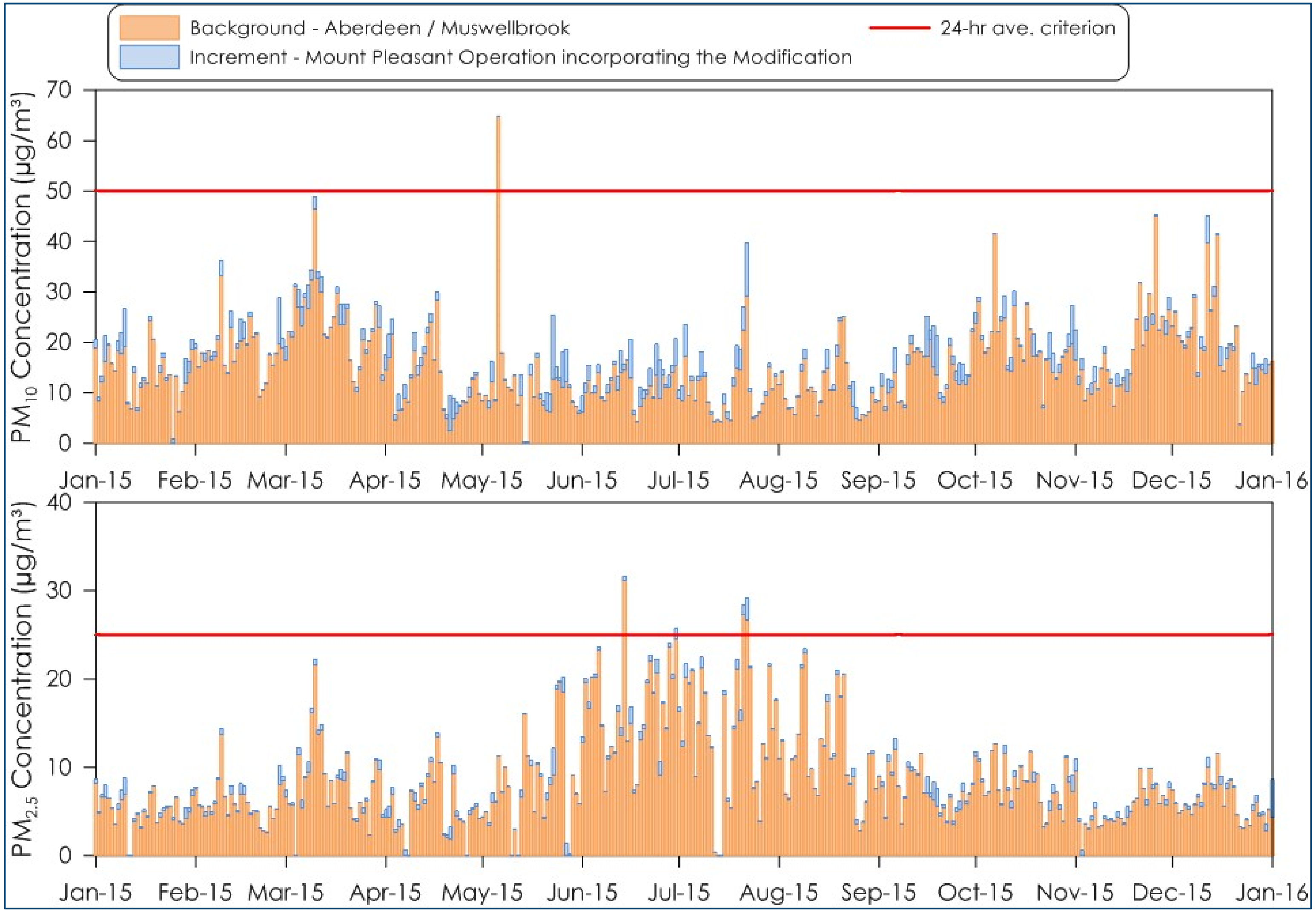


Figure 6-2: Predicted 24-hour average PM_{10} and $PM_{2.5}$ concentrations for sensitive receptor location 136 during Scenario 1 (unmitigated)

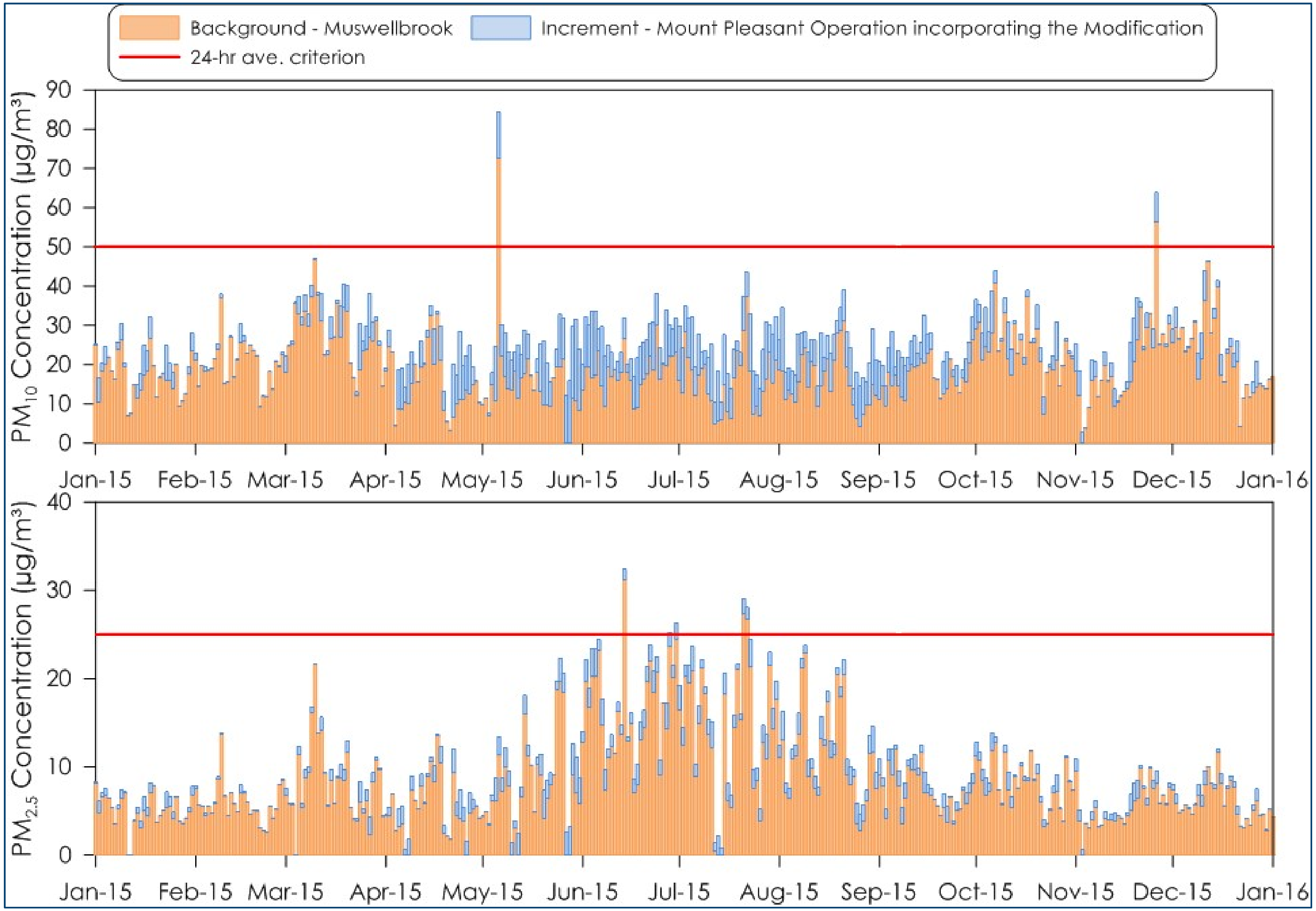


Figure 6-3: Predicted 24-hour average PM_{10} and $PM_{2.5}$ concentrations for sensitive receptor location 23 during Scenario 2 (unmitigated)

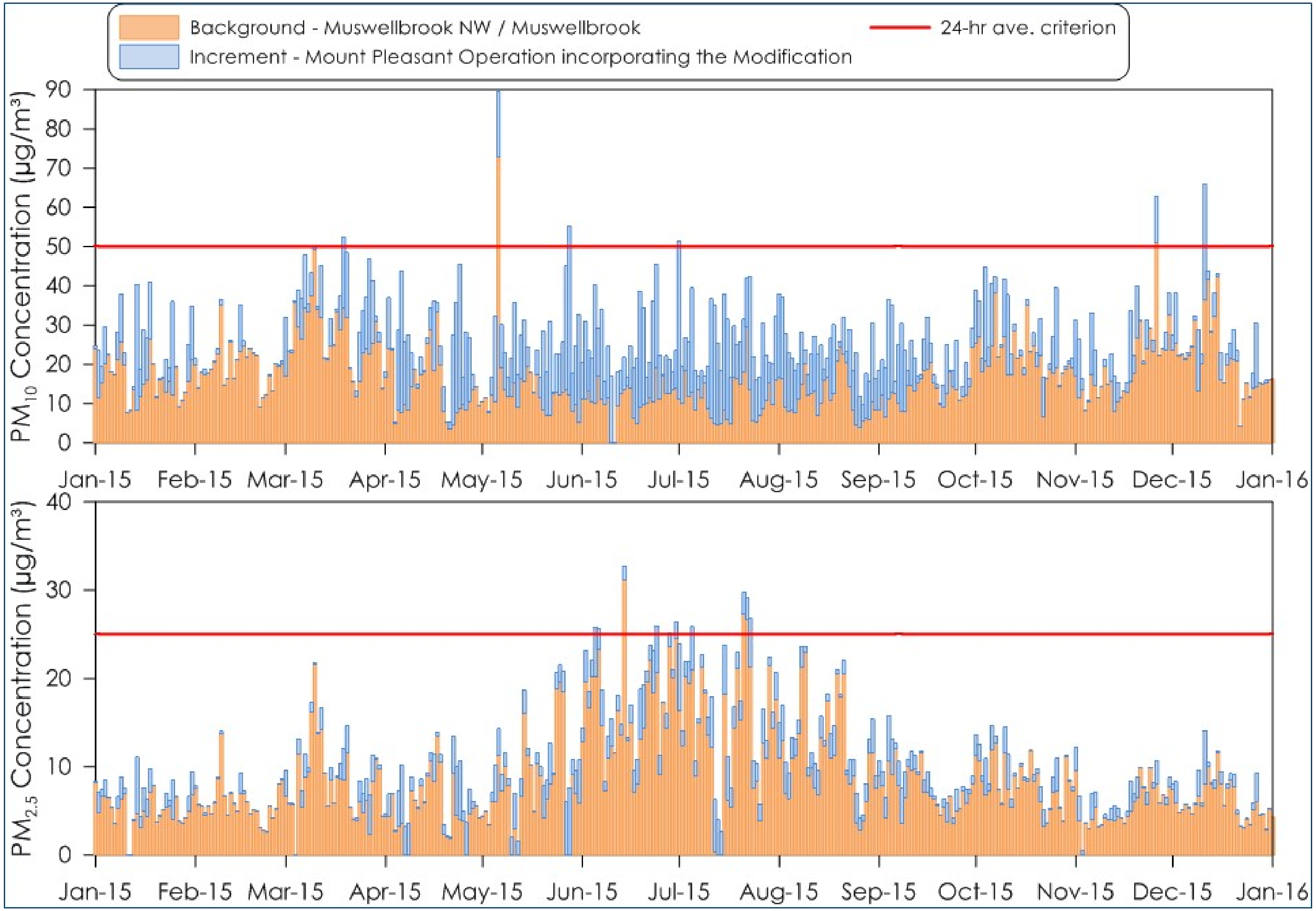


Figure 6-4: Predicted 24-hour average PM_{10} and $PM_{2.5}$ concentrations for sensitive receptor location 112 during Scenario 3 (unmitigated)

Table 6-5: Number of additional days in a year above 24-hour average criterion on background level at monitoring sites with implementation of reactive measures

Receptor ID	$PM_{2.5}$ analysis*			PM_{10} analysis		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
6	0	0	0	0	0	0
21	0	0	0	0	0	0
23	0	0	0	0	0	0
35b	0	0	0	0	0	0
67	0	0	0	0	0	0
112	0	0	0	0	0	0
118	0	0	0	0	0	0
121	0	0	0	0	0	0
136	0	0	0	0	0	0
139	0	0	0	0	0	0
143	0	0	0	0	0	0
147	0	0	0	0	0	0

* 24-hour $PM_{2.5}$ is not currently an EPL or Development Consent DA 92/97 compliance criteria.

The results indicate that all of the predicted additional exceedance days due to the Mount Pleasant Operation incorporating the Modification can be prevented using the reactive controls, which would be effective at reducing the incremental contribution of the Mount Pleasant Operation to cumulative levels.

While the modelling methodology is inherently conservative, the effectiveness of these measures would be further enhanced on a case-by-case basis as required.

Enhancements include using the real-time/ predictive management system for pre-planning of temporary cessation of dust generating activities, increased watering or re-scheduling of certain activities. Through such measures, the potential impacts in the surrounding environment could be further minimised.

6.3 Other dust metrics

The predicted cumulative annual average $PM_{2.5,}$ TSP and dust depositions levels due to the approved Mount Pleasant Operation incorporating the Modification were predicted to be below the relevant criteria at the assessed sensitive receptor locations.

Tabulated results for each of the sensitive receptor locations are presented in **Appendix F**. Associated isopleth diagrams of the dispersion modelling results are presented in **Appendix G**.

6.4 Dust impacts on more than 25 per cent of privately-owned land

The potential impacts due to the approved Mount Pleasant Operation incorporating the Modification, extending over more than 25 per cent of any privately-owned land, have been evaluated using the predicted pollutant dispersion contours.

Figure 6-5 presents the extent of the maximum 24-hour average PM_{10} level ($50\mu g/m^3$) due to the Mount Pleasant Operation incorporating the Modification in isolation. The maximum 24-hour average PM_{10} level was found to have the greatest extent of any of the other assessed dust metrics and hence represents the most impacting parameter.

The isopleth in **Figure 6-5** indicates there is no privately-owned land parcels which would be impacted more than 25 per cent.

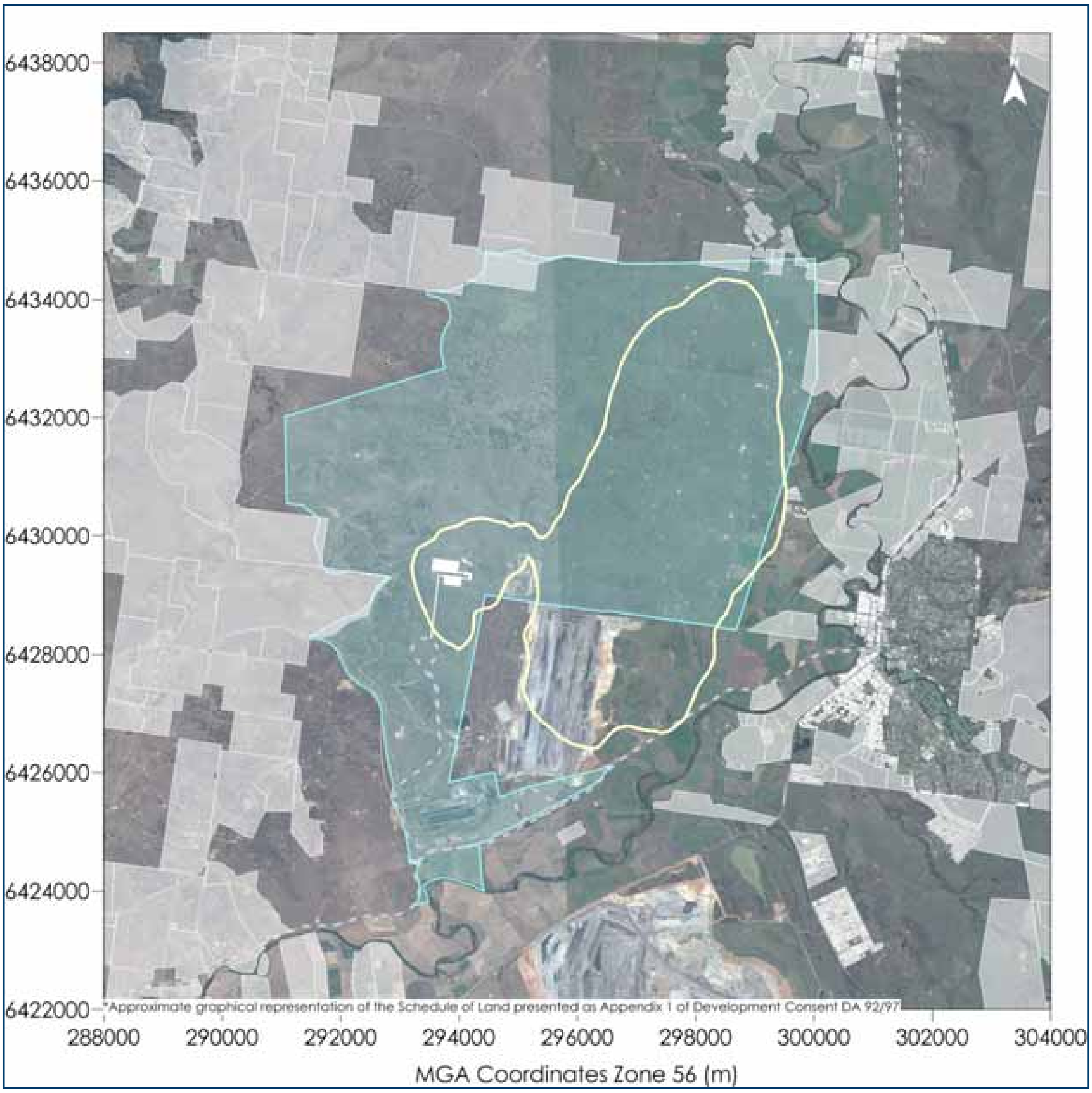


Figure 6-5: Predicted maximum 24-hour average PM_{10} level for all scenarios

7 ASSESSMENT OF BLAST FUME EMISSIONS

Air quality impacts from blast fume emissions are rare, but are possible when there are unforeseeable complications with a blast that causes high levels of NO_2 or dust emission, and when this occurs during unfavourable air dispersion conditions.

The Mount Pleasant Operation incorporating the Modification would employ best practice blast management measures to ensure that blasting activities are managed in a manner that would minimise the risk of impacts arising.

7.1 General outline of best practice blast management

The potential effects from blasting activities are generally managed by scheduling the blast to times when there would be a low risk of impact, for example, when winds blow away from receptors. These conditions are forecast using a predictive blast dust management system. Blast operators make the final decision to blast based on the available information, including available forecasts.

The decision of whether to initiate a blast at any given time will generally need to balance many potentially conflicting factors; for example water ingress will increase the risk of a high emissions event, thus waiting too long for ideal air dispersion conditions to occur may present an unacceptable level of risk, and thus the blast may be initiated under less than ideal weather conditions.

On the other hand, a dry blast with low scope for any degradation of the explosive over time or low potential to lead to any elevated emissions might be delayed if it appears that air dispersion conditions would soon improve significantly.

Occasionally safety concerns may also arise, and may require a blast to be detonated under less than ideal (environmental) conditions.

7.2 Suggested management of potential air quality impacts from blasting

Air quality impacts of blast operations at the Mount Pleasant Operation will be managed via the Blast Management Plan (BMP). The purpose of the BMP is to ensure that blasting operations comply with all relevant requirements particularly noise, overpressure, vibration, blast fume and dust effects.

The BMP will apply a blasting permissions procedure to guide operators on the suitability of various factors including the current weather conditions for blasting. The BMP takes into consideration meteorological factors such as wind speed and direction which can affect the scale of potential blast impacts at assessment locations.

A predictive blast management system is also proposed to be used at the Mount Pleasant Operation to aid with management of blasting operations. Such a system uses the weather conditions for each blast to predict the potential impact which may occur. The prediction is made on the basis of forecast weather data, allowing operators to schedule a blast to the time of least impact over the course of the upcoming day.

7.3 Summary

Overall, it is anticipated that with due care, potential blast impacts would be averted at the Mount Pleasant Operation. It is recommended that the BMP is regularly reviewed maintain best practice.

8 ASSESSMENT OF DIESEL EMISSIONS

It is generally considered that the quantity of emissions generated from diesel powered equipment used for mining activity is too low to generate any significant off-site concentrations. This is due to consideration of the relatively small individual sources, the generally large distance between the sources and sensitive receptor locations, and the generally widely spread distribution of sources across the mine site.

A large amount of diesel fuel is used in mining and, consequently, there may be potential for impacts to arise due to the emissions from diesel powered equipment used during operations.

It is noted that the available monitoring data do not indicate any likely issues in this regard (see **Appendix B**). For example, NO_2 is a significant pollutant emitted from the combustion of diesel, yet NO_2 levels at the UHAQMN Muswellbrook monitoring station are low relative to the criterion.

Fine particulate (i.e. $PM_{2.5}$) is also a significant pollutant emitted from diesel combustion. A recent Commonwealth Scientific and Industrial Research Organisation (CSIRO) study (**CSIRO, 2013**) on the composition of fine particulates in the Hunter Valley found that wood burning in winter made up an average of 62% of the $PM_{2.5}$ in Muswellbrook and 38% of the $PM_{2.5}$ in Singleton. Secondary sulphate and industry aged sea salt made the highest contribution during summer months, sulphate levels were found to be comparable to other Australian locations. Vehicle and industry sources comprised approximately 8% and 17% in Muswellbrook and Singleton, respectively.

Whilst these data may not indicate any issue related to diesel combustion, it is recognised that the locations at which these data were collected are some distance away from coal mines. Thus an assessment of potential impacts from diesel combustion was conducted for the approved Mount Pleasant Operation incorporating the Modification to determine whether any risk may arise at locations close to the site. It should be noted that emissions of fine particulate from diesel combustion in mining equipment is generally already included within the assessment of mine dust presented in **Section 6**.

8.1 Approach to assessment

Emissions from diesel powered equipment were estimated on the basis of manufacturer's data. It is noted that manufacturer's equipment performance specifications were typically categorised on the basis of the US EPA federal tier standards of emissions for diesel equipment (**Dieselnet**, **2017**).

Dispersion modelling of the diesel powered equipment was conducted for each indicative mine plan year. Modelled sources were described as point sources and impacts due to the approved Mount Pleasant Operation incorporating the Modification were added to the ambient background level to assess potential impacts.

Further detail is presented in **Appendix J.**

8.2 Dispersion modelling results

The modelling predictions in **Appendix J** indicate that in all the assessed years, all privately-owned and mine-owned sensitive receptor locations are predicted to experience maximum 1-hour average and annual average NO_2 concentrations below the relevant criteria of 246µg/m^3 and 63µg/m^3, respectively.

The ambient air quality goals for Carbon Monoxide (CO) are set at higher concentration levels than the NO_2 goals. Based on the NO_2 monitoring data which are low compared to the goals, and consideration of the typical mix of ambient pollutant levels and associated emissions of CO, the indication is that predictions of CO would be well below the air quality goals and do not require further consideration.

The Project would ensure diesel emissions from the site are minimised where possible by ensuring engines of all on-site vehicles are switched off when not in use, where reasonable and feasible fitting plant and equipment with pollution reduction devices and maintaining and servicing vehicles according to manufacturer's specifications.

9 GREENHOUSE GAS ASSESSMENT

9.1 Introduction

This assessment aims to estimate the predicted emissions of greenhouse gases to the atmosphere due to the Mount Pleasant Operation incorporating the Modification and to provide a comparison of the direct emissions from the Mount Pleasant Operation incorporating the Modification at the state and national level.

The Modification does not involve any changes to the approved Mount Pleasant Operation that would materially change the greenhouse gas emissions of the Mount Pleasant Operation, except for the change in mining methodology (dragline no longer proposed during the Modification period). Notwithstanding, a contemporary greenhouse gas assessment of the Mount Pleasant Operation incorporating the Modification has been completed.

9.2 Greenhouse gas inventory

The National Greenhouse Accounts (NGA) Factors document published by the Department of the Environment and Energy defines three scopes (Scope 1, 2 and 3) for different emission categories based on whether the emissions generated are from "direct" or "indirect" sources.

Scope 1 emissions encompass the direct sources from the Mount Pleasant Operation defined as:

> *"...from sources within the boundary of an organisation as a result of that organisation's activities"* (**Department of the Environment and Energy, 2016**).

Scope 2 and 3 emissions occur due to the indirect sources from the Mount Pleasant Operation as:

> *"...emissions generated in the wider economy as a consequence of an organisation's activities (particularly from its demand for goods and services), but which are physically produced by the activities of another organisation"* (**Department of the Environment and Energy, 2016**).

For the purpose of this assessment, emissions generated in all three scopes defined above provide a suitable approximation of the total greenhouse gas emissions generated from the Mount Pleasant Operation incorporating the Modification.

Scope 3 emissions can be a significant component of the total emissions inventory; however, these emissions are often not directly controlled by the operation. These emissions are understood to be considered in the Scope 1 emissions from other various organisations related to the Mount Pleasant Operation.

Scope 3 emissions also arise from a number of various other sources indirectly associated with the operation of the Mount Pleasant Operation such as emissions generated by employees travelling to and from the site. The relatively minor individual contributions that are difficult to accurately quantify due to the diversity and nature of the sources, have not been considered further in this assessment.

9.2.1 Emission sources

Scope 1 and 2 greenhouse gas emission sources identified from the operation of the Mount Pleasant Operation are the on-site combustion of diesel fuel, fuel oil combustion, emissions of methane from the exposed coal seams, and on-site consumption of electricity.

Scope 3 emissions have been identified as resulting from the purchase of diesel, electricity for use on-site and the transport to and final use of product coal.

Estimated quantities of materials that have the potential to emit greenhouse gas emissions associated with Scope 1 and 2 emissions for the Mount Pleasant Operation incorporating the Modification have been summarised in **Table 9-1** below. These estimates are based on a conservative upper limit of the assumed maximum production throughout the life of the Modification (up to 2026). The assessment provides a reasonable worst case approximation of the potential greenhouse gas emissions for the purpose of this assessment.

Table 9-1: Summary of quantities of materials estimated for the Mount Pleasant Operation incorporating the Modification

Period	ROM coal (tonnes)	Diesel (kL)	Fuel Oil (kL)	Electricity (MWh)
2017	263,409	4,745	210	1,730
2018	4,063,172	15,706	696	26,693
2019	7,544,594	23,093	1,024	49,564
2020	10,500,001	24,578	1,090	68,979
2021	10,500,001	31,279	1,387	68,979
2022	10,500,001	27,251	1,208	68,979
2023	10,500,001	25,335	1,123	68,979
2024	10,500,001	27,234	1,207	68,979
2025	10,500,001	28,517	1,264	68,979
2026	10,500,001	24,071	1,067	68,979
Total	**85,371,181**	**231,808**	**10,277**	**560,843**

Note: kL = kilolitres and MWHh = megawatt hour

Scope 3 emissions for the transport and final use of the coal may have the potential to vary in the future depending on the market situation at the time. These assumptions include emission factors for the transport modes of rail and shipping and the associated average weighted distance travelled for the export coal.

9.2.2 Emission factors

To quantify the amount of carbon dioxide equivalent (CO_2-e) material generated from the Modification, emission factors obtained from the NGA Factors (**Department of the Environment and Energy, 2016**) and other sources as required are summarised in **Table 9-2**.

Table 9-2: Summary of emission factors

Type	Energy content factor (GJ/kL)	Emission factor			Units	Scope
		CO_2	CH_4	N_2O		
Diesel	38.6	69.9	0.1	0.5	kg CO_2-e/GJ	1
		3.6	-	-		3
Fuel oil	39.7	73.6	0.04	0.2	kg CO_2-e/GJ	1
		3.6	-	-		3
Electricity	-	0.84	-	-	kg CO_2-e/kWh	2
		0.12	-	-		3
Fugitive emissions	-	-	0.012	-	t CO_2-e/t ROM	1
Rail transport	-	16.7	-	-	t CO_2-e/Mt-km	3
Ship transport	-	5.4	-	-	t CO_2-e/Mt-km	3
Thermal coal*	29.0	90	0.03	0.2	kg CO_2-e/GJ	3

*Assumes type of coal is anthracite

Note: GJ = Gigajoule, kWh = kilowatt hour, t = tonnes, Mt-km = million tonne-kilometres, CO_2 = Carbon Dioxide, CH_4 = Methane and N_2O = Nitrous Oxide

Product coal is transported to the Port of Newcastle by rail and then transferred to coal loaders before being shipped to its final destination. The approximate rail distance is taken to be 300km (return distance). The approximate shipping distance of 13,000km (return distance) is based predominately on destinations in the Asian market.

The emissions generated from the end use of coal produced by the Mount Pleasant Operation have been assumed to be used in power generation. This assessment has assumed the emissions generated would be equivalent to those generated in NSW.

9.3 Summary of greenhouse gas emissions

Table 9-3 summarises the estimated annual CO_2-e emissions due to the Mount Pleasant Operation incorporating the Modification.

Table 9-3: Summary of CO_2-e emissions for the Mount Pleasant Operation incorporating the Modification (t CO_2-e)

Year	Fugitive emissions	Diesel		Fuel Oil		Electricity		Rail transport	Ship transport	Thermal coal
	Scope									
	1	1	3	1	3	2	3	3	3	3
2017	3,161	12,912	659	617	30	1,454	208	998	9,529	689,255
2018	48,758	42,740	2,182	2,041	100	22,422	3,203	14,539	138,790	10,631,979
2019	90,535	62,843	3,209	3,001	146	41,634	5,948	27,584	263,323	19,741,713
2020	126,000	66,883	3,415	3,194	156	57,943	8,278	38,352	366,122	27,475,037
2021	126,000	85,120	4,347	4,065	198	57,943	8,278	39,452	376,628	27,475,037
2022	126,000	74,159	3,787	3,541	173	57,943	8,278	38,684	369,293	27,475,037
2023	126,000	68,945	3,521	3,292	161	57,943	8,278	38,593	368,422	27,475,037
2024	126,000	74,111	3,784	3,539	173	57,943	8,278	38,011	362,865	27,475,037
2025	126,000	77,604	3,963	3,706	181	57,943	8,278	38,821	370,605	27,475,037
2026	126,000	65,504	3,345	3,128	153	57,943	8,278	37,126	354,419	27,475,037

9.4 Contribution of greenhouse gas emissions

Table 9-4 summarises the emissions associated with the Modification based on Scopes 1, 2 and 3.

Table 9-4: Summary of CO_2-e emissions per scope (t CO_2-e)

Period	Scope 1	Scope 2	Scope 3
Annual	168,540	47,111	22,671,412
Total	**1,685,399**	**471,108**	**226,714,125**

The estimated annual greenhouse emissions for Australia during 2014 was 523.3 million tonnes of carbon dioxide equivalent (Mt CO_2-e) (**Department of the Environment and Energy, 2017**). In comparison, the estimated annual average greenhouse emission for the Mount Pleasant Operation incorporating the Modification is 0.22Mt CO_2-e (Scope 1 and 2). Therefore, the annual contribution of greenhouse emissions from the Modification in comparison to the Australian greenhouse emissions for the 2014 period is estimated to be approximately 0.04%.

At a state level, the estimated greenhouse emissions for NSW in the 2014 period was 130.1Mt CO_2-e (**Department of the Environment and Energy, 2017**). The annual contribution of greenhouse emissions from the Mount Pleasant Operation incorporating the Modification in comparison to the NSW greenhouse emissions for the 2014 period is estimated to be approximately 0.17%.

The estimated greenhouse gas emissions generated in all three scopes are based on approximated quantities of materials and where applicable generic emission factors. Therefore, the estimated emissions for the Mount Pleasant Operation incorporating the Modification are considered conservative.

9.5 Greenhouse gas management

The Mount Pleasant Operation will aim to utilise various mitigation measures to minimise the overall generation of greenhouse gas emissions. Some examples of greenhouse gas mitigation and management practices that may be applied for the Modification include:

- Investigating ways to reduce energy consumption during project planning phases and reviewing energy efficient alternatives;
- Regular maintenance of equipment and plant;
- Monitoring the consumption of fuel and regularly maintaining diesel powered equipment to ensure operational efficiency; and
- Monitoring the total site electricity consumption and investigating avenues to minimise the requirement.

10 SUMMARY AND CONCLUSIONS

This study has examined potential air quality and greenhouse gas impacts that may arise from the Mount Pleasant Operation incorporating the Modification for three indicative mine plan years. Conservative emission estimation (e.g. using maximum mining rates) and dispersion modelling (e.g. not including the effect of rainfall) has been completed for this assessment.

The modelling methodology uses recent and comprehensive weather and dust monitoring data, incorporates inventories for $PM_{2.5}$ emissions, and considers changes to nearby projects.

The results indicate that annual average PM_{10} dust impacts may potentially arise at a small number of privately-owned receptor locations.

Cumulative annual average PM_{10} levels are not predicted to exceed the Development Consent DA 92/97 criterion of 30µg/m^3, except at three privately-owned receivers already subject to acquisition upon request for air quality impacts from Bengalla Mine and Mt Arthur Coal Mine. It is noted that in each case, the criterion is exceeded with or without the Mount Pleasant Operation active. The new (2017) NSW EPA impact assessment criteria of 25µg/m^3 may also be exceeded at a small number of privately-owned receptors, primarily due to existing elevated dust levels.

Cumulative 24-hour average $PM_{2.5}$ and PM_{10} levels exceeding the NSW EPA impact assessment criteria were predicted to occur in the surrounding environment in the absence of the implementation of reactive measures. With the application of a reactive dust mitigation strategy and incorporation of real-time/ predicted management systems, it is predicted that short-term cumulative $PM_{2.5}$ and PM_{10} dust would be adequately managed to acceptable levels.

Predicted levels for the other assessed dust metrics would be below the relevant criterion at the privately-owned receptor locations. There are no likely air quality impacts associated with rail transport, blast fumes or diesel emissions identified for the Mount Pleasant Operation incorporating the Modification.

A contemporary greenhouse gas assessment of the Mount Pleasant Operation incorporating the Modification has been completed using the conservative upper limit of the assumed maximum production throughout the life of the Modification (up to 2026), the estimated annual average greenhouse emission is 0.22Mt CO_2-e material (Scope 1 and 2), which is calculated to be approximately 0.04% of the Australian greenhouse emissions and approximately 0.17% of the NSW greenhouse emissions for the 2014 period.

Overall, relative to the approved Mount Pleasant Operation, the potential air quality impacts associated with the Mount Pleasant Operation incorporating the Modification are significantly lower, as would be expected with the reduced total emissions.

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Appendix A

Sensitive Receptor Locations

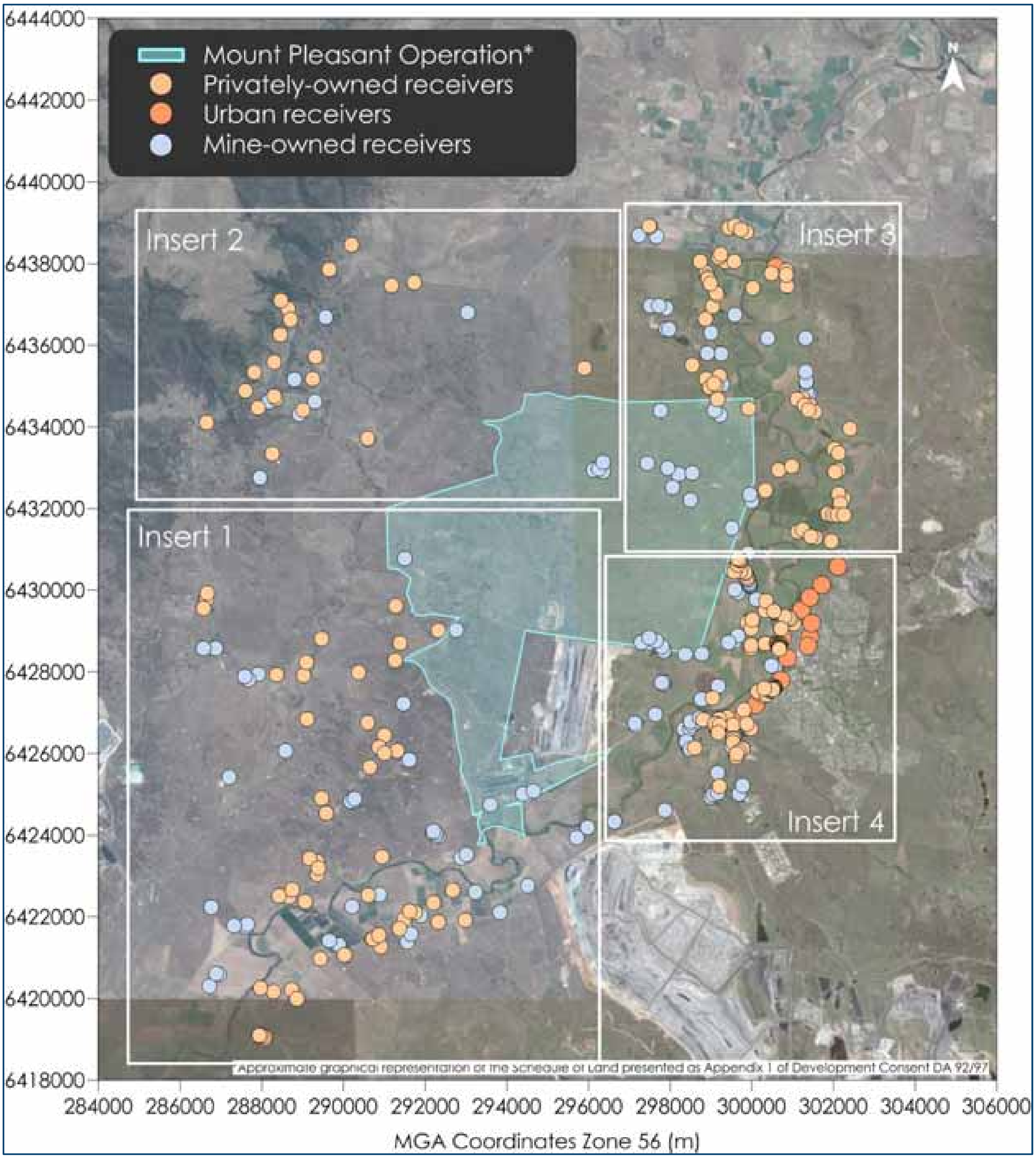

Figure A-1: Location of sensitive receptors assessed in this study

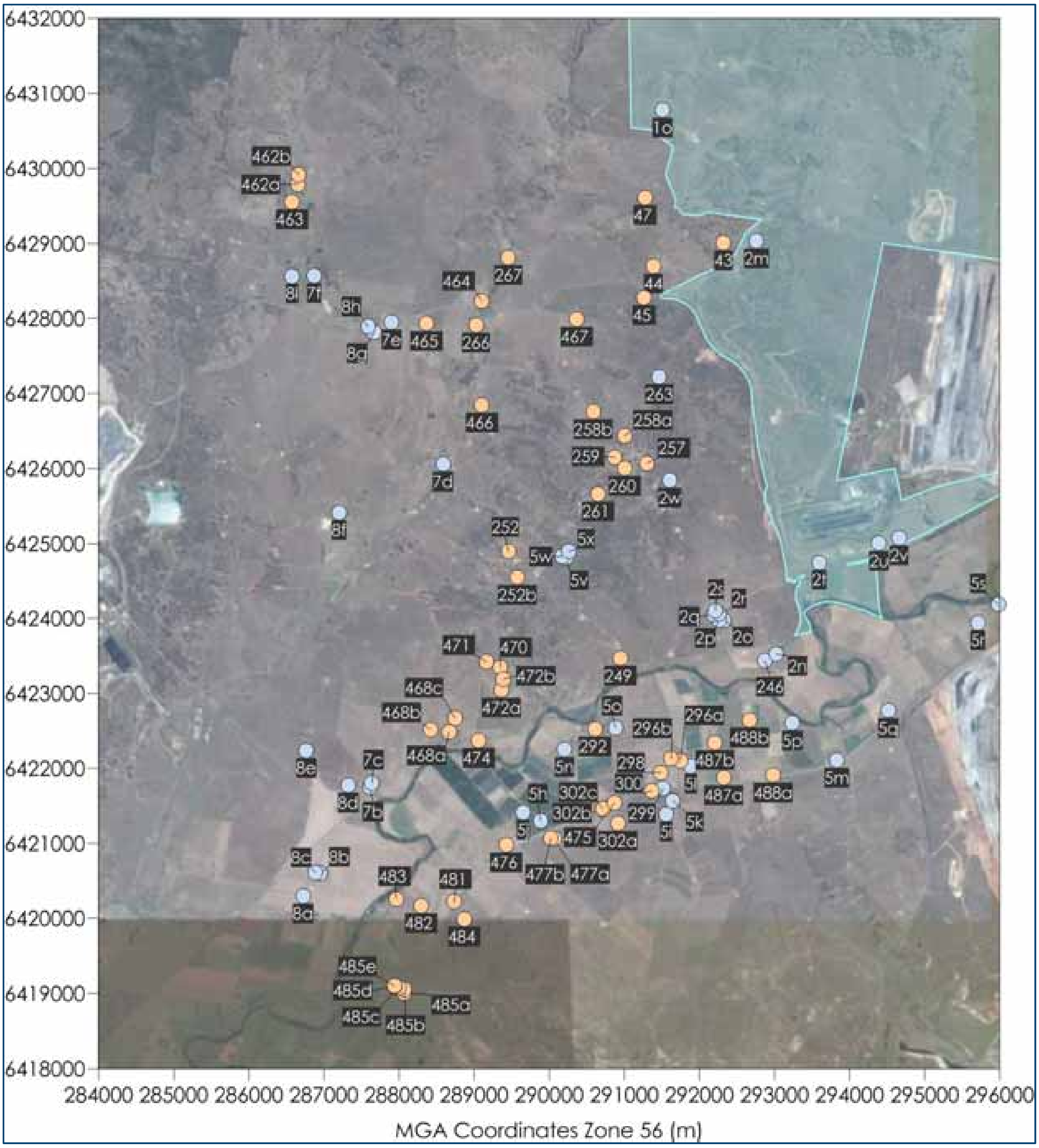

Figure A-2: Location of sensitive receptors assessed in this study – Insert 1

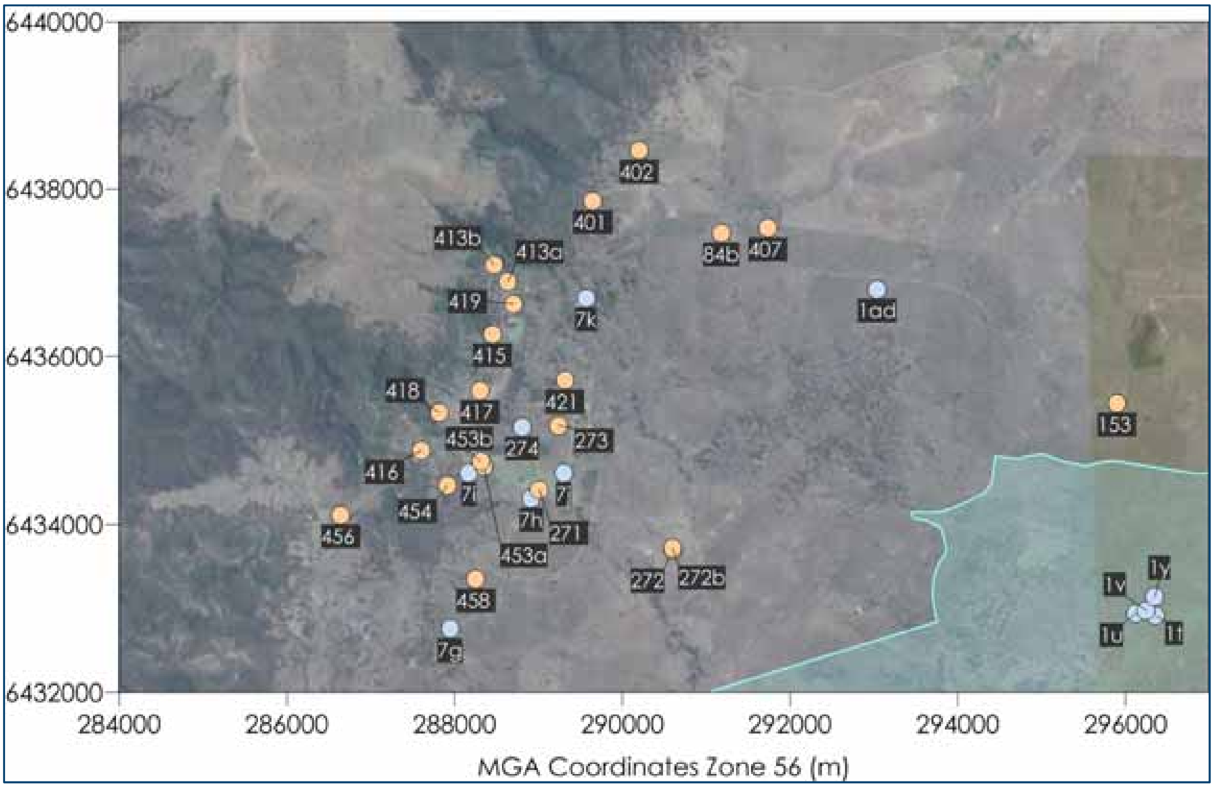

Figure A-3: Location of sensitive receptors assessed in this study – Insert 2

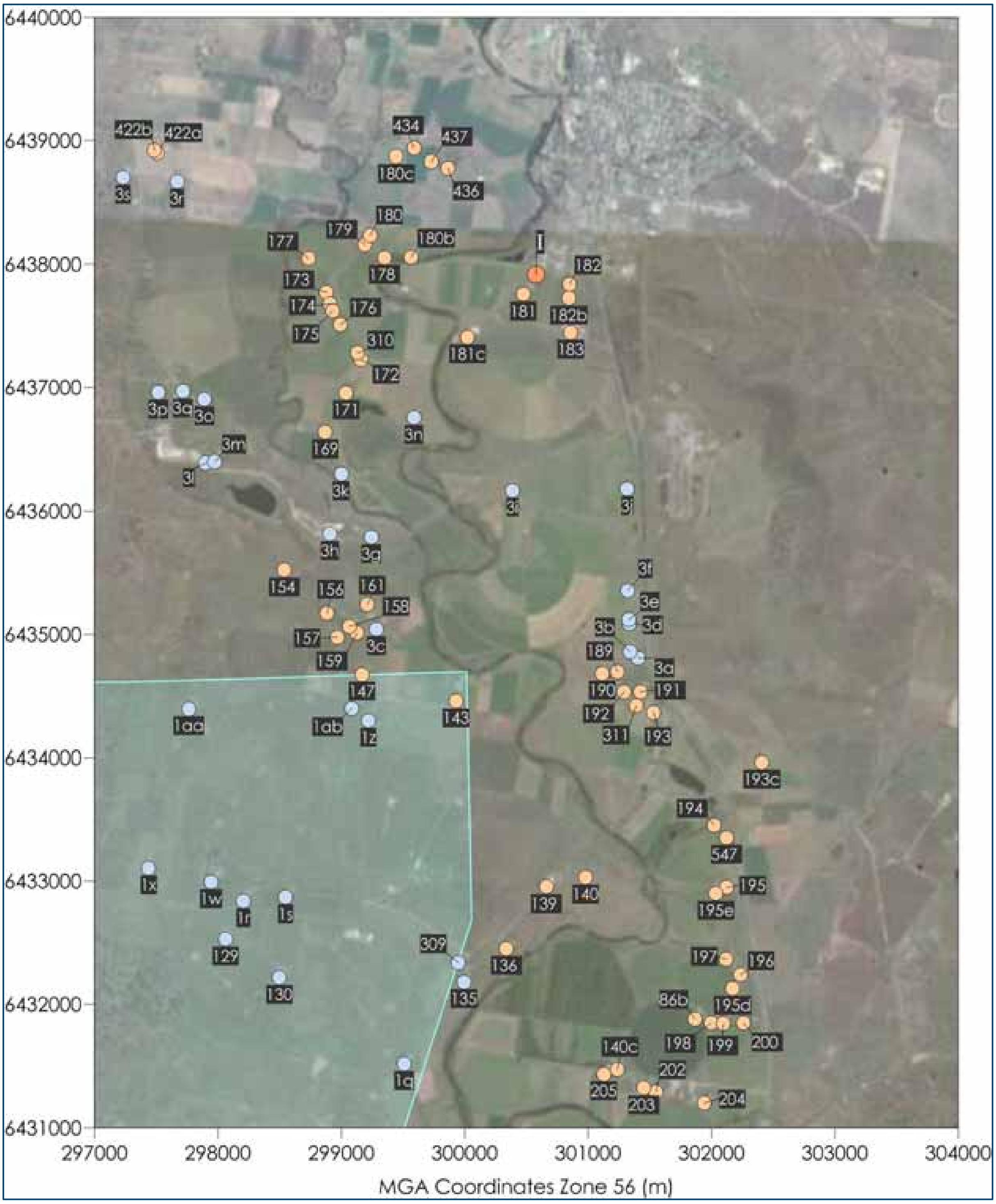

Figure A-4: Location of sensitive receptors assessed in this study – Insert 3

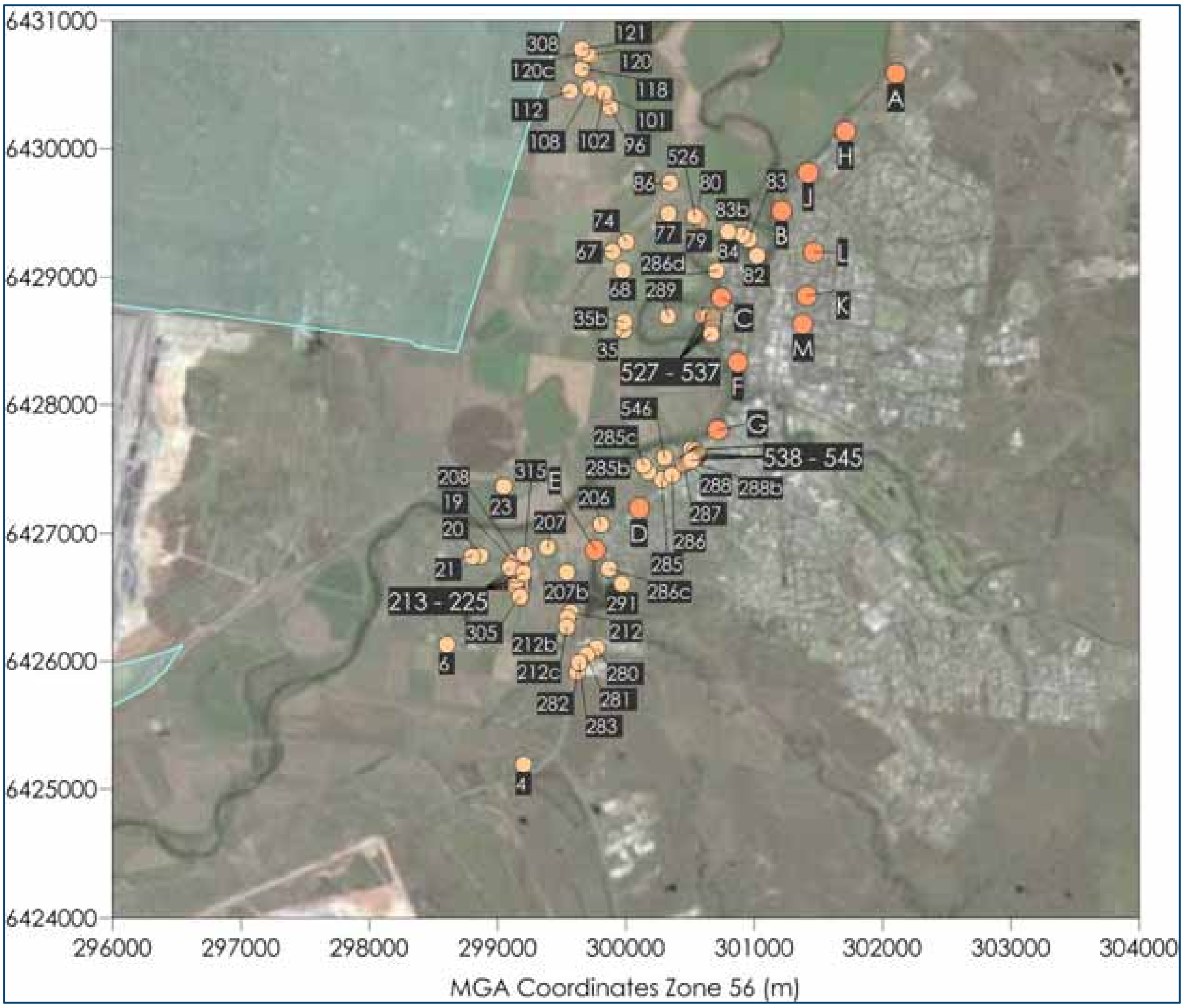

Figure A-5: Location of sensitive receptors assessed in this study – Insert 4 (privately owned)

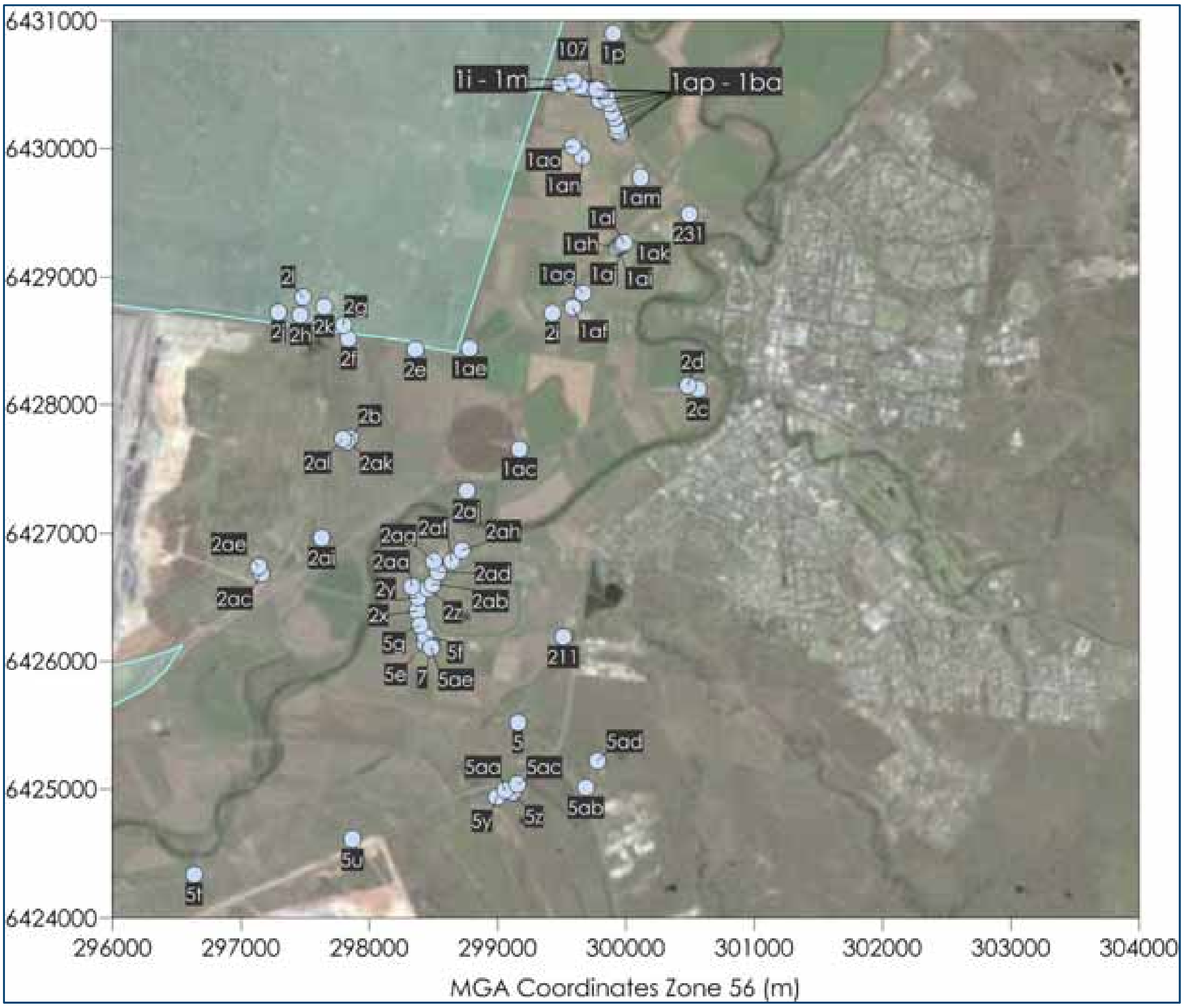

Figure A-6: Location of sensitive receptors assessed in this study – Insert 4 (mine owned)

Table A-1: List of sensitive receptors assessed in this study

Easting	Northing	Receptor ID	Easting	Northing	Receptor ID	Easting	Northing	Receptor ID
Privately-owned receptors								
299202	6425195	4	302170	6432128	195d	297482	6438920	422b
298605	6426135	6	302034	6432899	195e	299588	6438940	434
299120	6426779	19	301994	6431847	198	299863	6438778	436
298866	6426826	20	302094	6431842	199	299729	6438830	437
298804	6426823	21	302258	6431847	200	288345	6434693	453a
299047	6427361	23	301546	6431292	202	288307	6434751	453b
299980	6428580	35	301940	6431205	204	287912	6434470	454
299986	6428649	35b	301451	6431324	203	286641	6434111	456
292318	6429012	43	299806	6427069	206	288254	6433349	458
291384	6428700	44	299389	6426888	207	286648	6429789	462a
291263	6428277	45	299537	6426696	207b	286662	6429918	462b
291276	6429615	47	299174	6426781	208	286574	6429559	463
299896	6429202	67	299208	6426836	315	289097	6428232	464
299976	6429057	68	299568	6426381	212	288366	6427931	465
300003	6429277	74	299544	6426341	212b	289103	6426847	466
300332	6429501	77	299539	6426270	212c	290367	6427991	467
300572	6429448	79	299175	6426554	213	288665	6422488	468a
300556	6429470	80	299183	6426574	214	288416	6422514	468b
301020	6429170	82	299184	6426607	215	288743	6422667	468c
300956	6429298	83	299187	6426634	216	289351	6423345	470
300909	6429329	83b	299192	6426663	217	289165	6423423	471
300800	6429358	84	299137	6426583	218	289360	6423043	472a
291180	6437472	84b	299139	6426600	219	289390	6423191	472b
300342	6429734	86	299144	6426635	220	289062	6422372	474
301865	6431879	86b	299150	6426680	221	290869	6421541	475
299879	6430321	96	299154	6426716	222	289424	6420978	476
299841	6430413	101	299125	6426722	223	290064	6421064	477a
299829	6430440	102	299097	6426732	224	290021	6421067	477b
299715	6430470	108	299204	6426692	225	288731	6420218	481
299566	6430447	112	290948	6423468	249	288291	6420169	482
299655	6430627	118	289457	6424899	252	287961	6420256	483
299721	6430731	120	289575	6424546	252b	288865	6419989	484
299667	6430746	308	291302	6426071	257	288070	6419004	485a
299698	6430741	120c	291000	6426441	258a	288065	6419050	485b
299656	6430778	121	290584	6426756	258b	287991	6419081	485c
300336	6432453	136	290868	6426152	259	287936	6419095	485d
300659	6432952	139	291002	6426002	260	287940	6419101	485e
300978	6433030	140	290650	6425665	261	292323	6421876	487a
301126	6431439	205	289009	6434418	271	292203	6422343	487b
301236	6431474	140c	290603	6433696	272	292981	6421910	488a
299928	6434457	143	290597	6433720	272b	292667	6422644	488b
299209	6435244	161	289237	6435180	273	300537	6429477	526
295898	6435444	153	299773	6426105	280	300600	6428695	527
298537	6435520	154	299691	6426050	281	300622	6428693	528
298882	6435173	156	299620	6425915	282	300641	6428693	529
289455	6428815	267	299633	6425990	283	300678	6428689	530

Easting	Northing	Receptor ID	Easting	Northing	Receptor ID	Easting	Northing	Receptor ID
298965	6434977	157	300280	6427411	285	300678	6428670	531
289024	6427910	266	300172	6427476	285b	300677	6428649	532
299127	6435011	159	300136	6427524	285c	300673	6428627	533
298868	6436638	169	300360	6427448	286	300673	6428611	534
299038	6436955	171	299972	6426608	291	300665	6428593	535
299157	6437224	172	299871	6426726	286c	300665	6428573	536
299130	6437280	310	300709	6429052	286d	300664	6428556	537
298878	6437773	173	300454	6427537	287	300511	6427651	538
298908	6437676	174	300479	6427545	288	300540	6427645	539
298928	6437622	175	300493	6427559	288b	300569	6427621	540
298988	6437509	176	300328	6428692	289	300560	6427606	541
298731	6438046	177	290611	6422527	292	300550	6427597	542
299347	6438053	178	291487	6421945	298	300534	6427590	543
299191	6438159	179	291365	6421702	300	300523	6427578	544
299230	6438233	180	291746	6422103	296a	300509	6427568	545
299562	6438055	180b	291623	6422133	296b	300302	6427587	546
299444	6438872	180c	290914	6421267	302a	302122	6433354	547
300474	6437756	181	290695	6421456	302b	299165	6434674	147
300857	6437446	183	290718	6421463	302c	299063	6435063	158
300023	6437409	181c	299173	6426508	305	302102	6430586	A
300849	6437839	182	289649	6437858	401	301213	6429518	B
300843	6437724	182b	290201	6438459	402	300746	6428837	C
301236	6434698	189	291736	6437533	407	300102	6427193	D
301113	6434682	190	288634	6436895	413a	299763	6426870	E
301421	6434533	191	288465	6437096	413b	300871	6428333	F
301290	6434531	192	288448	6436265	415	300716	6427800	G
301529	6434365	193	287602	6434882	416	301710	6430134	H
301388	6434419	311	288300	6435593	417	300579	6437917	I
302406	6433964	193c	287814	6435336	418	301420	6429816	J
302021	6433456	194	288703	6436630	419	301411	6428853	K
302121	6432949	195	289314	6435713	421	301463	6429196	L
302234	6432240	196	297505	6438903	422a	301381	6428637	M
302117	6432365	197						
Mine-owned receptors								
299733	6430469	107	297852	6427737	2b	297666	6438671	3r
298060	6432528	129	300562	6428120	2c	297229	6438705	3s
298497	6432215	130	300480	6428149	2d	299157	6425521	5
299992	6432182	135	298361	6428430	2e	298474	6426128	7
300494	6429496	231	297839	6428516	2f	299511	6426190	211
291463	6427224	263	297798	6428624	2g	291514	6421734	299
299946	6432340	309	297465	6428703	2h	298433	6426136	5e
299751	6430465	1h	299426	6428718	2i	298437	6426197	5f
299682	6430469	1i	297292	6428728	2j	298396	6426283	5g
299662	6430475	1j	297649	6428770	2k	289883	6421305	5h
299624	6430483	1k	297486	6428841	2l	291557	6421390	5i
299647	6430484	1l	292759	6429036	2m	289652	6421415	5j
299491	6430502	1m	293017	6423526	2n	291647	6421569	5k
299591	6430533	1n	292327	6423973	2o	291885	6422030	5l

Easting	Northing	Receptor ID	Easting	Northing	Receptor ID	Easting	Northing	Receptor ID
291505	6430779	1o	292261	6423976	2p	293829	6422109	5m
299901	6430903	1p	292187	6424053	2q	290201	6422253	5n
299508	6431522	1q	292257	6424062	2r	290884	6422545	5o
298205	6432838	1r	292211	6424104	2s	293237	6422604	5p
298547	6432870	1s	293595	6424750	2t	294513	6422770	5q
296360	6432912	1t	294390	6425005	2u	295707	6423944	5r
296125	6432941	1u	294658	6425080	2v	295980	6424187	5s
296249	6432975	1v	291605	6425845	2w	296636	6424340	5t
297943	6432993	1w	298374	6426394	2x	297868	6424610	5u
297436	6433106	1x	298380	6426499	2y	290216	6424813	5v
296351	6433138	1y	298456	6426569	2z	290173	6424829	5w
299218	6434300	1z	298331	6426589	2aa	290260	6424898	5x
297760	6434394	1aa	298490	6426604	2ab	298996	6424939	5y
299084	6434398	1ab	297160	6426689	2ac	299118	6424976	5z
299171	6427655	1ac	298534	6426700	2ad	299058	6424990	5aa
293038	6436801	1ad	297138	6426742	2ae	299687	6425010	5ab
298783	6428442	1ae	298640	6426782	2af	299155	6425038	5ac
299585	6428763	1af	298505	6426785	2ag	299776	6425222	5ad
299664	6428876	1ag	298721	6426869	2ah	298482	6426106	5ae
299928	6429225	1ah	297630	6426965	2ai	288803	6435159	274
299941	6429237	1ai	298760	6427327	2aj	287608	6421748	7b
299957	6429246	1aj	297826	6427710	2ak	287636	6421806	7c
299970	6429257	1ak	297792	6427732	2al	288584	6426059	7d
299984	6429267	1al	301401	6434809	3a	287898	6427950	7e
300113	6429779	1am	301340	6434861	3b	286867	6428574	7f
299662	6429937	1an	299283	6435042	3c	287944	6432756	7g
299585	6430014	1ao	301334	6435087	3d	288913	6434308	7h
299957	6430106	1ap	301328	6435119	3e	288166	6434615	7i
299951	6430122	1aq	301318	6435356	3f	289298	6434616	7j
299932	6430141	1ar	299242	6435789	3g	289566	6436695	7k
299935	6430177	1as	298907	6435815	3h	286721	6420297	8a
299909	6430242	1at	300387	6436168	3i	286950	6420594	8b
299892	6430283	1au	301316	6436179	3j	286885	6420606	8c
299868	6430351	1av	298996	6436300	3k	287322	6421776	8d
299796	6430380	1aw	297899	6436391	3l	286763	6422241	8e
299851	6430393	1ax	297973	6436398	3m	287200	6425415	8f
299812	6430453	1ay	299587	6436753	3n	287670	6427813	8g
299792	6430458	1az	297890	6436905	3o	287584	6427890	8h
299775	6430463	1ba	297515	6436960	3p	286574	6428569	8i
292872	6423435	246	297714	6436969	3q			

Appendix B

Existing Environment

This Appendix describes the local climate and ambient air quality in the general area surrounding the Mount Pleasant Operation.

Local climatic conditions

Long term climatic data collected at the closest Bureau of Meteorology (BoM) weather station at Scone Soil Conservation Service (SCS) (Station Number 061089) were analysed to characterise the local climate in the proximity of the Project. The Scone SCS is located approximately 26km north-northeast of the Project.

Table B-1 and **Figure B-1** show climatic parameters which have been collected from the Scone SCS over a 17 to 67 year period. These data assist in characterising the local climatic conditions based on the long term meteorological parameters.

The data indicate that January is the hottest month with a mean maximum temperature of 31.2 degrees Celsius (ºC) and July is the coldest month with a mean minimum temperature of 4.7ºC.

Rainfall peaks during the summer months and declines during winter. The data show January is the wettest month with an average rainfall of 83.1 millimetres (mm) over 6.6 days and July is the driest month with an average rainfall of 36.8mm over 5.1 days.

Relative humidity levels exhibit variability over the day and seasonal fluctuations. Mean 9am relative humidity levels range from 59 per cent in October to 78 per cent in June. Mean 3pm relative humidity levels vary from 39 per cent in December to 58 per cent in June.

Wind speeds during the warmer months have a greater spread between the 9am and 3pm conditions compared to the colder months. The mean 9am wind speeds range from 6.7 kilometres per hour (km/h) in May to 10.0km/h in November. The mean 3pm wind speeds vary from 10.0km/h in May to 15.0km/h in November.

Table B-1: Monthly climate statistics summary – Scone SCS

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Temperature													
Mean max. temperature (ºC)	31.2	29.9	28.0	24.6	20.3	17.0	16.4	18.4	21.6	25.1	27.9	30.3	24.2
Mean min. temperature (ºC)	16.9	16.8	14.6	11.3	8.0	6.0	4.7	5.5	7.9	10.8	13.3	15.7	11.0
Rainfall													
Rainfall (mm)	83.1	75.0	52.5	39.4	46.0	46.3	36.8	38.9	38.7	56.8	63.1	67.6	644.2
Mean No. of rain days (≥1mm)	6.6	5.7	5.1	4.4	5.2	6.0	5.1	5.1	5.3	6.0	6.4	6.6	67.5
9am conditions													
Mean temperature (ºC)	22.9	21.9	20.2	17.6	13.3	10.4	9.5	11.5	15.2	18.7	20.3	22.5	17.0
Mean relative humidity (%)	67	73	73	71	76	78	75	67	62	59	62	61	69
Mean wind speed (km/h)	8.2	7.8	7.4	6.9	6.7	7.2	7.7	9.2	9.6	9.8	10.0	8.9	8.3
3pm conditions													
Mean temperature (ºC)	29.3	28.5	26.4	23.0	19.0	15.6	14.9	17.1	20.1	23.3	25.8	28.5	22.6
Mean relative humidity (%)	43	47	47	47	56	58	54	46	43	42	41	39	47
Mean wind speed (km/h)	14.9	14.3	13.5	11.6	10.0	10.4	10.9	13.4	13.9	13.6	15.0	14.2	13.0

Source: **Bureau of Meteorology, 2017**

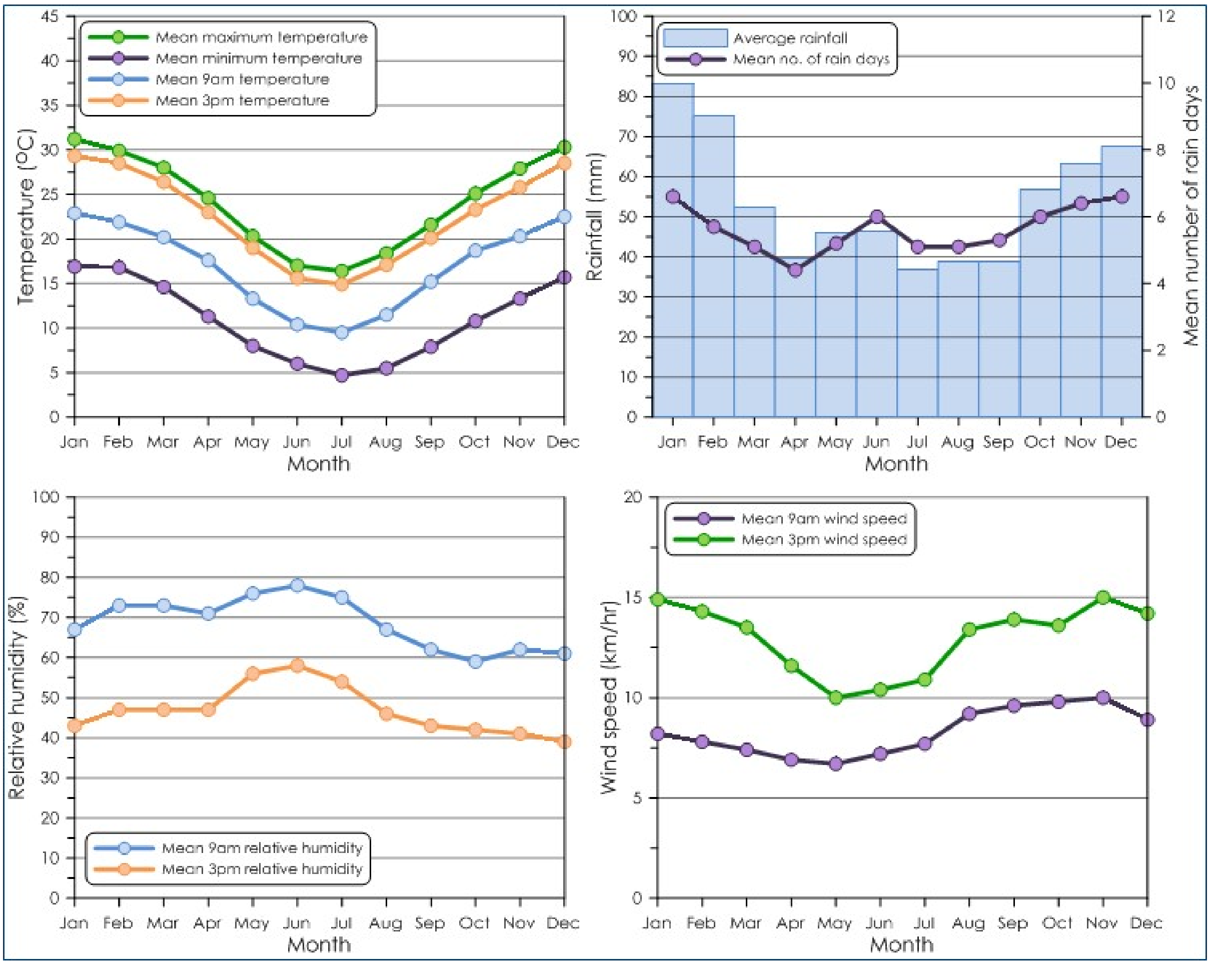

Figure B-1: Monthly climate statistics summary – Scone SCS

<u>Local meteorological conditions</u>

Three weather stations are located in close proximity to the Mount Pleasant Operation and the data recorded at these stations have been reviewed. The weather stations include one operated for the Mount Pleasant Operation and the other two operated by the NSW Office of Environment and Heritage (OEH) identified as the Muswellbrook NW and Muswellbrook weather stations.

Figure B-2 to **Figure B-5** present the locations of these stations overlaid with the annual windroses from the available data during 2012 to 2015.

It can be seen in the figures that the annual windroses for each station show similar inter-annual patterns in each year, and indicate the expected variability in the measured meteorological data due to the location of the weather station in the surrounding terrain.

For the Mount Pleasant Operation weather station, on an annual basis, winds typically flow along a north-northwest/ northwest to a south-southeast axis with very few winds arising from the northeast and southwest quadrants.

At the Muswellbrook NW weather station, winds are more varied and wind speeds are relatively lower in comparison to the Mount Pleasant Operation weather station. Winds from the south-southeast and north-east dominate the distribution. Winds from the north-east are identified as drainage flows along the Hunter River floodplain.

The Muswellbrook weather station indicates that winds are typically from south-east with fewer winds from the north-west quadrant. Very few winds occur from the north-east and south-west quadrants.

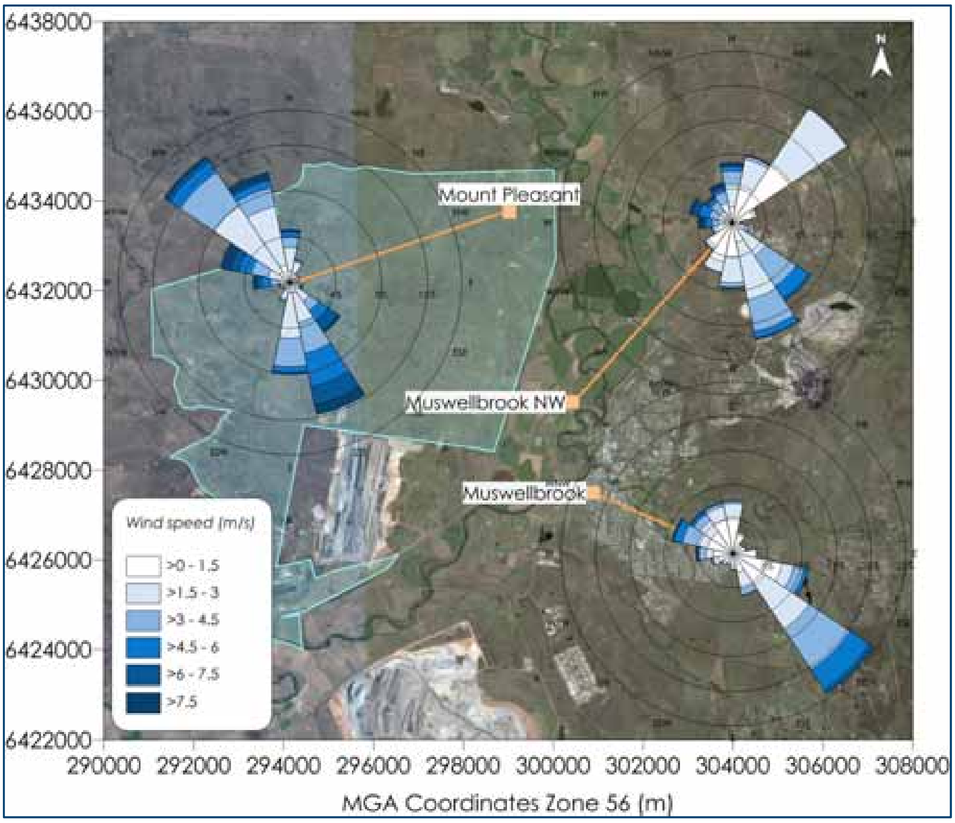

Figure B-2: Annual windroses for 2012

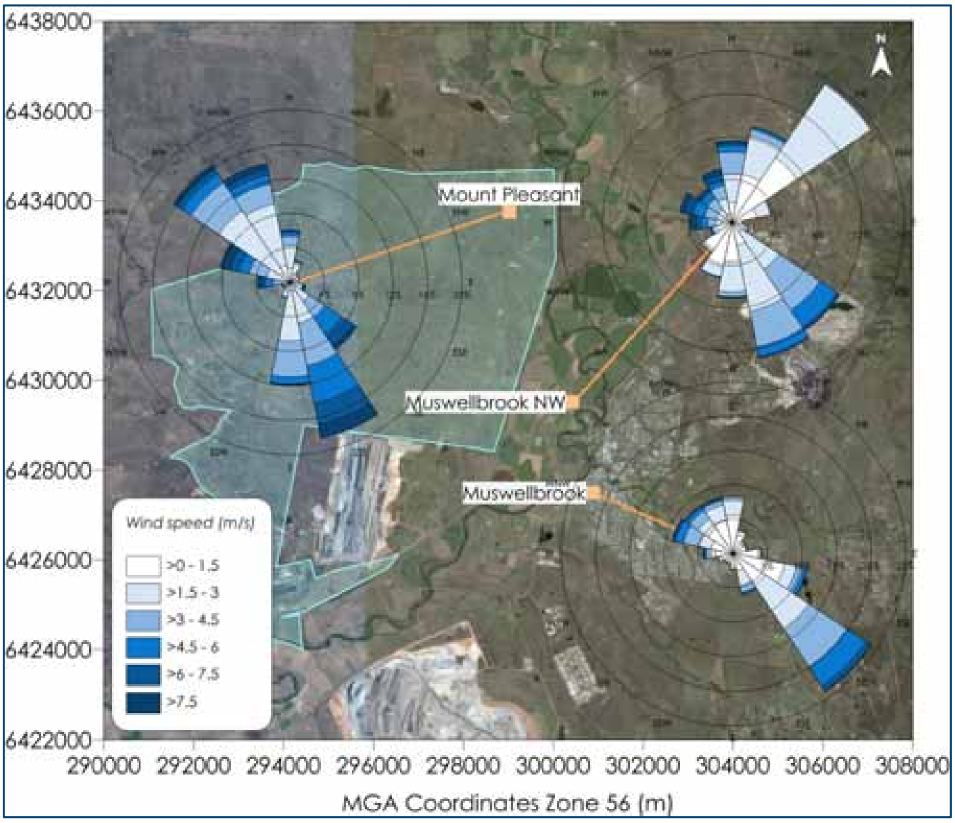

Figure B-3: Annual windroses for 2013

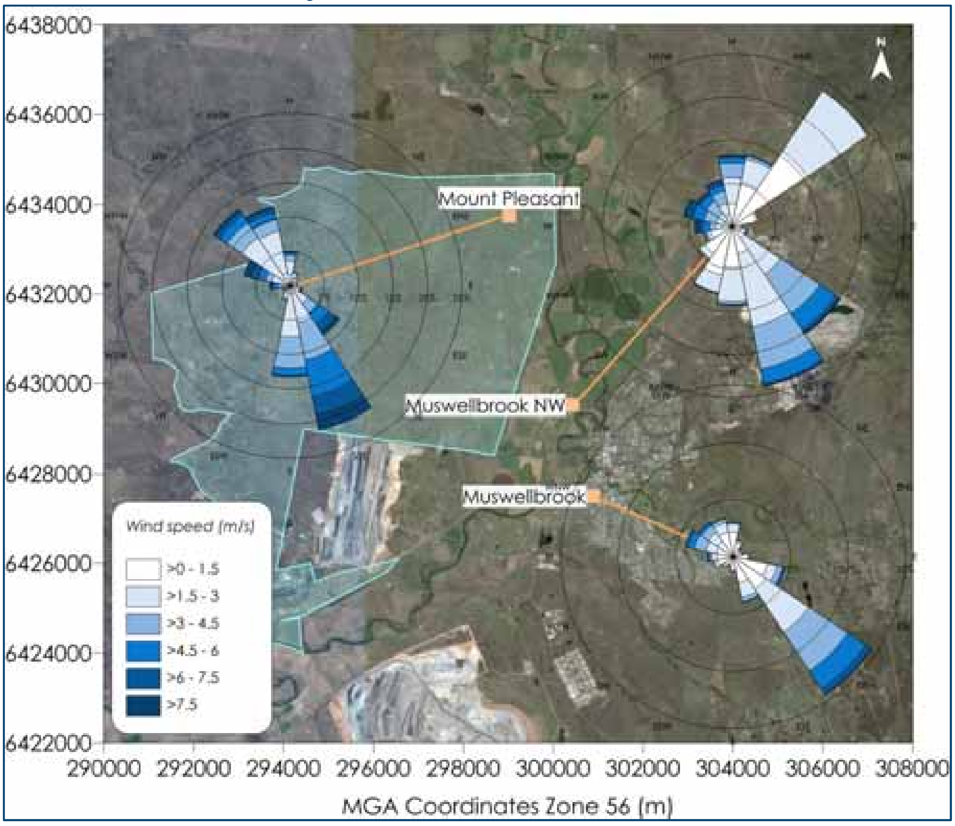

Figure B-4: Annual windroses for 2014

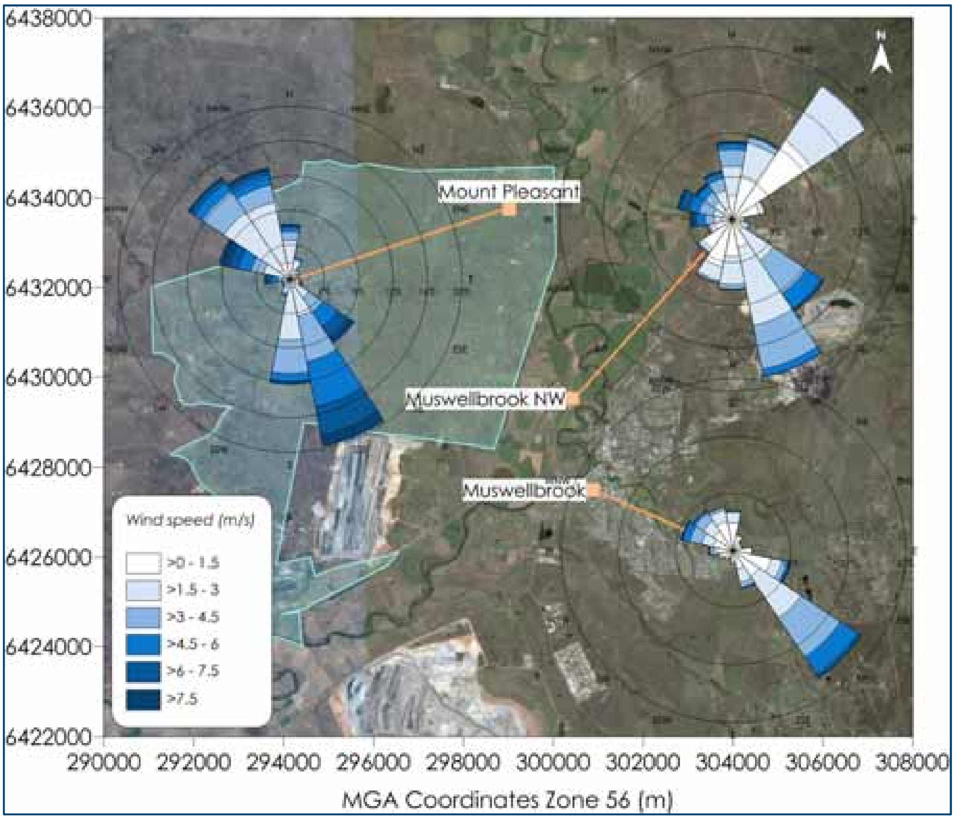

Figure B-5: Annual windroses for 2015

Statistical analysis of met data

The selection of the meteorological year for modelling considered the representativeness of the chosen year against available long-term datasets.

A statistical analysis of five contiguous years of meteorological data from the Scone Airport Automatic Weather Station (AWS) is presented in **Table B-2**. The standard deviation of the five years were analysed against the long-term measured wind speed, temperature and relative humidity spanning a 14 to 19 year period recorded at the station.

The analysis indicates that 2012 is closest to the long-term average for wind speed followed closely by 2014 and 2015. 2012 and 2013 is the closest to the long-term average for temperature and suggests the inter-annual temperature variation is small. For relative humidity, 2015 is the closest and shows greater variation between the selected years.

Overall this analysis would suggest 2012, 2014 or 2015 could be considered for the assessment as they are generally representative of the long-term measured wind speed, temperature and relative humidity.

Table B-2: Statistical analysis results of standard deviation from long-term meteorological data at Scone Airport AWS

Year	Wind speed	Temperature	Relative humidity
2011	1.4	1.1	4.3
2012	1.0	0.9	5.2
2013	1.4	0.9	5.4
2014	1.1	1.0	5.8
2015	1.1	1.0	3.8

Figure B-6 presents a graphical analysis of monthly meteorological conditions at the Scone Airport AWS from 2011 to 2015. The monthly conditions for a range of meteorological parameters are expressed as the maximum, minimum, 25^{th} and 75^{th} percentile.

The 2015 data is presented as the orange line for comparison with the range of the long term data set shown in the blue colours.

The 2015 data shows a higher percentage of winds originating from the northwest quadrant compared to the other years and for this assessment would likely show a potential worst-case impact for receptors in Muswellbrook. Therefore, based on a review of all years the 2015 data selected for modelling.

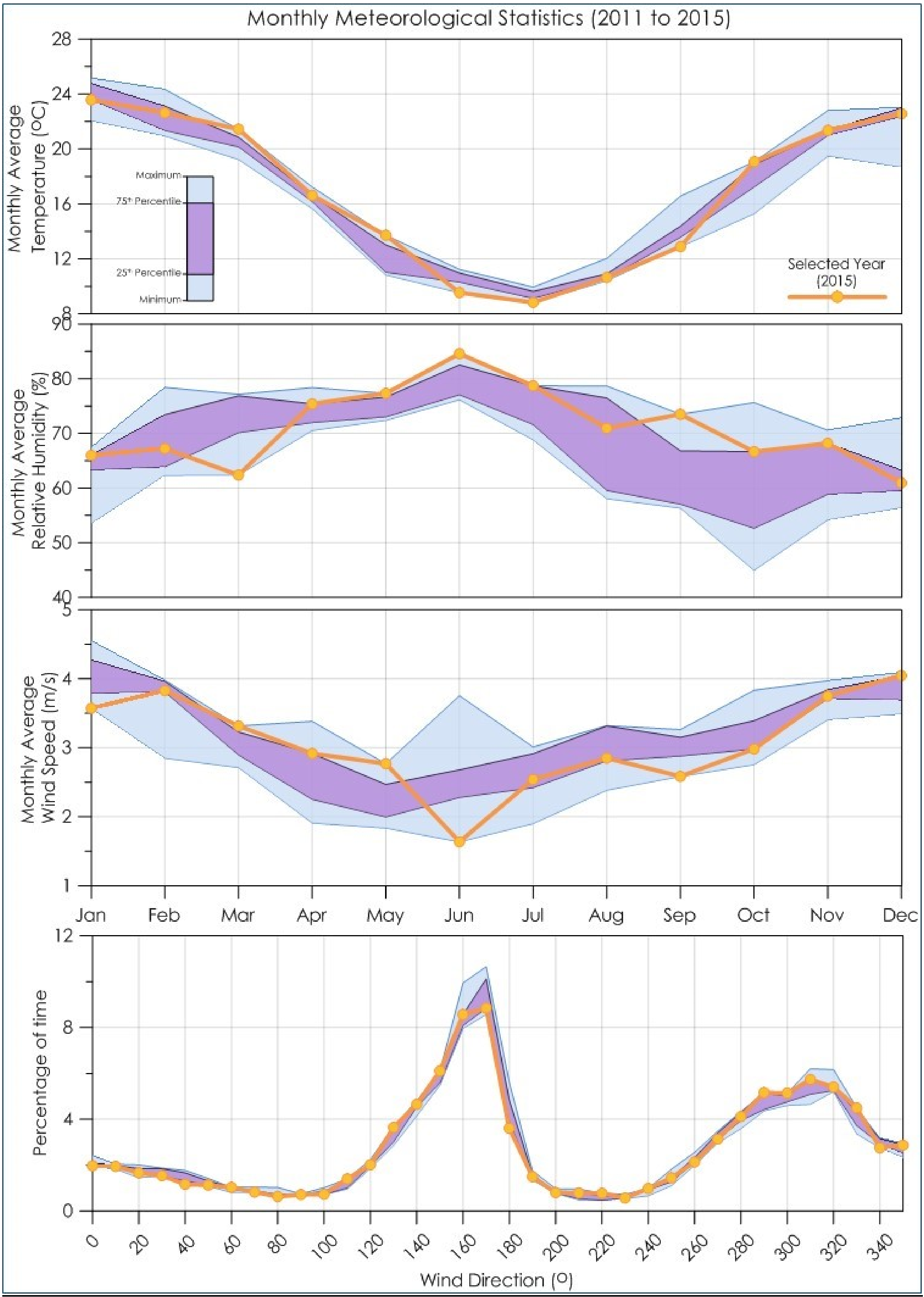

Figure B-6: Graphical analysis of meteorological conditions at Scone Airport AWS

Local air quality monitoring

The main sources of particulate matter in the wider area include active mining, agricultural activities, emissions from local anthropogenic activities such as motor vehicle exhaust and domestic wood heaters, urban activity and various other commercial and industrial activities including power generation associated with the Liddell, Bayswater and Redbank power stations.

This section reviews the available ambient air quality monitoring data sourced from the Mount Pleasant Operation and surrounding mining operations' air quality monitoring networks and the UHAQMN.

PM_{10} and TSP monitoring

Ambient PM_{10} and TSP monitoring data sourced from 30 stations have been reviewed. **Figure B-7** shows the approximate location of each of the monitoring stations with reference to the Mount Pleasant Operation. The type of air quality monitors used to measure ambient PM_{10} and TSP include TEOMs and HVAS.

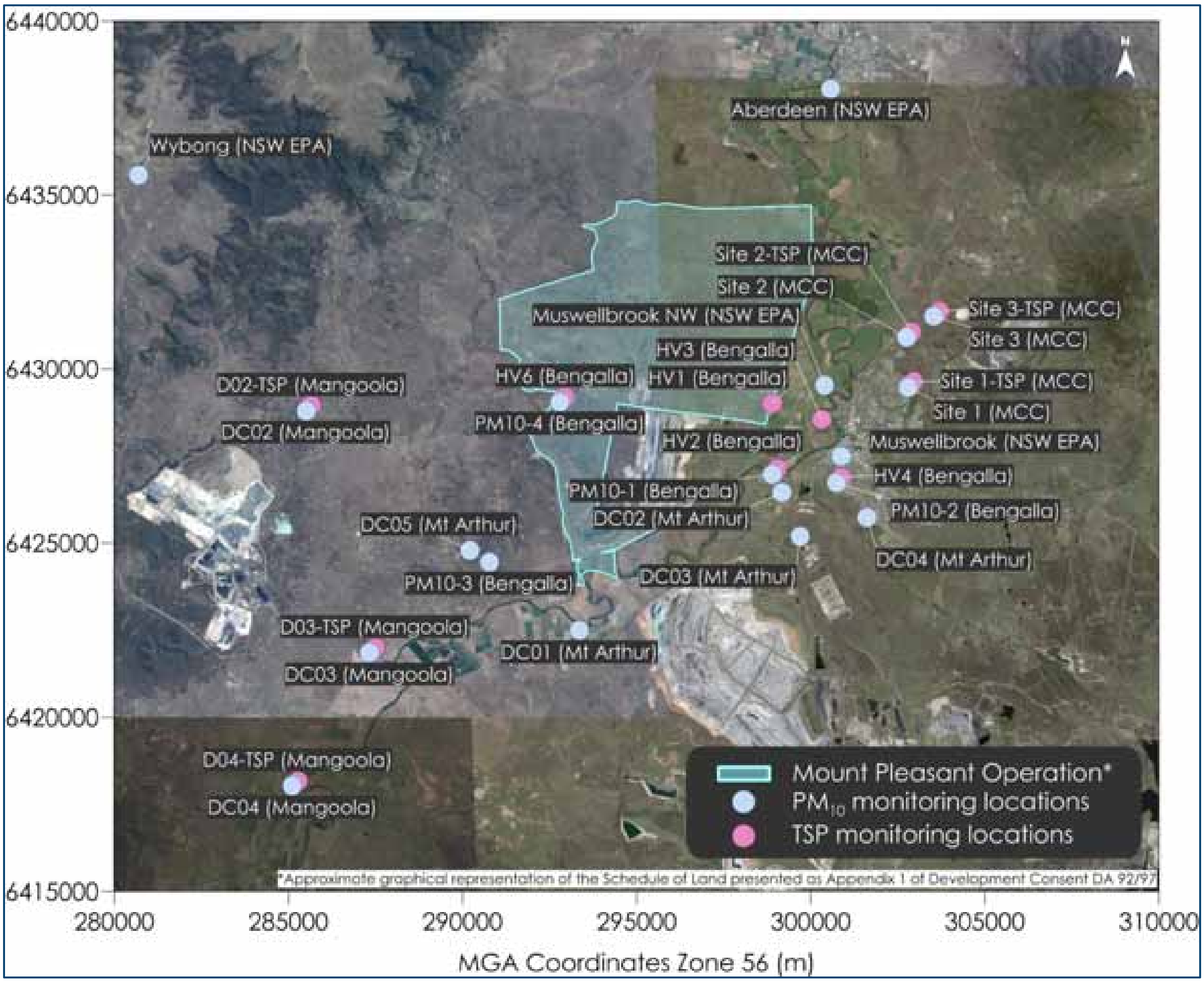

Figure B-7: Ambient PM_{10} and TSP monitoring locations

The available PM_{10} monitoring data from the UHAQMN monitoring stations has been reviewed and is summarised in **Table B-3**. Recorded 24-hour average PM_{10} concentrations are presented graphically in **Figure B-8**. The ambient PM_{10} monitoring data include the contribution from all emission sources in the vicinity of the monitoring locations and the Mount Pleasant Operation.

A review of **Table B-3** indicates that the annual average PM_{10} concentrations for each monitoring station were below the relevant criterion of 25µg/m³. The maximum 24-hour average PM_{10} concentrations recorded at these stations exceed the relevant criterion of 50µg/m³ at times during the review period.

Table B-3: Summary of ambient PM_{10} levels from UHAQMN (µg/m³)

Location	Annual average				Maximum 24-hour average			
	2012	2013	2014	2015	2012	2013	2014	2015
Muswellbrook NW	19.1	18.9	19.2	16.7	55.8	52.4	50.8	72.9
Muswellbrook	21.8	22.6	21.4	19.1	51.0	55.6	53.0	72.6
Aberdeen	17.0	17.3	17.9	15.2	45.8	42.7	50.4	64.8
Wybong	15.4	15.5	17.0	14.8	54.4	83.0	67.7	79.5

It can be seen from **Figure B-8** that PM_{10} concentrations are nominally highest in the spring and summer months with the warmer weather raising the potential for drier ground elevating the occurrence of windblown dust, bushfires and pollen levels.

Examination of the potential cause of the elevated PM_{10} levels indicate that they typically coincide with regional dust events and bushfires which affect a wide area, for example as indicated by other air quality monitoring stations in the surrounding region also recording elevated levels on such days. At other times, potential sources such as local agricultural sources, mining activity and other sources may have contributed to periods of elevated PM_{10} levels.

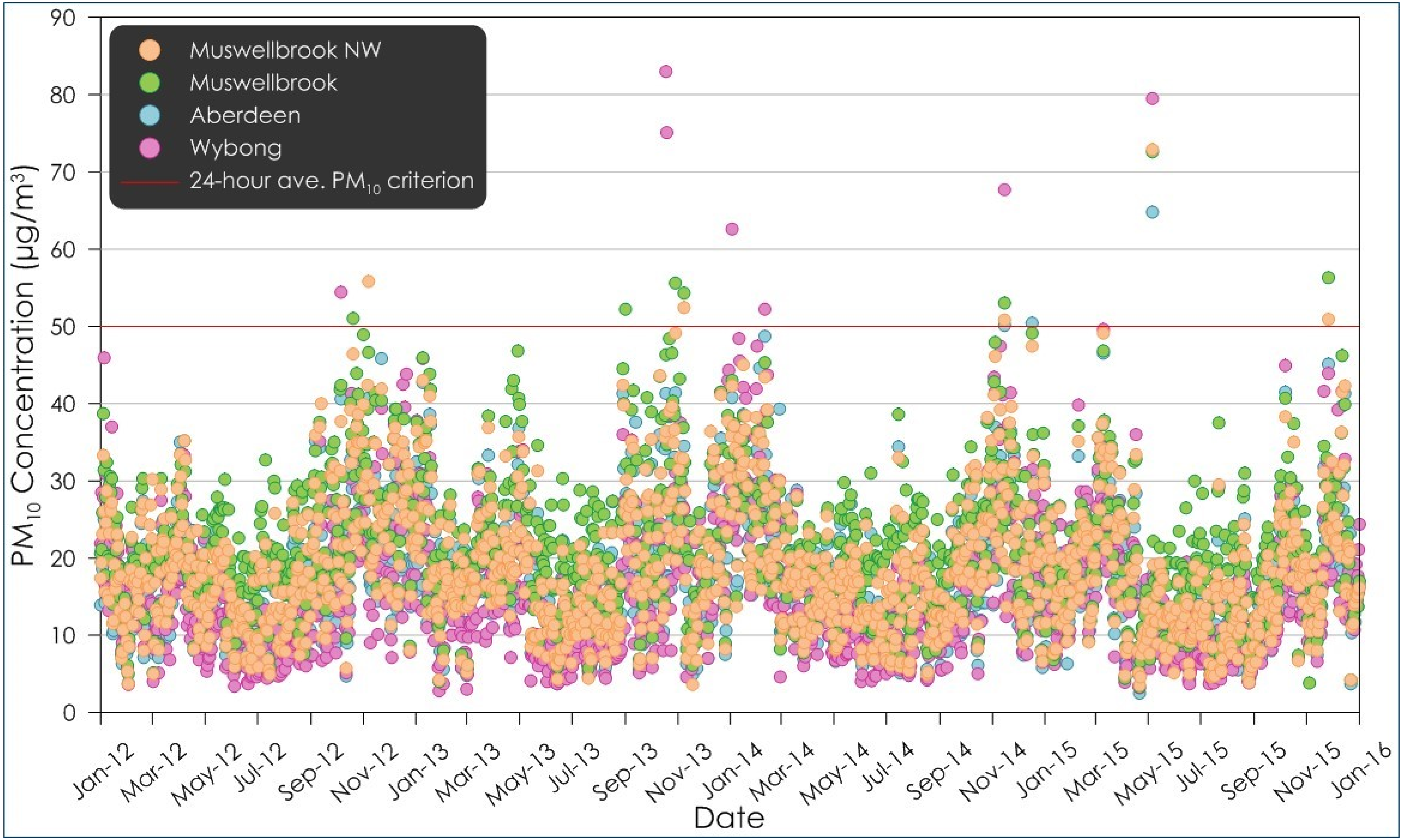

Figure B-8: 24-hour average PM_{10} concentrations at UHAQMN monitoring stations

Table B-4 summarises the annual average PM_{10} levels from monitoring stations operated by nearby mining operations, including; Mt Arthur Coal Mine, Mangoola Coal, Bengalla Mine and MCC.

The ambient air quality monitoring data for these stations were obtained from publically available sources including annual reviews and published monitoring data records.

For the 2012 to 2015 period, all monitoring stations recorded levels below 25µg/m³ with the exception of the PM10-1 station operated by Bengalla Mine which recorded a level of 26.0µg/m³ in 2013.

The recorded annual average levels at these monitors typically show similar levels to those recorded at the UHAQMN stations for the same period. Monitoring stations located closer to mining operations generally indicate high levels of PM_{10} compared to those located further away.

Table B-4: Summary of annual average PM_{10} levels from surrounding mining operations (µg/m³)

Location	2012	2013	2014	2015
DC01 (Mt Arthur)	16.7	-	-	-
DC02 (Mt Arthur)	16.7	22.4	21.3	18.5
DC03 (Mt Arthur)	18.9	-	-	-
DC04 (Mt Arthur)	18.3	20.8	20.4	18.4
DC05 (Mt Arthur)	10.8	16.1	16.3	14.1
DC04 (Mangoola)	11.1	12.2	12.2	9.9
DC03 (Mangoola)	13.6	14.9	15.4	12.3
DC02 (Mangoola)	13.3	14.5	14.4	11.4
PM10-1 (Bengalla)	24.4	**26.0**	23.5	20.0
PM10-2 (Bengalla)	25.0	22.5	23.6	18.9
PM10-3 (Bengalla)	16.2	17.7	23.7	18.9
PM10-4 (Bengalla)	20.1	20.2	23.7	22.7
Site 1 (MCC)	-	16.6	17.2	14.9
Site 2 (MCC)	-	17.3	17.6	14.9
Site 3 (MCC)	-	18.6	15.3	13.7

Table B-5 summarises the available annual average TSP levels for monitoring stations operated by nearby mining operations. For the 2012 to 2015 period, all monitoring stations recorded levels below 90µg/m³.

Table B-5: Summary of annual average TSP levels from surrounding mining operations (µg/m³)

Location	2012	2013	2014	2015
D02-TSP (Mangoola)	41.4	42.9	47	37.3
D03-TSP (Mangoola)	37.7	43.5	50	38
D04-TSP (Mangoola)	28.7	36.7	38.6	39.5
HV1 (Bengalla)	50.1	45.5	60.3	45.8
HV2 (Bengalla)	60.9	61.3	67.3	54.1
HV3 (Bengalla)	43.5	42.6	49.3	39.1
HV4 (Bengalla)	55	51.6	60.9	44.5
HV6 (Bengalla)	64.6	66.1	80.1	73.1
Site 1 (MCC)	-	33.0	39.5	29.8
Site 2 (MCC)	-	37.5	39.4	29.7
Site 3 (MCC)	-	38.2	51.4	32.9

$PM_{2.5}$ monitoring

A summary of the available $PM_{2.5}$ monitoring data from the UHAQMN Muswellbrook monitoring station is presented in **Table B-6**. Recorded 24-hour average $PM_{2.5}$ concentrations are presented graphically in **Figure B-9**.

A review of **Table B-6** indicates that the annual average $PM_{2.5}$ concentrations for the Muswellbrook monitoring station were above the relevant criterion of 8µg/m^3 for the periods reviewed. The maximum 24-hour average $PM_{2.5}$ concentrations recorded at these stations were also found to exceed the relevant criterion of 25µg/m^3 at times during the review period.

Table B-6: Summary of ambient $PM_{2.5}$ levels (µg/m³)

	Annual average				Maximum 24-hour average			
	2012	2013	2014	2015	2012	2013	2014	2015
Muswellbrook	10.1	9.4	9.7	8.7	26.4	36.6	27.4	31.2

A seasonal trend in 24-hour average $PM_{2.5}$ concentrations can be seen in **Figure B-9** with elevated levels occurring in the cooler months. This is opposite to the seasonal trend for PM_{10} concentrations which has elevated levels during the warmer months. Ambient $PM_{2.5}$ levels at the Muswellbrook monitoring station are likely to be governed by many non-mining background sources such as wood heaters and motor vehicles. The wintertime peak in $PM_{2.5}$ levels would arise due to emissions from urban wood heaters in the nearby residential areas.

$PM_{2.5}$ monitors located near mining operations (away from towns) are found to have little seasonal trend in comparison to the Muswellbrook monitoring station (**Todoroski Air Sciences, 2014**). This suggests the influence of anthropogenic sources on $PM_{2.5}$ levels is localised to the towns and does not significantly affect the areas that are sparsely populated.

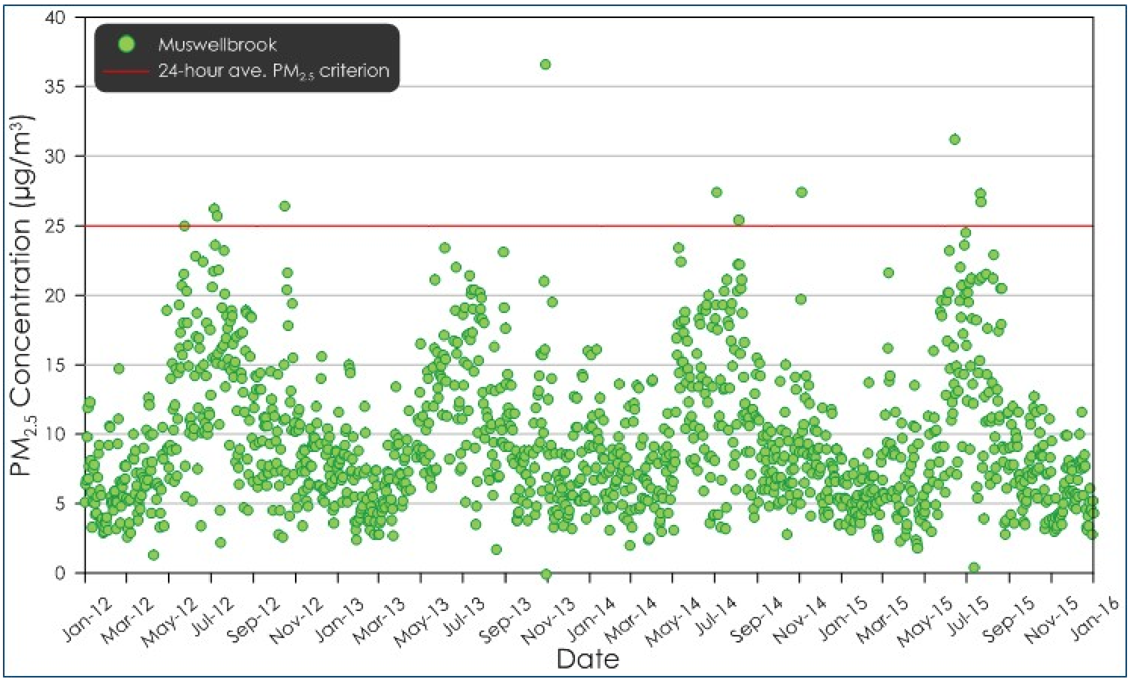

Figure B-9: 24-hour average $PM_{2.5}$ concentrations from UHAQMN Muswellbrook monitoring station

Dust deposition monitoring

Dust deposition monitoring conducted by the Mount Pleasant Operation, Bengalla Mine, Mangoola Coal and MCC have been reviewed.

Figure B-10 to **Figure B-13** present visualisations of the recorded dust deposition levels during 2012 to 2015. The figures show the interpolated data graphically (note that these are not modelling results and thus no result may be shown in places where no monitoring occurs).

The results indicate that dust deposition levels are typically highest near mining activity. It is noted that Bengalla Mine have a number of monitors located very close to mining which skews the isopleths, this should not be interpreted to mean the mine is any dustier than any other.

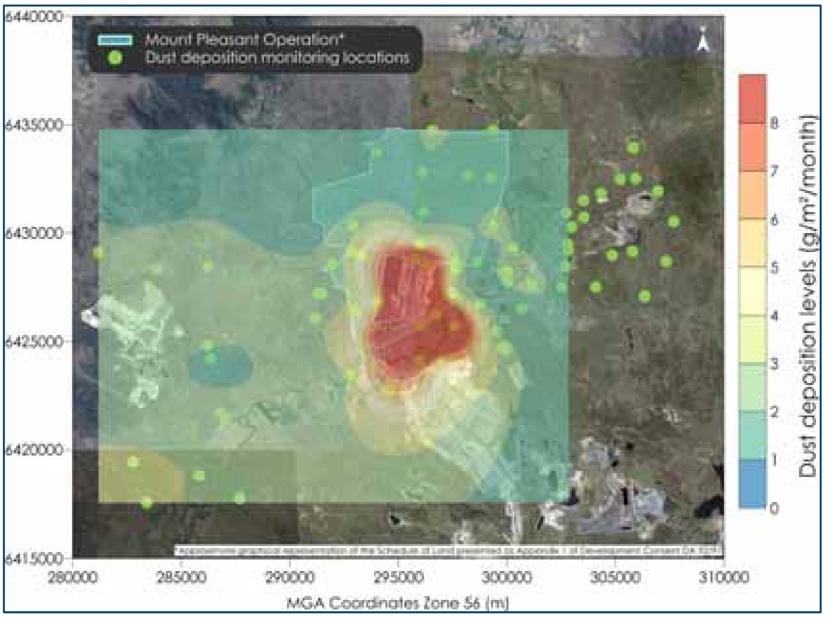

Figure B-10: Visualisation of measured annual average dust deposition levels for 2012

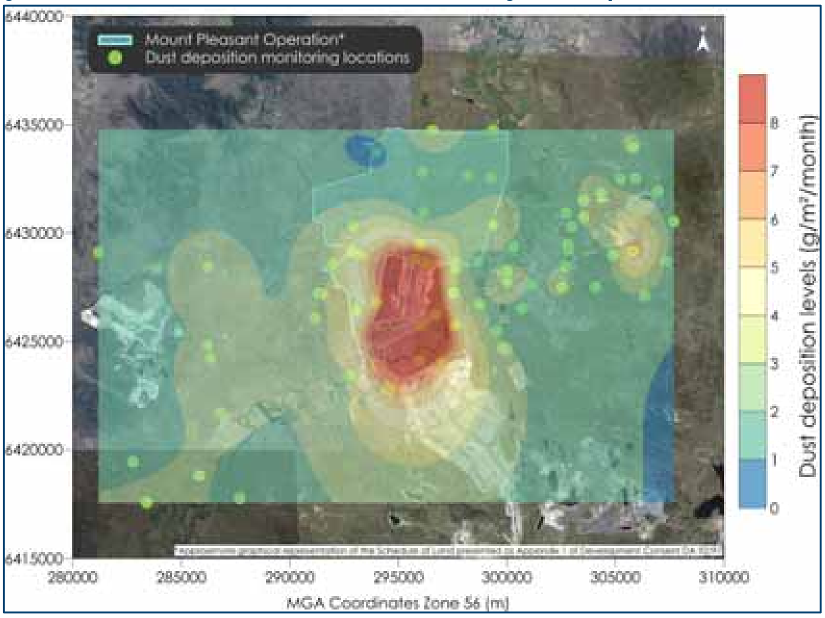

Figure B-11: Visualisation of measured annual average dust deposition levels for 2013

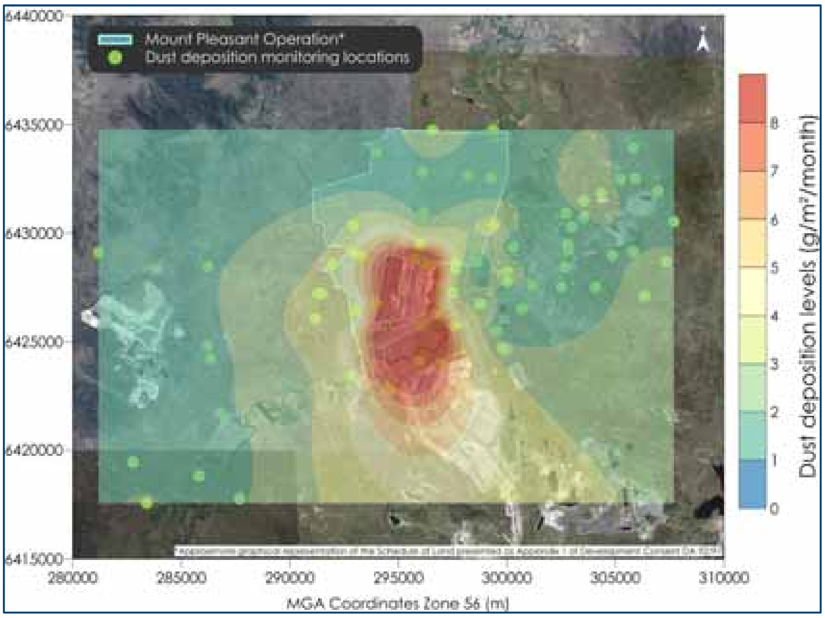

Figure B-12: Visualisation of measured annual average dust deposition levels for 2014

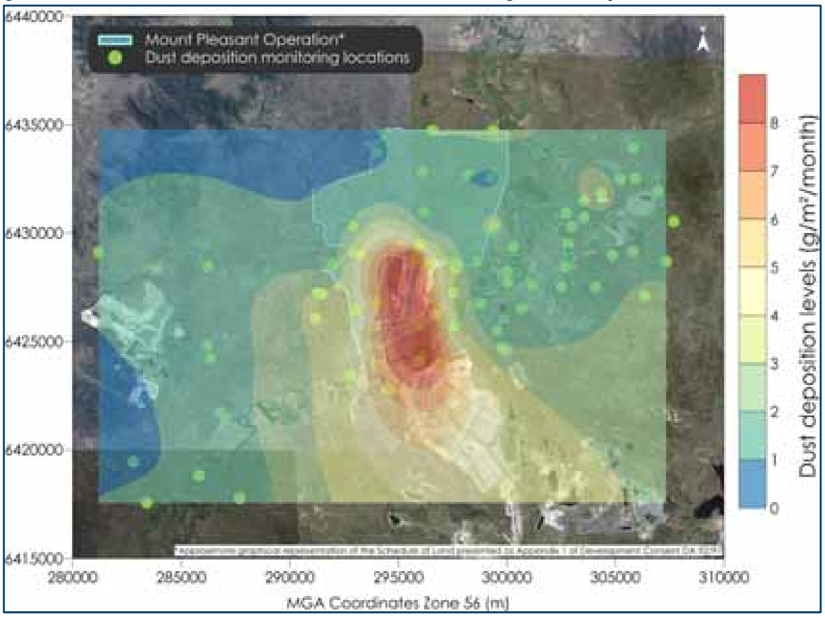

Figure B-13: Visualisation of measured annual average dust deposition levels for 2015

Nitrogen dioxide monitoring

Figure B-14 presents the maximum daily 1-hour average NO_2 concentrations from the UHAQMN Muswellbrook monitoring station from January 2012 to December 2015.

The ambient air quality monitoring data would include emissions from sources such as the Liddell, Bayswater and Redbank power stations, methane gas flaring operations at mining operations as well as other various combustion sources. The monitoring data recorded are well below the NSW EPA 1-hour average goal of 246µg/m^3 during the review period and the data in **Figure B-14** indicate very little seasonal variation.

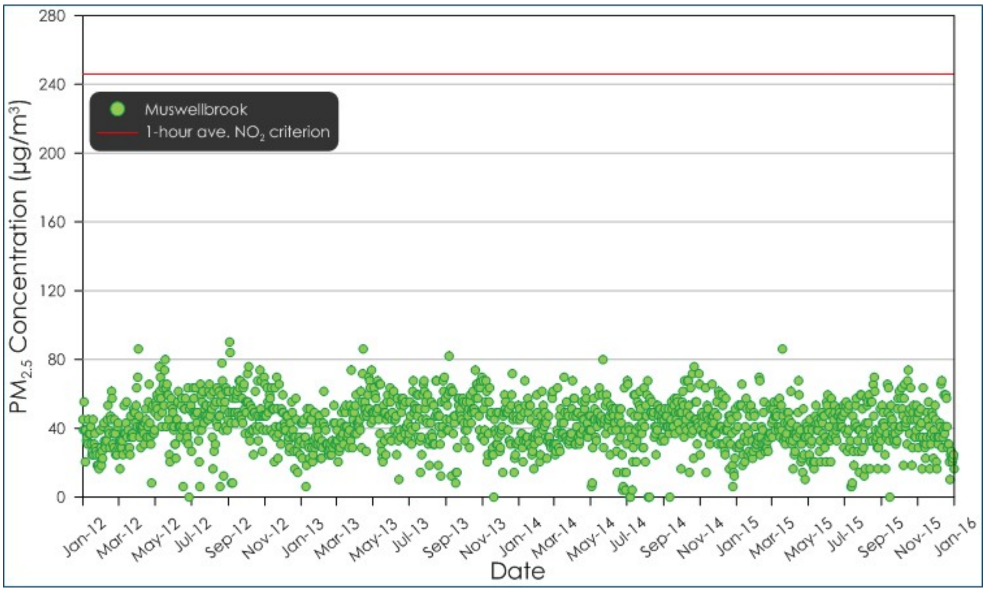

Figure B-14: Daily 1-hour maximum NO_2 concentrations from UHAQMN Muswellbrook monitoring station

Appendix C

Dispersion Modelling Approach

Introduction

For this assessment the CALPUFF modelling suite is applied to dispersion modelling. CALPUFF is an air dispersion model approved by the NSW EPA for use in air quality impact assessments.

The model setup used is in general accordance with methods provided in the NSW EPA document *Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia'* (**TRC Environmental Corporation**, **2011**).

Meteorological modelling

The meteorological modelling methodology applied a 'hybrid' approach which includes a combination of prognostic model data from TAPM with surface observations.

TAPM was applied to generate prognostic upper air data for use in CALMET. The centre of analysis for the TAPM modelling used is 32deg15min south (295000m) and 150deg49.5min east (6430000m). The TAPM simulation involved an outer grid of 30km, with three nested grids of 10km, 3km and 1km with 35 vertical grid levels.

The CALMET modelling used a nested approach where the wind field from the coarser grid outer domain is used as the initial (or starting) field for the finer grid inner domains. The CALMET initial domain was run on an 85 x 85km grid with a 1.7km grid resolution and refined for a second domain on a 50 x 50km grid with a 1.0km grid resolution and further refined for a final domain on a 30 x 30km grid with a 0.3km grid resolution.

The 2015 calendar year is selected as the period for modelling the Modification. Accordingly, the available meteorological data from eight nearby meteorological monitoring sites were included in the simulation. **Table C-1** outlines the parameters used from each station.

Table C-1: Surface observation stations

Weather Stations	Parameters						
	WS	WD	CH	CC	T	RH	SLP
Mount Pleasant Operation	✓	✓			✓	✓	
Muswellbrook NW (NSW OEH)	✓	✓			✓	✓	
Muswellbrook (NSW OEH)	✓	✓			✓	✓	
Scone Airport AWS (BoM) (Station No. 061363)	✓	✓			✓	✓	✓
Murrurundi Gap AWS (BoM) (Station No. 061392)	✓	✓	✓	✓	✓	✓	✓
Merriwa (Roscommon) Weather Station (BoM) (Station No, 061287)	✓	✓	✓	✓	✓	✓	✓
Cessnock Airport AWS (BoM) (Station No. 061260)	✓	✓			✓	✓	✓
Nullo Mountain AWS (BoM) (Station No. 062100)	✓	✓			✓	✓	

WS = wind speed, WD= wind direction, CH = cloud height, CC = cloud cover, T = temperature, RH = relative humidity, SLP = station level pressure and AWS = Automatic Weather Station

The seven critical parameters used in the CALMET modelling are presented in **Table C-2**.

Table C-2: Seven critical parameters used in CALMET

Parameter	Value		
	Domain 3	Domain 2	Domain 1
TERRAD	10		
IEXTRP	-4		
BIAS (NZ)	-1, -0.5, -0.25, 0, 0, 0, 0, 0		
R1 and R2	2.5,2.5	5,5	10,10
RMAX1 and RMAX2	5,5	10,10	20,20

Meteorological modelling evaluation

The outputs of the CALMET modelling is evaluated using visual analysis of the wind fields and extracted data and also through statistical evaluation.

Figure C-1 presents a visualisation of the wind field generated by CALMET for a single hour of the modelling period. The wind fields are seen to follow the terrain well and indicate the simulation produces realistic fine scale flow fields (such as terrain forced flows) in surrounding areas.

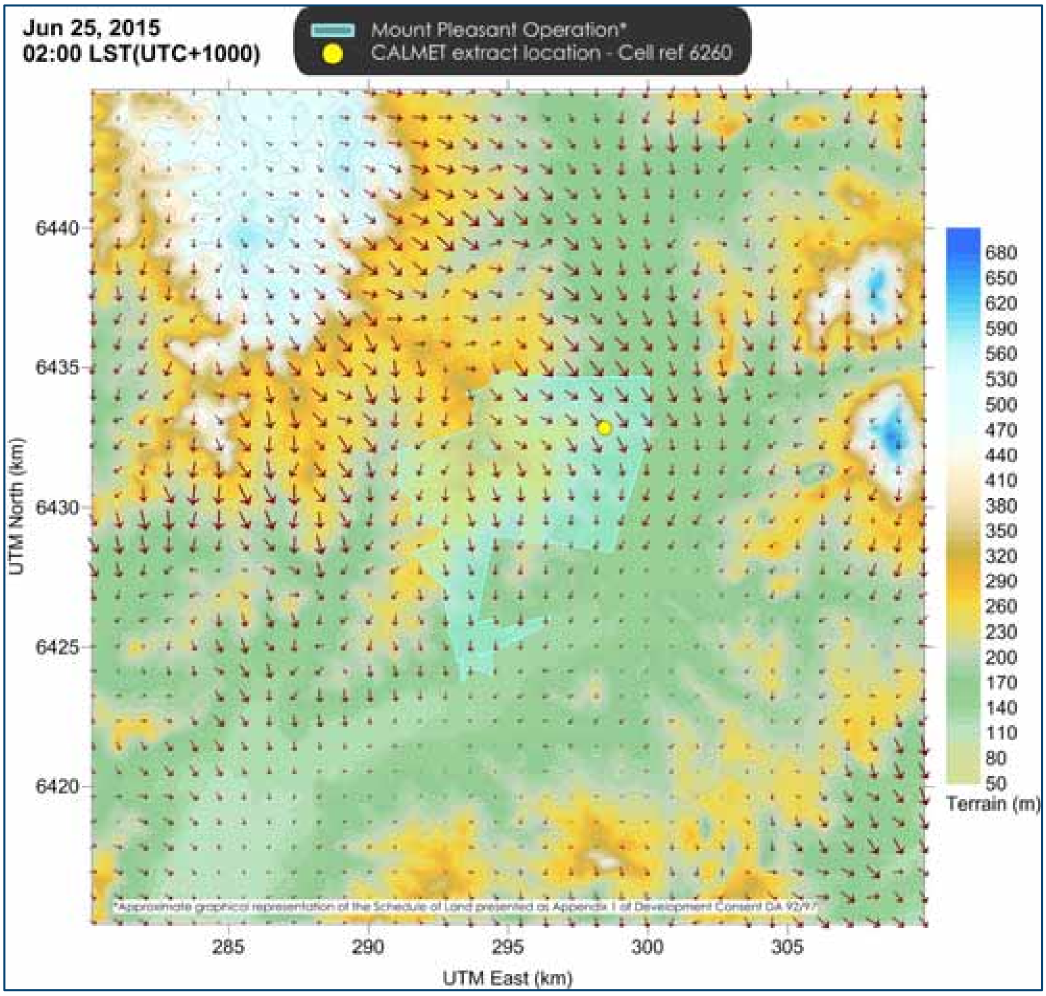

Figure C-1: Example of the wind field for one of the 8,760 hours of the year that are modelled

CALMET generated meteorological data were extracted at a location within the CALMET domain (see **Figure C-1**) and are graphically represented in **Figure C-2** and **Figure C-3**.

Figure C-2 presents annual and seasonal windroses extracted at a location within the CALMET domain. On an annual basis, winds from the south-southeast are most frequent followed by winds from the north-west. During summer, winds from the south-southeast dominate the distribution with fewer winds from the south and south-east. The autumn and spring wind distribution patterns are similar to the annual distribution with the majority of winds originating from the south-southeast and north-west. In winter, winds from the north-west are the most predominant.

Overall the windroses generated in the CALMET modelling reflect the expected wind distribution patterns of the area as determined based on the available measured data and the expected terrain effects on the prevailing winds. This is evident as the windroses based on the CALMET data also compare well with the windroses generated with the measured data, as presented in **Figure B-2** to **Figure B-5**.

Figure C-3 includes graphs of the temperature, wind speed, mixing height and stability classification over the modelling period and shows sensible trends considered to be representative of the area.

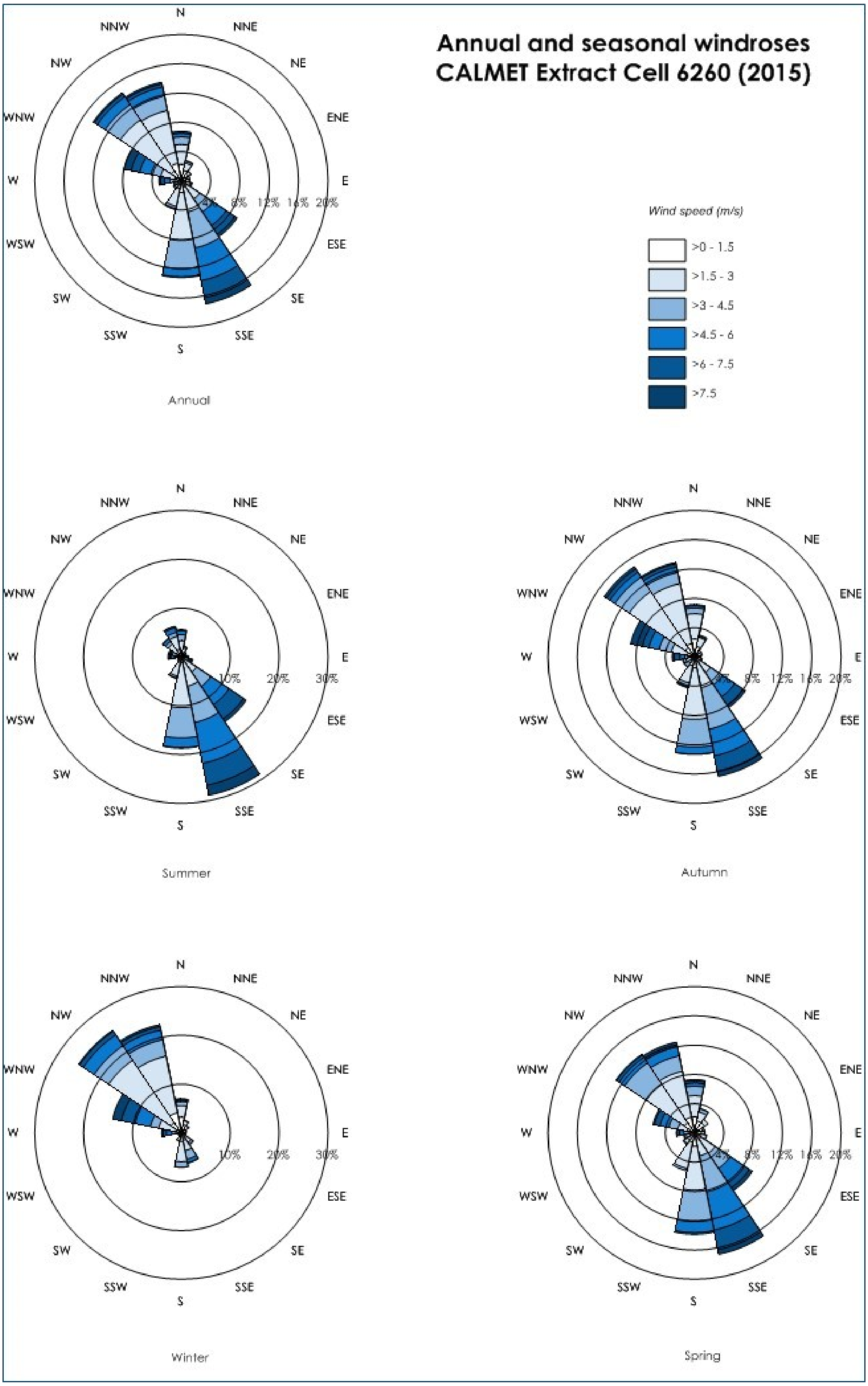

Figure C-2: Windroses from CALMET extract Cell ref 6260 (2015)

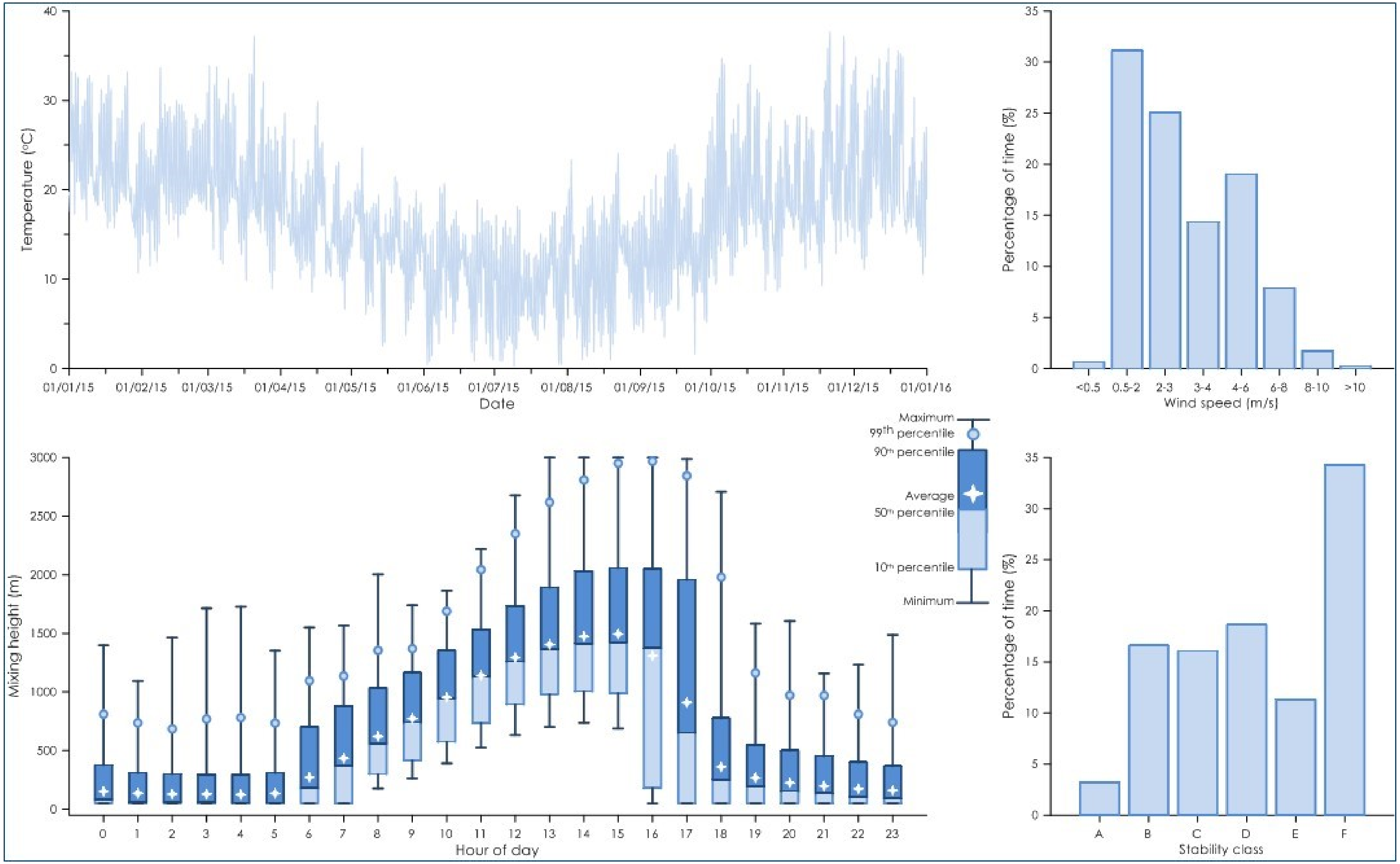

Figure C-3: Meteorological analysis of CALMET extract Cell ref 6260 (2015)

Dispersion modelling

CALPUFF modelling is based on the distribution of particles for each particle size category derived from the applied emission factor equations. Emissions from each activity were represented by a series of volume sources and were included in the CALPUFF model via an hourly varying emission file. Meteorological conditions associated with dust generation (such as wind speed) and levels of dust generating activity were considered in calculating the hourly varying emission rate for each source.

It should be noted that as a conservative measure, the effect of the precipitation rate (rainfall) in removing dust emissions from the atmosphere has not been considered in this assessment. As a result, the predicted impact can be expected to be elevated when examined against a typical year, especially for years with above average rainfall.

Appendix D

Emission Calculation

Emission Calculation

The mining schedule and mine plan designs provided by the Proponent have been combined with emissions factor equations that relate to the quantity of dust emitted from particular activities based on intensity, the prevailing meteorological conditions, and composition of the material being handled.

Emission factors and associated controls have been sourced from the US EPA AP42 Emission Factors (**US EPA, 1985 and Updates**), the National Pollutant Inventory document *Emission Estimation Technique Manual for Mining, Version 3.1* (**NPI, 2012**) and the NSW EPA document, *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining*, prepared by Katestone Environmental (**Katestone Environmental, 2010**).

The emission factor equations used for each dust generating activity are outlined in **Table D-1** below. Detailed emission inventories for each scenario are presented in **Table D-2** to **Table D-5**.

Control factors include the following:

- Hauling on unpaved surfaces – 80% to 90% control for watering of trafficked areas. Note the control factor is only applied to the mechanically generated emissions and not the contributions from the diesel exhaust emissions.
- Drilling overburden material – 70% control for use of dust suppression.
- Unloading ROM to hopper at CHPP – 85% control for use of enclosure and fogging sprays.
- Conveyor transfer points – 70% control enclosures and water sprays.
- Conveyor – 70% control for enclosed conveyors.
- Loading product coal to stockpile – 25% for use of luffing stacker.
- Overburden emplacement areas – 21% for primary rehabilitation, watering of exposed surface and surface crusting. Control factor is based on applying 30% control to 70% of the inactive area.
- Open pit – 18% for inactivity and surface crusting/ stabilisation. Control factor is based on applying 30% control to 60% of the inactive area.
- Topsoil stockpiles – 65% for watering stockpile surface and vegetative wind breaks.
- Initial rehabilitation – 70% for vegetative ground cover.

Potential air emissions associated with locomotives idling at the rail loop have been included in the emissions inventory. Emission estimates assume three locomotives idling continuously with emission based on Class 81 locomotive emission rates (**Parsons Brinckerhoff, 2012**).

Air emissions associated with the operation of the diesel powered equipment have been estimated based on the number of equipment, power rating, hours of operation and emission factors sourced from the NSW EPA document *NSW Coal Mining Benchmarking Study Best-practice measures for reducing non-road diesel exhaust emissions* (**NSW EPA, 2014**). Emission factors for Scenario 1 are based on Tier 2 equipment and in Scenario 2 and 3 assume Tier 4 equipment. A detailed emission inventory for diesel emissions is presented in **Table D-6**.

Table D-1: Emission factor equations

Activity	Emission factor equation		
	TSP	PM_{10}	$PM_{2.5}$
Drilling (overburden)	$EF = 0.59\ kg/hole$	$0.52 \times TSP$	$0.03 \times TSP$
Blasting (overburden)	$EF = 0.00022 \times A^{1.5}\ kg/blast$	$0.52 \times TSP$	$0.03 \times TSP$
Loading / emplacing overburden & loading product coal to stockpile & conveyor transfer	$EF = 0.74 \times 0.0016 \times \left(\frac{U}{2.2}^{1.3} / \frac{M}{2}^{1.4}\right) kg/tonne$	$EF = 0.35 \times 0.0016 \times \left(\frac{U}{2.2}^{1.3} / \frac{M}{2}^{1.4}\right) kg/tonne$	$EF = 0.053 \times 0.0016 \times \left(\frac{U}{2.2}^{1.3} / \frac{M}{2}^{1.4}\right) kg/tonne$
Hauling on unsealed surfaces	$EF = \left(\frac{0.4536}{1.6093}\right) \times 4.9 \times (s/12)^{0.7} \times (1.1023 \times M/3)^{0.45}\ kg/VKT$	$EF = \left(\frac{0.4536}{1.6093}\right) \times 1.5 \times (s/12)^{0.9} \times (1.1023 \times M/3)^{0.45}\ kg/VKT$	$EF = \left(\frac{0.4536}{1.6093}\right) \times 0.15 \times (s/12)^{0.9} \times (1.1023 \times M/3)^{0.45}\ kg/VKT$
Dozers on overburden	$EF = 2.6 \times \frac{s^{1.2}}{M^{1.3}}\ kg/hour$	$EF = 0.45 \times \frac{s^{1.5}}{M^{1.4}} \times 0.75\ kg/hour$	$EF = 0.45 \times \frac{s^{1.5}}{M^{1.4}} \times 0.105\ kg/hour$
Dozers on coal	$EF = 35.6 \times \frac{s^{1.2}}{M^{1.4}}\ kg/hour$	$EF = 8.44 \times \frac{s^{1.5}}{M^{1.4}} \times 0.75\ kg/hour$	$EF = 8.44 \times \frac{s^{1.5}}{M^{1.4}} \times 0.022\ kg/hour$
Loading / emplacing coal	$EF = \frac{0.58}{M^{1.2}}\ kg/tonne$	$EF = \frac{0.0596}{M^{0.9}} \times 0.75\ kg/tonne$	$EF = \frac{0.0596}{M^{0.9}} \times 0.019\ kg/tonne$
Wind erosion on exposed areas & conveyors	$EF = 850\ kg/ha/year$	$0.5 \times TSP$	$0.075 \times TSP$
Wind erosion on stockpiles	$EF = 1.9 \times \left(\frac{s}{1.5}\right) \times 365 \times \left(\frac{365 - p}{235}\right) \times \left(\frac{f}{15}\right) kg/ha/year$	$0.5 \times TSP$	$0.075 \times TSP$
Grading roads	$EF = 0.0034 \times sp^{2.5}\ kg/VKT$	$EF = 0.0056 \times sp^{2.0} \times 0.6\ kg/VKT$	$EF = 0.0056 \times sp^{2.0} \times 0.031\ kg/VKT$

EF = emission factor, A = area of blast (m^2), U = wind speed (m/s), M = moisture content (%), s = silt content (%), VKT = vehicle kilometres travelled (km), p = number of days per year when rainfall is greater than 0.25mm (days), f = percentage of time that wind speed is greater than 5.4m/s (%), sp = speed of grader (km/h).

Table D-2: Emission inventory – Scenario 1

Activity	TSP emission	PM10 emission	PM25 emission	Intensity	Units	Emission Factor - TSP	Emission Factor - PM10	Emission Factor - PM25	Units	Variable 1	Units	Variable 2	Units	Variable 3 - TSP	Variable 3 - PM10	Variable 3 - PM25	Units	Variable 4	Units	Variable 5	Units	Variable 6	Units
OB - Topsoil Removal with dozer	11,690	2,763	1,227	934	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
OB - Excavator loading topsoil to haul tru	244	115	17	166,601	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling topsoil to dump	1,758	610	320	166,601	t/yr	0.044	0.009	0.001	kg/t	218	tonnes/load	3.0	km/return trip	3.1	0.7	0.1	kg/VKT	2.0	% SC	274	Ave. weig	80	% Control
OB - Emplacing topsoil at dump	244	115	17	166,601	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %								(tonnes)		
OB - Drilling	10,764	5,597	323	60,814	holes/yr	0.59	0.31	0.02	kg/hole													70	% Control
OB - Blasting	43,790	22,771	1,314	92	blasts/yr	476	247.5	14.3	kg/blast	16,728	Area of blast in m²												
OB - Excavator loading OB to haul truck	52,916	25,028	3,790	36,110,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling to dump (Day period)	280,292	61,105	7,376	16,550,417	t/yr	0.084	0.018	0.0018	kg/t	247	tonnes/load	6.0	km/return trip	3.5	0.7	0.1	kg/VKT	2.0	% silt c	341	Ave weight	80	% Control
OB - Hauling to dump (Evening/night peri	276,423	60,486	7,544	19,559,583	t/yr	0.070	0.015	0.0015	kg/t	247	tonnes/load	5.0	km/return trip	3.5	0.7	0.1	kg/VKT	2.0	% silt c	341	Ave weight	80	% Control
OB - Emplacing at dump	52,916	25,028	3,790	36,110,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %								(tonnes)		
OB - Rehandle OB	5,292	2,503	379	3,611,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Dozers on OB in pit	87,674	20,719	9,206	7,002	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
OB - Dozers on OB working on dump	87,674	20,719	9,206	7,002	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
CL - Dozers ripping/pushing/clean-up	52,713	12,194	1,160	3,734	hrs/yr	14.1	3.3	0.3	kg/h	5	SC in %	9	MC in %										
CL - Loading ROM coal to haul truck	168,602	25,120	3,203	4,060,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %												
CL - Hauling ROM to hopper - CHPP	60,408	13,933	2,511	4,060,000	t/yr	0.146	0.031	0.0031	kg/t	180	tonnes/load	9.0	km/return trip	2.9	0.6	0.1	kg/VKT	2.0	% silt c	234	Ave weight	90	% Control
CHPP - Unloading ROM to hopper	25,290	3,768	481	4,060,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %										(tonnes)	85	% Control
CHPP - Rehandle ROM at hopper	33,720	5,024	641	812,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %												
CHPP - Primary crushing	10,962	4,872	902	4,060,000	t/yr	0.0027	0.0012	0.0002	kg/t														
CHPP - Transfer	297	140	21	4,060,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to secondary crusher	6	3	0	0.023	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Secondary crushing	10,962	4,872	902	4,060,000	t/yr	0.0027	0.0012	0.0002	kg/t							MC = moisture content							
CHPP - Tertiary crushing	10,962	4,872	902	4,060,000	t/yr	0.0027	0.0012	0.0002	kg/t							SC = silt content							
CHPP - Transfer	297	140	21	4,060,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to 1000t bin	9	4	1	0.034	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Transfer	297	140	21	4,060,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to CPP	5	3	0	0.021	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Transfer	161	76	12	2,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									70	% Control
CHPP - Conveying to Product stockpile	27	14	2	0.107	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Unloading to Product stockpile	403	191	29	2,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									25	% Control
CHPP - Transfer	161	76	12	2,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									70	% Control
CHPP - Conveying to train loadout	80	40	6	0.313	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Loading coal to train	538	254	39	2,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %										
CHPP - Dozers on ROM stockpiles	52,713	12,194	1,160	3,734	hrs/yr	14.1	3.3	0.3	kg/h	5	SC in %	9	MC in %										
CHPP - Dozers on Product stockpiles	40,609	9,207	893	3,734	hrs/yr	10.9	2.5	0.2	kg/h	5	SC in %	11	MC in %										
OB - Loading Reject to haul truck	747	353	54	510,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling Reject to dump	7,588	1,750	315	510,000	tonnes/y	0.146	0.031	0.0031	kg/t	180	tonnes/load	9.0	km/return trip	2.9	0.6	0.1	kg/VKT	2.0	% silt c	234	Ave. weig	90	% Control
OB - Emplacing Reject at dump	747	353	54	510,000	tonnes/y	0.0015	0.0007	0.0001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	moisture content in %								(tonnes)		
WE - Overburden emplacement areas	85,075	42,538	6,381	127	ha	850	425	64	kg/ha/yr													21	% Control
WE - Open pit	80,820	40,410	6,062	116	ha	850	425	64	kg/ha/yr													18	% Control
WE - ROM stockpiles	8,395	4,197	630	7	ha	1,139	570	85	kg/ha/yr	5	SC in %	65.5	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4m/s				
WE - Product stockpiles	4,324	2,162	324	4	ha	1,139	570	85	kg/ha/yr	5	SC in %	65.5	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4m/s				
WE - Topsoil stockpiles	4,042	2,021	303	10	ha	1,139	570	85	kg/ha/yr	5	SC in %	65.5	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4			65	% Control
WE - Initial Rehab	3,432	1,716	257	10	ha	1,139	570	85	kg/ha/yr	5	SC in %	65.5	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4			70	% Control
OB - Grading roads	36,774	12,849	1,140	59,750	km	0.62	0.22	0.02	kg/VKT	8	speed of graders in km/h												
Locomotive idling	515	515	499																				
Total emissions	**1,613,362**	**453,563**	**73,447**																				

Note: ha = hectares, SC=silt content, kg/h = kilograms/hour, WS = wind speed, MC = moisture content.

Table D-3: Emission inventory – Scenario 2

ACTIVITY	TSP emission	PM10 emission	PM25 emission	Intensity	Units	Emission Factor - TSP	Emission Factor - PM10	Emission Factor - PM25	Units	Variable 1	Units	Variable 2	Units	Variable 3 - TSP	Variable 3 - PM10	Variable 3 - PM25	Units	Variable 4	Units	Variable 5	Units	Variable 6	Units
OB - Topsoil Removal with dozer	18,234	4,309	1,915	1,456	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
OB - Excavator loading topsoil to ha	249	118	18	170,084	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling topsoil to dump	2,065	529	149	170,084	t/yr	0.057	0.012	0.001	kg/t	218	tonnes/load	4.0	km/return trip	3.1	0.7	0.1	kg/VKT	2.0	% SC	274	Ave. weig	80	% Control
OB - Emplacing topsoil at dump	249	118	18	170,084	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %								(tonnes)		
OB - Drilling	14,028	7,294	421	79,253	holes/yr	0.59	0.31	0.02	kg/hole													70	% Control
OB - Blasting	136,831	71,152	4,105	128	blasts/yr	1069	555.9	32.1	kg/blast	28,688	Area of blast in m^2												
OB - Excavator loading OB to haul t	105,496	49,897	7,556	71,990,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling to dump (Day period)	359,163	77,472	8,453	32,995,417	t/yr	0.054	0.012	0.001	kg/t	222	tonnes/load	3.7	km/return trip	3.2	0.7	0.1	kg/VKT	2.0	% SC	296	Ave. weig	80	% Control
OB - Hauling to dump (Evening/nigh	310,066	67,085	7,542	38,994,583	t/yr	0.040	0.008	0.001	kg/t	222	tonnes/load	2.7	km/return trip	3.2	0.7	0.1	kg/VKT	2.0	% SC	296	Ave. weig	80	% Control
OB - Emplacing at dump	105,496	49,897	7,556	71,990,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %								(tonnes)		
OB - Rehandle OB	10,550	4,990	756	7,199,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Dozers on OB in pit	173,225	40,937	18,189	13,834	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
OB - Dozers on OB working on dum	173,225	40,937	18,189	13,834	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
CL - Dozers ripping/pushing/clean-u	82,223	19,020	1,809	5,825	hrs/yr	14.1	3.3	0.3	kg/h	5	SC in %	9	MC in %										
CL - Loading ROM coal to haul truck	436,040	64,965	8,285	10,500,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %												
CL - Hauling ROM to hopper - CHPP	273,886	58,973	6,320	10,500,000	t/yr	0.260	0.056	0.006	kg/t	180	tonnes/load	16.0	km/return trip	2.9	0.6	0.1	kg/VKT	2.0	% SC	234	Ave. weig	90	% Control
CHPP - Unloading ROM to hopper	65,406	9,745	1,243	10,500,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %										(tonnes)	85	% Control
CHPP - Rehandle ROM at hopper	87,208	12,993	1,657	2,100,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %												
CHPP - Primary crushing	28,350	12,600	2,333	10,500,000	t/yr	0.0027	0.0012	0.0002	kg/t														
CHPP - Transfer	768	363	55	10,500,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to secondary cru	6	3	0	0.023	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Secondary crushing	28,350	12,600	2,333	10,500,000	t/yr	0.0027	0.0012	0.0002	kg/t							MC = moisture content							
CHPP - Tertiary crushing	28,350	12,600	2,333	10,500,000	t/yr	0.0027	0.0012	0.0002	kg/t							SC = silt content							
CHPP - Transfer	768	363	55	10,500,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to 1000t bin	9	4	1	0.034	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Transfer	768	363	55	10,500,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to CPP	5	3	0	0.021	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Transfer	437	207	31	7,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									70	% Control
CHPP - Conveying to Product stock	27	14	2	0.107	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Unloading to Product stockp	1,094	517	78	7,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									25	% Control
CHPP - Transfer	437	207	31	7,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									70	% Control
CHPP - Conveying to train loadout	80	40	6	0.313	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Loading coal to train	1,458	690	104	7,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %										
CHPP - Dozers on ROM stockpiles	82,223	19,020	1,809	5,825	hrs/yr	14.1	3.3	0.3	kg/h	5	SC in %	9	MC in %										
CHPP - Dozers on Product stockpile	63,343	14,362	1,394	5,825	hrs/yr	10.9	2.5	0.2	kg/h	5	SC in %	11	MC in %										
OB - Loading Reject to haul truck	1,685	797	121	1,150,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling Reject to dump	29,997	6,459	692	1,150,000	t/yr	0.260	0.056	0.006	kg/t	180	tonnes/load	16.0	km/return trip	2.9	0.6	0.1	kg/VKT	2.0	% SC	234	Ave. weig	90	% Control
OB - Emplacing Reject at dump	1,685	797	121	1,150,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %								(tonnes)		
WE - Overburden emplacement are	104,148	52,074	7,811	155.1	ha	850	425	64	kg/ha/yr													21	% Control
WE - Open pit	210,287	105,144	15,772	301.7	ha	850	425	64	kg/ha/yr													18	% Control
WE - ROM stockpiles	8,395	4,197	630	7.4	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4m/s				
WE - Product stockpiles	4,324	2,162	324	3.8	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4m/s				
WE - Topsoil stockpiles	7,106	3,553	533	17.8	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4			65	% Control
WE - Initial rehabilition	50,069	25,035	3,755	146.5	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4			70	% Control
OB - Grading roads	57,361	20,042	1,778	93,200	km	0.62	0.22	0.02	kg/VKT	8	speed of graders in km/h												
Locomotive idling	515	515	499																				
Total emissions	**3,065,690**	**875,161**	**136,836**																				

Table D-4: Emission inventory – Scenario 2 including approved CHPP haul route

ACTIVITY	TSP emission	PM10 emission	PM25 emission	Intensity	Units	Emission Factor - TSP	Emission Factor - PM10	Emission Factor - PM25	Units	Variable 1	Units	Variable 2	Units	Variable 3 - TSP	Variable 3 - PM10	Variable 3 - PM25	Units	Variable 4	Units	Variable 5	Units	Variable 6	Units
OB - Topsoil Removal with dozer	18,234	4,309	1,915	1,456	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
OB - Excavator loading topsoil to h	249	118	18	170,084	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling topsoil to dump	2,065	529	149	170,084	t/yr	0.057	0.012	0.001	kg/t	218	tonnes/load	4.0	km/return trip	3.1	0.7	0.1	kg/VKT	2.0	% SC	274	Ave. weig	80	% Control
OB - Emplacing topsoil at dump	249	118	18	170,084	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %								(tonnes)		
OB - Drilling	14,028	7,294	421	79,253	holes/yr	0.59	0.31	0.02	kg/hole													70	% Control
OB - Blasting	136,831	71,152	4,105	128	blasts/yr	1069	555.9	32.1	kg/blast	28,688	Area of blast in m²												
OB - Excavator loading OB to haul t	105,496	49,897	7,556	71,990,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling to dump (Day period)	359,163	77,472	8,453	32,995,417	t/yr	0.054	0.012	0.001	kg/t	222	tonnes/load	3.7	km/return trip	3.2	0.7	0.1	kg/VKT	2.0	% SC	296	Ave. weig	80	% Control
OB - Hauling to dump (Evening/nigh	310,066	67,085	7,542	38,994,583	t/yr	0.040	0.008	0.001	kg/t	222	tonnes/load	2.7	km/return trip	3.2	0.7	0.1	kg/VKT	2.0	% SC	296	Ave. weig	80	% Control
OB - Emplacing at dump	105,496	49,897	7,556	71,990,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %								(tonnes)		
OB - Rehandle OB	10,550	4,990	756	7,199,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Dozers on OB in pit	173,225	40,937	18,189	13,834	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
OB - Dozers on OB working on dum	173,225	40,937	18,189	13,834	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
CL - Dozers ripping/pushing/clean-u	82,223	19,020	1,809	5,825	hrs/yr	14.1	3.3	0.3	kg/h	5	SC in %	9	MC in %										
CL - Loading ROM coal to haul truck	436,040	64,965	8,285	10,500,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %												
CL - Hauling ROM to hopper - CHPP	264,198	56,901	6,112	10,500,000	t/yr	0.260	0.056	0.006	kg/t	180	tonnes/load	16.0	km/return trip	2.9	0.6	0.1	kg/VKT	2.0	% SC	234	Ave. weig	90	% Control
CHPP - Unloading ROM to hopper	65,406	9,745	1,243	10,500,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %										(tonnes)	85	% Control
CHPP - Rehandle ROM at hopper	87,208	12,993	1,657	2,100,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %												
CHPP - Primary crushing	28,350	12,600	2,333	10,500,000	t/yr	0.0027	0.0012	0.0002	kg/t														
CHPP - Transfer	768	363	55	10,500,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to secondary cru	6	3	0	0.023	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Secondary crushing	28,350	12,600	2,333	10,500,000	t/yr	0.0027	0.0012	0.0002	kg/t							MC = moisture content							
CHPP - Tertiary crushing	28,350	12,600	2,333	10,500,000	t/yr	0.0027	0.0012	0.0002	kg/t							SC = silt content							
CHPP - Transfer	768	363	55	10,500,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to 1000t bin	9	4	1	0.034	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Transfer	768	363	55	10,500,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to CPP	5	3	0	0.021	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Transfer	437	207	31	7,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									70	% Control
CHPP - Conveying to Product stock	27	14	2	0.107	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Unloading to Product stockp	1,094	517	78	7,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									25	% Control
CHPP - Transfer	437	207	31	7,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									70	% Control
CHPP - Conveying to train loadout	80	40	6	0.313	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Loading coal to train	1,458	690	104	7,920,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %										
CHPP - Dozers on ROM stockpiles	82,223	19,020	1,809	5,825	hrs/yr	14.1	3.3	0.3	kg/h	5	SC in %	9	MC in %										
CHPP - Dozers on Product stockpile	63,343	14,362	1,394	5,825	hrs/yr	10.9	2.5	0.2	kg/h	5	SC in %	11	MC in %										
OB - Loading Reject to haul truck	1,685	797	121	1,150,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling Reject to dump	28,936	6,232	669	1,150,000	t/yr	0.260	0.056	0.006	kg/t	180	tonnes/load	16.0	km/return trip	2.9	0.6	0.1	kg/VKT	2.0	% SC	234	Ave. weig	90	% Control
OB - Emplacing Reject at dump	1,685	797	121	1,150,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %								(tonnes)		
WE - Overburden emplacement are	104,148	52,074	7,811	155.1	ha	850	425	64	kg/ha/yr													21	% Control
WE - Open pit	210,287	105,144	15,772	301.7	ha	850	425	64	kg/ha/yr													18	% Control
WE - ROM stockpiles	8,395	4,197	630	7.4	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4m/s				
WE - Product stockpiles	4,324	2,162	324	3.8	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4m/s				
WE - Topsoil stockpiles	7,106	3,553	533	17.8	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4			65	% Control
WE - Initial rehabilition	50,069	25,035	3,755	146.5	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4			70	% Control
OB - Grading roads	57,361	20,042	1,778	93,200	km	0.62	0.22	0.02	kg/VKT	8	speed of graders in km/h												
Locomotive idling	515	515	499																				
Total emissions	**3,054,940**	**872,862**	**136,606**																				

Table D-5: Emission inventory – Scenario 3

ACTIVITY	TSP emission	PM10 emission	PM25 emission	Intensity	Units	Emission Factor - TSP	Emission Factor - PM10	Emission Factor - PM25	Units	Variable 1	Units	Variable 2	Units	Variable 3 - TSP	Variable 3 - PM10	Variable 3 - PM25	Units	Variable 4	Units	Variable 5	Units	Variable 6	Units
OB - Topsoil Removal with dozer	-	-	-	-	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
OB - Excavator loading topsoil to ha	-	-	-	-	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling topsoil to dump	-	-	-	-	t/yr	0.000	0.000	0.000	kg/t	218	tonnes/load	0.0	km/return trip	3.1	0.7	0.1	kg/VKT	2.0	% SC	274	Ave. weig	80	% Control
OB - Emplacing topsoil at dump	-	-	-	-	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %								(tonnes)		
OB - Drilling	14,028	7,294	421	79,253	holes/yr	0.59	0.31	0.02	kg/hole													70	% Control
OB - Blasting	136,831	71,152	4,105	128	blasts/yr	1069	555.9	32.1	kg/blast	28,688	Area of blast in m²												
OB - Excavator loading OB to haul t	96,059	45,433	6,880	65,550,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling to dump (Day period)	715,824	153,818	16,139	30,043,750	t/yr	0.119	0.025	0.003	kg/t	214	tonnes/load	8.0	km/return trip	3.2	0.7	0.1	kg/VKT	2.0	% SC	283	Ave. weig	80	% Control
OB - Hauling to dump (Evening/nigh	740,355	159,190	16,814	35,506,250	t/yr	0.104	0.022	0.002	kg/t	214	tonnes/load	7.0	km/return trip	3.2	0.7	0.1	kg/VKT	2.0	% SC	283	Ave. weig	80	% Control
OB - Emplacing at dump	96,059	45,433	6,880	65,550,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %								(tonnes)		
OB - Rehandle OB	9,606	4,543	688	6,555,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Dozers on OB in pit	218,811	51,710	22,975	17,475	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
OB - Dozers on OB working on dum	218,811	51,710	22,975	17,475	hrs/yr	12.5	3.0	1.3	kg/h	10	SC in %	2.5	MC in %										
CL - Dozers ripping/pushing/clean-u	82,223	19,020	1,809	5,825	hrs/yr	14.1	3.3	0.3	kg/h	5	SC in %	9	MC in %										
CL - Loading ROM coal to haul truck	436,040	64,965	8,285	10,500,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %												
CL - Hauling ROM to hopper - CHPP	126,983	27,545	3,175	10,500,000	t/yr	0.120	0.026	0.003	kg/t	180	tonnes/load	7.4	km/return trip	2.9	0.6	0.1	kg/VKT	2.0	% SC	234	Ave. weig	90	% Control
CHPP - Unloading ROM to hopper	65,406	9,745	1,243	10,500,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %										(tonnes)	85	% Control
CHPP - Rehandle ROM at hopper	87,208	12,993	1,657	2,100,000	t/yr	0.042	0.006	0.001	kg/t	9	MC in %												
CHPP - Primary crushing	28,350	12,600	2,333	10,500,000	t/yr	0.0027	0.0012	0.0002	kg/t														
CHPP - Transfer	768	363	55	10,500,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to secondary cru	6	3	0	0.023	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Secondary crushing	28,350	12,600	2,333	10,500,000	t/yr	0.0027	0.0012	0.0002	kg/t							MC = moisture content							
CHPP - Tertiary crushing	28,350	12,600	2,333	10,500,000	t/yr	0.0027	0.0012	0.0002	kg/t							SC = silt content							
CHPP - Transfer	768	363	55	10,500,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to 1000t bin	9	4	1	0.034	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Transfer	768	363	55	10,500,000	t/yr	0.00024	0.00012	0.00002	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	9	MC in %									70	% Control
CHPP - Conveying to CPP	5	3	0	0.021	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Transfer	431	204	31	7,800,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									70	% Control
CHPP - Conveying to Product stock	27	14	2	0.107	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Unloading to Product stockp	1,077	509	77	7,800,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									25	% Control
CHPP - Transfer	431	204	31	7,800,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %									70	% Control
CHPP - Conveying to train loadout	80	40	6	0.313	ha	850	425	64	kg/ha/yr													70	% Control
CHPP - Loading coal to train	1,436	679	103	7,800,000	t/yr	0.00018	0.00009	0.00001	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	11	MC in %										
CHPP - Dozers on ROM stockpiles	82,223	19,020	1,809	5,825	hrs/yr	14.1	3.3	0.3	kg/h	5	SC in %	9	MC in %										
CHPP - Dozers on Product stockpile	63,343	14,362	1,394	5,825	hrs/yr	10.9	2.5	0.2	kg/h	5	SC in %	11	MC in %										
OB - Loading Reject to haul truck	1,773	839	127	1,210,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %										
OB - Hauling Reject to dump	14,633	3,174	366	1,210,000	t/yr	0.120	0.026	0.003	kg/t	180	tonnes/load	7.4	km/return trip	2.9	0.6	0.1	kg/VKT	2.0	% SC	234	Ave. weig	90	% Control
OB - Emplacing Reject at dump	1,773	839	127	1,210,000	t/yr	0.00147	0.00069	0.00010	kg/t	1.692	$(WS/2.2)^{1.3}$ in m/s	2.5	MC in %								(tonnes)		
WE - Overburden emplacement are	112,676	56,338	8,451	167.8	ha	850	425	64	kg/ha/yr													21	% Control
WE - Open pit	211,582	105,791	15,869	303.6	ha	850	425	64	kg/ha/yr													18	% Control
WE - ROM stockpiles	8,395	4,197	630	7.4	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4m/s				
WE - Product stockpiles	4,324	2,162	324	3.8	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4m/s				
WE - Topsoil stockpiles	11,672	5,836	875	29.3	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4			65	% Control
WE - Initial rehabilition	40,845	20,423	3,063	119.5	ha	1,139	570	85	kg/ha/yr	5	SC in %	66	number of rain days (>0.25mm)					5.8	% of time wind speed >5.4			70	% Control
OB - Grading roads	57,361	20,042	1,778	93,200	km	0.62	0.22	0.02	kg/VKT	8	speed of graders in km/h												
Locomotive idling	515	515	499																				
Total emissions	**3,746,215**	**1,018,639**	**156,773**																				

Table D-6: Emission inventory – Diesel emissions

Type	Make	Number			Hours of operation			Power (hp)	LF	Emission factor		Summary of PM_{10} emissions (kg/year)			Summary of $PM_{2.5}$ emissions (kg/year)		
		2018	2021	2025	2018	2021	2025			Tier 2	Tier 4f	2018	2021	2025	2018	2021	2025
Trucks	Cat	1	8*	11	4605	7183	7183	1,770	0.32	0.1047	0.025	281.56	839	1,154	273	814	1,119
Trucks	Cat	6	6	6	4380	6833	6833	1,770	0.32	0.1047	0.025	1,607	599	599	1,559	581	581
Trucks	Hitachi	9	9*	8	4605	7183	7183	2,575	0.32	0.1047	0.025	3,686	1,373	1,220	3,575	1,332	1,184
Excavators	Liebherr	2	2	2	3707	5782	5782	3,004	0.45	0.1047	0.025	1,082	403	403	1,049	391	391
Excavators	Hitachi	1	2	3	3707	5782	5782	1,944	0.45	0.1047	0.025	350	261	391	340	253	379
Dozer (CHPP)	Cat	2	2	2	3707	5782	5782	850	0.48	0.1047	0.025	327	122	122	317	118	118
Dozers	Cat	4	4	5	3707	5782	5782	599	0.48	0.1047	0.0072	460	49	62	447	48	60
Wheel Dozers	Cat	1	2	2	3707	5782	5782	814	0.49	0.1047	0.025	160	119	119	155	115	115
Loader	Cat	1	1	1	3707	5782	5782	1,464	0.49	0.1046	0.025	287	107	107	278	104	104
Grader	Cat	1	1	1	3707	5782	5782	532	0.46	0.1047	0.0071	98	10	10	95	10	10
Graders	Cat	1	1	1	3707	5782	5782	290	0.46	0.1047	0.0071	53	6	6	52	5	5
Water Truck	Cat	1	1	1	4493	7008	7008	944	0.32	0.1046	0.025	146	55	55	142	53	53
Water Trucks	Komatsu	1	1	1	4493	7008	7008	1,179	0.32	0.1047	0.0251	183	68	68	177	66	66
Blasthole Drill	Terex	1	1	1	3707	5782	5782	801	0.52	0.0755	0.0249	120	62	62	117	60	60
Blasthole Drill	Drilltech	1	1	1	3707	5782	5782	801	0.52	0.0755	0.0249	120	62	62	117	60	60
Blasthole Drill	Sandvik	0	0	1	3707	5782	5782	302	0.52	0.0756	0.0072	-	-	7	-	-	7
Excavator	Cat	1	1	1	1853	2891	2891	306	0.45	0.1047	0.0072	28	3	3	27	3	3
Truck	Cat	2	2	2	2303	3592	3592	2,337	0.32	0.1047	0.025	372	138	138	361	134	134

* Following the initial modelling of the 2021 scenario, the proposed mobile fleet was revised and one Cat truck and two Hitachi trucks were removed. However, to be conservative, the higher number of trucks was retained in the modelling.

Emissions from other mining operations

In addition to the estimated dust emissions from the Mount Pleasant Operation incorporating the Modification, emissions from all nearby approved mining operations were also modelled, in accordance with their current consent (or current proposed project), to assess potential cumulative dust effects.

Emissions estimates from these sources were derived from information provided in the air quality assessments available in the public domain at the time of modelling. These estimates are likely to be conservative, as in many cases, mines do not continually operate at the maximum extraction rates assessed in their respective environmental assessments. This is evident when examining Annual Reviews for coal mines in the Hunter Valley which show that the mine's actual rate of activity is generally below the approved level of activity.

Table D-7 summarises the emissions adopted in this assessment for each nearby mining operation.

It is also noted that consents for some mining operations would expire at some stage during the Modification. However to assess potential worst case cumulative dust effects, it has been assumed that these operations would continue until the end of the Modification period. This adds considerable conservatism to the model predictions.

Table D-7: Estimated emissions from nearby mining operations (kg of TSP)

Operation	Scenario 1	Scenario 2	Scenario 3
Bengalla[(1)]	7,289,184	7,812,619	8,336,736
Mt Arthur[(2)]	11,395,942	11,924,658	12,341,657
Mangoola[(3)]	5,272,539	5,000,255	5,000,255
Muswellbrook Coal Mine[(4)]	968,910	968,910	968,910
Drayton South Coal Project[(5)]	348,823	459,313	465,633

[(1)] Todoroski Air Sciences (2013a) [(2)] PAEHolmes (2013) [(3)] Todoroski Air Sciences (2013b)
[(4)] Todoroski Air Sciences (2016) [(5)] Pacific Environment Limited (2015)

The emission estimates for Mt Arthur were adjusted to account for the different meteorological conditions in this assessment compared with the conditions applied in the original assessment. The methodology applied is identical to the methodology applied in the *Cumulative Impact Assessment Mt Arthur, Bengalla and Mangoola Coal Mines* (**Todoroski Air Sciences, 2014**).

For this assessment, the Drayton South Coal Project has been assumed to be approved and operating. The majority of dust generating activities associated with the potential Drayton South Coal Project would occur outside the modelling domain and only those activities occurring within the modelling domain have been considered. These include hauling ROM to the CHPP, unloading at the CHPP, handling coal at the CHPP, dozer activity and loading trains. It is noted that the Drayton South Coal Project was refused by the NSW Planning Assessment Commission in February 2017, however the potential emissions from the proposed project have been retained for conservatism.

Potential dust emissions from the Dartbrook Mine have not been specifically included in this assessment. Mining at the Dartbrook Mine has been suspended and placed under Care and Maintenance from January 2007 with no clear indication of when it may recommence. Regardless, the potential dust emissions generated from the underground mining operation is much lower in comparison to the other modelled open cut mining operations, as the majority of activity occurs below the surface. The dust generating activity on the surface is generally fixed in position and would be easily managed, hence the potential for any cumulative dust impacts to occur with the Dartbrook Mine is likely to be minor.

In addition to the emissions from nearby mining operations, there would be numerous smaller or more distant sources that contribute to the total background dust level. Modelling of these sources explicitly is impractical; however, the residual level of dust due to all other such non-modelled sources has been included in the cumulative results, as discussed in the following section.

Accounting for background dust levels

To account for the contribution from other non-mining sources of particulate matter in the wider area an allowance has been added to the modelling predictions to fully assess the total potential impact.

The contribution to the prevailing annual average background dust level of other non-modelled dust sources was estimated by modelling the past (known) mining activities (including Bengalla Mine, Mt Arthur Coal Mine, Mangoola Coal, Muswellbrook Coal Mine and Drayton Mine) during 2012 to 2015 and comparing model predictions with the actual measured data from the corresponding monitoring stations.

The average difference between the measured and predicted PM_{10}, TSP and deposited dust levels from each of the monitoring points was considered to be the contribution from other non-modelled dust sources, and was added to the future predicted values to account for the background dust levels (not explicitly in the model and arising from numerous small or distant, non-modelled dust sources).

Due to the high density of available PM_{10} monitors in the central area of the modelling domain, and the presence of Muswellbrook, a large, but not modelled source of emissions, it is possible to apply various spatially varying background levels to account for the variation in the background dust level in the central modelling domain. This provides a more realistic representation of background dust levels in this area than adding a constant level across the domain.

Due to the elevated $PM_{2.5}$ levels at the UHAQMN Muswellbrook monitor which appear to be significantly influenced by local anthropogenic sources occurring during the colder months, i.e. wood heater emissions (**Todoroski Air Sciences, 2014**), the $PM_{2.5}$ contribution from non-modelled dust sources is taken from the cumulative impact assessment of Mt Arthur Coal Mine, Bengalla Mine and Mangoola Coal (**Todoroski Air Sciences, 2014**) based on monitoring data from other stations less influenced by wood heater emissions.

Thus the annual average $PM_{2.5}$ level to account for non-modelled other sources applied in this assessment is 2.9µg/m^3. Using this level in the assessment would not represent the already elevated levels recorded within Muswellbrook, but may reasonably represent the levels at the nearest, potentially most affected locations around the Mount Pleasant Operation, which are of primary relevance to the assessment.

The estimated annual average contribution from other non-modelled dust sources applied in the assessment is presented in **Table D-8**.

Table D-8: Estimated contribution from other non-modelled dust sources

Dust metric	Averaging period	Unit	Estimated contribution
TSP	Annual	µg/m³	34.8
PM_{10}	Annual	µg/m³	Variable grid
$PM_{2.5}$	Annual	µg/m³	2.9
Dust deposition	Annual	g/m²/month	1.9

It is important that the above values are not confused with measured background levels, background levels excluding only the Mount Pleasant Operation, or the change in existing levels as a result of the Modification. The values above are not background levels in that sense, but are the residual amount of the background dust that is not accounted for directly in the air dispersion modelling.

Appendix E

Further Detail Regarding Coal Dust Emissions from Train Wagons

Introduction

Coal dust emissions from train wagons have the potential to originate from the coal surface of loaded wagons, leakage from wagon doors, re-suspension and wind erosion of coal spilled in the rail corridor, residual coal in unloaded wagons, and parasitic load on sills, shear plates and bogies of wagons.

The surface of loaded wagons provides a significant exposed area, which is subject to wind erosion and air movement during transport. The amount of dust potentially generated during transport is related to the inherent dustiness of the coal material and the interactions of the air with the exposed coal surface (**Connell Hatch, 2008**).

Coal dust can potentially leak from the bottom doors of train wagons and fall into the ballast of the train line. This occurs when the doors of the wagon are not completely sealed. The amount of material released will depend on the material properties of the coal, and the vibrational forces experienced by the coal in the wagons that potentially break down the coal material. Dust impacts from this source are considered to be low as the ballast would provide a sufficient shielding effect to prevent particle lift-off (**Connell Hatch, 2008**).

During the loading process and in transit, there is potential for coal material to be spilled into the train corridor and cause parasitic loading on the sills, shear plates and bogies. These sources of emissions are easily prevented by careful loading of the material and profiling the shape of the load (**Connell Hatch, 2008**).

Residual coal remaining in an unloaded wagon can dry and become airborne during travel back to the site. This source is dependent on meteorological conditions, the train travel speed and the extent of any turbulent air generated in the unloaded wagon space causing the residual coal particles to become airborne.

Emission estimation

As there are no representative coal samples available for the Mount Pleasant Operation to test in order to determine the potential for dust-lift off during the transportation, dust emissions have been estimated from measurements conducted in other studies.

The study conducted by Katestone Environmental on behalf of Connell Hatch for Queensland Rail Limited (**Connell Hatch, 2008**) completed a review of a study by **Ferreira et al. (2003)** which focused on the release of coal dust from train wagons. The **Ferreira et al. (2003)** study conducted full-scale measurements of coal dust emissions from coal wagons over a 350km journey with an average train speed of between 55 and 60km/hr. The findings of this study determined that the total emission for an uncovered rail wagon was determined to be 9.6 grams of TSP per km.

The Katestone Environmental study applied this emission factor with dispersion modelling and found that the resulting predicted concentration compared well with actual air quality monitoring conducted. This suggests that the findings of the **Ferreria et al. (2003)** study are sensible and therefore have been applied to estimate emissions for the Mount Pleasant Operation incorporating the Modification.

The Mount Pleasant Operation is approved with a peak of nine train movements per day (which would continue for the Modification). Each train would have an average capacity of approximately 9,000 tonnes of product coal and consist of approximately 96 wagons per train. This would result in an estimated emission rate of approximately 922g of TSP per km per train.

Modelling approach

The transportation model CAL3QHCR, developed by the US EPA, has been used to assess potential impacts from this source. CAL3QHCR was designed for use in dispersion modelling of road transport emissions, however given the similar linear nature of the potential train wagon emissions compared to road transport emissions it is considered to be a suitable model for this situation also.

To consider the range of varying land use between the Mount Pleasant Operation incorporating the Modification and the Port of Newcastle, and the varying orientation of the rail line relative to the prevailing winds, the dispersion model has been set up to assess theoretical sections of the rail line over a distance of 3km with two varying alignments (north/south and east/west) and two different land use categories. Dust level calculation points were applied at a spacing of 10m, perpendicular from the centre of the rail line source alignment out to a distance of 200m either side of the rail line.

Modelling predictions

Figure E-1 presents the model predictions for each scenario. The modelling predictions indicate that at distances of 50m and beyond the rail track centreline, the maximum 24-hour average TSP concentration for all scenarios would be approximately 3.4µg/m^3. By assuming 40% of the TSP is comprised of PM_{10}, the predicted maximum 24-hour average PM_{10} concentration would be approximately 1.4µg/m^3.

For urban areas, the predicted maximum 24-hour average TSP level at 50m from the rail track centreline would be approximately 2.2µg/m^3 with an equivalent PM_{10} level of 0.9µg/m^3.

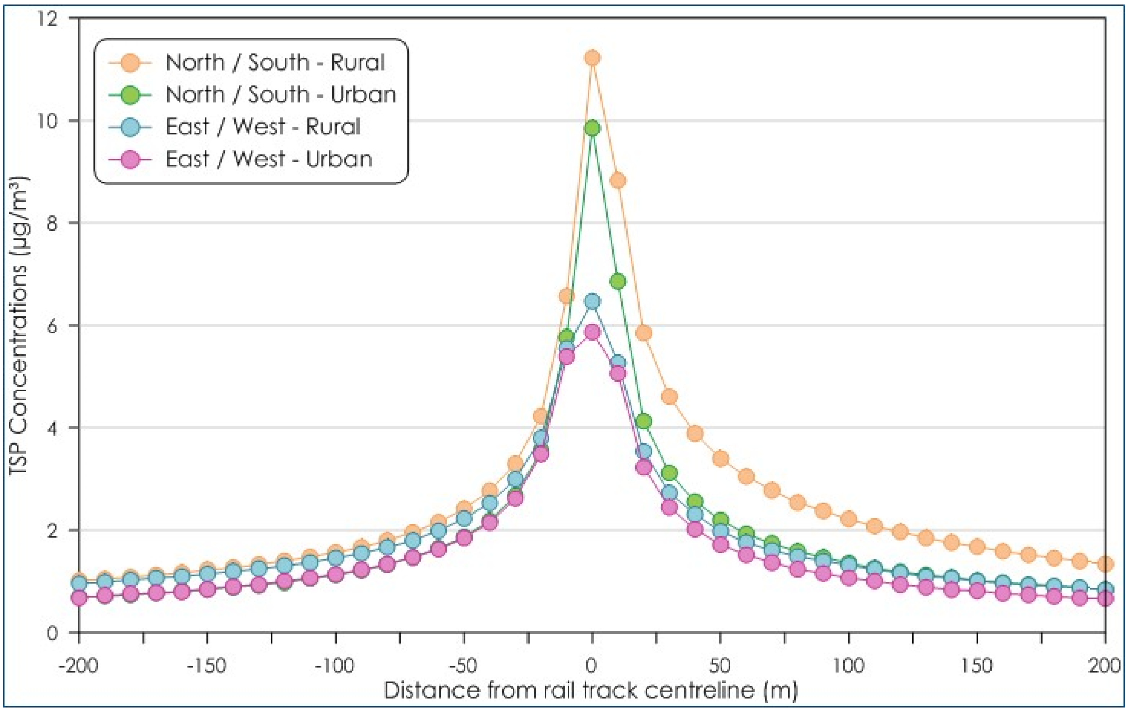

Figure E-1: Maximum predicted 24-hour average TSP concentration based on train wagon emissions

Summary

The detailed study of dust emissions generated during rail transport of coal conducted by Katestone Environmental for Queensland Rail Limited (**Connell Hatch, 2008**) found that, based on monitoring and modelling of the emissions and impacts of coal train wagons, there appears to be a minimal risk of adverse impact on human health. The study found that concentrations of coal dust at the edge of the rail corridor are below levels known to cause adverse impacts on amenity.

A more recent review of a study conducted for the Australian Rail Track Corporation Ltd (**Ryan and Wand, 2014**) for trains travelling on the Hunter Valley network found no significant difference in the particulate matter measurements for passing freight and coal trains (loaded and unloaded). The study determined that the significant increase of smaller particles ($PM_{2.5}$ and PM_1) measured suggest that the elevated particle matter levels were mostly due to diesel particles associated with locomotive emissions as opposed to coal dust which tends to be in the larger particle range.

Further re-analysis of this dataset, taking into account additional data, dispelled the hypothesis that diesel exhaust from the locomotives was a large portion of the observed levels and suggests that a key mechanism for the increased particulate levels was due to the passing trains stirring up existing dust particles settled on the tracks and nearby ground (**Ryan & Malecki, 2015**).

This assessment is consistent with the findings of these studies in indicating that 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 air quality.

Appendix F

Modelling Predictions

Table F-1: Modelling predictions for Scenario 1

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
Privately-owned receptors										
4	2	1	12	3	5	0.1	5.3	26	69	2.4
6	4	1	21	5	9	0.2	5.7	29	74	2.6
19	4	1	21	5	10	0.2	5.2	25	65	2.5
20	5	1	22	5	11	0.2	5.5	26	69	2.6
21	5	1	22	5	12	0.2	5.5	27	69	2.6
23	6	1	28	6	12	0.3	5.2	25	64	2.5
35	4	1	18	3	7	0.3	4.2	21	50	2.3
35b	4	1	17	3	7	0.3	4.1	21	50	2.3
43	1	0	5	1	1	0.0	4.9	26	66	2.7
44	0	0	2	0	1	0.0	4.1	17	52	2.4
45	0	0	2	0	0	0.0	4.1	16	51	2.4
47	0	0	2	0	1	0.0	4.2	18	53	2.5
67	4	1	20	3	7	0.3	4.1	21	49	2.3
68	4	1	18	3	7	0.3	4.1	21	49	2.3
74	4	1	18	3	6	0.3	4.0	21	48	2.2
77	3	0	14	2	5	0.2	3.8	21	46	2.2
79	3	0	13	2	4	0.2	3.7	21	45	2.1
80	3	0	13	2	4	0.2	3.7	21	45	2.1
82	2	0	10	2	3	0.2	3.7	20	44	2.2
83	2	0	11	2	3	0.2	3.7	20	44	2.1
83b	2	0	11	2	3	0.2	3.7	20	44	2.1
84	2	0	12	2	3	0.2	3.7	20	44	2.1
84b	0	0	2	0	1	0.0	3.3	15	40	2.1
86	3	0	14	2	4	0.2	3.8	20	45	2.1
86b	1	0	7	0	1	0.0	3.3	17	40	2.0
96	3	0	13	2	4	0.1	3.8	18	45	2.1
101	3	0	14	2	4	0.1	3.8	18	44	2.1
102	3	0	14	2	4	0.1	3.8	18	44	2.1
108	3	1	15	2	5	0.1	3.8	18	45	2.1
112	4	1	16	3	5	0.1	3.9	18	46	2.1
118	3	1	15	2	4	0.1	3.8	18	45	2.0
120	3	0	14	2	4	0.1	3.8	17	44	2.0
308	3	1	15	2	4	0.1	3.8	17	44	2.0
120c	3	1	15	2	4	0.1	3.8	17	44	2.0
121	3	1	15	2	4	0.1	3.8	17	44	2.0
136	3	0	13	1	2	0.0	3.5	17	41	2.0
139	2	0	10	1	2	0.0	3.4	17	40	2.0
140	1	0	6	1	1	0.0	3.3	16	40	2.0
205	2	0	9	1	1	0.0	3.4	17	40	2.0
140c	2	0	9	1	1	0.0	3.4	17	40	2.0
143	2	0	7	1	1	0.0	3.3	16	39	2.0
161	1	0	6	1	2	0.0	3.4	16	40	2.0
153	1	0	6	1	3	0.1	3.5	15	42	2.0
154	1	0	7	1	2	0.0	3.4	16	40	2.0
156	1	0	6	1	2	0.0	3.4	16	40	2.0
267	0	0	1	0	0	0.0	3.6	13	45	2.2
157	1	0	7	1	2	0.0	3.4	16	40	2.0
266	0	0	1	0	0	0.0	3.5	12	43	2.1
159	1	0	6	1	2	0.0	3.4	16	40	2.0
169	1	0	4	1	1	0.0	3.3	16	39	2.0

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
171	1	0	3	1	1	0.0	3.2	16	38	2.0
172	1	0	3	1	1	0.0	3.2	16	38	2.0
310	1	0	3	1	1	0.0	3.2	16	38	2.0
173	1	0	3	0	1	0.0	3.2	16	38	2.0
174	1	0	3	1	1	0.0	3.2	16	38	2.0
175	1	0	3	1	1	0.0	3.2	16	38	2.0
176	1	0	3	1	1	0.0	3.2	16	38	2.0
177	1	0	3	0	1	0.0	3.2	16	38	1.9
178	1	0	2	0	1	0.0	3.1	17	38	1.9
179	1	0	2	0	1	0.0	3.1	17	38	1.9
180	0	0	2	0	1	0.0	3.1	17	38	1.9
180b	1	0	2	0	1	0.0	3.1	17	37	1.9
180c	0	0	2	0	0	0.0	3.1	16	37	1.9
181	0	0	2	0	0	0.0	3.1	17	37	2.0
183	0	0	2	0	0	0.0	3.1	17	37	2.0
181c	1	0	2	0	1	0.0	3.1	17	38	2.0
182	0	0	2	0	0	0.0	3.1	17	37	2.0
182b	0	0	2	0	0	0.0	3.1	17	37	2.0
189	1	0	5	0	1	0.0	3.3	17	39	2.0
190	1	0	5	0	1	0.0	3.3	16	39	2.0
191	1	0	4	0	1	0.0	3.3	17	39	2.0
192	1	0	5	0	1	0.0	3.3	17	39	2.0
193	1	0	4	0	1	0.0	3.3	17	39	2.0
311	1	0	4	0	1	0.0	3.3	17	39	2.0
193c	1	0	3	0	0	0.0	3.3	17	40	2.0
194	1	0	4	0	1	0.0	3.3	17	40	2.0
195	1	0	4	0	1	0.0	3.3	17	40	2.0
196	1	0	6	0	1	0.0	3.3	17	40	2.0
197	1	0	7	0	1	0.0	3.3	17	40	2.0
195d	1	0	6	0	1	0.0	3.3	17	40	2.0
195e	1	0	5	0	1	0.0	3.3	17	40	2.0
198	1	0	7	0	1	0.0	3.3	18	40	2.0
199	1	0	6	0	1	0.0	3.3	18	40	2.0
200	1	0	6	0	1	0.0	3.3	18	40	2.0
202	1	0	6	1	1	0.0	3.4	18	40	2.0
204	1	0	5	1	1	0.0	3.4	18	40	2.0
203	1	0	7	1	1	0.0	3.4	18	40	2.0
206	4	1	19	3	7	0.2	4.6	23	56	2.4
207	4	1	21	4	8	0.2	4.9	24	61	2.5
207b	4	1	18	3	7	0.2	4.8	23	60	2.5
208	4	1	20	4	9	0.2	5.1	25	64	2.5
315	4	1	21	4	9	0.2	5.1	25	64	2.5
212	3	1	15	3	7	0.1	4.8	23	60	2.4
212b	3	1	15	3	7	0.1	4.8	23	61	2.4
212c	3	1	14	3	7	0.1	4.9	23	61	2.4
213	4	1	18	4	9	0.2	5.1	25	65	2.5
214	4	1	18	4	9	0.2	5.1	25	65	2.5
215	4	1	18	4	9	0.2	5.1	25	65	2.5
216	4	1	19	4	9	0.2	5.1	25	64	2.5
217	4	1	19	4	9	0.2	5.1	25	64	2.5
218	4	1	18	4	9	0.2	5.2	25	65	2.5
219	4	1	18	4	9	0.2	5.2	25	65	2.5

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
220	4	1	19	4	9	0.2	5.2	25	65	2.5
221	4	1	19	4	9	0.2	5.2	25	65	2.5
222	4	1	20	4	9	0.2	5.2	25	65	2.5
223	4	1	20	4	9	0.2	5.2	25	65	2.5
224	4	1	20	5	10	0.2	5.2	25	65	2.5
225	4	1	19	4	9	0.2	5.1	25	64	2.5
249	0	0	2	0	0	0.0	3.8	16	47	2.0
252	0	0	2	0	0	0.0	3.5	11	43	2.0
252b	0	0	2	0	0	0.0	3.5	12	43	2.0
257	1	0	4	0	1	0.0	4.2	19	53	2.2
258a	1	0	4	0	0	0.0	4.1	17	51	2.2
258b	1	0	4	0	0	0.0	3.9	15	49	2.2
259	1	0	4	0	0	0.0	4.0	16	49	2.2
260	1	0	3	0	0	0.0	4.0	17	50	2.2
261	1	0	3	0	0	0.0	3.8	15	47	2.1
271	0	0	2	0	1	0.0	3.5	16	44	2.1
272	0	0	3	0	1	0.0	3.7	16	47	2.2
272b	0	0	3	0	1	0.0	3.7	16	47	2.2
273	0	0	2	0	1	0.0	3.5	16	43	2.1
280	3	1	12	3	6	0.1	4.7	22	59	2.4
281	3	1	12	3	6	0.1	4.8	22	60	2.4
282	2	1	12	3	6	0.1	4.8	23	61	2.4
283	2	1	12	3	6	0.1	4.8	23	61	2.4
285	3	1	16	3	6	0.2	4.2	23	52	2.4
285b	3	1	17	3	6	0.2	4.3	23	52	2.4
285c	4	1	18	3	6	0.2	4.3	23	52	2.4
286	3	1	16	3	5	0.2	4.2	23	51	2.4
291	3	1	17	3	6	0.1	4.6	23	57	2.4
286c	4	1	18	3	6	0.2	4.6	23	57	2.4
286d	2	0	11	2	4	0.2	3.8	21	45	2.2
287	3	1	17	2	5	0.2	4.1	23	50	2.3
288	3	1	17	2	5	0.2	4.1	23	50	2.3
288b	3	0	17	2	5	0.2	4.1	23	50	2.3
289	3	1	14	3	5	0.2	4.0	21	47	2.2
292	0	0	1	0	0	0.0	3.6	13	45	2.0
298	0	0	2	0	0	0.0	3.9	15	48	2.0
300	0	0	2	0	0	0.0	3.8	14	47	2.0
296a	1	0	2	0	0	0.0	4.0	16	50	2.0
296b	1	0	2	0	0	0.0	3.9	15	49	2.0
302a	0	0	2	0	0	0.0	3.7	13	45	2.0
302b	0	0	1	0	0	0.0	3.6	13	45	2.0
302c	0	0	1	0	0	0.0	3.7	13	45	2.0
305	4	1	17	4	9	0.2	5.1	25	65	2.5
401	0	0	2	0	1	0.0	3.3	16	41	2.0
402	0	0	2	0	1	0.0	3.3	15	40	2.0
407	0	0	2	0	1	0.1	3.3	15	40	2.0
413a	0	0	2	0	1	0.0	3.4	16	41	2.0
413b	0	0	2	0	1	0.0	3.4	16	41	2.0
415	0	0	2	0	1	0.0	3.4	16	42	2.0
416	0	0	2	0	0	0.0	3.4	15	42	2.0
417	0	0	2	0	1	0.0	3.4	16	42	2.1
418	0	0	1	0	0	0.0	3.4	16	42	2.0

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
419	0	0	2	0	1	0.0	3.4	16	42	2.0
421	0	0	2	0	1	0.0	3.5	16	43	2.1
422a	1	0	3	1	1	0.0	3.2	16	38	2.0
422b	1	0	3	1	1	0.0	3.2	16	38	2.0
434	0	0	1	0	0	0.0	3.1	17	37	1.9
436	0	0	1	0	0	0.0	3.1	17	37	1.9
437	0	0	1	0	0	0.0	3.1	17	37	1.9
453a	0	0	2	0	0	0.0	3.5	16	43	2.1
453b	0	0	2	0	0	0.0	3.5	16	43	2.1
454	0	0	2	0	0	0.0	3.5	15	42	2.1
456	0	0	1	0	0	0.0	3.4	14	41	2.0
458	0	0	1	0	0	0.0	3.5	15	43	2.1
462a	0	0	1	0	0	0.0	3.3	11	40	2.0
462b	0	0	1	0	0	0.0	3.3	11	40	2.0
463	0	0	1	0	0	0.0	3.3	11	40	2.0
464	0	0	1	0	0	0.0	3.6	12	44	2.1
465	0	0	1	0	0	0.0	3.4	11	42	2.0
466	0	0	1	0	0	0.0	3.5	11	43	2.1
467	0	0	1	0	0	0.0	3.8	14	48	2.4
468a	0	0	1	0	0	0.0	3.5	11	42	2.0
468b	0	0	1	0	0	0.0	3.5	10	42	2.0
468c	0	0	1	0	0	0.0	3.5	11	42	2.0
470	0	0	1	0	0	0.0	3.5	12	43	2.0
471	0	0	1	0	0	0.0	3.5	11	42	2.0
472a	0	0	1	0	0	0.0	3.5	12	43	2.0
472b	0	0	1	0	0	0.0	3.5	12	43	2.0
474	0	0	1	0	0	0.0	3.5	11	42	2.0
475	0	0	2	0	0	0.0	3.7	13	45	2.0
476	0	0	1	0	0	0.0	3.5	11	43	2.0
477a	0	0	1	0	0	0.0	3.5	12	43	2.0
477b	0	0	1	0	0	0.0	3.5	12	43	2.0
481	0	0	1	0	0	0.0	3.4	11	42	2.0
482	0	0	1	0	0	0.0	3.4	11	42	2.0
483	0	0	1	0	0	0.0	3.4	11	42	2.0
484	0	0	1	0	0	0.0	3.4	11	42	2.0
485a	0	0	1	0	0	0.0	3.3	11	40	2.0
485b	0	0	1	0	0	0.0	3.3	11	40	2.0
485c	0	0	1	0	0	0.0	3.3	11	40	2.0
485d	0	0	1	0	0	0.0	3.3	11	40	2.0
485e	0	0	1	0	0	0.0	3.3	11	40	2.0
487a	1	0	2	0	0	0.0	4.3	19	54	2.1
487b	1	0	2	0	0	0.0	4.2	18	53	2.1
488a	1	0	3	0	1	0.0	4.9	26	64	2.1
488b	1	0	3	0	1	0.0	4.6	22	59	2.1
526	3	0	13	2	4	0.2	3.8	21	45	2.1
527	3	0	12	2	4	0.2	3.8	21	46	2.2
528	3	0	12	2	4	0.2	3.8	21	46	2.2
529	2	0	12	2	4	0.2	3.8	21	46	2.2
530	2	0	12	2	4	0.2	3.8	21	46	2.2
531	2	0	12	2	4	0.2	3.8	21	46	2.2
532	2	0	12	2	4	0.2	3.8	21	46	2.2
533	3	0	12	2	4	0.2	3.8	21	46	2.2

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
534	3	0	12	2	4	0.2	3.8	21	46	2.2
535	3	0	12	2	4	0.2	3.8	21	46	2.2
536	3	0	13	2	4	0.2	3.8	21	46	2.2
537	3	0	13	2	4	0.2	3.8	21	46	2.2
538	3	0	17	2	5	0.2	4.1	23	49	2.3
539	3	0	17	2	5	0.2	4.0	23	49	2.3
540	3	0	17	2	5	0.2	4.0	23	49	2.3
541	3	0	17	2	5	0.2	4.0	23	49	2.3
542	3	0	17	2	5	0.2	4.0	23	49	2.3
543	3	0	17	2	5	0.2	4.1	23	49	2.3
544	3	0	17	2	5	0.2	4.1	23	49	2.3
545	3	0	17	2	5	0.2	4.1	23	50	2.3
546	4	1	18	3	6	0.2	4.2	23	51	2.3
547	1	0	4	0	1	0.0	3.3	17	40	2.0
147	2	0	7	1	2	0.0	3.4	16	40	2.0
158	1	0	6	1	2	0.0	3.4	16	40	2.0
A	1	0	4	1	1	0.0	3	19	42	2.0
B	2	0	10	1	3	0.1	4	20	43	2.1
C	2	0	11	2	4	0.2	4	21	45	2.2
D	4	1	17	3	6	0.2	4	23	54	2.4
E	4	1	19	3	7	0.2	5	23	57	2.4
F	2	0	12	2	4	0.2	4	22	46	2.3
G	3	0	16	2	4	0.2	4	23	48	2.3
H	1	0	6	1	2	0.1	3	19	42	2.0
I	0	0	2	0	0	0.0	3	17	37	2.0
J	2	0	8	1	2	0.1	4	19	43	2.1
K	2	0	9	1	3	0.2	4	21	45	2.2
L	2	0	10	1	3	0.2	4	21	44	2.1
M	2	0	10	1	3	0.2	4	21	45	2.2
Mine-owned receptors										
107	3	1	15	2	4	0.1	4	18	45	2.1
129	6	1	29	7	13	0.3	5	23	57	2.2
130	8	2	38	8	17	0.3	5	24	60	2.2
135	4	0	17	2	4	0.0	4	17	43	2.0
231	3	0	13	2	4	0.2	4	21	45	2.1
263	1	0	6	0	1	0.0	4	19	54	2.3
309	5	1	22	2	4	0.1	4	18	44	2.0
1h	3	1	14	2	4	0.1	4	18	45	2.1
1i	3	1	15	2	5	0.1	4	18	45	2.1
1j	3	1	15	2	5	0.1	4	18	45	2.1
1k	3	1	16	3	5	0.1	4	18	45	2.1
1l	3	1	15	2	5	0.1	4	18	45	2.1
1m	4	1	18	3	6	0.1	4	18	47	2.1
1n	4	1	16	3	5	0.1	4	18	46	2.1
1o	1	0	3	0	1	0.0	4	20	56	2.7
1p	3	0	13	2	3	0.1	4	17	43	2.0
1q	4	1	17	3	5	0.1	4	17	45	2.0
1r	5	1	24	5	10	0.2	5	21	52	2.2
1s	5	1	23	5	9	0.2	4	20	51	2.1
1t	3	1	13	4	7	0.3	4	20	53	2.4
1u	2	1	12	3	7	0.3	4	19	52	2.3
1v	3	1	12	3	7	0.3	4	19	52	2.3

Receptor ID	PM$_{2.5}$ (µg/m³)		PM$_{10}$ (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM$_{2.5}$ (µg/m³)	PM$_{10}$ (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
1w	4	1	20	5	9	0.2	4	20	52	2.2
1x	4	1	19	4	9	0.3	4	20	52	2.2
1y	3	1	12	3	7	0.3	4	19	51	2.3
1z	2	0	9	1	2	0.0	3	16	41	2.0
1aa	2	0	11	2	4	0.1	4	17	44	2.1
1ab	2	0	8	2	3	0.0	3	16	41	2.0
1ac	6	1	28	5	12	0.3	5	24	62	2.5
1ad	1	0	3	1	1	0.1	3	14	40	2.1
1ae	9	2	40	9	20	0.6	6	25	67	2.7
1af	4	1	21	4	10	0.4	4	21	53	2.4
1ag	4	1	21	4	9	0.3	4	21	52	2.3
1ah	4	1	19	3	7	0.3	4	21	48	2.3
1ai	4	1	19	3	7	0.3	4	21	48	2.2
1aj	4	1	19	3	7	0.3	4	21	48	2.2
1ak	4	1	19	3	6	0.3	4	21	48	2.2
1al	4	1	18	3	6	0.3	4	21	48	2.2
1am	3	1	15	2	5	0.2	4	20	46	2.2
1an	4	1	21	4	7	0.3	4	19	48	2.3
1ao	5	1	21	4	8	0.4	4	19	49	2.3
1ap	3	1	15	2	5	0.2	4	19	45	2.1
1aq	3	1	15	2	5	0.2	4	19	45	2.1
1ar	3	1	14	2	5	0.2	4	19	45	2.1
1as	3	1	14	2	5	0.2	4	19	45	2.1
1at	3	1	13	2	4	0.1	4	18	45	2.1
1au	3	1	13	2	4	0.1	4	18	45	2.1
1av	3	0	13	2	4	0.1	4	18	45	2.1
1aw	3	1	14	2	4	0.1	4	18	45	2.1
1ax	3	0	13	2	4	0.1	4	18	45	2.1
1ay	3	0	14	2	4	0.1	4	18	44	2.1
1az	3	1	14	2	4	0.1	4	18	45	2.1
1ba	3	1	14	2	4	0.1	4	18	45	2.1
246	1	0	4	0	1	0.0	5	27	66	2.2
2b	24	5	107	25	54	0.9	10	54	125	3.6
2c	3	0	15	2	5	0.2	4	22	48	2.3
2d	3	1	15	2	5	0.2	4	22	48	2.3
2e	11	3	51	13	30	0.9	7	29	79	3.0
2f	35	8	152	38	91	2.3	13	56	146	4.4
2g	40	10	174	45	112	3.1	14	63	166	5.2
2h	95	26	440	124	350	9.2	31	153	419	11.5
2i	5	1	24	5	11	0.4	5	22	55	2.4
2j	119	29	576	145	421	8.7	34	175	492	10.9
2k	79	22	419	111	296	7.1	27	136	360	9.3
2l	101	29	483	140	408	9.5	34	170	477	11.7
2m	1	0	8	1	2	0.0	5	31	75	2.7
2n	1	0	4	1	1	0.0	5	31	71	2.3
2o	1	0	4	0	1	0.0	5	25	61	2.2
2p	1	0	4	0	1	0.0	5	24	60	2.2
2q	1	0	4	0	1	0.0	5	24	59	2.2
2r	1	0	4	0	1	0.0	5	24	60	2.2
2s	1	0	4	0	1	0.0	5	24	59	2.2
2t	1	0	7	1	2	0.0	7	54	104	2.8
2u	2	0	10	2	3	0.0	13	138	221	3.9

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
2v	2	0	11	2	3	0.0	16	178	281	4.5
2w	1	0	3	0	1	0.0	4	21	55	2.2
2x	5	1	25	6	12	0.2	6	31	77	2.7
2y	5	1	27	6	12	0.2	6	30	77	2.7
2z	5	1	26	6	12	0.2	6	30	75	2.7
2aa	6	1	28	6	13	0.2	6	31	77	2.8
2ab	5	1	26	6	12	0.2	6	29	75	2.7
2ac	10	2	48	11	21	0.3	8	50	110	3.3
2ad	5	1	25	6	13	0.2	6	29	74	2.7
2ae	11	2	51	11	23	0.3	9	51	112	3.4
2af	5	1	23	6	12	0.2	6	28	72	2.6
2ag	5	1	25	6	13	0.2	6	29	74	2.7
2ah	5	1	23	6	12	0.2	6	27	70	2.6
2ai	14	3	69	13	27	0.4	8	46	103	3.3
2aj	6	1	30	7	14	0.3	6	26	69	2.6
2ak	23	5	106	24	53	0.9	10	54	124	3.6
2al	25	6	114	26	56	1.0	11	56	129	3.7
3a	1	0	5	0	1	0.0	3	17	39	2.0
3b	1	0	5	0	1	0.0	3	17	39	2.0
3c	1	0	6	1	2	0.0	3	16	40	2.0
3d	1	0	4	0	1	0.0	3	16	39	2.0
3e	1	0	4	0	1	0.0	3	16	39	2.0
3f	1	0	4	0	1	0.0	3	16	38	2.0
3g	1	0	5	1	1	0.0	3	16	39	2.0
3h	1	0	5	1	2	0.0	3	16	40	2.0
3i	1	0	3	0	1	0.0	3	16	38	2.0
3j	1	0	3	0	0	0.0	3	16	38	2.0
3k	1	0	4	1	1	0.0	3	16	39	2.0
3l	1	0	6	1	2	0.0	3	16	40	2.0
3m	1	0	6	1	2	0.0	3	16	40	2.0
3n	1	0	3	1	1	0.0	3	16	38	2.0
3o	1	0	5	1	1	0.0	3	16	39	2.0
3p	1	0	5	1	2	0.0	3	16	40	2.0
3q	1	0	5	1	2	0.0	3	16	39	2.0
3r	1	0	3	1	1	0.0	3	16	38	2.0
3s	1	0	3	1	1	0.0	3	16	38	2.0
5	3	1	14	3	6	0.1	5	25	68	2.4
7	4	1	22	5	10	0.2	6	30	76	2.7
211	3	1	13	3	7	0.1	5	23	62	2.4
299	0	0	2	0	0	0.0	4	15	48	2.0
5e	5	1	22	5	10	0.2	6	31	77	2.7
5f	5	1	23	5	10	0.2	6	31	77	2.7
5g	5	1	24	5	11	0.2	6	31	77	2.7
5h	0	0	1	0	0	0.0	4	12	43	2.0
5i	0	0	2	0	0	0.0	4	15	48	2.0
5j	0	0	1	0	0	0.0	4	12	43	2.0
5k	0	0	2	0	0	0.0	4	15	49	2.0
5l	1	0	2	0	0	0.0	4	16	50	2.0
5m	1	0	4	0	1	0.0	7	52	100	2.4
5n	0	0	1	0	0	0.0	4	12	44	2.0
5o	0	0	2	0	0	0.0	4	14	46	2.0
5p	1	0	3	0	1	0.0	5	31	72	2.2

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
5q	1	0	5	1	1	0.0	11	95	157	3.3
5r	2	0	9	1	3	0.0	18	185	299	7.2
5s	2	0	10	2	3	0.0	13	127	210	4.3
5t	2	0	11	2	4	0.1	9	77	142	3.7
5u	2	1	12	3	5	0.1	7	52	104	2.7
5v	0	0	2	0	0	0.0	4	13	45	2.0
5w	0	0	2	0	0	0.0	4	13	45	2.0
5x	0	0	2	0	0	0.0	4	13	45	2.0
5y	2	1	11	3	5	0.1	6	29	73	2.4
5z	2	1	11	2	5	0.1	5	28	72	2.4
5aa	2	1	11	3	5	0.1	6	28	72	2.4
5ab	2	0	8	2	4	0.1	5	23	64	2.3
5ac	2	1	11	3	5	0.1	5	27	71	2.4
5ad	2	0	8	2	4	0.1	5	22	62	2.3
5ae	4	1	21	5	10	0.2	6	30	76	2.7
274	0	0	2	0	1	0.0	3	16	43	2.1
7b	0	0	1	0	0	0.0	4	11	43	2.1
7c	0	0	1	0	0	0.0	4	11	43	2.1
7d	0	0	1	0	0	0.0	3	10	41	2.0
7e	0	0	1	0	0	0.0	3	10	41	2.0
7f	0	0	1	0	0	0.0	3	10	40	2.0
7g	0	0	1	0	0	0.0	3	14	42	2.1
7h	0	0	2	0	1	0.0	4	16	44	2.1
7i	0	0	2	0	0	0.0	3	15	43	2.1
7j	0	0	2	0	1	0.0	4	16	44	2.1
7k	1	0	3	0	1	0.0	3	16	42	2.1
8a	0	0	1	0	0	0.0	3	11	42	2.0
8b	0	0	1	0	0	0.0	3	11	43	2.0
8c	0	0	1	0	0	0.0	3	11	43	2.0
8d	0	0	1	0	0	0.0	4	11	43	2.1
8e	0	0	1	0	0	0.0	4	11	44	2.1
8f	0	0	1	0	0	0.0	3	9	40	2.0
8g	0	0	1	0	0	0.0	3	10	41	2.0
8h	0	0	1	0	0	0.0	3	10	41	2.0
8i	0	0	1	0	0	0.0	3	10	40	2.0

Note: DD = dust deposition.

Table F-2: Modelling predictions for Scenario 2

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
Privately-owned receptors										
4	2	0	9	2	5	0.1	4.8	20	61	2.3
6	3	1	17	4	8	0.1	5.1	23	65	2.5
19	3	1	17	4	8	0.2	4.7	21	59	2.4
20	4	1	19	5	10	0.2	4.9	22	61	2.4

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
21	4	1	20	5	10	0.2	5.0	22	62	2.5
23	4	1	21	5	10	0.2	4.8	21	59	2.4
35	3	1	17	4	7	0.2	4.1	21	49	2.3
35b	3	1	17	4	8	0.3	4.1	21	49	2.3
43	1	0	7	1	1	0.0	5.0	26	68	2.8
44	1	0	4	0	1	0.0	4.1	16	52	2.4
45	1	0	3	0	1	0.0	4.1	16	52	2.4
47	0	0	2	0	1	0.0	4.2	18	54	2.5
67	4	1	22	4	9	0.3	4.1	20	49	2.3
68	4	1	20	4	8	0.3	4.1	20	49	2.3
74	4	1	22	4	8	0.3	4.1	20	49	2.3
77	5	1	24	3	7	0.3	3.9	21	47	2.2
79	4	1	22	3	6	0.2	3.8	21	46	2.2
80	4	1	22	3	6	0.2	3.8	21	46	2.2
82	4	0	18	2	4	0.2	3.7	21	45	2.2
83	4	0	19	2	4	0.2	3.7	20	45	2.2
83b	4	0	20	2	5	0.2	3.7	20	45	2.2
84	4	0	20	2	5	0.2	3.8	21	45	2.2
84b	1	0	3	1	1	0.1	3.3	14	41	2.1
86	5	1	25	3	7	0.3	3.9	20	47	2.2
86b	1	0	5	1	2	0.1	3.3	16	40	2.0
96	6	1	30	5	10	0.4	4.2	18	49	2.4
101	6	1	31	5	10	0.4	4.2	18	49	2.4
102	6	1	31	5	10	0.4	4.2	18	50	2.4
108	7	1	33	5	11	0.5	4.3	18	51	2.4
112	7	1	35	6	13	0.6	4.5	18	53	2.5
118	7	1	35	6	12	0.5	4.3	17	51	2.5
120	6	1	31	5	11	0.5	4.3	17	50	2.4
308	6	1	32	5	12	0.5	4.3	17	51	2.4
120c	6	1	31	5	11	0.5	4.3	17	50	2.4
121	6	1	31	5	12	0.5	4.3	17	51	2.4
136	3	0	14	2	3	0.1	3.5	13	41	2.0
139	2	0	12	1	2	0.0	3.3	13	40	2.0
140	2	0	9	1	2	0.0	3.3	14	39	2.0
205	2	0	8	1	3	0.1	3.4	16	41	2.0
140c	1	0	7	1	3	0.1	3.4	16	41	2.0
143	2	0	10	1	2	0.0	3.3	13	39	2.0
161	3	0	14	2	4	0.1	3.5	14	41	2.0
153	2	0	8	2	4	0.2	3.5	12	42	2.1
154	3	1	14	3	5	0.1	3.6	14	43	2.0
156	3	1	15	3	5	0.1	3.6	14	42	2.0
267	0	0	1	0	0	0.0	3.7	13	46	2.2
157	3	1	17	2	5	0.1	3.6	14	42	2.0
266	0	0	1	0	0	0.0	3.6	12	45	2.1
159	3	0	16	2	4	0.1	3.5	14	41	2.0
169	2	0	7	1	2	0.1	3.3	14	39	2.0
171	1	0	6	1	2	0.0	3.3	15	39	2.0
172	1	0	5	1	2	0.0	3.2	15	38	2.0
310	1	0	5	1	2	0.0	3.2	15	38	2.0
173	1	0	5	1	2	0.0	3.2	15	38	2.0
174	1	0	5	1	2	0.0	3.2	15	38	2.0
175	1	0	5	1	2	0.0	3.2	15	38	2.0

Receptor ID	PM$_{2.5}$ (µg/m³)		PM$_{10}$ (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM$_{2.5}$ (µg/m³)	PM$_{10}$ (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
176	1	0	5	1	2	0.0	3.2	15	38	2.0
177	1	0	5	1	1	0.0	3.2	15	38	2.0
178	1	0	4	1	1	0.0	3.1	16	38	2.0
179	1	0	4	1	1	0.0	3.1	16	38	2.0
180	1	0	4	1	1	0.0	3.1	16	37	2.0
180b	1	0	3	0	1	0.0	3.1	16	37	2.0
180c	1	0	3	0	1	0.0	3.1	16	37	1.9
181	1	0	3	0	0	0.0	3.1	17	37	2.0
183	1	0	3	0	0	0.0	3.1	16	37	2.0
181c	1	0	4	0	1	0.0	3.1	16	37	2.0
182	1	0	3	0	0	0.0	3.1	17	37	2.0
182b	1	0	3	0	0	0.0	3.1	17	37	2.0
189	1	0	6	1	1	0.0	3.2	14	39	2.0
190	1	0	6	1	1	0.0	3.2	14	39	2.0
191	1	0	5	0	1	0.0	3.2	15	39	2.0
192	1	0	6	1	1	0.0	3.2	14	39	2.0
193	1	0	5	0	1	0.0	3.2	15	39	2.0
311	1	0	5	1	1	0.0	3.2	14	39	2.0
193c	1	0	4	0	1	0.0	3.3	15	40	2.0
194	1	0	6	0	1	0.0	3.3	15	40	2.0
195	1	0	6	0	1	0.0	3.3	15	40	2.0
196	1	0	5	1	1	0.0	3.3	16	40	2.0
197	1	0	5	1	1	0.0	3.3	16	40	2.0
195d	1	0	5	1	1	0.0	3.3	16	40	2.0
195e	1	0	6	1	1	0.0	3.3	15	40	2.0
198	1	0	5	1	1	0.1	3.3	16	40	2.0
199	1	0	5	1	1	0.0	3.3	16	40	2.0
200	1	0	4	1	1	0.0	3.3	17	40	2.0
202	1	0	7	1	2	0.1	3.4	17	41	2.0
204	1	0	6	1	2	0.1	3.4	17	41	2.0
203	1	0	7	1	2	0.1	3.4	17	41	2.0
206	3	1	14	3	6	0.2	4.3	21	53	2.3
207	3	1	15	4	8	0.2	4.6	21	56	2.4
207b	3	1	13	3	7	0.1	4.5	20	55	2.4
208	3	1	17	4	8	0.2	4.7	21	59	2.4
315	3	1	17	4	8	0.2	4.7	21	58	2.4
212	2	1	12	3	6	0.1	4.5	20	56	2.3
212b	2	1	12	3	6	0.1	4.5	20	56	2.3
212c	2	1	11	3	6	0.1	4.5	20	56	2.3
213	3	1	15	4	8	0.2	4.7	21	59	2.4
214	3	1	15	4	8	0.2	4.7	21	59	2.4
215	3	1	15	4	8	0.2	4.7	21	59	2.4
216	3	1	16	4	8	0.2	4.7	21	59	2.4
217	3	1	16	4	8	0.2	4.7	21	59	2.4
218	3	1	16	4	8	0.2	4.7	21	59	2.4
219	3	1	16	4	8	0.2	4.7	21	59	2.4
220	3	1	16	4	8	0.2	4.7	21	59	2.4
221	3	1	16	4	8	0.2	4.7	21	59	2.4
222	3	1	16	4	8	0.2	4.7	21	59	2.4
223	3	1	17	4	8	0.2	4.7	21	59	2.4
224	3	1	17	4	8	0.2	4.8	21	59	2.4
225	3	1	16	4	8	0.2	4.7	21	58	2.4

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
249	0	0	2	0	0	0.0	4.0	18	50	2.1
252	0	0	2	0	0	0.0	3.6	12	44	2.0
252b	0	0	2	0	0	0.0	3.6	13	44	2.0
257	1	0	4	0	1	0.0	4.4	21	56	2.3
258a	1	0	5	0	0	0.0	4.3	19	54	2.3
258b	1	0	4	0	0	0.0	4.1	17	51	2.3
259	1	0	4	0	0	0.0	4.2	18	52	2.2
260	1	0	4	0	0	0.0	4.2	19	53	2.2
261	1	0	3	0	0	0.0	4.0	17	50	2.2
271	0	0	2	0	1	0.0	3.5	15	44	2.1
272	0	0	2	0	1	0.0	3.7	15	47	2.2
272b	0	0	2	0	1	0.0	3.7	15	47	2.2
273	0	0	2	0	1	0.0	3.5	15	43	2.1
280	2	1	10	3	5	0.1	4.4	19	55	2.3
281	2	1	11	3	5	0.1	4.5	19	56	2.3
282	2	1	11	3	5	0.1	4.5	19	56	2.3
283	2	1	11	3	5	0.1	4.5	19	56	2.3
285	2	1	12	3	5	0.2	4.1	22	50	2.3
285b	3	1	13	3	6	0.2	4.1	22	50	2.3
285c	3	1	13	3	6	0.2	4.1	22	50	2.3
286	2	1	12	3	5	0.2	4.0	22	49	2.3
291	2	1	11	3	5	0.1	4.3	21	53	2.3
286c	2	1	12	3	6	0.1	4.3	21	53	2.3
286d	4	0	19	2	5	0.2	3.8	21	45	2.2
287	2	1	12	2	5	0.2	4.0	22	48	2.3
288	2	0	12	2	5	0.2	4.0	22	48	2.3
288b	2	0	12	2	5	0.2	4.0	22	48	2.3
289	3	1	17	3	6	0.2	4.0	21	47	2.2
292	0	0	1	0	0	0.0	3.7	14	46	2.0
298	0	0	2	0	0	0.0	4.0	17	50	2.0
300	0	0	2	0	0	0.0	4.0	16	49	2.0
296a	0	0	2	0	0	0.0	4.2	18	52	2.1
296b	0	0	2	0	0	0.0	4.1	18	51	2.1
302a	0	0	2	0	0	0.0	3.8	15	47	2.0
302b	0	0	1	0	0	0.0	3.7	14	46	2.0
302c	0	0	1	0	0	0.0	3.7	14	46	2.0
305	3	1	15	4	8	0.1	4.7	21	59	2.4
401	1	0	3	0	1	0.0	3.3	14	41	2.0
402	1	0	3	0	1	0.0	3.3	14	40	2.0
407	1	0	3	1	1	0.1	3.3	13	40	2.1
413a	0	0	2	0	1	0.0	3.4	15	41	2.0
413b	0	0	2	0	1	0.0	3.3	15	41	2.0
415	0	0	2	0	1	0.0	3.4	15	42	2.0
416	0	0	1	0	0	0.0	3.4	15	42	2.0
417	0	0	2	0	1	0.0	3.4	15	42	2.1
418	0	0	1	0	0	0.0	3.4	15	42	2.0
419	0	0	2	0	1	0.0	3.4	15	42	2.0
421	0	0	2	0	1	0.0	3.4	15	43	2.1
422a	1	0	4	1	2	0.0	3.2	15	38	2.0
422b	1	0	4	1	2	0.0	3.2	15	38	2.0
434	1	0	2	0	1	0.0	3.1	16	37	1.9
436	1	0	2	0	0	0.0	3.1	16	37	1.9

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
437	1	0	2	0	1	0.0	3.1	16	37	1.9
453a	0	0	1	0	0	0.0	3.5	15	43	2.1
453b	0	0	1	0	0	0.0	3.5	15	43	2.1
454	0	0	1	0	0	0.0	3.5	14	43	2.1
456	0	0	1	0	0	0.0	3.4	14	41	2.0
458	0	0	1	0	0	0.0	3.5	14	43	2.1
462a	0	0	1	0	0	0.0	3.4	11	41	2.0
462b	0	0	1	0	0	0.0	3.4	11	41	2.0
463	0	0	1	0	0	0.0	3.3	11	41	2.0
464	0	0	1	0	0	0.0	3.6	13	45	2.1
465	0	0	1	0	0	0.0	3.5	11	43	2.1
466	0	0	1	0	0	0.0	3.6	12	44	2.1
467	0	0	2	0	0	0.0	3.9	15	49	2.4
468a	0	0	1	0	0	0.0	3.5	11	43	2.0
468b	0	0	1	0	0	0.0	3.5	11	42	2.0
468c	0	0	1	0	0	0.0	3.5	11	43	2.0
470	0	0	1	0	0	0.0	3.6	12	44	2.0
471	0	0	1	0	0	0.0	3.5	12	43	2.0
472a	0	0	1	0	0	0.0	3.6	12	44	2.0
472b	0	0	1	0	0	0.0	3.6	13	44	2.0
474	0	0	1	0	0	0.0	3.5	11	43	2.0
475	0	0	2	0	0	0.0	3.8	14	47	2.0
476	0	0	1	0	0	0.0	3.5	12	43	2.0
477a	0	0	1	0	0	0.0	3.6	13	44	2.0
477b	0	0	1	0	0	0.0	3.6	13	44	2.0
481	0	0	1	0	0	0.0	3.4	11	42	2.0
482	0	0	1	0	0	0.0	3.4	11	42	2.0
483	0	0	1	0	0	0.0	3.4	11	42	2.0
484	0	0	1	0	0	0.0	3.4	12	42	2.0
485a	0	0	1	0	0	0.0	3.3	11	40	2.0
485b	0	0	1	0	0	0.0	3.3	11	40	2.0
485c	0	0	1	0	0	0.0	3.3	11	40	2.0
485d	0	0	1	0	0	0.0	3.3	11	40	2.0
485e	0	0	1	0	0	0.0	3.3	11	40	2.0
487a	1	0	2	0	0	0.0	4.6	22	58	2.1
487b	1	0	2	0	1	0.0	4.5	22	58	2.1
488a	1	0	3	0	1	0.0	5.6	34	74	2.2
488b	1	0	3	0	1	0.0	5.2	29	67	2.2
526	5	1	22	3	6	0.2	3.8	21	46	2.2
527	3	1	16	2	5	0.2	3.8	21	46	2.2
528	3	1	15	2	5	0.2	3.8	21	46	2.2
529	3	0	15	2	5	0.2	3.8	21	46	2.2
530	3	0	15	2	5	0.2	3.8	21	46	2.2
531	3	0	15	2	5	0.2	3.8	21	46	2.2
532	3	0	15	2	5	0.2	3.8	21	46	2.2
533	3	0	15	2	5	0.2	3.8	21	46	2.2
534	3	0	15	2	5	0.2	3.8	21	46	2.2
535	3	0	15	2	5	0.2	3.8	21	46	2.2
536	3	0	15	2	5	0.2	3.8	21	46	2.2
537	3	0	15	2	5	0.2	3.8	21	46	2.2
538	2	0	12	2	5	0.2	4.0	22	48	2.3
539	2	0	12	2	5	0.2	4.0	22	48	2.3

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
540	2	0	12	2	5	0.2	4.0	22	48	2.3
541	2	0	12	2	5	0.2	4.0	22	48	2.3
542	2	0	12	2	5	0.2	4.0	22	48	2.3
543	2	0	12	2	5	0.2	4.0	22	48	2.3
544	2	0	12	2	5	0.2	4.0	22	48	2.3
545	2	0	12	2	5	0.2	4.0	22	48	2.3
546	2	1	13	3	5	0.2	4.1	22	49	2.3
547	1	0	6	0	1	0.0	3.3	15	40	2.0
147	4	0	18	2	4	0.1	3.6	13	42	2.0
158	3	0	16	2	4	0.1	3.6	14	42	2.0
A	1	0	7	1	2	0.1	3	18	42	2.1
B	4	0	18	2	4	0.2	4	20	44	2.2
C	3	0	16	2	5	0.2	4	21	46	2.2
D	2	1	13	3	6	0.2	4	22	51	2.3
E	3	1	13	3	6	0.2	4	21	54	2.3
F	3	0	14	2	4	0.2	4	21	46	2.2
G	3	0	13	2	5	0.2	4	22	47	2.2
H	2	0	10	1	3	0.2	4	19	43	2.1
I	1	0	3	0	0	0.0	3	17	37	2.0
J	3	0	15	2	4	0.2	4	19	43	2.1
K	3	0	15	2	4	0.2	4	21	45	2.2
L	3	0	16	2	4	0.2	4	20	44	2.2
M	3	0	14	2	4	0.2	4	21	45	2.2
Mine-owned receptors										
107	6	1	33	5	11	0.5	4	18	50	2.4
129	22	5	96	26	70	1.7	9	34	111	3.7
130	37	8	175	38	111	2.8	12	46	151	4.8
135	3	0	16	2	5	0.1	4	13	43	2.1
231	5	1	23	3	6	0.2	4	21	46	2.2
263	1	0	6	0	1	0.0	4	19	56	2.3
309	4	1	19	2	5	0.1	4	13	43	2.1
1h	6	1	32	5	11	0.5	4	18	50	2.4
1i	7	1	34	5	12	0.5	4	18	51	2.4
1j	7	1	34	6	12	0.5	4	18	51	2.4
1k	7	1	35	6	13	0.5	4	18	52	2.5
1l	7	1	34	6	12	0.5	4	18	52	2.4
1m	7	1	37	7	15	0.6	5	18	55	2.5
1n	7	1	36	6	13	0.5	4	18	53	2.5
1o	1	0	3	0	1	0.0	4	19	57	2.8
1p	5	1	23	4	9	0.4	4	16	48	2.3
1q	5	1	23	5	11	0.5	4	15	50	2.4
1r	20	5	87	22	56	1.7	8	30	96	3.6
1s	42	5	271	22	56	1.8	8	30	95	3.8
1t	3	1	17	5	10	0.6	4	13	51	2.6
1u	3	1	13	4	8	0.5	4	12	49	2.5
1v	3	1	15	4	9	0.5	4	12	50	2.5
1w	12	3	55	15	37	1.2	6	23	77	3.2
1x	8	2	40	10	24	1.0	5	18	63	2.9
1y	3	1	15	4	9	0.6	4	12	50	2.5
1z	4	1	20	2	5	0.1	4	13	42	2.0
1aa	4	1	19	5	11	0.4	4	14	49	2.3
1ab	4	1	21	3	5	0.1	4	13	43	2.0

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
1ac	4	1	21	5	10	0.2	5	21	57	2.4
1ad	1	0	4	1	2	0.1	3	13	41	2.1
1ae	5	1	28	7	16	0.4	5	21	60	2.5
1af	4	1	20	5	10	0.3	4	20	52	2.3
1ag	4	1	20	5	10	0.3	4	20	51	2.3
1ah	4	1	22	4	8	0.3	4	20	49	2.3
1ai	4	1	22	4	8	0.3	4	20	49	2.3
1aj	4	1	22	4	8	0.3	4	20	49	2.3
1ak	4	1	22	4	8	0.3	4	20	49	2.3
1al	4	1	22	4	8	0.3	4	20	49	2.3
1am	5	1	27	4	8	0.3	4	20	48	2.3
1an	6	1	33	5	11	0.4	4	19	51	2.4
1ao	7	1	35	6	12	0.5	4	19	52	2.4
1ap	6	1	30	4	9	0.4	4	19	49	2.3
1aq	6	1	30	4	9	0.4	4	19	49	2.3
1ar	6	1	30	4	9	0.4	4	18	49	2.3
1as	6	1	30	4	9	0.4	4	18	49	2.3
1at	6	1	30	4	10	0.4	4	18	49	2.3
1au	6	1	30	5	10	0.4	4	18	49	2.3
1av	6	1	30	5	10	0.4	4	18	49	2.4
1aw	6	1	31	5	11	0.4	4	18	50	2.4
1ax	6	1	31	5	10	0.4	4	18	49	2.4
1ay	6	1	31	5	10	0.4	4	18	50	2.4
1az	6	1	32	5	11	0.4	4	18	50	2.4
1ba	6	1	32	5	11	0.5	4	18	50	2.4
246	1	0	4	0	1	0.0	6	36	78	2.4
2b	12	3	65	14	30	0.5	7	34	88	2.9
2c	3	1	15	2	5	0.2	4	22	47	2.2
2d	3	1	15	3	5	0.2	4	21	47	2.2
2e	7	2	38	10	22	0.5	6	23	67	2.6
2f	15	4	81	21	45	1.0	8	34	94	3.1
2g	17	4	90	23	51	1.1	8	36	99	3.2
2h	37	9	183	47	111	2.2	13	63	165	4.3
2i	4	1	22	5	11	0.3	4	20	53	2.3
2j	48	12	249	64	160	3.3	16	83	218	5.5
2k	31	8	153	39	89	1.8	12	54	141	3.9
2l	49	12	240	60	146	2.8	16	80	205	4.9
2m	2	0	11	1	2	0.0	6	34	81	2.8
2n	1	0	4	1	1	0.0	6	41	84	2.5
2o	1	0	4	0	1	0.0	5	31	69	2.3
2p	1	0	3	0	1	0.0	5	30	67	2.3
2q	1	0	3	0	1	0.0	5	29	66	2.3
2r	1	0	3	0	1	0.0	5	30	67	2.3
2s	1	0	3	0	1	0.0	5	30	67	2.3
2t	1	0	6	1	2	0.0	8	68	121	2.9
2u	2	0	9	1	3	0.0	18	206	310	4.5
2v	2	0	9	2	3	0.1	21	254	383	5.3
2w	1	0	4	0	1	0.0	5	23	59	2.3
2x	4	1	20	5	10	0.2	5	24	68	2.6
2y	4	1	21	5	10	0.2	5	24	67	2.6
2z	4	1	21	5	10	0.2	5	24	66	2.5
2aa	4	1	22	5	11	0.2	5	24	68	2.6

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
2ab	4	1	21	5	10	0.2	5	23	66	2.5
2ac	6	1	33	7	15	0.2	7	36	87	2.9
2ad	4	1	21	5	11	0.2	5	23	65	2.5
2ae	7	1	35	8	16	0.2	7	37	88	2.9
2af	4	1	21	5	10	0.2	5	23	64	2.5
2ag	4	1	22	5	11	0.2	5	23	65	2.5
2ah	4	1	21	5	10	0.2	5	22	63	2.5
2ai	8	2	42	9	18	0.3	6	33	82	2.9
2aj	5	1	23	6	12	0.2	5	22	62	2.5
2ak	12	3	64	14	30	0.5	7	34	88	2.9
2al	13	3	67	15	31	0.5	7	35	90	3.0
3a	1	0	5	0	1	0.0	3	15	39	2.0
3b	1	0	5	0	1	0.0	3	15	39	2.0
3c	3	0	15	2	4	0.1	3	13	41	2.0
3d	1	0	5	0	1	0.0	3	15	38	2.0
3e	1	0	5	0	1	0.0	3	15	38	2.0
3f	1	0	5	0	1	0.0	3	15	38	2.0
3g	2	0	8	1	3	0.0	3	14	40	2.0
3h	2	0	10	2	4	0.1	3	14	41	2.0
3i	1	0	5	1	1	0.0	3	15	38	2.0
3j	1	0	5	0	1	0.0	3	15	38	2.0
3k	2	0	8	1	3	0.1	3	14	40	2.0
3l	2	0	10	2	4	0.1	3	14	41	2.1
3m	2	0	10	2	4	0.1	3	14	41	2.0
3n	1	0	5	1	1	0.0	3	15	38	2.0
3o	2	0	8	1	3	0.1	3	14	40	2.0
3p	1	0	7	2	3	0.1	3	14	40	2.1
3q	1	0	7	1	3	0.1	3	14	40	2.0
3r	1	0	4	1	2	0.0	3	15	38	2.0
3s	1	0	5	1	2	0.1	3	14	39	2.0
5	2	1	11	3	5	0.1	5	20	60	2.3
7	3	1	18	4	8	0.1	5	24	67	2.5
211	2	1	11	3	6	0.1	5	20	57	2.3
299	0	0	2	0	0	0.0	4	17	50	2.0
5e	4	1	18	4	9	0.1	5	24	67	2.5
5f	4	1	18	4	9	0.2	5	24	67	2.5
5g	4	1	19	4	9	0.2	5	24	68	2.6
5h	0	0	1	0	0	0.0	4	13	44	2.0
5i	0	0	2	0	0	0.0	4	17	50	2.0
5j	0	0	1	0	0	0.0	4	12	44	2.0
5k	0	0	2	0	0	0.0	4	17	51	2.0
5l	1	0	2	0	0	0.0	4	19	53	2.1
5m	1	0	3	0	1	0.0	10	88	142	2.9
5n	0	0	1	0	0	0.0	4	13	45	2.0
5o	0	0	2	0	0	0.0	4	15	47	2.0
5p	1	0	3	0	1	0.0	7	45	89	2.5
5q	1	0	5	1	1	0.0	15	147	220	3.9
5r	2	0	8	1	3	0.0	13	125	205	4.4
5s	2	0	9	2	3	0.0	12	113	191	4.7
5t	2	0	8	2	4	0.1	8	62	119	2.9
5u	2	0	9	2	4	0.1	6	36	83	2.5
5v	0	0	2	0	0	0.0	4	15	47	2.1

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
5w	0	0	2	0	0	0.0	4	15	47	2.1
5x	0	0	2	0	0	0.0	4	15	47	2.1
5y	2	0	9	2	4	0.1	5	21	63	2.3
5z	2	0	9	2	4	0.1	5	20	62	2.3
5aa	2	0	9	2	4	0.1	5	21	62	2.3
5ab	2	0	8	2	4	0.1	5	18	58	2.3
5ac	2	0	9	2	4	0.1	5	20	62	2.3
5ad	2	0	8	2	4	0.1	4	18	57	2.3
5ae	3	1	17	4	8	0.1	5	24	67	2.5
274	0	0	2	0	1	0.0	3	15	43	2.1
7b	0	0	1	0	0	0.0	4	11	43	2.1
7c	0	0	1	0	0	0.0	4	11	43	2.1
7d	0	0	1	0	0	0.0	3	10	42	2.1
7e	0	0	1	0	0	0.0	3	11	42	2.0
7f	0	0	1	0	0	0.0	3	11	41	2.0
7g	0	0	1	0	0	0.0	3	14	43	2.1
7h	0	0	1	0	1	0.0	4	15	44	2.1
7i	0	0	1	0	0	0.0	3	15	43	2.1
7j	0	0	2	0	1	0.0	4	15	44	2.1
7k	0	0	3	0	1	0.0	3	15	42	2.0
8a	0	0	1	0	0	0.0	3	11	41	2.0
8b	0	0	1	0	0	0.0	3	11	42	2.0
8c	0	0	1	0	0	0.0	3	11	42	2.0
8d	0	0	1	0	0	0.0	4	11	43	2.1
8e	0	0	1	0	0	0.0	4	11	44	2.1
8f	0	0	1	0	0	0.0	3	9	41	2.0
8g	0	0	1	0	0	0.0	3	11	42	2.0
8h	0	0	1	0	0	0.0	3	11	42	2.0
8i	0	0	0	0	0	0.0	3	10	40	2.0

Note: DD = dust deposition.

Table F-3: Modelling predictions for Scenario 3

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
Privately-owned receptors										
4	2	1	11	3	6	0.1	4.6	17	58	2.3
6	4	1	20	5	10	0.2	5.0	21	64	2.5
19	4	1	21	5	11	0.2	4.8	20	59	2.4
20	5	1	23	6	12	0.2	4.9	21	61	2.4
21	5	1	24	6	12	0.2	5.0	21	62	2.4
23	5	1	26	6	13	0.3	4.8	22	60	2.4
35	4	1	20	5	10	0.3	4.2	21	51	2.3
35b	4	1	20	5	10	0.3	4.2	21	51	2.3
43	1	0	8	1	1	0.0	5.6	32	78	3.2
44	1	0	4	0	1	0.0	4.1	16	53	2.5

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
45	1	0	4	0	1	0.0	4.0	16	52	2.4
47	0	0	2	0	1	0.0	4.3	19	57	2.7
67	4	1	23	5	11	0.3	4.2	21	51	2.3
68	4	1	21	5	10	0.3	4.2	21	51	2.3
74	4	1	22	5	10	0.3	4.2	21	51	2.3
77	4	1	20	4	9	0.3	4.0	21	48	2.3
79	4	1	19	3	7	0.3	3.9	21	47	2.2
80	4	1	19	3	7	0.3	3.9	21	47	2.2
82	3	0	16	3	5	0.2	3.8	21	46	2.2
83	3	1	16	3	6	0.2	3.8	21	46	2.2
83b	3	1	17	3	6	0.2	3.8	21	46	2.2
84	4	1	17	3	6	0.2	3.8	21	46	2.2
84b	1	0	3	1	1	0.1	3.3	13	41	2.1
86	4	1	21	4	9	0.3	4.0	21	48	2.3
86b	1	0	8	1	2	0.1	3.3	16	40	2.0
96	5	1	29	6	13	0.4	4.3	19	52	2.4
101	6	1	31	6	14	0.5	4.3	19	53	2.4
102	6	1	31	6	14	0.5	4.3	19	53	2.4
108	7	1	35	7	16	0.5	4.5	19	55	2.5
112	8	2	43	8	19	0.6	4.7	20	58	2.5
118	7	1	39	7	17	0.5	4.5	19	55	2.5
120	7	1	38	7	15	0.5	4.4	19	54	2.4
308	7	1	40	7	16	0.5	4.5	19	55	2.5
120c	7	1	39	7	16	0.5	4.4	19	54	2.4
121	8	1	41	7	16	0.5	4.5	19	55	2.5
136	3	0	18	2	4	0.1	3.5	13	42	2.0
139	2	0	12	2	3	0.1	3.4	13	40	2.0
140	2	0	11	1	2	0.0	3.3	14	40	2.0
205	2	0	12	2	4	0.1	3.5	16	42	2.0
140c	2	0	11	2	3	0.1	3.4	16	41	2.0
143	3	0	16	2	3	0.0	3.4	13	40	2.0
161	5	1	25	3	5	0.1	3.6	14	42	2.0
153	2	0	11	2	5	0.3	3.5	11	43	2.2
154	4	1	23	4	8	0.1	3.8	14	45	2.1
156	5	1	28	4	8	0.1	3.8	14	45	2.1
267	0	0	1	0	0	0.0	3.7	13	46	2.2
157	6	1	31	4	8	0.1	3.8	14	45	2.1
266	0	0	1	0	0	0.0	3.6	12	45	2.1
159	6	1	29	3	6	0.1	3.7	14	43	2.0
169	2	0	11	2	4	0.1	3.4	14	40	2.0
171	2	0	8	1	3	0.0	3.3	15	39	2.0
172	1	0	7	1	2	0.0	3.2	15	39	2.0
310	1	0	7	1	2	0.0	3.2	15	39	2.0
173	1	0	7	1	2	0.0	3.2	15	38	2.0
174	1	0	7	1	2	0.0	3.2	15	39	2.0
175	1	0	7	1	2	0.0	3.2	15	39	2.0
176	1	0	7	1	2	0.0	3.2	15	39	2.0
177	1	0	7	1	2	0.0	3.2	15	38	2.0
178	1	0	5	1	1	0.0	3.2	15	38	2.0
179	1	0	5	1	1	0.0	3.2	15	38	2.0
180	1	0	5	1	1	0.0	3.1	15	38	2.0
180b	1	0	4	1	1	0.0	3.1	16	37	2.0

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
180c	1	0	3	0	1	0.0	3.1	16	37	1.9
181	1	0	4	0	1	0.0	3.1	17	37	2.0
183	1	0	4	0	1	0.0	3.1	16	37	2.0
181c	1	0	5	1	1	0.0	3.1	16	38	2.0
182	1	0	3	0	1	0.0	3.1	17	37	2.0
182b	1	0	4	0	1	0.0	3.1	17	37	2.0
189	1	0	7	1	1	0.0	3.2	14	39	2.0
190	1	0	7	1	1	0.0	3.2	14	39	2.0
191	1	0	6	1	1	0.0	3.2	14	39	2.0
192	1	0	7	1	1	0.0	3.2	14	39	2.0
193	1	0	6	1	1	0.0	3.2	14	39	2.0
311	1	0	7	1	1	0.0	3.2	14	39	2.0
193c	1	0	6	1	1	0.0	3.2	15	39	2.0
194	1	0	8	1	1	0.0	3.2	15	39	2.0
195	1	0	6	1	1	0.0	3.3	15	40	2.0
196	1	0	6	1	2	0.0	3.3	16	40	2.0
197	1	0	6	1	2	0.0	3.3	15	40	2.0
195d	1	0	7	1	2	0.0	3.3	16	40	2.0
195e	1	0	7	1	1	0.0	3.3	15	40	2.0
198	1	0	8	1	2	0.1	3.3	16	40	2.0
199	1	0	7	1	2	0.1	3.3	16	40	2.0
200	1	0	7	1	2	0.1	3.3	16	40	2.0
202	2	0	10	1	3	0.1	3.4	17	41	2.0
204	1	0	8	1	2	0.1	3.4	18	41	2.0
203	2	0	10	1	3	0.1	3.4	17	41	2.0
206	3	1	18	4	8	0.2	4.4	21	53	2.3
207	4	1	19	5	10	0.2	4.6	20	57	2.4
207b	3	1	17	4	9	0.2	4.5	20	55	2.3
208	4	1	20	5	10	0.2	4.7	20	59	2.4
315	4	1	20	5	10	0.2	4.7	20	58	2.4
212	3	1	14	4	8	0.2	4.5	19	55	2.3
212b	3	1	14	4	8	0.2	4.5	19	56	2.3
212c	3	1	14	4	8	0.2	4.5	19	56	2.3
213	4	1	18	5	10	0.2	4.7	20	58	2.4
214	4	1	18	5	10	0.2	4.7	20	58	2.4
215	4	1	19	5	10	0.2	4.7	20	58	2.4
216	4	1	19	5	10	0.2	4.7	20	58	2.4
217	4	1	19	5	10	0.2	4.7	20	58	2.4
218	4	1	19	5	10	0.2	4.7	20	59	2.4
219	4	1	19	5	10	0.2	4.7	20	59	2.4
220	4	1	19	5	10	0.2	4.7	20	59	2.4
221	4	1	19	5	10	0.2	4.7	20	59	2.4
222	4	1	20	5	10	0.2	4.7	20	59	2.4
223	4	1	20	5	10	0.2	4.7	20	59	2.4
224	4	1	20	5	11	0.2	4.8	20	59	2.4
225	4	1	19	5	10	0.2	4.7	20	58	2.4
249	0	0	2	0	0	0.0	4.2	21	53	2.1
252	0	0	2	0	0	0.0	3.8	14	46	2.1
252b	0	0	2	0	0	0.0	3.8	14	47	2.1
257	1	0	4	0	1	0.0	4.4	21	57	2.2
258a	1	0	5	0	1	0.0	4.3	19	54	2.3
258b	1	0	5	0	0	0.0	4.1	17	51	2.3

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
259	1	0	5	0	1	0.0	4.2	19	53	2.2
260	1	0	4	0	1	0.0	4.3	20	54	2.2
261	1	0	3	0	1	0.0	4.2	18	52	2.2
271	0	0	2	0	1	0.0	3.6	15	45	2.1
272	0	0	3	1	1	0.1	3.7	15	47	2.2
272b	0	0	3	1	1	0.0	3.7	15	47	2.2
273	0	0	2	0	1	0.0	3.5	15	44	2.1
280	2	1	12	3	7	0.1	4.4	18	54	2.3
281	2	1	12	3	7	0.1	4.4	18	55	2.3
282	2	1	12	3	7	0.1	4.4	18	55	2.3
283	2	1	12	3	7	0.1	4.4	18	55	2.3
285	3	1	16	3	7	0.2	4.1	22	50	2.3
285b	3	1	16	4	8	0.2	4.2	22	51	2.3
285c	3	1	17	4	8	0.2	4.2	22	51	2.3
286	3	1	15	3	7	0.2	4.1	22	50	2.3
291	3	1	14	3	7	0.2	4.3	20	53	2.3
286c	3	1	15	4	7	0.2	4.3	20	53	2.3
286d	3	1	16	3	6	0.3	3.9	21	47	2.2
287	3	1	14	3	7	0.2	4.0	22	49	2.3
288	3	1	14	3	6	0.2	4.0	22	49	2.3
288b	3	1	14	3	6	0.2	4.0	22	49	2.3
289	3	1	17	4	8	0.3	4.0	21	49	2.3
292	0	0	2	0	0	0.0	3.9	16	48	2.1
298	1	0	2	0	0	0.0	4.2	19	54	2.1
300	1	0	2	0	0	0.0	4.2	18	52	2.1
296a	1	0	3	0	1	0.0	4.4	21	56	2.1
296b	1	0	3	0	1	0.0	4.4	20	55	2.1
302a	0	0	2	0	0	0.0	3.9	16	49	2.1
302b	0	0	2	0	0	0.0	3.9	16	48	2.1
302c	0	0	2	0	0	0.0	3.9	16	48	2.1
305	4	1	18	4	10	0.2	4.7	20	58	2.4
401	1	0	3	0	1	0.0	3.3	14	41	2.0
402	1	0	3	0	1	0.0	3.2	14	40	2.0
407	1	0	3	1	1	0.1	3.3	13	40	2.1
413a	0	0	2	0	1	0.0	3.4	15	42	2.0
413b	0	0	2	0	1	0.0	3.3	15	41	2.0
415	0	0	2	0	1	0.0	3.4	15	42	2.0
416	0	0	1	0	0	0.0	3.5	15	43	2.1
417	0	0	2	0	1	0.0	3.5	15	43	2.1
418	0	0	1	0	1	0.0	3.5	15	43	2.1
419	0	0	2	0	1	0.0	3.4	15	42	2.0
421	0	0	2	0	1	0.0	3.5	15	43	2.1
422a	1	0	6	1	3	0.1	3.2	15	39	2.0
422b	1	0	6	1	3	0.1	3.2	15	39	2.0
434	1	0	3	0	1	0.0	3.1	16	37	1.9
436	1	0	3	0	1	0.0	3.1	16	37	2.0
437	1	0	3	0	1	0.0	3.1	16	37	1.9
453a	0	0	2	0	1	0.0	3.5	15	44	2.1
453b	0	0	2	0	1	0.0	3.5	15	43	2.1
454	0	0	1	0	0	0.0	3.5	14	43	2.1
456	0	0	1	0	0	0.0	3.4	14	42	2.0
458	0	0	1	0	0	0.0	3.5	14	44	2.1

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
462a	0	0	1	0	0	0.0	3.4	11	41	2.0
462b	0	0	1	0	0	0.0	3.4	12	41	2.0
463	0	0	1	0	0	0.0	3.4	11	41	2.0
464	0	0	1	0	0	0.0	3.6	13	45	2.1
465	0	0	1	0	0	0.0	3.6	12	44	2.1
466	0	0	2	0	0	0.0	3.7	13	45	2.2
467	0	0	2	0	0	0.0	3.9	15	49	2.3
468a	0	0	1	0	0	0.0	3.6	12	44	2.1
468b	0	0	1	0	0	0.0	3.6	11	43	2.1
468c	0	0	1	0	0	0.0	3.6	12	44	2.1
470	0	0	2	0	0	0.0	3.7	14	45	2.1
471	0	0	2	0	0	0.0	3.7	13	45	2.1
472a	0	0	2	0	0	0.0	3.7	14	45	2.1
472b	0	0	2	0	0	0.0	3.7	14	45	2.1
474	0	0	1	0	0	0.0	3.6	12	44	2.1
475	0	0	2	0	0	0.0	3.9	16	49	2.1
476	0	0	1	0	0	0.0	3.6	13	44	2.0
477a	0	0	2	0	0	0.0	3.7	14	46	2.0
477b	0	0	2	0	0	0.0	3.7	14	45	2.0
481	0	0	1	0	0	0.0	3.5	12	43	2.0
482	0	0	1	0	0	0.0	3.5	12	42	2.0
483	0	0	1	0	0	0.0	3.4	11	42	2.0
484	0	0	1	0	0	0.0	3.5	12	42	2.0
485a	0	0	1	0	0	0.0	3.3	11	40	2.0
485b	0	0	1	0	0	0.0	3.3	11	40	2.0
485c	0	0	1	0	0	0.0	3.3	11	40	2.0
485d	0	0	1	0	0	0.0	3.3	11	40	2.0
485e	0	0	1	0	0	0.0	3.3	11	40	2.0
487a	1	0	3	0	1	0.0	5.0	27	65	2.2
487b	1	0	3	0	1	0.0	4.9	26	63	2.2
488a	1	0	4	0	1	0.0	6.3	42	85	2.4
488b	1	0	4	0	1	0.0	5.6	34	75	2.4
526	4	1	19	3	7	0.3	3.9	21	47	2.2
527	3	1	15	3	7	0.3	3.9	21	47	2.3
528	3	1	15	3	6	0.3	3.9	21	47	2.3
529	3	1	15	3	6	0.3	3.9	21	47	2.3
530	3	1	15	3	6	0.3	3.9	21	47	2.3
531	3	1	15	3	6	0.3	3.9	21	47	2.3
532	3	1	15	3	6	0.3	3.9	21	47	2.3
533	3	1	15	3	6	0.3	3.9	21	47	2.3
534	3	1	15	3	6	0.3	3.9	21	47	2.3
535	3	1	15	3	6	0.3	3.9	21	47	2.3
536	3	1	15	3	6	0.3	3.9	21	47	2.3
537	3	1	15	3	6	0.3	3.9	21	47	2.3
538	3	1	14	3	6	0.2	4.0	22	49	2.3
539	3	1	14	3	6	0.2	4.0	22	49	2.3
540	3	1	14	3	6	0.2	4.0	22	49	2.3
541	3	1	14	3	6	0.2	4.0	22	49	2.3
542	3	1	14	3	6	0.2	4.0	22	49	2.3
543	3	1	14	3	6	0.2	4.0	22	49	2.3
544	3	1	14	3	6	0.2	4.0	22	49	2.3
545	3	1	14	3	6	0.2	4.0	22	49	2.3

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
546	3	1	15	3	7	0.2	4.1	22	50	2.3
547	1	0	7	1	1	0.0	3.3	15	39	2.0
147	7	1	35	4	7	0.1	3.7	13	44	2.0
158	6	1	29	3	7	0.1	3.7	14	44	2.0
A	1	0	8	1	3	0.1	4	19	42	2.1
B	3	0	14	2	5	0.2	4	20	45	2.2
C	3	1	15	3	6	0.3	4	21	47	2.3
D	3	1	16	4	7	0.2	4	21	52	2.3
E	3	1	17	4	8	0.2	4	20	54	2.3
F	3	1	14	3	6	0.2	4	21	47	2.3
G	3	1	14	3	6	0.2	4	22	48	2.3
H	2	0	9	2	3	0.2	4	19	43	2.1
I	1	0	4	0	1	0.0	3	17	37	2.0
J	2	0	11	2	4	0.2	4	20	44	2.2
K	3	0	13	2	4	0.2	4	21	45	2.2
L	3	0	13	2	4	0.2	4	20	45	2.2
M	3	0	12	2	4	0.2	4	21	45	2.2
Mine-owned receptors										
107	6	1	34	7	15	0.5	4	19	54	2.4
129	59	13	357	78	247	6.3	16	82	285	8.3
130	50	8	278	41	123	3.1	11	46	161	5.1
135	5	1	25	3	6	0.2	4	13	44	2.1
231	4	1	19	4	8	0.3	4	21	47	2.2
263	1	0	7	0	1	0.0	4	19	56	2.3
309	5	1	26	3	7	0.1	4	13	44	2.1
1h	6	1	34	7	15	0.5	4	19	54	2.4
1i	7	1	36	7	16	0.5	5	20	55	2.5
1j	7	1	37	7	16	0.5	5	20	55	2.5
1k	7	1	39	8	17	0.6	5	20	56	2.5
1l	7	1	37	7	17	0.5	5	20	56	2.5
1m	9	2	50	9	21	0.7	5	21	60	2.6
1n	8	1	41	8	18	0.6	5	20	57	2.5
1o	1	0	3	0	1	0.0	5	21	60	3.0
1p	6	1	32	5	12	0.4	4	17	50	2.3
1q	9	1	45	6	14	0.5	4	16	52	2.4
1r	35	6	205	34	91	2.1	9	39	129	4.0
1s	29	4	161	20	49	1.1	7	26	86	3.0
1t	6	1	33	7	15	0.8	4	12	53	2.7
1u	5	1	26	6	12	0.6	4	11	51	2.6
1v	6	1	29	6	13	0.7	4	11	52	2.6
1w	23	5	134	31	81	2.2	9	36	118	4.2
1x	15	4	84	20	49	1.8	7	25	86	3.7
1y	6	1	32	6	14	0.7	4	12	52	2.7
1z	7	1	38	4	7	0.1	4	13	44	2.0
1aa	7	2	35	9	19	0.6	5	16	56	2.5
1ab	8	1	42	4	8	0.1	4	14	45	2.1
1ac	5	1	27	6	13	0.3	5	22	58	2.4
1ad	1	0	4	1	2	0.1	3	12	41	2.1
1ae	7	2	38	9	20	0.5	5	23	63	2.5
1af	5	1	25	6	13	0.4	4	21	54	2.4
1ag	5	1	24	6	12	0.4	4	21	54	2.4
1ah	4	1	23	5	11	0.3	4	21	51	2.3

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
1ai	4	1	22	5	11	0.3	4	21	51	2.3
1aj	4	1	22	5	11	0.3	4	21	51	2.3
1ak	4	1	22	5	11	0.3	4	21	51	2.3
1al	4	1	22	5	10	0.3	4	21	51	2.3
1am	5	1	23	5	10	0.3	4	21	50	2.3
1an	6	1	33	7	15	0.5	4	20	55	2.4
1ao	7	1	37	7	16	0.5	5	21	56	2.5
1ap	5	1	26	5	12	0.4	4	20	51	2.4
1aq	5	1	26	5	12	0.4	4	20	51	2.4
1ar	5	1	26	6	12	0.4	4	20	52	2.4
1as	5	1	26	6	12	0.4	4	20	52	2.4
1at	5	1	27	6	13	0.4	4	20	52	2.4
1au	5	1	28	6	13	0.4	4	19	52	2.4
1av	6	1	29	6	13	0.4	4	19	52	2.4
1aw	6	1	32	6	14	0.5	4	19	53	2.4
1ax	6	1	30	6	13	0.4	4	19	52	2.4
1ay	6	1	32	6	14	0.5	4	19	53	2.4
1az	6	1	32	6	14	0.5	4	19	53	2.4
1ba	6	1	33	6	15	0.5	4	19	53	2.4
246	1	0	5	1	1	0.0	6	44	88	2.6
2b	13	3	70	16	35	0.6	7	32	88	2.9
2c	3	1	15	3	7	0.2	4	22	48	2.3
2d	3	1	16	3	7	0.2	4	22	49	2.3
2e	9	2	50	12	26	0.6	6	25	70	2.7
2f	16	4	90	22	48	1.0	8	34	95	3.1
2g	18	4	99	24	53	1.1	8	36	99	3.3
2h	34	8	184	43	103	2.1	12	56	151	4.2
2i	5	1	27	7	14	0.4	5	22	56	2.4
2j	43	10	232	56	141	3.1	14	69	190	5.2
2k	29	7	158	36	82	1.7	11	48	129	3.8
2l	41	10	215	49	118	2.4	13	61	165	4.4
2m	2	0	13	1	3	0.0	7	46	100	3.2
2n	1	0	5	1	1	0.0	7	50	96	2.7
2o	1	0	4	1	1	0.0	6	36	76	2.4
2p	1	0	4	1	1	0.0	6	35	75	2.4
2q	1	0	4	1	1	0.0	6	34	73	2.4
2r	1	0	4	1	1	0.0	6	35	74	2.4
2s	1	0	4	1	1	0.0	6	35	73	2.4
2t	2	0	8	1	2	0.0	9	81	139	3.0
2u	2	0	12	2	3	0.1	19	227	342	4.9
2v	2	0	12	2	4	0.1	19	225	343	5.0
2w	1	0	5	1	1	0.0	5	24	60	2.3
2x	5	1	25	6	12	0.2	5	23	67	2.5
2y	5	1	26	6	13	0.2	5	23	67	2.5
2z	5	1	26	6	13	0.2	5	23	66	2.5
2aa	5	1	27	6	14	0.2	5	23	67	2.5
2ab	5	1	26	6	13	0.2	5	22	65	2.5
2ac	7	2	41	9	19	0.3	6	33	85	2.8
2ad	5	1	26	6	13	0.2	5	22	65	2.5
2ae	8	2	43	9	20	0.3	7	34	86	2.8
2af	5	1	25	6	13	0.2	5	22	64	2.5
2ag	5	1	27	6	14	0.2	5	22	65	2.5

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	PM2.5 (µg/m³)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
2ah	5	1	25	6	13	0.2	5	22	63	2.5
2ai	9	2	48	10	23	0.4	6	30	81	2.8
2aj	5	1	29	7	15	0.3	5	22	63	2.5
2ak	13	3	70	16	35	0.6	7	32	88	2.9
2al	14	3	73	16	36	0.6	7	33	89	3.0
3a	1	0	6	1	1	0.0	3	14	38	2.0
3b	1	0	6	1	1	0.0	3	14	38	2.0
3c	5	1	27	3	5	0.1	4	14	42	2.0
3d	1	0	6	1	1	0.0	3	14	38	2.0
3e	1	0	6	1	1	0.0	3	14	38	2.0
3f	1	0	5	1	1	0.0	3	14	38	2.0
3g	3	0	17	2	4	0.1	3	14	41	2.0
3h	4	1	19	3	5	0.1	4	14	42	2.0
3i	2	0	8	1	1	0.0	3	15	38	2.0
3j	1	0	5	0	1	0.0	3	15	38	2.0
3k	2	0	13	2	4	0.1	3	14	40	2.0
3l	3	1	15	3	6	0.2	4	14	43	2.1
3m	3	1	15	3	6	0.2	4	14	43	2.1
3n	2	0	9	1	2	0.0	3	15	38	2.0
3o	2	0	12	2	5	0.1	3	14	41	2.1
3p	2	0	10	2	5	0.2	3	14	42	2.1
3q	2	0	11	2	5	0.1	3	14	41	2.1
3r	1	0	6	1	3	0.1	3	15	39	2.0
3s	1	0	7	1	3	0.1	3	14	39	2.0
5	3	1	13	3	7	0.1	5	18	58	2.3
7	4	1	21	5	11	0.2	5	22	65	2.5
211	3	1	14	4	8	0.1	4	19	56	2.3
299	1	0	2	0	0	0.0	4	19	53	2.1
5e	4	1	22	5	11	0.2	5	22	66	2.5
5f	4	1	22	5	11	0.2	5	23	66	2.5
5g	5	1	24	5	12	0.2	5	23	66	2.5
5h	0	0	1	0	0	0.0	4	14	45	2.0
5i	1	0	2	0	0	0.0	4	19	54	2.1
5j	0	0	1	0	0	0.0	4	13	45	2.0
5k	1	0	2	0	0	0.0	4	20	55	2.1
5l	1	0	3	0	1	0.0	5	22	58	2.2
5m	1	0	4	1	1	0.0	11	97	156	3.2
5n	0	0	2	0	0	0.0	4	15	47	2.1
5o	0	0	2	0	0	0.0	4	17	50	2.1
5p	1	0	4	1	1	0.0	7	51	98	2.6
5q	1	0	6	1	1	0.0	16	157	242	4.7
5r	2	0	10	2	3	0.0	15	157	246	4.5
5s	2	0	11	2	4	0.1	11	100	166	3.2
5t	2	0	11	2	5	0.1	7	50	100	2.6
5u	2	1	11	3	6	0.1	5	27	72	2.4
5v	1	0	2	0	0	0.0	4	17	50	2.1
5w	1	0	2	0	0	0.0	4	17	50	2.1
5x	1	0	2	0	0	0.0	4	17	50	2.1
5y	2	1	10	3	5	0.1	5	18	59	2.3
5z	2	1	10	3	5	0.1	5	18	59	2.3
5aa	2	1	10	3	6	0.1	5	18	59	2.3
5ab	2	0	9	2	5	0.1	4	16	55	2.2

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/mth)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/mth)
	Mount Pleasant Operation impact						Total impact			
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria									
	25	-	50	-	-	2	8	25	90	4
5ac	2	1	10	3	6	0.1	5	17	58	2.3
5ad	2	0	9	2	5	0.1	4	15	54	2.2
5ae	4	1	21	5	10	0.2	5	22	65	2.5
274	0	0	2	0	1	0.0	4	15	44	2.1
7b	0	0	1	0	0	0.0	4	11	44	2.1
7c	0	0	1	0	0	0.0	4	11	44	2.1
7d	0	0	2	0	0	0.0	4	11	44	2.1
7e	0	0	1	0	0	0.0	3	11	43	2.0
7f	0	0	1	0	0	0.0	3	11	41	2.0
7g	0	0	1	0	0	0.0	4	14	43	2.1
7h	0	0	2	0	1	0.0	4	15	44	2.1
7i	0	0	2	0	1	0.0	4	15	43	2.1
7j	0	0	2	0	1	0.0	4	15	45	2.1
7k	1	0	3	0	1	0.0	3	14	42	2.0
8a	0	0	1	0	0	0.0	3	11	41	2.0
8b	0	0	1	0	0	0.0	3	11	42	2.0
8c	0	0	1	0	0	0.0	3	11	42	2.0
8d	0	0	1	0	0	0.0	4	11	44	2.1
8e	0	0	1	0	0	0.0	4	11	44	2.1
8f	0	0	1	0	0	0.0	3	9	42	2.0
8g	0	0	1	0	0	0.0	3	11	42	2.0
8h	0	0	1	0	0	0.0	3	11	42	2.0
8i	0	0	1	0	0	0.0	3	11	41	2.0

Note: DD = dust deposition.

Appendix G

Isopleth Diagrams

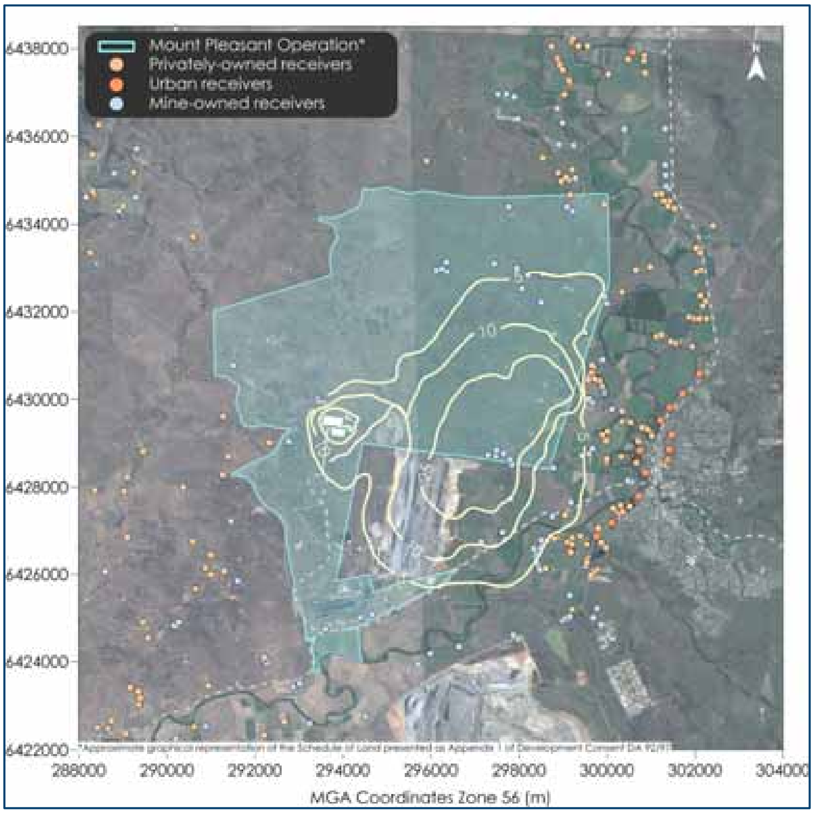

Figure G-1: Predicted maximum 24-hour average $PM_{2.5}$ concentrations due to emissions from the Modification in Scenario 1 ($\mu g/m^3$)

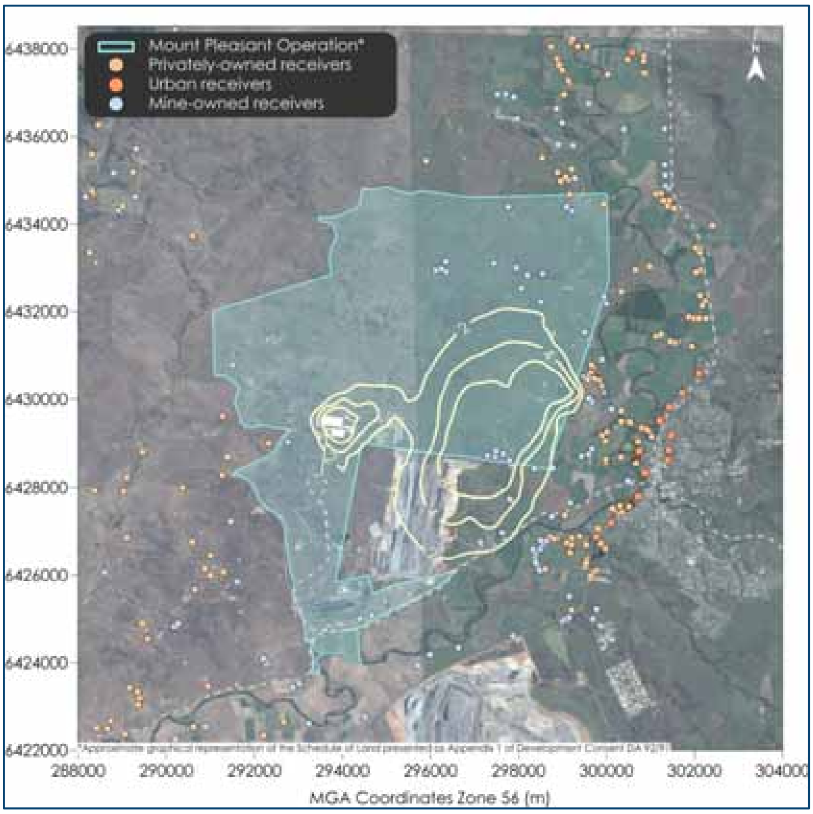

Figure G-2: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Modification in Scenario 1 ($\mu g/m^3$)

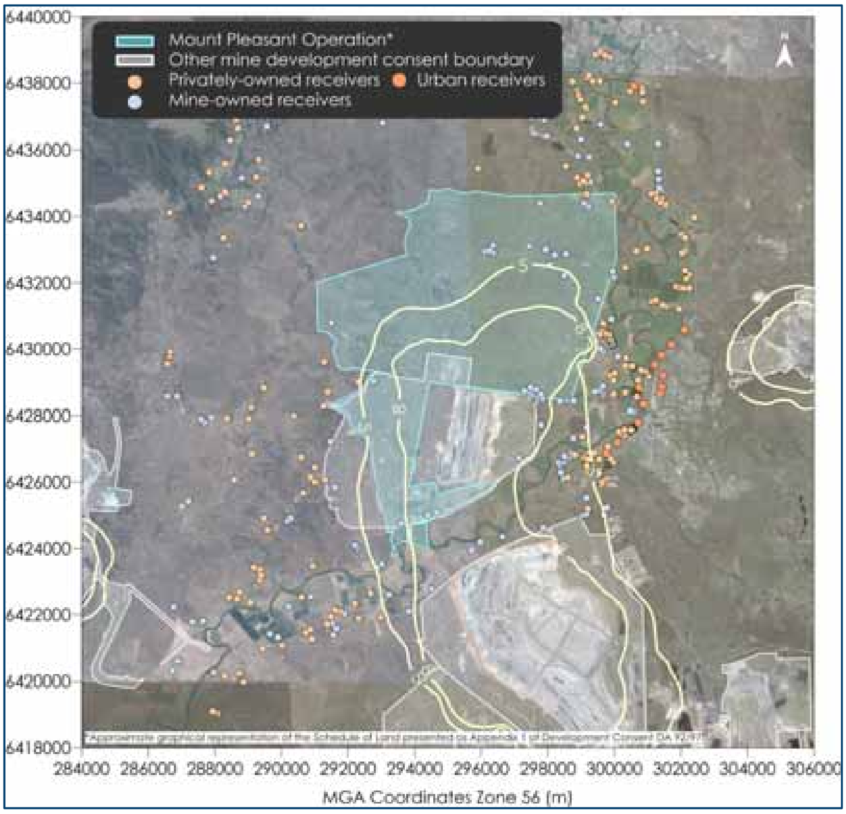

Figure G-3: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Modification and other sources in Scenario 1 (µg/m³)

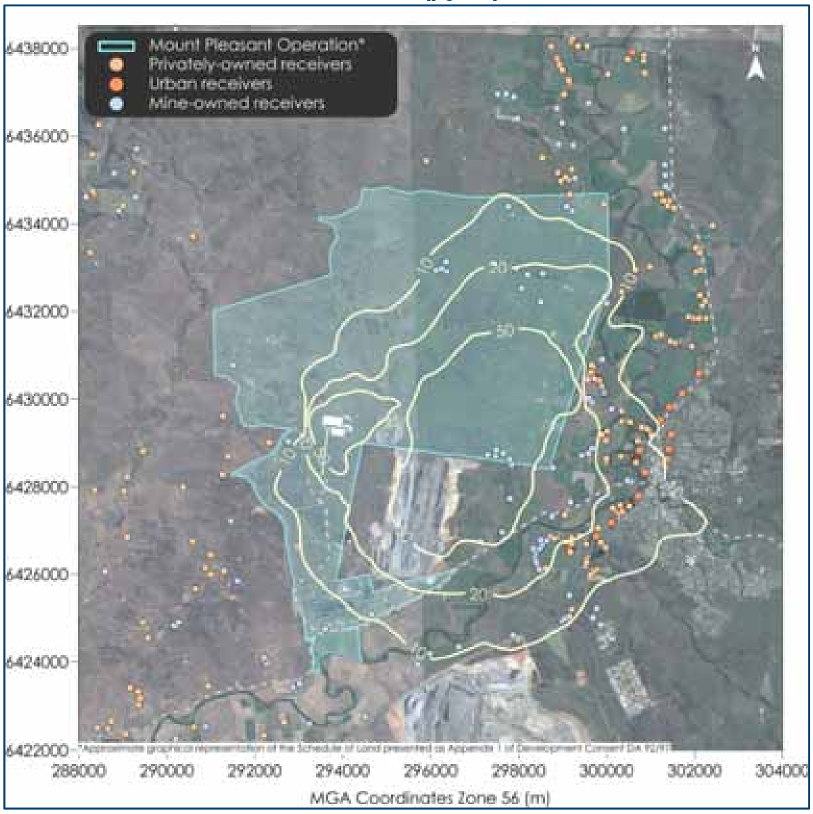

Figure G-4: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from the Modification in Scenario 1 (µg/m³)

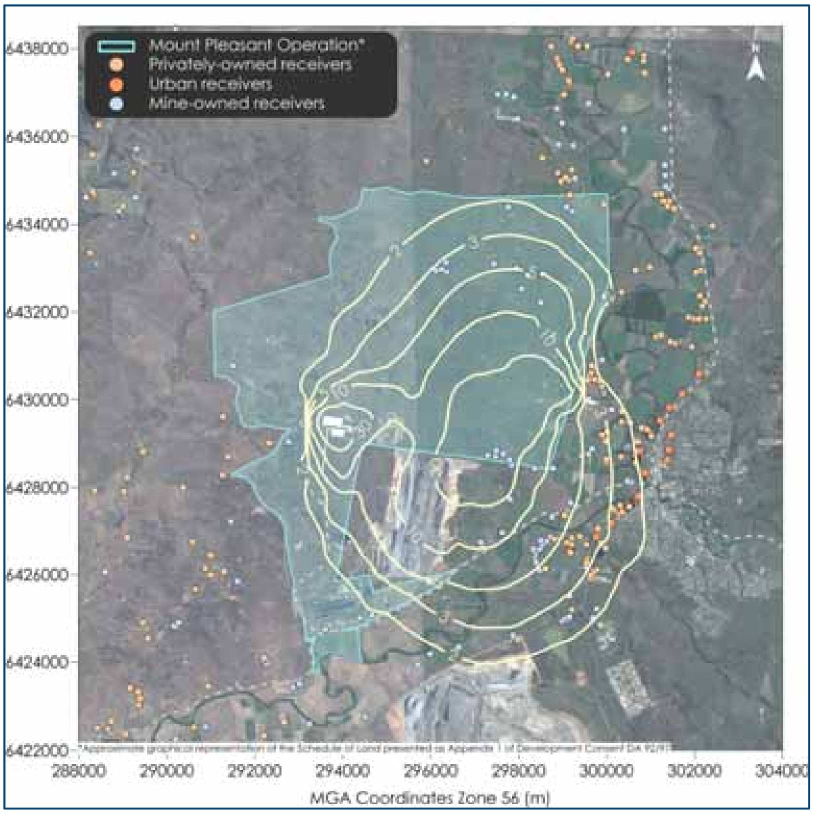

Figure G-5: Predicted annual average PM_{10} concentrations due to emissions from the Modification in Scenario 1 (μg/m³)

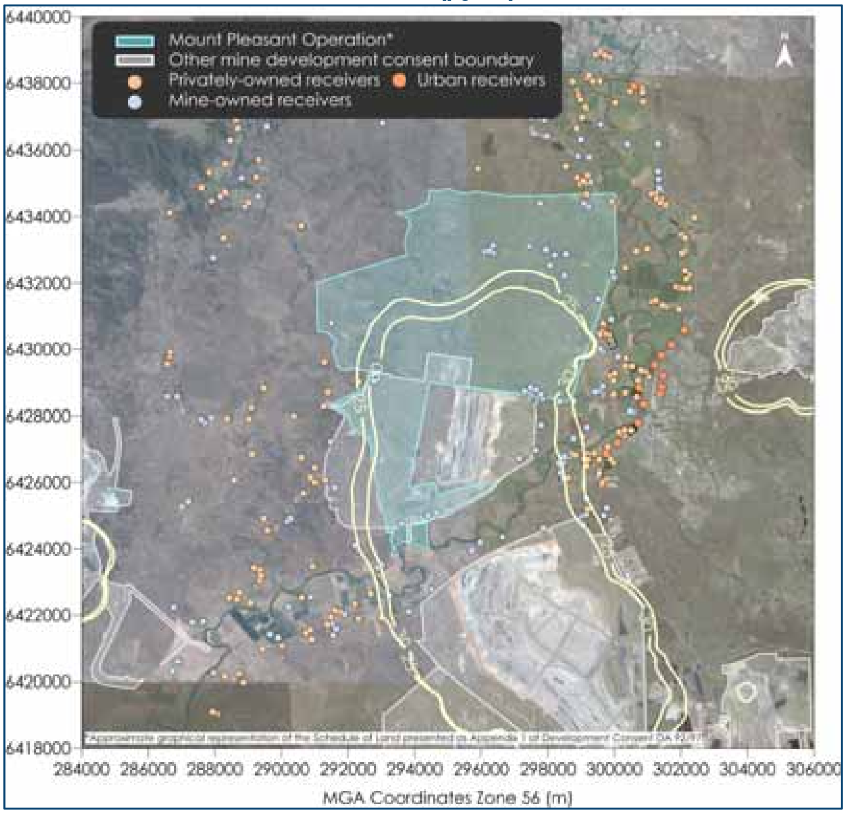

Figure G-6: Predicted annual average PM_{10} concentrations due to emissions from the Modification and other sources in Scenario 1 (μg/m³)

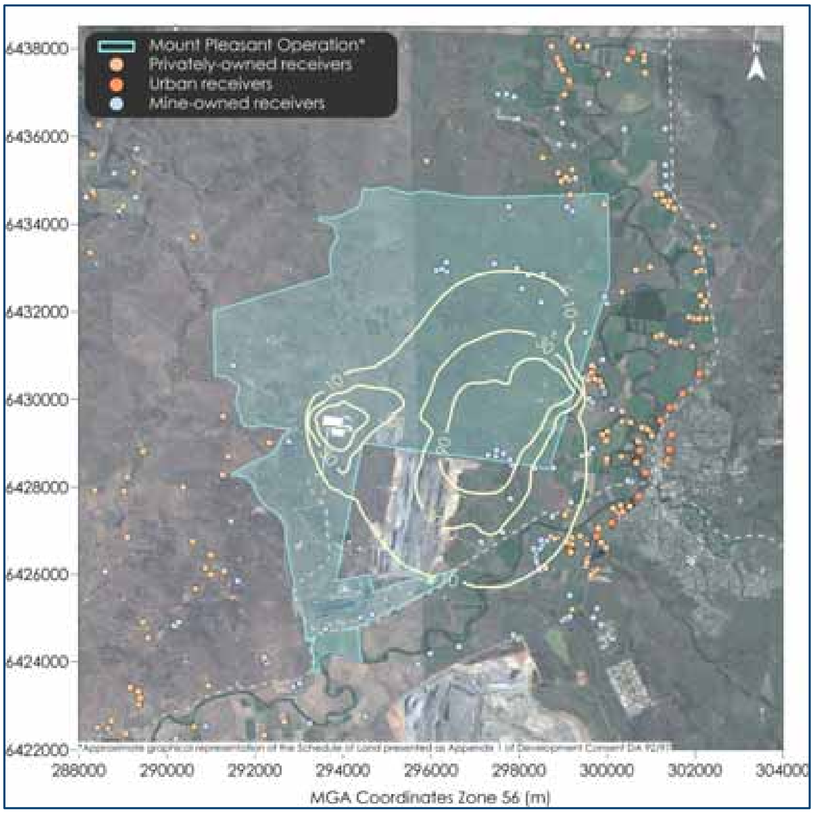

Figure G-7: Predicted annual average TSP concentrations due to emissions from the Modification in Scenario 1 (µg/m³)

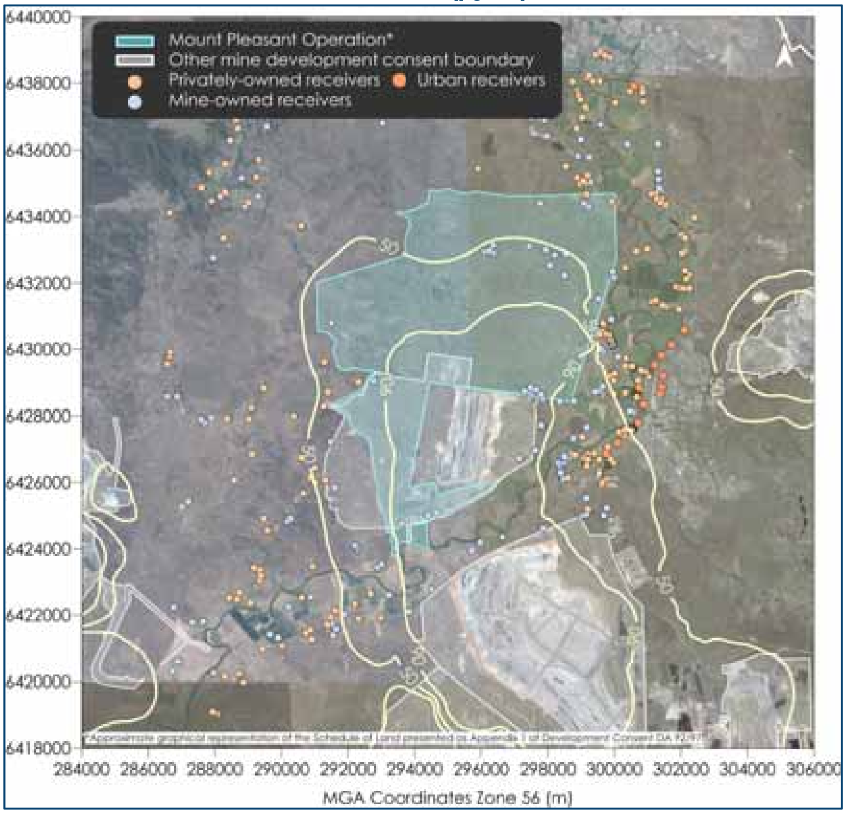

Figure G-8: Predicted annual average TSP concentrations due to emissions from the Modification and other sources in Scenario 1 (µg/m³)

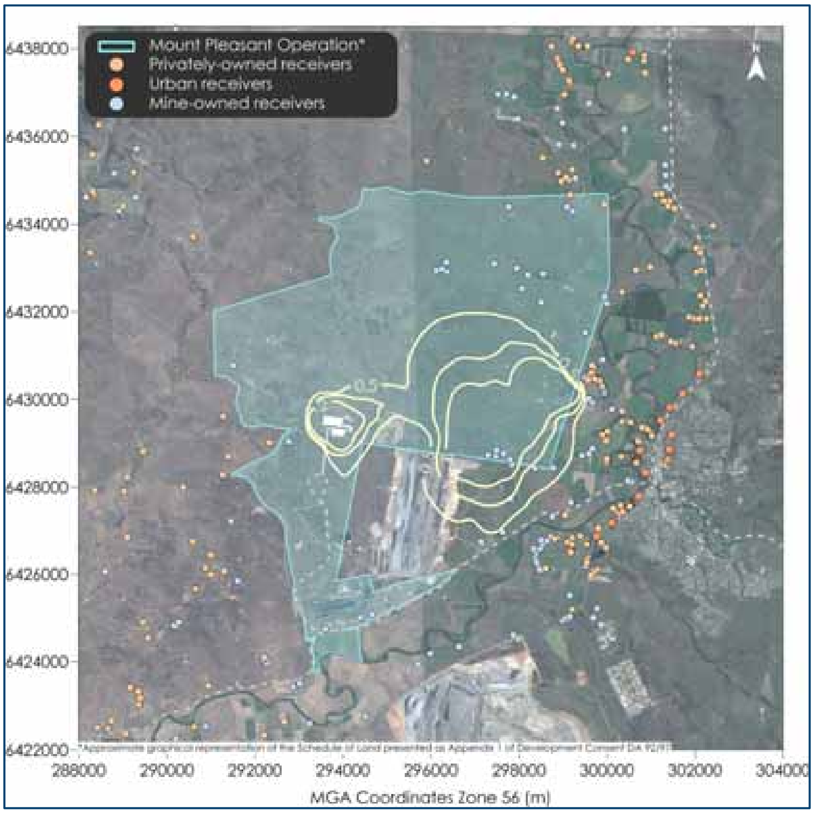

Figure G-9: Predicted annual average dust deposition levels due to emissions from the Modification in Scenario 1 (g/m²/month)

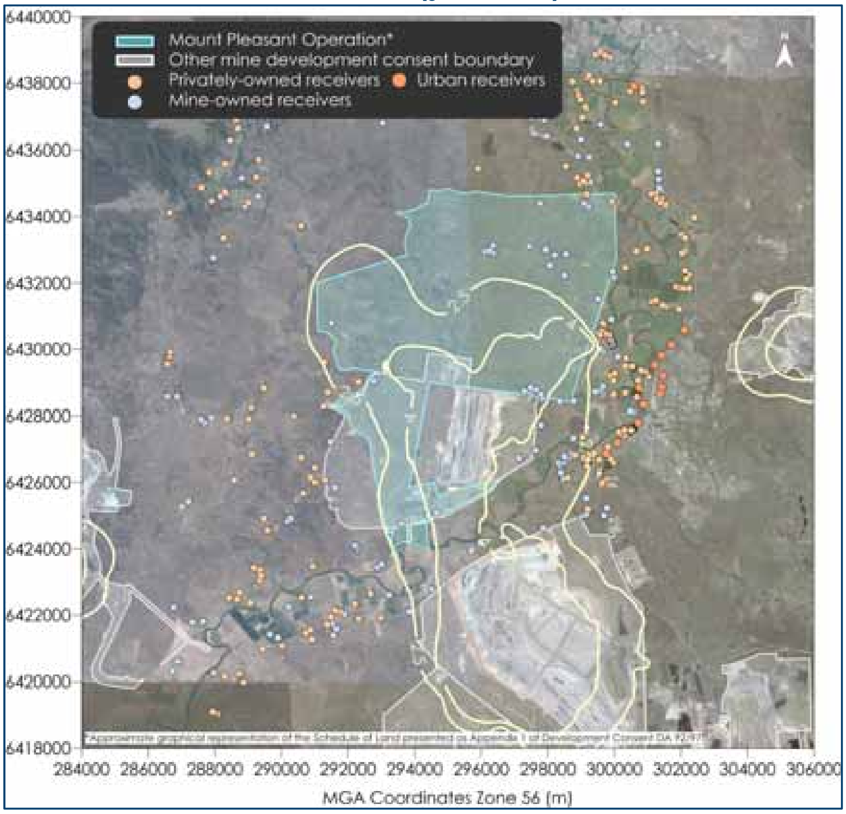

Figure G-10: Predicted annual average dust deposition levels due to emissions from the Modification and other sources in Scenario 1 (g/m²/month)

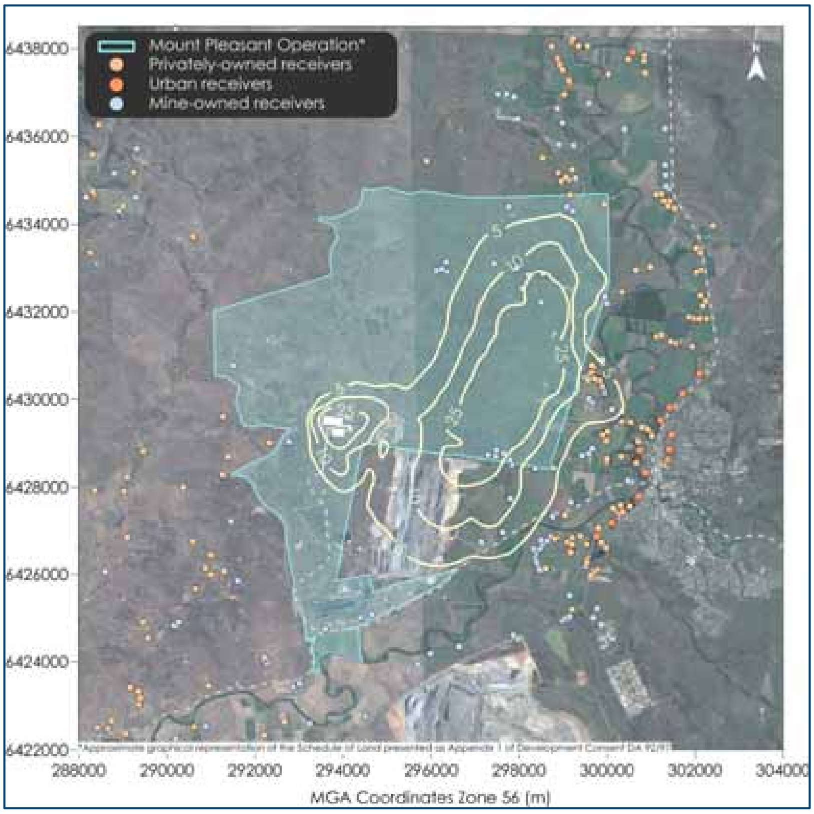

Figure G-11: Predicted maximum 24-hour average $PM_{2.5}$ concentrations due to emissions from the Modification in Scenario 2 (µg/m³)

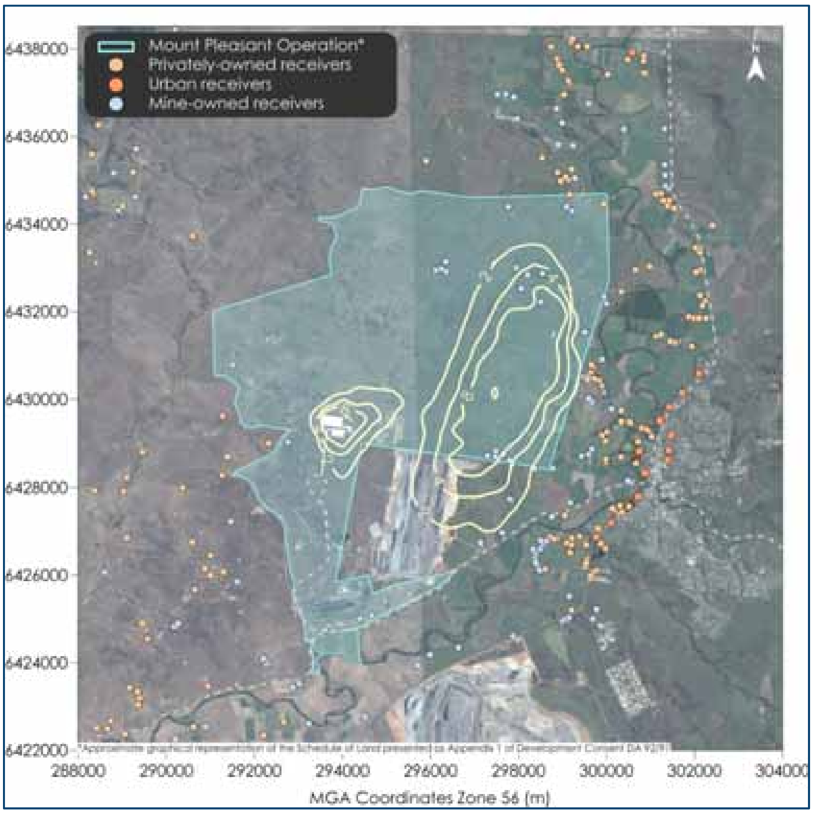

Figure G-12: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Modification in Scenario 2 (µg/m³)

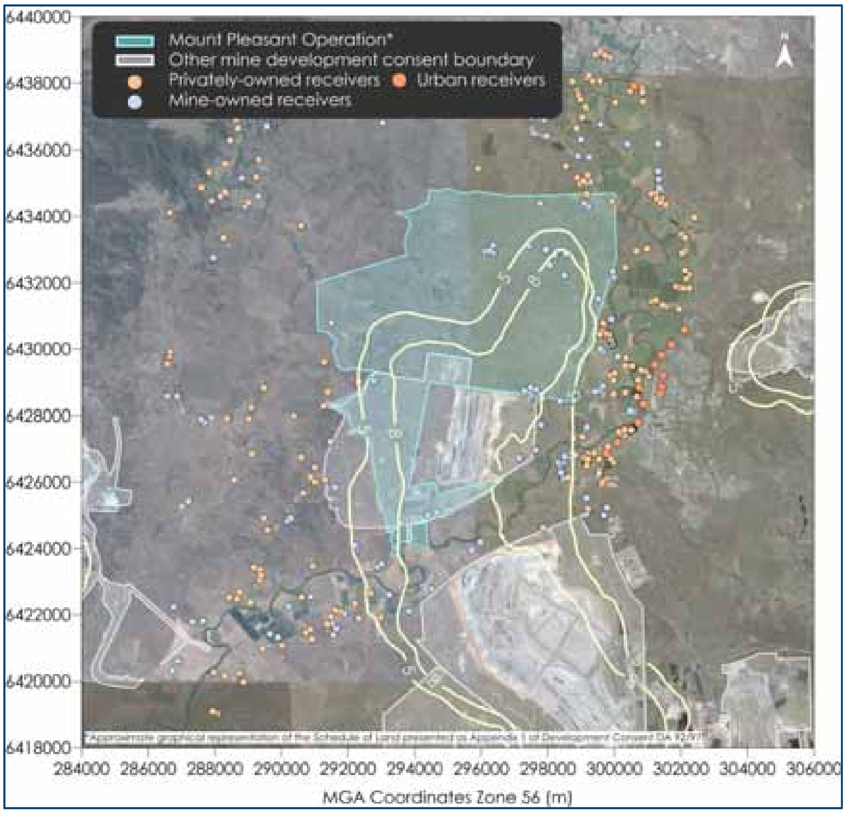

Figure G-13: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Modification and other sources in Scenario 2 (µg/m³)

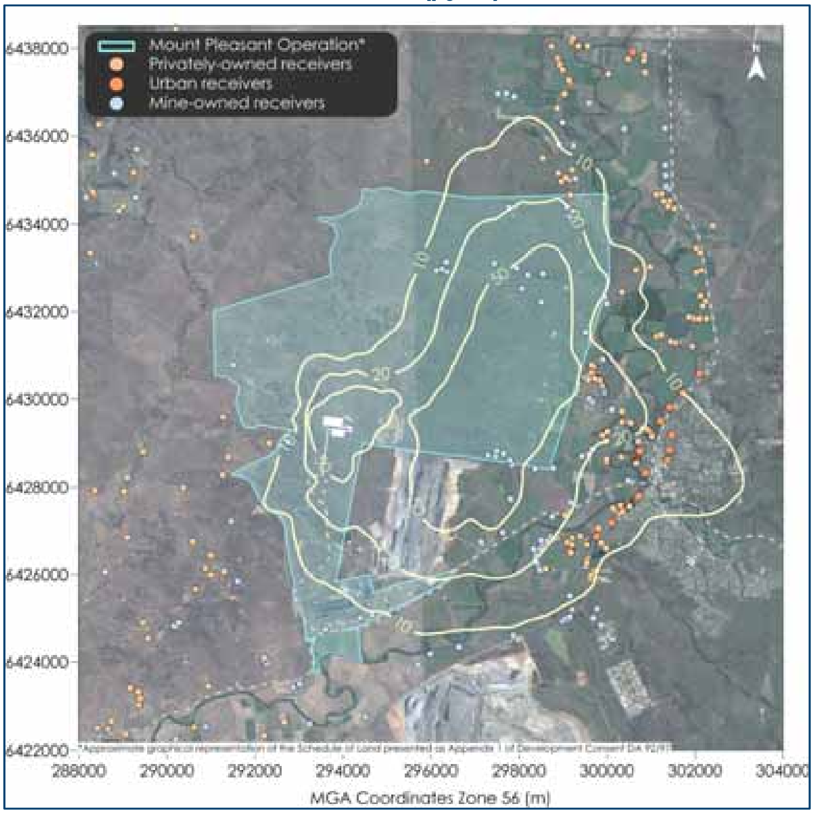

Figure G-14: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from the Modification in Scenario 2 (µg/m³)

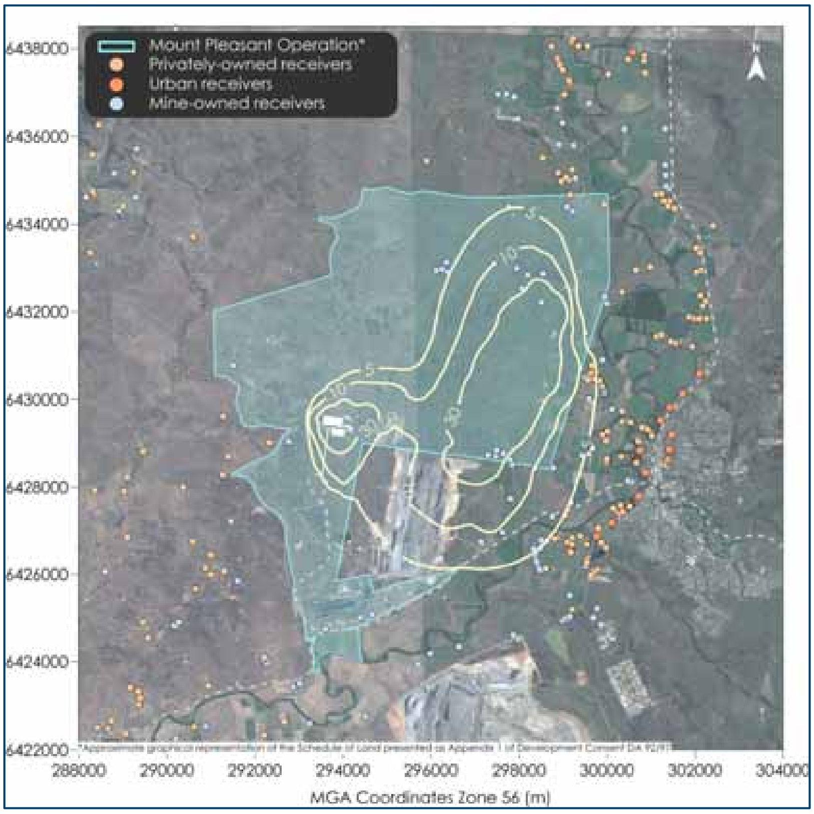

Figure G-15: Predicted annual average PM_{10} concentrations due to emissions from the Modification in Scenario 2 (µg/m³)

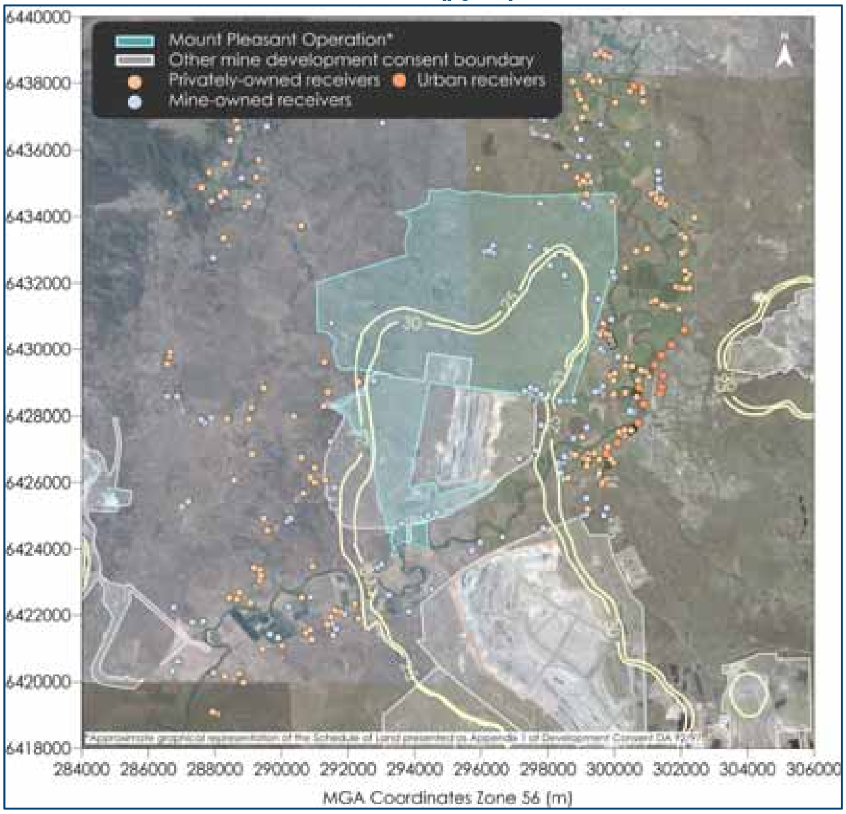

Figure G-16: Predicted annual average PM_{10} concentrations due to emissions from the Modification and other sources in Scenario 2 (µg/m³)

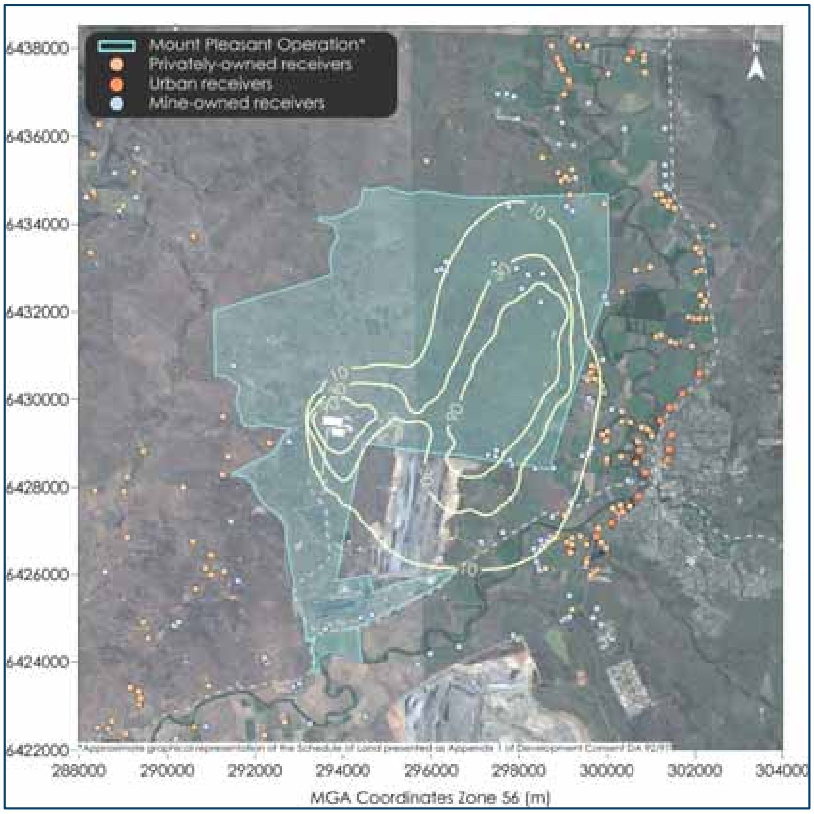

Figure G-17: Predicted annual average TSP concentrations due to emissions from the Modification in Scenario 2 (µg/m³)

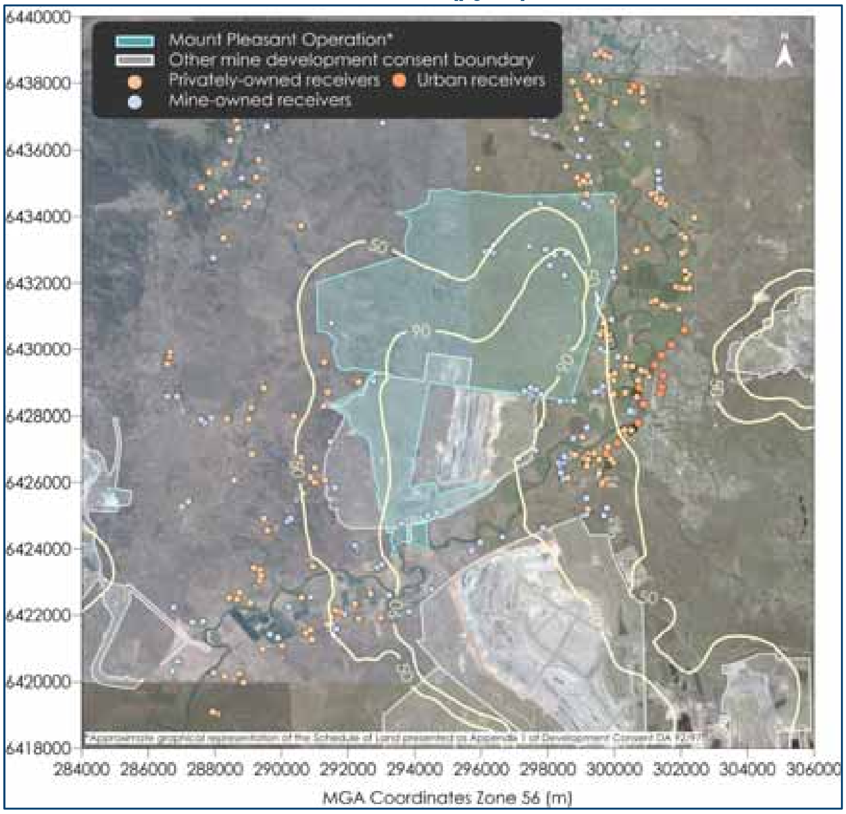

Figure G-18: Predicted annual average TSP concentrations due to emissions from the Modification and other sources in Scenario 2 (µg/m³)

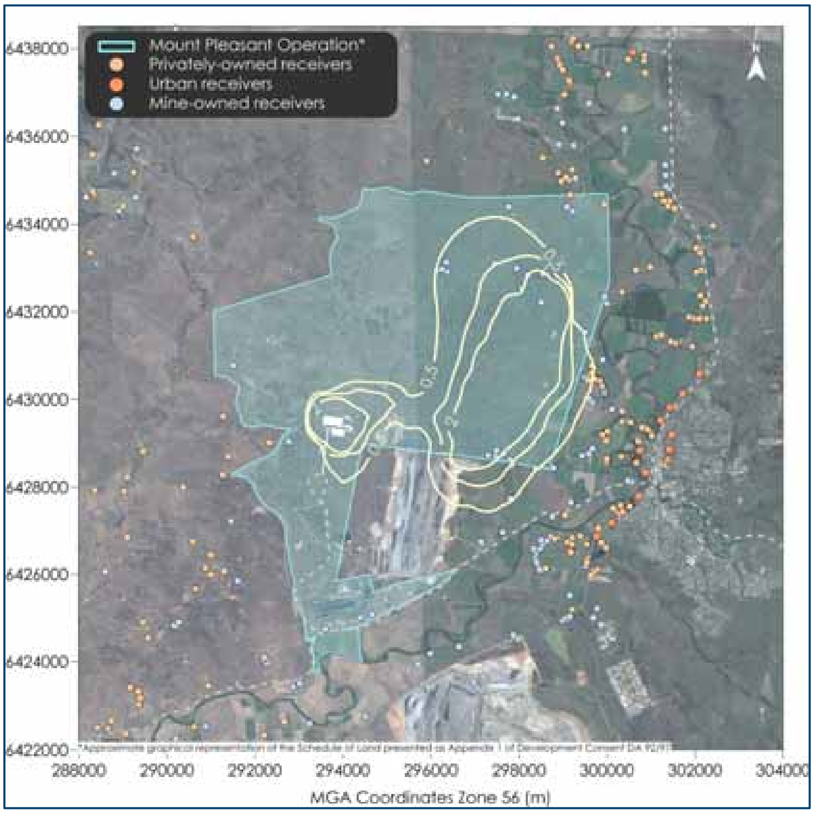

Figure G-19: Predicted annual average dust deposition levels due to emissions from the Modification in Scenario 2 (g/m²/month)

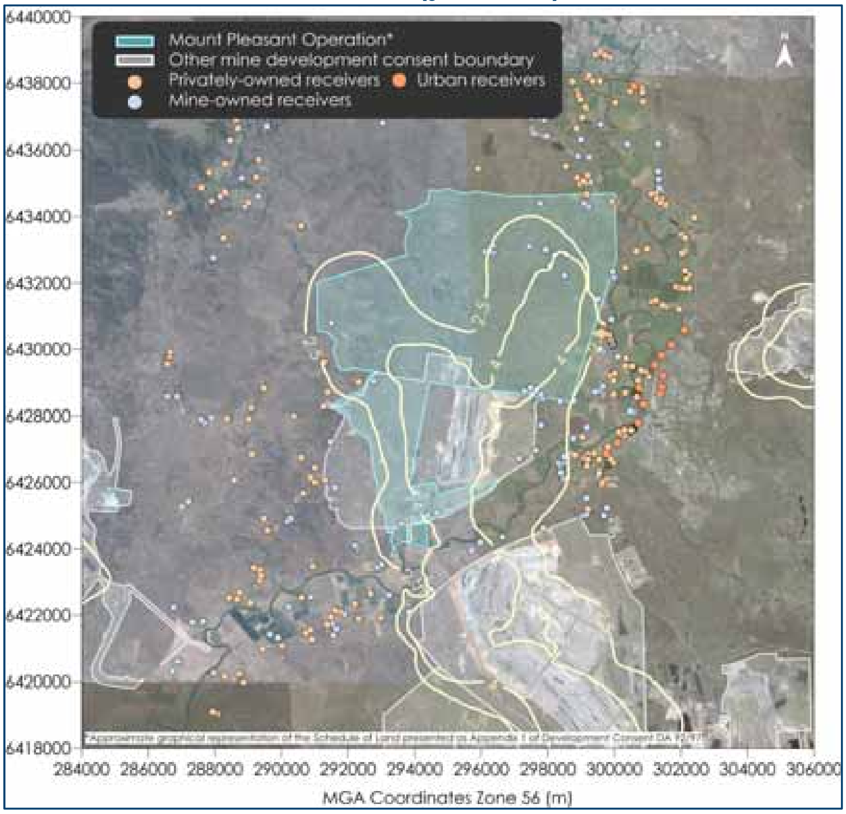

Figure G-20: Predicted annual average dust deposition levels due to emissions from the Modification and other sources in Scenario 2 (g/m²/month)

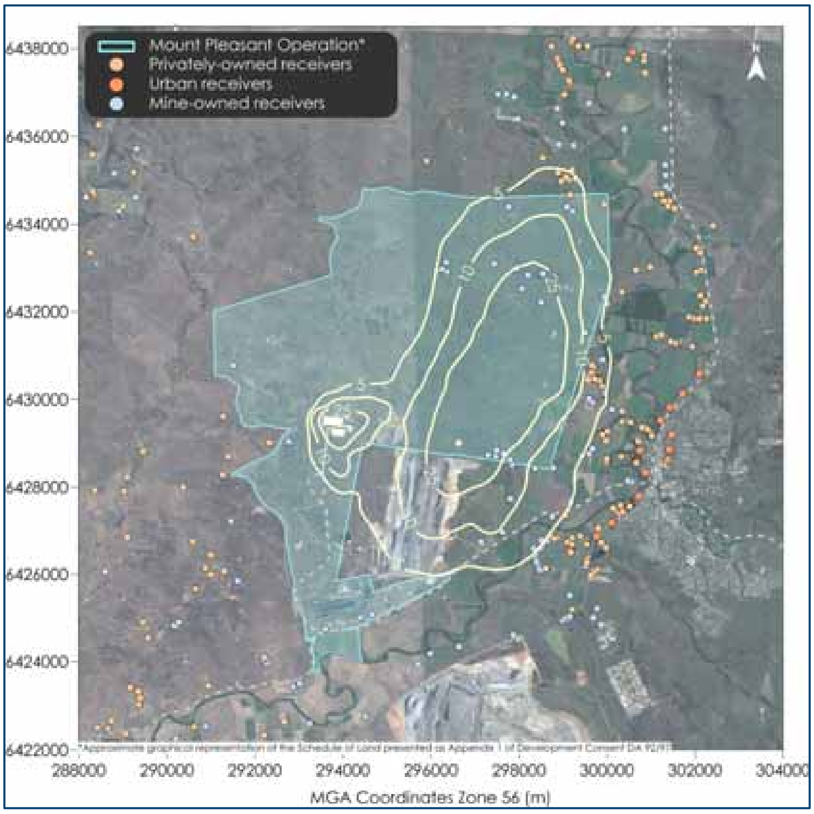

Figure G-21: Predicted maximum 24-hour average $PM_{2.5}$ concentrations due to emissions from the Modification in Scenario 3 (µg/m³)

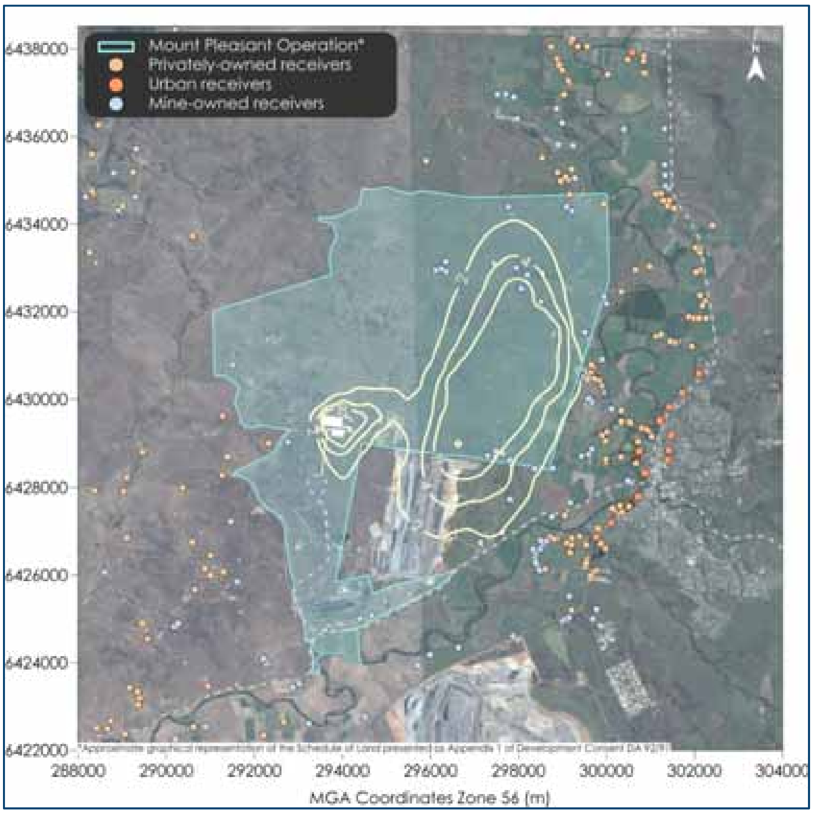

Figure G-22: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Modification in Scenario 3 (µg/m³)

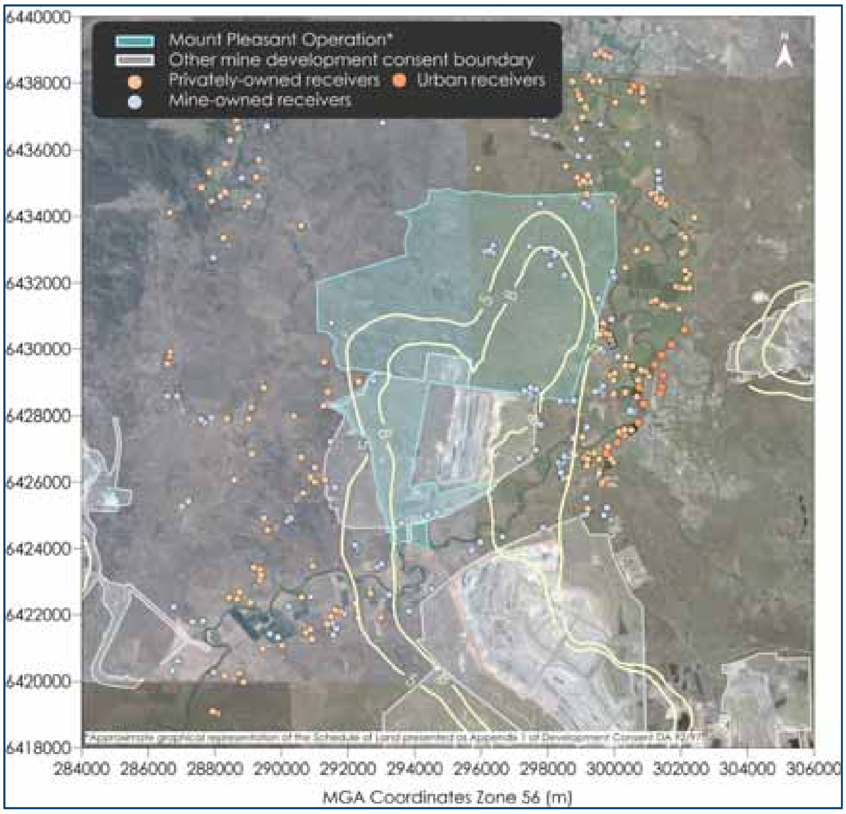

Figure G-23: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Modification and other sources in Scenario 3 (µg/m³)

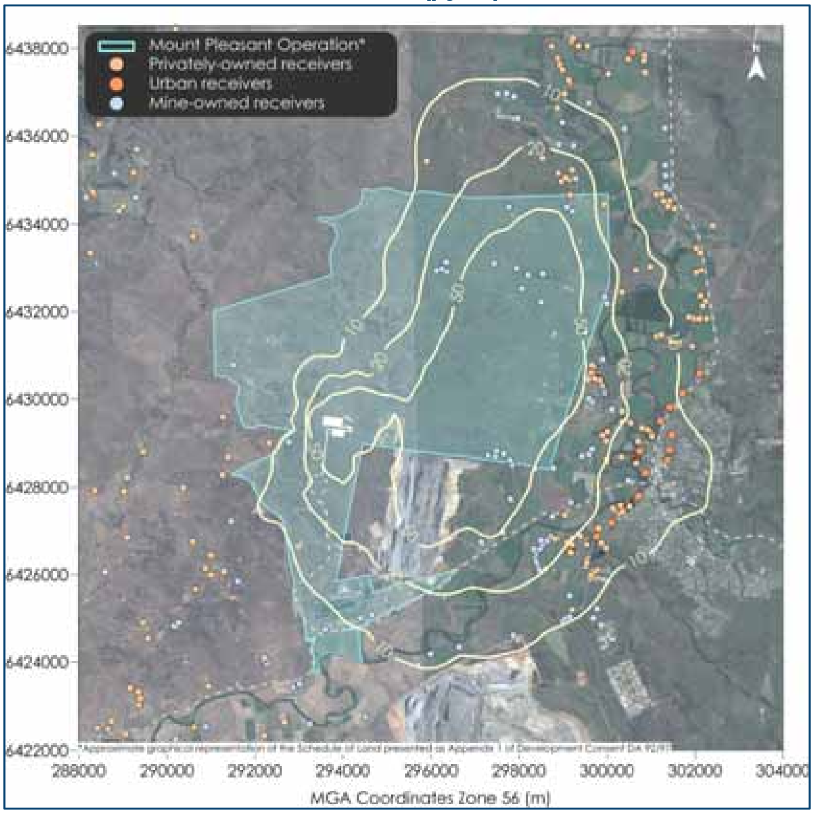

Figure G-24: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from the Modification in Scenario 3 (µg/m³)

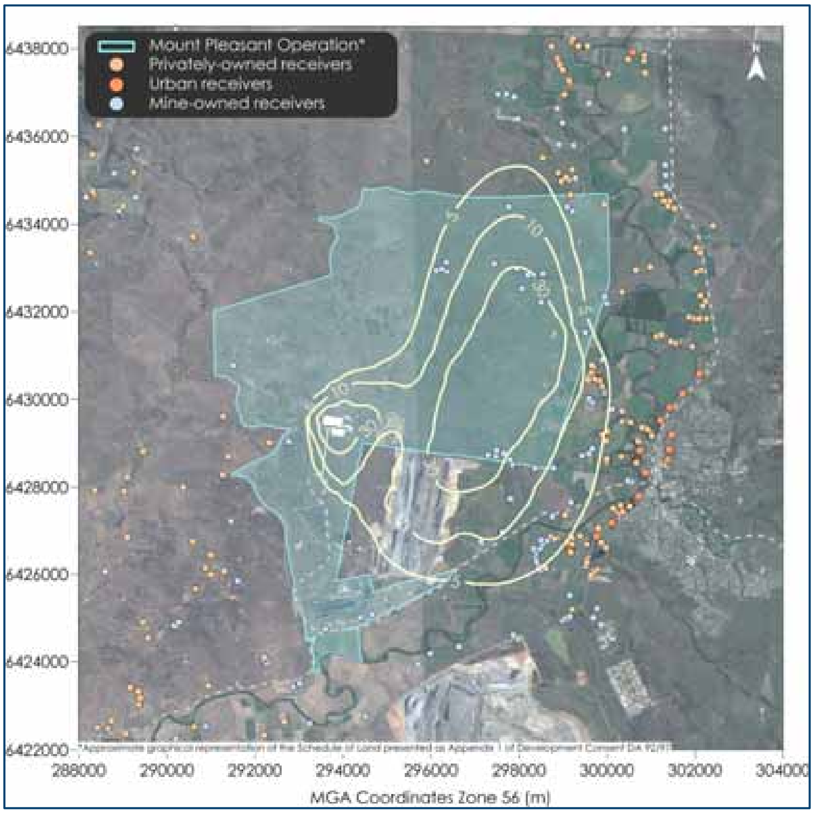

Figure G-25: Predicted annual average PM_{10} concentrations due to emissions from the Modification in Scenario 3 (µg/m³)

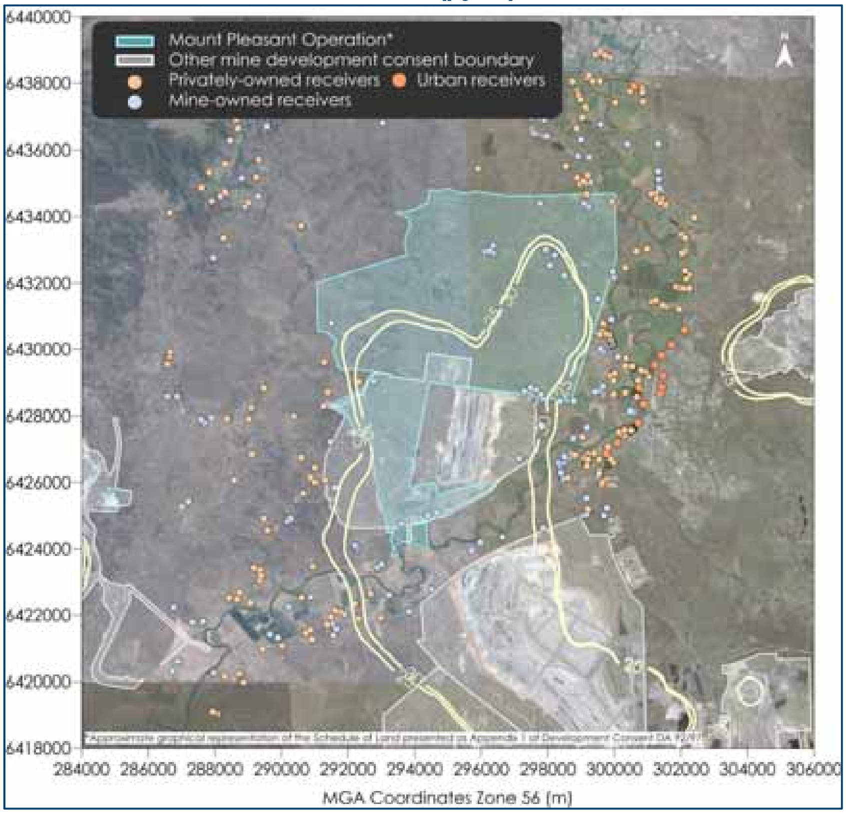

Figure G-26: Predicted annual average PM_{10} concentrations due to emissions from the Modification and other sources in Scenario 3 (µg/m³)

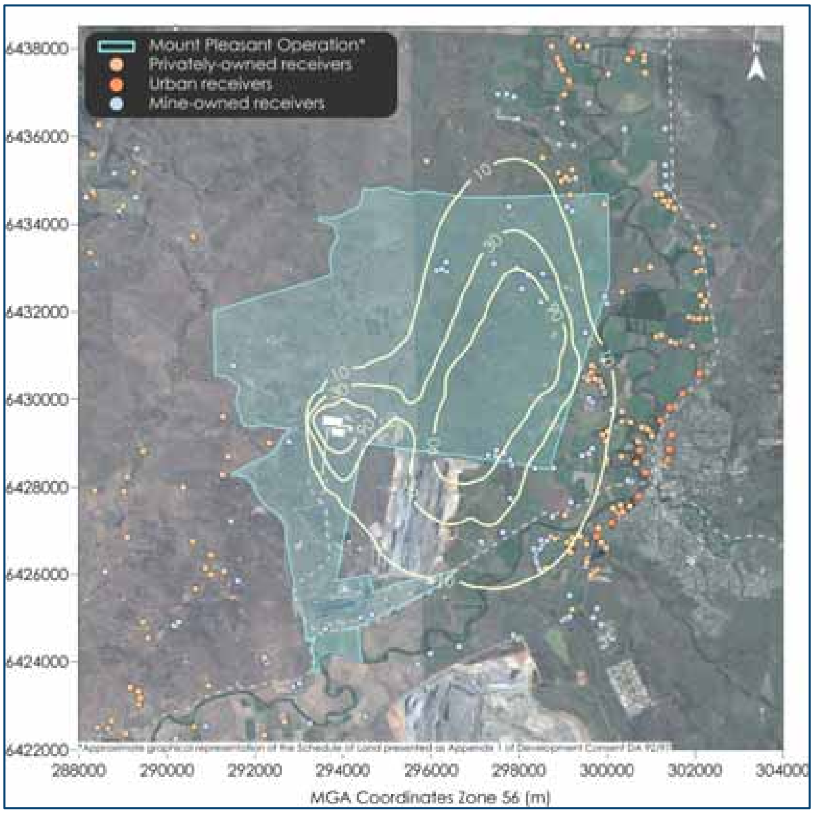

Figure G-27: Predicted annual average TSP concentrations due to emissions from the Modification in Scenario 3 (µg/m³)

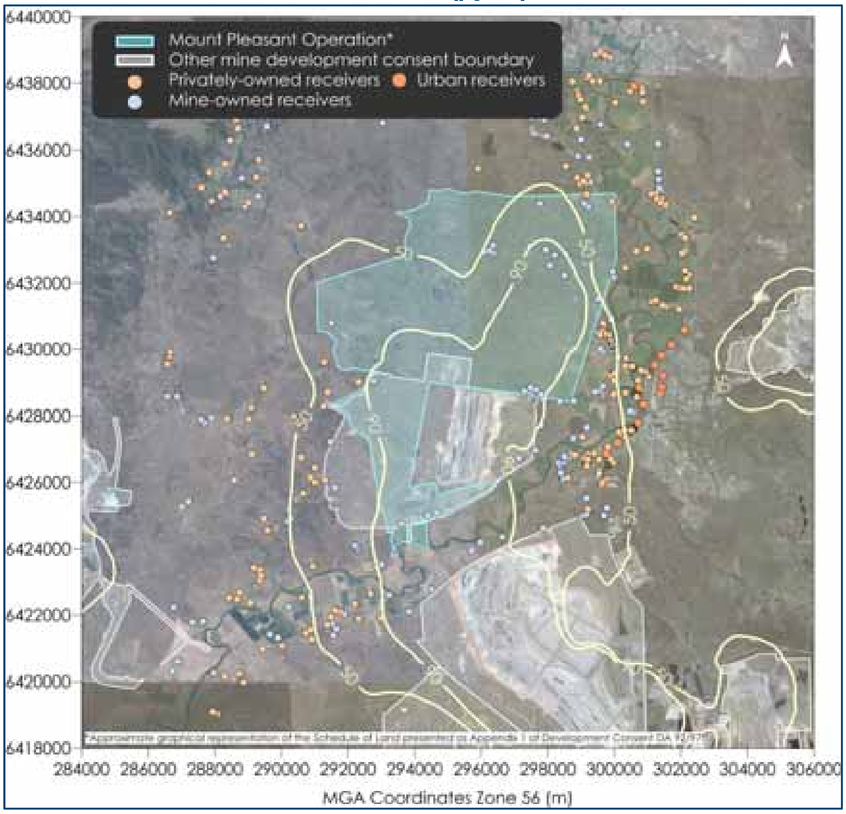

Figure G-28: Predicted annual average TSP concentrations due to emissions from the Modification and other sources in Scenario 3 (µg/m³)

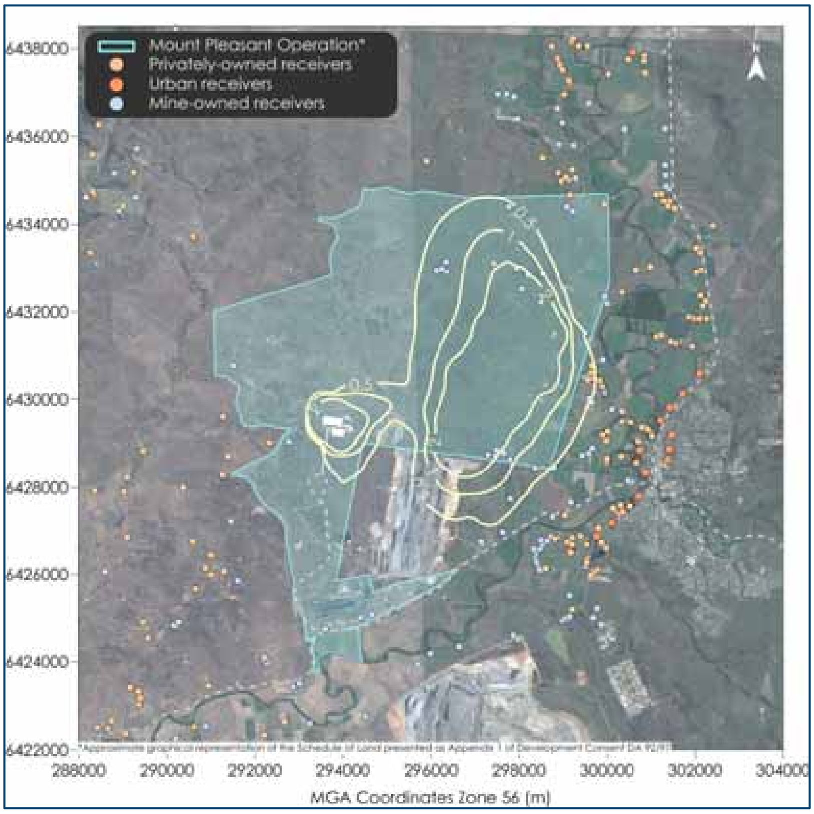

Figure G-29: Predicted annual average dust deposition levels due to emissions from the Modification in Scenario 3 (g/m²/month)

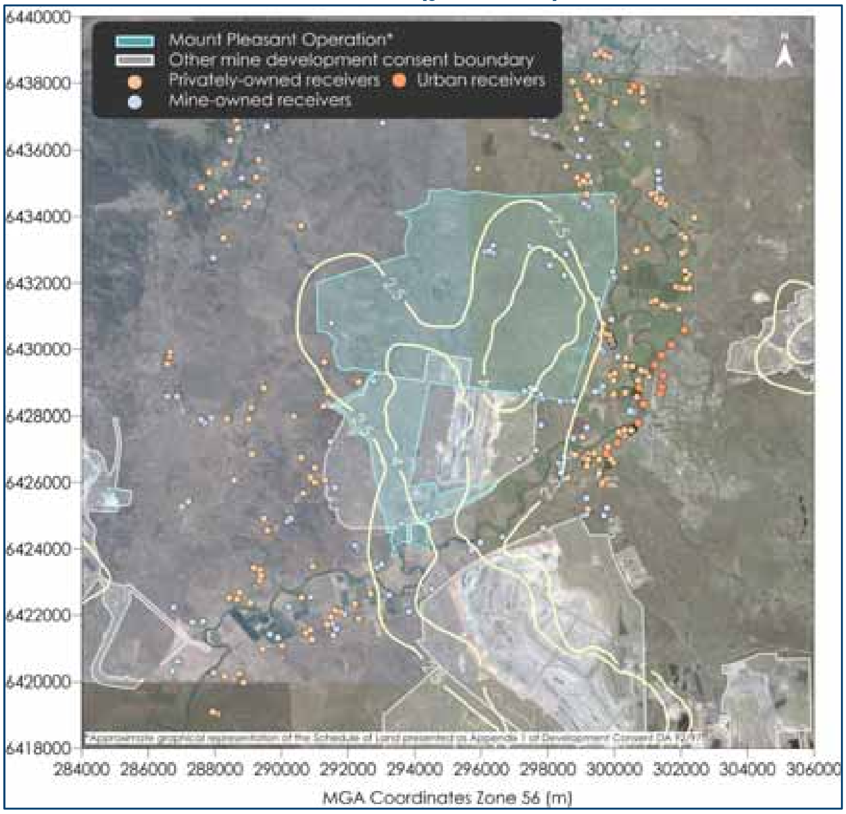

Figure G-30: Predicted annual average dust deposition levels due to emissions from the Modification and other sources in Scenario 3 (g/m²/month)

Appendix H

Further Detail Regarding 24-hour $PM_{2.5}$ Analysis

Table H-1: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 6

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	1.2	32.4				
21/07/2015	27.3	1.5	28.8				
22/07/2015	26.7	1.5	28.2				
30/06/2015	24.5	1.9	26.4	12/05/2015	ND	4.2	4.2
28/06/2015	23.6	1.5	25.1	30/05/2015	7.0	4.1	11.1
6/06/2015	23.2	1.1	24.3	4/06/2015	20.2	4.1	24.3
9/08/2015	22.9	0.7	23.6	29/05/2015	9.1	4.0	13.1
22/06/2015	22.0	1.7	23.7	28/07/2015	10.9	3.8	14.7
10/03/2015	21.6	0.0	21.6	5/06/2015	20.2	3.5	23.7
29/07/2015	21.5	1.3	22.8	20/05/2015	4.2	3.3	7.5
23/07/2015	21.3	3.2	24.5	5/07/2015	20.9	3.2	24.1
8/07/2015	21.2	1.0	22.2	23/07/2015	21.3	3.2	24.5
8/08/2015	21.2	0.9	22.1	19/11/2015	6.1	3.1	9.2

ND – No data
Green Shading = background level below 25µg/m³

Table H-2: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 21

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	1.2	32.4				
21/07/2015	27.3	2.4	29.7				
22/07/2015	26.7	1.6	28.3				
30/06/2015	24.5	2.1	26.6	5/06/2015	20.2	4.7	24.9
28/06/2015	23.6	1.5	25.1	24/04/2015	4.1	4.5	8.6
6/06/2015	23.2	1.2	24.4	20/05/2015	4.2	4.4	8.6
9/08/2015	22.9	0.7	23.6	29/05/2015	9.1	4.4	13.5
22/06/2015	22.0	1.8	23.8	30/05/2015	7.0	4.2	11.2
10/03/2015	21.6	0.1	21.7	18/06/2015	8.0	4.0	12.0
29/07/2015	21.5	1.4	22.9	22/04/2015	9.3	4.0	13.3
23/07/2015	21.3	3.7	25.0	4/06/2015	20.2	3.9	24.1
8/07/2015	21.2	1.2	22.4	23/07/2015	21.3	3.7	25.0
8/08/2015	21.2	0.9	22.1	27/04/2015	4.7	3.7	8.4

Table H-3: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 23

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	1.1	32.3				
21/07/2015	27.3	3.2	30.5				
22/07/2015	26.7	1.7	28.4				
30/06/2015	24.5	2.1	26.6	24/04/2015	4.1	5.8	9.9
28/06/2015	23.6	1.4	25.0	20/05/2015	4.2	4.6	8.8
6/06/2015	23.2	1.2	24.4	5/06/2015	20.2	4.5	24.7
9/08/2015	22.9	0.6	23.5	30/05/2015	7.0	4.4	11.4
22/06/2015	22.0	1.6	23.6	31/05/2015	5.8	4.3	10.1
10/03/2015	21.6	0.1	21.7	5/09/2015	9.1	4.0	13.1
29/07/2015	21.5	1.2	22.7	22/04/2015	9.3	4.0	13.3
23/07/2015	21.3	3.8	25.1	2/08/2015	13.0	3.9	16.9
8/07/2015	21.2	1.3	22.5	7/06/2015	14.7	3.9	18.6
8/08/2015	21.2	0.8	22.0	1/07/2015	16.4	3.9	20.3

Table H-4: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 35b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.4	31.6				
21/07/2015	27.3	1.0	28.3				
22/07/2015	26.7	0.9	27.6				
30/06/2015	24.5	0.9	25.4	1/07/2015	16.4	3.6	20.0
28/06/2015	23.6	0.4	24.0	14/01/2015	4.7	3.1	7.8
6/06/2015	23.2	0.8	24.0	12/07/2015	0.4	3.0	3.4
9/08/2015	22.9	0.4	23.3	24/04/2015	4.1	2.7	6.8
22/06/2015	22.0	0.4	22.4	27/03/2015	2.3	2.7	5.0
10/03/2015	21.6	0.1	21.7	11/05/2015	3.0	2.7	5.7
29/07/2015	21.5	0.3	21.8	3/08/2015	7.0	2.4	9.4
23/07/2015	21.3	1.8	23.1	13/07/2015	ND	2.4	2.4
8/07/2015	21.2	1.0	22.2	6/04/2015	3.5	2.4	5.9
8/08/2015	21.2	0.3	21.5	26/04/2015	ND	2.3	2.3

ND – No data

Table H-5: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 67

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.4	31.6				
21/07/2015	27.3	1.1	28.4				
22/07/2015	26.7	1.0	27.7				
30/06/2015	24.5	0.9	25.4	14/01/2015	4.7	4.2	8.9
28/06/2015	23.6	0.4	24.0	12/07/2015	0.4	3.2	3.6
6/06/2015	23.2	1.0	24.2	11/12/2015	8.0	3.0	11.0
9/08/2015	22.9	0.4	23.3	4/08/2015	6.4	3.0	9.4
22/06/2015	22.0	0.4	22.4	25/01/2015	4.1	2.9	7.0
10/03/2015	21.6	0.1	21.7	1/07/2015	16.4	2.9	19.3
29/07/2015	21.5	0.3	21.8	26/11/2015	8.1	2.5	10.6
23/07/2015	21.3	1.7	23.0	23/04/2015	4.5	2.5	7.0
8/07/2015	21.2	1.0	22.2	18/08/2015	11.3	2.4	13.7
8/08/2015	21.2	0.2	21.4	16/04/2015	8.3	2.4	10.7

Table H-6: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 112

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.3	31.5				
21/07/2015	27.3	1.5	28.8				
22/07/2015	26.7	1.9	28.6				
30/06/2015	24.5	1.3	25.8	24/06/2015	20.7	3.6	24.3
28/06/2015	23.6	0.4	24.0	1/06/2015	12.8	3.5	16.3
6/06/2015	23.2	1.5	24.7	1/11/2015	9.5	3.4	12.9
9/08/2015	22.9	1.2	24.1	13/05/2015	6.6	3.2	9.8
22/06/2015	22.0	0.8	22.8	12/03/2015	14.2	3.1	17.3
10/03/2015	21.6	0.4	22.0	4/09/2015	10.7	2.9	13.6
29/07/2015	21.5	0.3	21.8	27/05/2015	ND	2.8	2.8
23/07/2015	21.3	1.1	22.4	19/06/2015	13.1	2.7	15.8
8/07/2015	21.2	1.3	22.5	5/04/2015	3.2	2.7	5.9
8/08/2015	21.2	0.5	21.7	10/10/2015	11.6	2.6	14.2

ND – No data

Table H-7: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 118

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.3	31.5				
21/07/2015	27.3	1.3	28.6				
22/07/2015	26.7	1.8	28.5				
30/06/2015	24.5	1.3	25.8	1/06/2015	12.8	3.2	16.0
28/06/2015	23.6	0.4	24.0	24/06/2015	20.7	3.1	23.8
6/06/2015	23.2	1.3	24.5	1/11/2015	9.5	3.0	12.5
9/08/2015	22.9	1.0	23.9	13/05/2015	6.6	2.8	9.4
22/06/2015	22.0	0.8	22.8	27/05/2015	ND	2.7	2.7
10/03/2015	21.6	0.4	22.0	12/03/2015	14.2	2.7	16.9
29/07/2015	21.5	0.3	21.8	4/09/2015	10.7	2.4	13.1
23/07/2015	21.3	0.9	22.2	10/10/2015	11.6	2.3	13.9
8/07/2015	21.2	1.2	22.4	19/06/2015	13.1	2.3	15.4
8/08/2015	21.2	0.5	21.7	5/04/2015	3.2	2.2	5.4

ND – No data

Table H-8: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 121

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.3	**31.5**				
21/07/2015	27.3	1.4	**28.7**				
22/07/2015	26.7	2.0	**28.7**				
30/06/2015	24.5	1.3	25.8	1/06/2015	12.8	3.3	16.1
28/06/2015	23.6	0.5	24.1	24/06/2015	20.7	3.1	23.8
6/06/2015	23.2	1.2	24.4	1/11/2015	9.5	3.0	12.5
9/08/2015	22.9	1.0	23.9	27/05/2015	ND	2.7	2.7
22/06/2015	22.0	0.8	22.8	13/05/2015	6.6	2.6	9.2
10/03/2015	21.6	0.4	22.0	12/03/2015	14.2	2.4	16.6
29/07/2015	21.5	0.3	21.8	10/10/2015	11.6	2.3	13.9
23/07/2015	21.3	0.7	22.0	19/06/2015	13.1	2.2	15.3
8/08/2015	21.2	0.5	21.7	4/09/2015	10.7	2.2	12.9
8/07/2015	21.2	1.2	22.4	26/05/2015	18.5	2.2	20.7

ND – No data

Table H-9: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 136

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.4	31.6				
21/07/2015	27.3	1.1	28.4				
22/07/2015	26.7	2.4	29.1				
30/06/2015	24.5	1.2	25.7	23/05/2015	9.1	3.0	12.1
28/06/2015	23.6	0.5	24.1	22/07/2015	26.7	2.4	29.1
6/06/2015	23.2	0.4	23.6	27/02/2015	8.0	2.2	10.2
9/08/2015	22.9	0.5	23.4	18/09/2015	6.3	2.0	8.3
22/06/2015	22.0	0.7	22.7	19/09/2015	5.6	1.9	7.5
10/03/2015	21.6	0.7	22.3	16/06/2015	14.9	1.9	16.8
29/07/2015	21.5	0.2	21.7	31/10/2015	7.3	1.9	9.2
23/07/2015	21.3	0.2	21.5	16/09/2015	7.1	1.8	8.9
8/07/2015	21.2	1.2	22.4	10/01/2015	7.0	1.8	8.8
8/08/2015	21.2	0.4	21.6	26/05/2015	18.5	1.7	20.2

Table H-10: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 139

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.2	31.4				
21/07/2015	27.3	0.7	28.0				
22/07/2015	26.7	1.7	28.4				
30/06/2015	24.5	0.9	25.4	23/05/2015	9.1	2.2	11.3
28/06/2015	23.6	0.3	23.9	22/07/2015	26.7	1.7	28.4
6/06/2015	23.2	0.3	23.5	27/02/2015	8.0	1.6	9.6
9/08/2015	22.9	0.3	23.2	18/09/2015	6.3	1.4	7.7
22/06/2015	22.0	0.5	22.5	19/09/2015	5.6	1.4	7.0
10/03/2015	21.6	0.4	22.0	16/06/2015	14.9	1.3	16.2
29/07/2015	21.5	0.1	21.6	26/05/2015	18.5	1.3	19.8
23/07/2015	21.3	0.1	21.4	16/09/2015	7.1	1.3	8.4
8/07/2015	21.2	0.9	22.1	3/07/2015	20.2	1.2	21.4
8/08/2015	21.2	0.2	21.4	10/01/2015	7.0	1.2	8.2

Table H-11: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 143

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.6	31.8				
21/07/2015	27.3	0.6	27.9				
22/07/2015	26.7	1.1	27.8				
30/06/2015	24.5	0.9	25.4	23/05/2015	9.1	1.5	10.6
28/06/2015	23.6	0.6	24.2	27/02/2015	8.0	1.4	9.4
6/06/2015	23.2	0.2	23.4	30/03/2015	9.7	1.4	11.1
9/08/2015	22.9	0.2	23.1	19/09/2015	5.6	1.2	6.8
22/06/2015	22.0	0.5	22.5	22/07/2015	26.7	1.1	27.8
10/03/2015	21.6	0.7	22.3	3/07/2015	20.2	1.1	21.3
29/07/2015	21.5	0.2	21.7	16/06/2015	14.9	1.1	16.0
23/07/2015	21.3	0.0	21.3	16/09/2015	7.1	1.0	8.1
8/07/2015	21.2	0.8	22.0	18/09/2015	6.3	0.9	7.2
8/08/2015	21.2	0.1	21.3	30/12/2015	2.8	0.9	3.7

Table H-12: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 147

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	1.0	32.2				
21/07/2015	27.3	0.6	27.9				
22/07/2015	26.7	1.1	27.8				
30/06/2015	24.5	1.1	25.6	30/03/2015	9.7	1.6	11.3
28/06/2015	23.6	1.0	24.6	27/02/2015	8.0	1.5	9.5
6/06/2015	23.2	0.4	23.6	19/09/2015	5.6	1.4	7.0
9/08/2015	22.9	0.4	23.3	31/10/2015	7.3	1.4	8.7
22/06/2015	22.0	0.7	22.7	23/05/2015	9.1	1.3	10.4
10/03/2015	21.6	1.0	22.6	16/06/2015	14.9	1.2	16.1
29/07/2015	21.5	0.3	21.8	16/05/2015	10.2	1.2	11.4
23/07/2015	21.3	0.0	21.3	3/07/2015	20.2	1.2	21.4
8/07/2015	21.2	0.8	22.0	22/07/2015	26.7	1.1	27.8
8/08/2015	21.2	0.2	21.4	30/06/2015	24.5	1.1	25.6

Table H-13: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 6

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	1.1	32.3				
21/07/2015	27.3	1.1	28.4				
22/07/2015	26.7	1.2	27.9				
30/06/2015	24.5	1.5	26.0	30/05/2015	7.0	3.3	10.3
28/06/2015	23.6	1.4	25.0	4/06/2015	20.2	3.0	23.2
6/06/2015	23.2	1.0	24.2	29/05/2015	9.1	3.0	12.1
9/08/2015	22.9	0.8	23.7	27/06/2015	14.3	2.8	17.1
22/06/2015	22.0	1.5	23.5	28/07/2015	10.9	2.5	13.4
10/03/2015	21.6	0.0	21.6	23/07/2015	21.3	2.5	23.8
29/07/2015	21.5	1.2	22.7	12/05/2015	ND	2.5	2.5
23/07/2015	21.3	2.5	23.8	5/06/2015	20.2	2.4	22.6
8/07/2015	21.2	0.7	21.9	5/07/2015	20.9	2.4	23.3
8/08/2015	21.2	1.1	22.3	27/08/2015	3.8	2.4	6.2

ND – No data

Table H-14: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 21

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	1.2	32.4				
21/07/2015	27.3	1.4	28.7				
22/07/2015	26.7	1.3	28.0				
30/06/2015	24.5	1.8	26.3	30/05/2015	7.0	3.9	10.9
28/06/2015	23.6	1.7	25.3	29/05/2015	9.1	3.5	12.6
6/06/2015	23.2	1.1	24.3	4/06/2015	20.2	3.3	23.5
9/08/2015	22.9	0.9	23.8	27/06/2015	14.3	3.1	17.4
22/06/2015	22.0	1.8	23.8	5/06/2015	20.2	3.1	23.3
10/03/2015	21.6	0.0	21.6	20/05/2015	4.2	3.0	7.2
29/07/2015	21.5	1.4	22.9	28/07/2015	10.9	3.0	13.9
23/07/2015	21.3	2.9	24.2	23/07/2015	21.3	2.9	24.2
8/07/2015	21.2	0.9	22.1	28/05/2015	ND	2.9	2.9
8/08/2015	21.2	1.1	22.3	2/08/2015	13.0	2.8	15.8

ND – No data

Table H-15: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 23

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	1.2	32.4				
21/07/2015	27.3	1.7	29.0				
22/07/2015	26.7	1.3	28.0				
30/06/2015	24.5	1.8	26.3	30/05/2015	7.0	4.0	11.0
28/06/2015	23.6	1.6	25.2	29/05/2015	9.1	3.5	12.6
6/06/2015	23.2	1.2	24.4	24/04/2015	4.1	3.3	7.4
9/08/2015	22.9	0.9	23.8	2/08/2015	13.0	3.2	16.2
22/06/2015	22.0	1.8	23.8	5/06/2015	20.2	3.2	23.4
10/03/2015	21.6	0.1	21.7	28/05/2015	ND	3.2	3.2
29/07/2015	21.5	1.5	23.0	4/06/2015	20.2	3.1	23.3
23/07/2015	21.3	3.1	24.4	23/07/2015	21.3	3.1	24.4
8/07/2015	21.2	1.0	22.2	20/05/2015	4.2	3.1	7.3
8/08/2015	21.2	1.1	22.3	30/08/2015	11.6	3.0	14.6

ND – No data

Table H-16: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 35b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	0.7	31.9				
21/07/2015	27.3	1.0	28.3				
22/07/2015	26.7	0.9	27.6				
30/06/2015	24.5	1.1	25.6	12/07/2015	0.4	3.4	3.8
28/06/2015	23.6	0.9	24.5	24/04/2015	4.1	3.0	7.1
6/06/2015	23.2	0.9	24.1	1/07/2015	16.4	2.9	19.3
9/08/2015	22.9	0.4	23.3	13/07/2015	ND	2.7	2.7
22/06/2015	22.0	0.8	22.8	8/04/2015	ND	2.7	2.7
10/03/2015	21.6	0.1	21.7	28/05/2015	ND	2.5	2.5
29/07/2015	21.5	0.7	22.2	27/03/2015	2.3	2.3	4.6
23/07/2015	21.3	2.1	23.4	11/05/2015	3.0	2.2	5.2
8/07/2015	21.2	0.9	22.1	5/05/2015	6.1	2.2	8.3
8/08/2015	21.2	0.6	21.8	31/05/2015	5.8	2.2	8.0

ND – No data

Table H-17: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 67

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.7	31.9				
21/07/2015	27.3	0.9	28.2				
22/07/2015	26.7	1.0	27.7				
30/06/2015	24.5	1.1	25.6	12/07/2015	0.4	4.3	4.7
28/06/2015	23.6	0.9	24.5	1/07/2015	16.4	3.5	19.9
6/06/2015	23.2	1.0	24.2	24/04/2015	4.1	3.0	7.1
9/08/2015	22.9	0.4	23.3	13/07/2015	ND	3.0	3.0
22/06/2015	22.0	0.8	22.8	11/12/2015	8.0	2.9	10.9
10/03/2015	21.6	0.1	21.7	28/05/2015	ND	2.9	2.9
29/07/2015	21.5	0.6	22.1	11/05/2015	3.0	2.8	5.8
23/07/2015	21.3	2.4	23.7	8/04/2015	ND	2.8	2.8
8/07/2015	21.2	1.0	22.2	14/01/2015	4.7	2.8	7.5
8/08/2015	21.2	0.7	21.9	27/03/2015	2.3	2.7	5.0

ND – No data

Table H-18: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 112

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	1.2	32.4				
21/07/2015	27.3	1.4	28.7				
22/07/2015	26.7	1.9	28.6				
30/06/2015	24.5	1.6	26.1	12/07/2015	0.4	6.8	7.2
28/06/2015	23.6	1.3	24.9	14/01/2015	4.7	5.6	10.3
6/06/2015	23.2	1.9	25.1	11/12/2015	8.0	5.5	13.5
9/08/2015	22.9	0.8	23.7	13/07/2015	ND	5.0	5.0
22/06/2015	22.0	1.4	23.4	28/05/2015	ND	4.9	4.9
10/03/2015	21.6	0.2	21.8	1/07/2015	16.4	4.9	21.3
29/07/2015	21.5	0.9	22.4	11/05/2015	3.0	4.5	7.5
23/07/2015	21.3	3.8	25.1	6/04/2015	3.5	4.2	7.7
8/07/2015	21.2	1.3	22.5	23/04/2015	4.5	4.2	8.7
8/08/2015	21.2	0.8	22.0	27/05/2015	ND	4.1	4.1

ND – No data

Table H-19: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 118

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	1.0	32.2				
21/07/2015	27.3	1.1	28.4				
22/07/2015	26.7	1.8	28.5				
30/06/2015	24.5	1.4	25.9	12/07/2015	0.4	6.8	7.2
28/06/2015	23.6	1.1	24.7	11/12/2015	8.0	5.2	13.2
6/06/2015	23.2	1.8	25.0	14/01/2015	4.7	5.2	9.9
9/08/2015	22.9	0.7	23.6	13/07/2015	ND	4.8	4.8
22/06/2015	22.0	1.2	23.2	11/05/2015	3.0	4.6	7.6
10/03/2015	21.6	0.2	21.8	1/07/2015	16.4	4.5	20.9
29/07/2015	21.5	0.8	22.3	28/05/2015	ND	4.2	4.2
23/07/2015	21.3	3.4	24.7	23/04/2015	4.5	4.0	8.5
8/07/2015	21.2	1.2	22.4	27/05/2015	ND	3.8	3.8
8/08/2015	21.2	0.7	21.9	25/01/2015	4.1	3.7	7.8

ND – No data

Table H-20: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 121

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	1.0	32.2				
21/07/2015	27.3	0.9	28.2				
22/07/2015	26.7	1.8	28.5				
30/06/2015	24.5	1.4	25.9	12/07/2015	0.4	6.3	6.7
28/06/2015	23.6	1.0	24.6	14/01/2015	4.7	5.4	10.1
6/06/2015	23.2	1.9	25.1	11/12/2015	8.0	5.2	13.2
9/08/2015	22.9	0.7	23.6	13/07/2015	ND	4.7	4.7
22/06/2015	22.0	1.2	23.2	1/07/2015	16.4	4.6	21.0
10/03/2015	21.6	0.2	21.8	11/05/2015	3.0	4.6	7.6
29/07/2015	21.5	0.8	22.3	23/04/2015	4.5	4.1	8.6
23/07/2015	21.3	3.4	24.7	28/05/2015	ND	4.0	4.0
8/07/2015	21.2	1.2	22.4	27/05/2015	ND	3.9	3.9
8/08/2015	21.2	0.7	21.9	4/09/2015	10.7	3.7	14.4

ND – No data

Table H-21: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 136

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	0.1	31.3				
21/07/2015	27.3	0.3	27.6				
22/07/2015	26.7	1.0	27.7				
30/06/2015	24.5	0.6	25.1	1/11/2015	9.5	2.6	12.1
28/06/2015	23.6	0.1	23.7	1/06/2015	12.8	2.5	15.3
6/06/2015	23.2	0.7	23.9	27/05/2015	ND	2.4	2.4
9/08/2015	22.9	0.2	23.1	12/03/2015	14.2	2.3	16.5
22/06/2015	22.0	0.3	22.3	4/09/2015	10.7	2.1	12.8
10/03/2015	21.6	0.2	21.8	5/04/2015	3.2	2.1	5.3
29/07/2015	21.5	0.1	21.6	13/05/2015	6.6	2.0	8.6
23/07/2015	21.3	0.5	21.8	19/03/2015	8.5	2.0	10.5
8/07/2015	21.2	0.9	22.1	7/11/2015	5.4	1.9	7.3
8/08/2015	21.2	0.0	21.2	19/06/2015	13.1	1.9	15.0

ND – No data

Table H-22: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 139

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	0.1	31.3				
21/07/2015	27.3	0.3	27.6				
22/07/2015	26.7	0.7	27.4				
30/06/2015	24.5	0.5	25.0	27/05/2015	ND	2.0	2.0
28/06/2015	23.6	0.1	23.7	12/03/2015	14.2	1.8	16.0
6/06/2015	23.2	0.4	23.6	1/11/2015	9.5	1.8	11.3
9/08/2015	22.9	0.2	23.1	19/03/2015	8.5	1.6	10.1
22/06/2015	22.0	0.2	22.2	13/05/2015	6.6	1.5	8.1
10/03/2015	21.6	0.2	21.8	31/10/2015	7.3	1.4	8.7
29/07/2015	21.5	0.1	21.6	19/06/2015	13.1	1.3	14.4
23/07/2015	21.3	0.2	21.5	16/06/2015	14.9	1.3	16.2
8/07/2015	21.2	0.7	21.9	12/12/2015	10.0	1.3	11.3
8/08/2015	21.2	0.0	21.2	4/09/2015	10.7	1.3	12.0

ND – No data

Table H-23: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 143

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.2	31.4				
21/07/2015	27.3	0.6	27.9				
22/07/2015	26.7	2.0	28.7				
30/06/2015	24.5	1.0	25.5	23/05/2015	9.1	2.2	11.3
28/06/2015	23.6	0.2	23.8	22/07/2015	26.7	2.0	28.7
6/06/2015	23.2	0.3	23.5	27/02/2015	8.0	2.0	10.0
9/08/2015	22.9	0.2	23.1	16/06/2015	14.9	1.7	16.6
22/06/2015	22.0	0.3	22.3	19/09/2015	5.6	1.7	7.3
10/03/2015	21.6	0.4	22.0	3/07/2015	20.2	1.6	21.8
29/07/2015	21.5	0.1	21.6	26/05/2015	18.5	1.5	20.0
23/07/2015	21.3	0.1	21.4	10/01/2015	7.0	1.4	8.4
8/07/2015	21.2	1.3	22.5	16/09/2015	7.1	1.4	8.5
8/08/2015	21.2	0.0	21.2	31/10/2015	7.3	1.4	8.7

Table H-24: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 147

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.9	32.1				
21/07/2015	27.3	1.6	28.9				
22/07/2015	26.7	3.7	30.4				
30/06/2015	24.5	1.8	26.3	22/07/2015	26.7	3.7	30.4
28/06/2015	23.6	0.8	24.4	23/05/2015	9.1	3.1	12.2
6/06/2015	23.2	0.4	23.6	16/06/2015	14.9	2.9	17.8
9/08/2015	22.9	0.5	23.4	27/02/2015	8.0	2.8	10.8
22/06/2015	22.0	0.8	22.8	31/10/2015	7.3	2.8	10.1
10/03/2015	21.6	1.4	23.0	19/09/2015	5.6	2.7	8.3
29/07/2015	21.5	0.4	21.9	30/03/2015	9.7	2.5	12.2
23/07/2015	21.3	0.1	21.4	10/01/2015	7.0	2.4	9.4
8/07/2015	21.2	2.3	23.5	8/07/2015	21.2	2.3	23.5
8/08/2015	21.2	0.0	21.2	16/09/2015	7.1	2.2	9.3

Table H-25: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 6

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	1.3	32.5				
21/07/2015	27.3	1.2	28.5				
22/07/2015	26.7	1.4	28.1				
30/06/2015	24.5	1.9	26.4	30/05/2015	7.0	3.9	10.9
28/06/2015	23.6	1.9	25.5	27/06/2015	14.3	3.6	17.9
6/06/2015	23.2	1.2	24.4	4/06/2015	20.2	3.5	23.7
9/08/2015	22.9	1.0	23.9	29/05/2015	9.1	3.3	12.4
22/06/2015	22.0	1.9	23.9	23/07/2015	21.3	3.0	24.3
10/03/2015	21.6	0.0	21.6	25/05/2015	19.6	2.9	22.5
29/07/2015	21.5	1.5	23.0	12/05/2015	ND	2.9	2.9
23/07/2015	21.3	3.0	24.3	28/07/2015	10.9	2.9	13.8
8/07/2015	21.2	0.7	21.9	28/05/2015	ND	2.9	2.9
8/08/2015	21.2	1.3	22.5	5/07/2015	20.9	2.9	23.8

ND – No data

Table H-26: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 21

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	1.5	32.7				
21/07/2015	27.3	1.6	28.9				
22/07/2015	26.7	1.6	28.3				
30/06/2015	24.5	2.3	26.8	30/05/2015	7.0	4.6	11.6
28/06/2015	23.6	2.2	25.8	27/06/2015	14.3	4.1	18.4
6/06/2015	23.2	1.4	24.6	4/06/2015	20.2	3.9	24.1
9/08/2015	22.9	1.2	24.1	29/05/2015	9.1	3.8	12.9
22/06/2015	22.0	2.3	24.3	28/05/2015	ND	3.6	3.6
10/03/2015	21.6	0.0	21.6	23/07/2015	21.3	3.5	24.8
29/07/2015	21.5	1.9	23.4	28/07/2015	10.9	3.5	14.4
23/07/2015	21.3	3.5	24.8	5/06/2015	20.2	3.4	23.6
8/07/2015	21.2	0.9	22.1	25/05/2015	19.6	3.3	22.9
8/08/2015	21.2	1.5	22.7	30/08/2015	11.6	3.3	14.9

ND – No data

Table H-27: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 23

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	1.5	32.7				
21/07/2015	27.3	1.9	29.2				
22/07/2015	26.7	1.6	28.3				
30/06/2015	24.5	2.4	26.9	30/05/2015	7.0	4.9	11.9
28/06/2015	23.6	2.1	25.7	28/05/2015	ND	3.9	3.9
6/06/2015	23.2	1.6	24.8	29/05/2015	9.1	3.9	13.0
9/08/2015	22.9	1.1	24.0	27/06/2015	14.3	3.8	18.1
22/06/2015	22.0	2.3	24.3	23/07/2015	21.3	3.8	25.1
10/03/2015	21.6	0.1	21.7	4/06/2015	20.2	3.7	23.9
29/07/2015	21.5	1.9	23.4	24/04/2015	4.1	3.7	7.8
23/07/2015	21.3	3.8	25.1	7/06/2015	14.7	3.6	18.3
8/07/2015	21.2	1.1	22.3	30/08/2015	11.6	3.6	15.2
8/08/2015	21.2	1.5	22.7	5/06/2015	20.2	3.6	23.8

ND – No data

Table H-28: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 35b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	0.9	32.1				
21/07/2015	27.3	1.1	28.4				
22/07/2015	26.7	1.2	27.9				
30/06/2015	24.5	1.5	26.0	24/04/2015	4.1	3.7	7.8
28/06/2015	23.6	1.3	24.9	1/07/2015	16.4	3.5	19.9
6/06/2015	23.2	1.2	24.4	28/05/2015	ND	3.3	3.3
9/08/2015	22.9	0.6	23.5	12/07/2015	0.4	3.2	3.6
22/06/2015	22.0	1.2	23.2	5/06/2015	20.2	2.9	23.1
10/03/2015	21.6	0.1	21.7	23/07/2015	21.3	2.8	24.1
29/07/2015	21.5	1.1	22.6	31/05/2015	5.8	2.7	8.5
23/07/2015	21.3	2.8	24.1	25/08/2015	3.6	2.7	6.3
8/07/2015	21.2	1.0	22.2	7/06/2015	14.7	2.6	17.3
8/08/2015	21.2	1.1	22.3	19/06/2015	13.1	2.6	15.7

ND – No data

Table H-29: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 67

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	1.0	32.2				
21/07/2015	27.3	1.4	28.7				
22/07/2015	26.7	1.3	28.0				
30/06/2015	24.5	1.5	26.0	24/04/2015	4.1	4.1	8.2
28/06/2015	23.6	1.3	24.9	1/07/2015	16.4	4.1	20.5
6/06/2015	23.2	1.4	24.6	28/05/2015	ND	3.9	3.9
9/08/2015	22.9	0.5	23.4	12/07/2015	0.4	3.8	4.2
22/06/2015	22.0	1.1	23.1	5/06/2015	20.2	3.5	23.7
10/03/2015	21.6	0.1	21.7	19/06/2015	13.1	3.2	16.3
29/07/2015	21.5	1.0	22.5	11/12/2015	8.0	3.1	11.1
23/07/2015	21.3	3.1	24.4	23/07/2015	21.3	3.1	24.4
8/07/2015	21.2	1.1	22.3	6/04/2015	3.5	3.1	6.6
8/08/2015	21.2	1.3	22.5	31/05/2015	5.8	3.0	8.8

ND – No data

Table H-30: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 112

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	1.5	32.7				
21/07/2015	27.3	2.4	29.7				
22/07/2015	26.7	2.5	29.2				
30/06/2015	24.5	1.9	26.4	28/05/2015	ND	7.6	7.6
28/06/2015	23.6	1.6	25.2	1/07/2015	16.4	7.5	23.9
6/06/2015	23.2	2.4	25.6	6/04/2015	3.5	6.6	10.1
9/08/2015	22.9	0.7	23.6	24/04/2015	4.1	6.5	10.6
22/06/2015	22.0	1.7	23.7	14/01/2015	4.7	6.3	11.0
10/03/2015	21.6	0.2	21.8	11/12/2015	8.0	6.0	14.0
29/07/2015	21.5	0.9	22.4	27/05/2015	ND	5.9	5.9
23/07/2015	21.3	5.5	26.8	12/07/2015	0.4	5.9	6.3
8/07/2015	21.2	1.5	22.7	11/07/2015	12.2	5.7	17.9
8/08/2015	21.2	2.4	23.6	19/06/2015	13.1	5.7	18.8

ND – No data

Table H-31: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 118

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	1.3	32.5				
21/07/2015	27.3	2.0	29.3				
22/07/2015	26.7	2.4	29.1				
30/06/2015	24.5	1.6	26.1	1/07/2015	16.4	7.3	23.7
28/06/2015	23.6	1.2	24.8	14/01/2015	4.7	6.5	11.2
6/06/2015	23.2	2.3	25.5	28/05/2015	ND	6.2	6.2
9/08/2015	22.9	0.6	23.5	6/04/2015	3.5	6.0	9.5
22/06/2015	22.0	1.2	23.2	23/04/2015	4.5	5.7	10.2
10/03/2015	21.6	0.2	21.8	11/12/2015	8.0	5.6	13.6
29/07/2015	21.5	0.6	22.1	27/05/2015	ND	5.5	5.5
23/07/2015	21.3	5.2	26.5	19/06/2015	13.1	5.5	18.6
8/07/2015	21.2	1.3	22.5	15/07/2015	18.2	5.5	23.7
8/08/2015	21.2	1.9	23.1	11/07/2015	12.2	5.4	17.6

ND – No data

Table H-32: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 121

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	1.2	32.4				
21/07/2015	27.3	1.6	28.9				
22/07/2015	26.7	2.5	29.2				
30/06/2015	24.5	1.5	26.0	1/07/2015	16.4	7.5	23.9
28/06/2015	23.6	1.1	24.7	14/01/2015	4.7	6.7	11.4
6/06/2015	23.2	2.4	25.6	23/04/2015	4.5	6.2	10.7
9/08/2015	22.9	0.6	23.5	4/09/2015	10.7	5.8	16.5
22/06/2015	22.0	1.1	23.1	28/05/2015	ND	5.7	5.7
10/03/2015	21.6	0.2	21.8	6/04/2015	3.5	5.7	9.2
29/07/2015	21.5	0.5	22.0	19/06/2015	13.1	5.7	18.8
23/07/2015	21.3	5.4	26.7	15/07/2015	18.2	5.7	23.9
8/07/2015	21.2	1.3	22.5	11/12/2015	8.0	5.6	13.6
8/08/2015	21.2	1.7	22.9	27/05/2015	ND	5.6	5.6

ND – No data

Table H-33: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 136

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.2	31.4				
21/07/2015	27.3	0.4	27.7				
22/07/2015	26.7	1.2	27.9				
30/06/2015	24.5	0.7	25.2	5/04/2015	3.2	3.4	6.6
28/06/2015	23.6	0.1	23.7	4/09/2015	10.7	3.1	13.8
6/06/2015	23.2	1.0	24.2	1/06/2015	12.8	3.1	15.9
9/08/2015	22.9	0.3	23.2	1/11/2015	9.5	3.1	12.6
22/06/2015	22.0	0.3	22.3	7/11/2015	5.4	2.9	8.3
10/03/2015	21.6	0.2	21.8	12/03/2015	14.2	2.8	17.0
29/07/2015	21.5	0.2	21.7	19/06/2015	13.1	2.7	15.8
23/07/2015	21.3	0.7	22.0	19/03/2015	8.5	2.5	11.0
8/07/2015	21.2	1.1	22.3	9/06/2015	11.0	2.4	13.4
8/08/2015	21.2	0.1	21.3	27/05/2015	ND	2.4	2.4

ND – No data

Table H-34: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 139

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
14/06/2015	31.2	0.1	31.3				
21/07/2015	27.3	0.3	27.6				
22/07/2015	26.7	0.9	27.6				
30/06/2015	24.5	0.6	25.1	1/11/2015	9.5	2.3	11.8
28/06/2015	23.6	0.1	23.7	12/03/2015	14.2	2.2	16.4
6/06/2015	23.2	0.6	23.8	27/05/2015	ND	2.2	2.2
9/08/2015	22.9	0.2	23.1	5/04/2015	3.2	2.2	5.4
22/06/2015	22.0	0.2	22.2	19/03/2015	8.5	2.1	10.6
10/03/2015	21.6	0.2	21.8	1/06/2015	12.8	2.1	14.9
29/07/2015	21.5	0.1	21.6	4/09/2015	10.7	2.0	12.7
23/07/2015	21.3	0.3	21.6	7/11/2015	5.4	2.0	7.4
8/07/2015	21.2	1.0	22.2	19/06/2015	13.1	1.9	15.0
8/08/2015	21.2	0.1	21.3	16/06/2015	14.9	1.9	16.8

ND – No data

Table H-35: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 143

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	0.1	31.3				
21/07/2015	27.3	0.6	27.9				
22/07/2015	26.7	2.4	29.1				
30/06/2015	24.5	1.2	25.7	16/06/2015	14.9	3.1	18.0
28/06/2015	23.6	0.2	23.8	27/02/2015	8.0	2.7	10.7
6/06/2015	23.2	0.4	23.6	23/05/2015	9.1	2.6	11.7
9/08/2015	22.9	0.3	23.2	3/07/2015	20.2	2.4	22.6
22/06/2015	22.0	0.4	22.4	22/07/2015	26.7	2.4	29.1
10/03/2015	21.6	0.6	22.2	9/01/2015	6.4	2.3	8.7
29/07/2015	21.5	0.2	21.7	19/09/2015	5.6	2.3	7.9
23/07/2015	21.3	0.1	21.4	18/09/2015	6.3	2.2	8.5
8/07/2015	21.2	1.9	23.1	31/10/2015	7.3	2.2	9.5
8/08/2015	21.2	0.0	21.2	1/11/2015	9.5	2.1	11.6

Table H-36: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Sensitive receptor location 147

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level
14/06/2015	31.2	0.8	32.0				
21/07/2015	27.3	1.9	29.2				
22/07/2015	26.7	5.4	32.1				
30/06/2015	24.5	2.7	27.2	23/05/2015	9.1	6.6	15.7
28/06/2015	23.6	0.7	24.3	22/07/2015	26.7	5.4	32.1
6/06/2015	23.2	0.5	23.7	16/06/2015	14.9	5.4	20.3
9/08/2015	22.9	0.7	23.6	19/09/2015	5.6	5.2	10.8
22/06/2015	22.0	0.9	22.9	27/02/2015	8.0	4.9	12.9
10/03/2015	21.6	1.7	23.3	31/10/2015	7.3	4.2	11.5
29/07/2015	21.5	0.5	22.0	10/01/2015	7.0	4.0	11.0
23/07/2015	21.3	0.1	21.4	4/01/2015	6.7	3.8	10.5
8/07/2015	21.2	3.8	25.0	8/07/2015	21.2	3.8	25.0
8/08/2015	21.2	0.0	21.2	26/05/2015	18.5	3.6	22.1

Appendix I

Further Detail Regarding 24-hour PM_{10} Analysis

Table I-1: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 6

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.6	6.0	78.6				
26/11/2015	56.3	9.0	65.3				
10/03/2015	46.8	0.2	47.0	12/05/2015	11.3	21.3	32.6
12/12/2015	46.2	0.0	46.2	4/06/2015	16.6	20.1	36.7
7/10/2015	40.7	2.7	43.4	29/05/2015	11.5	19.1	30.6
15/12/2015	39.9	1.6	41.5	30/05/2015	10.7	19.0	29.7
11/03/2015	37.8	0.4	38.2	28/07/2015	16.4	17.8	34.2
22/07/2015	37.5	6.0	43.5	8/06/2015	9.2	16.3	25.5
17/10/2015	37.4	2.0	39.4	5/06/2015	17.3	16.2	33.5
9/03/2015	37.2	2.7	39.9	20/05/2015	9.6	15.7	25.3
9/02/2015	37.1	1.0	38.1	19/11/2015	20.9	15.3	36.2
11/12/2015	36.2	5.9	42.1	5/07/2015	18.5	15.1	33.6
17/03/2015	35.7	0.8	36.5	27/08/2015	7.1	14.9	22.0
4/03/2015	35.6	0.2	35.8	31/05/2015	8.4	14.5	22.9
19/03/2015	34.5	5.2	39.7	22/04/2015	6.6	13.9	20.5

Table I-2: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 21

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.6	14.5	87.1				
26/11/2015	56.3	8.4	64.7				
10/03/2015	46.8	0.3	47.1	5/06/2015	17.3	21.7	39.0
12/12/2015	46.2	0.0	46.2	24/04/2015	11	21.6	32.6
7/10/2015	40.7	2.5	43.2	20/05/2015	9.6	21.4	31.0
15/12/2015	39.9	1.8	41.7	29/05/2015	11.5	20.7	32.2
11/03/2015	37.8	0.4	38.2	18/06/2015	9	19.7	28.7
22/07/2015	37.5	6.7	44.2	30/05/2015	10.7	19.7	30.4
17/10/2015	37.4	2.0	39.4	4/06/2015	16.6	19.1	35.7
9/03/2015	37.2	3.9	41.1	12/05/2015	11.3	18.0	29.3
9/02/2015	37.1	1.2	38.3	22/04/2015	6.6	17.9	24.5
11/12/2015	36.2	9.6	45.8	27/04/2015	12.6	17.7	30.3
17/03/2015	35.7	0.8	36.5	2/07/2015	12.7	17.1	29.8
4/03/2015	35.6	0.2	35.8	31/05/2015	8.4	16.8	25.2
19/03/2015	34.5	6.5	41.0	5/05/2015	10.7	16.7	27.4
21/11/2015	34.5	1.0	35.5	30/07/2015	15.4	16.6	32.0
20/03/2015	33.7	6.4	40.1	7/06/2015	14.6	16.3	30.9
7/03/2015	33.6	3.9	37.5	5/09/2015	14.7	15.9	30.6

Table I-3: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 23

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.6	17.2	89.8				
26/11/2015	56.3	7.5	63.8				
10/03/2015	46.8	0.3	47.1	24/04/2015	11	28.1	39.1
12/12/2015	46.2	0.3	46.5	20/05/2015	9.6	21.7	31.3
7/10/2015	40.7	2.1	42.8	30/05/2015	10.7	21.6	32.3
15/12/2015	39.9	1.7	41.6	5/06/2015	17.3	20.7	38.0
11/03/2015	37.8	0.4	38.2	31/05/2015	8.4	20.6	29.0
22/07/2015	37.5	6.7	44.2	7/06/2015	14.6	18.9	33.5
17/10/2015	37.4	1.8	39.2	5/09/2015	14.7	18.6	33.3
9/03/2015	37.2	5.0	42.2	2/08/2015	18.4	18.3	36.7
9/02/2015	37.1	1.2	38.3	29/05/2015	11.5	18.3	29.8
11/12/2015	36.2	10.9	47.1	5/05/2015	10.7	18.1	28.8
17/03/2015	35.7	0.7	36.4	22/04/2015	6.6	18.0	24.6
4/03/2015	35.6	0.2	35.8	8/09/2015	11.6	17.8	29.4
19/03/2015	34.5	7.2	41.7	18/06/2015	9	17.6	26.6
21/11/2015	34.5	0.9	35.4	1/07/2015	15.9	17.3	33.2
20/03/2015	33.7	6.7	40.4	6/05/2015	72.6	17.2	89.8
7/03/2015	33.6	4.1	37.7	27/07/2015	13.2	17.2	30.4
10/10/2015	33.1	4.3	37.4	30/08/2015	14.9	17.2	32.1
5/03/2015	33	3.9	36.9	28/05/2015	ND	16.9	16.9

ND – No data

Table I-4: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 6

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.6	4.8	77.4				
26/11/2015	56.3	6.5	62.8				
10/03/2015	46.8	0.2	47.0	30/05/2015	10.7	16.7	27.4
12/12/2015	46.2	0.0	46.2	4/06/2015	16.6	16.0	32.6
7/10/2015	40.7	3.2	43.9	29/05/2015	11.5	16.0	27.5
15/12/2015	39.9	1.4	41.3	27/06/2015	19.6	13.7	33.3
11/03/2015	37.8	0.4	38.2	12/05/2015	11.3	13.6	24.9
22/07/2015	37.5	5.2	42.7	28/07/2015	16.4	13.3	29.7
17/10/2015	37.4	1.8	39.2	8/06/2015	9.2	12.6	21.8
9/03/2015	37.2	2.1	39.3	20/05/2015	9.6	12.6	22.2
9/02/2015	37.1	0.7	37.8	5/06/2015	17.3	12.5	29.8
11/12/2015	36.2	4.4	40.6	27/08/2015	7.1	12.5	19.6

Table I-5: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 21

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.6	9.6	82.2				
26/11/2015	56.3	7.2	63.5				
10/03/2015	46.8	0.2	47.0	30/05/2015	10.7	19.8	30.5
12/12/2015	46.2	0.0	46.2	29/05/2015	11.5	18.7	30.2
7/10/2015	40.7	3.4	44.1	4/06/2015	16.6	17.8	34.4
15/12/2015	39.9	1.5	41.4	20/05/2015	9.6	16.0	25.6
11/03/2015	37.8	0.4	38.2	5/06/2015	17.3	15.7	33.0
22/07/2015	37.5	5.9	43.4	28/07/2015	16.4	15.5	31.9
17/10/2015	37.4	1.7	39.1	27/06/2015	19.6	15.4	35.0
9/03/2015	37.2	2.5	39.7	12/05/2015	11.3	15.2	26.5
9/02/2015	37.1	0.8	37.9	28/05/2015	ND	14.2	14.2
11/12/2015	36.2	6.7	42.9	8/06/2015	9.2	14.1	23.3
17/03/2015	35.7	0.8	36.5	2/08/2015	18.4	13.9	32.3

ND – No data

Table I-6: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 23

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.6	11.7	84.3				
26/11/2015	56.3	7.5	63.8				
10/03/2015	46.8	0.2	47.0	30/05/2015	10.7	20.9	31.6
12/12/2015	46.2	0.2	46.4	29/05/2015	11.5	18.2	29.7
7/10/2015	40.7	3.2	43.9	24/04/2015	11	17.5	28.5
15/12/2015	39.9	1.4	41.3	4/06/2015	16.6	16.9	33.5
11/03/2015	37.8	0.5	38.3	20/05/2015	9.6	16.4	26.0
22/07/2015	37.5	6.0	43.5	5/06/2015	17.3	16.2	33.5
17/10/2015	37.4	1.5	38.9	2/08/2015	18.4	16.0	34.4
9/03/2015	37.2	3.1	40.3	28/05/2015	ND	15.8	15.8
9/02/2015	37.1	0.8	37.9	31/05/2015	8.4	15.6	24.0
11/12/2015	36.2	7.8	44.0	7/06/2015	14.6	15.0	29.6
17/03/2015	35.7	0.7	36.4	23/07/2015	18.4	14.6	33.0
4/03/2015	35.6	0.2	35.8	28/07/2015	16.4	14.5	30.9
19/03/2015	34.5	5.8	40.3	11/07/2015	10.7	14.5	25.2

ND – No data

Table I-7: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 6

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.6	5.6	78.2				
26/11/2015	56.3	7.8	64.1				
10/03/2015	46.8	0.2	47.0	30/05/2015	10.7	20.2	30.9
12/12/2015	46.2	0.0	46.2	4/06/2015	16.6	19.1	35.7
7/10/2015	40.7	4.4	45.1	27/06/2015	19.6	18.3	37.9
15/12/2015	39.9	1.6	41.5	29/05/2015	11.5	18.0	29.5
11/03/2015	37.8	0.5	38.3	12/05/2015	11.3	16.6	27.9
22/07/2015	37.5	6.6	44.1	28/07/2015	16.4	15.6	32.0
17/10/2015	37.4	2.0	39.4	5/07/2015	18.5	15.6	34.1
9/03/2015	37.2	2.4	39.6	25/05/2015	19.4	15.2	34.6
9/02/2015	37.1	0.8	37.9	27/08/2015	7.1	15.0	22.1
11/12/2015	36.2	5.5	41.7	28/05/2015	ND	14.9	14.9
17/03/2015	35.7	0.9	36.6	23/07/2015	18.4	14.7	33.1
4/03/2015	35.6	0.2	35.8	20/05/2015	9.6	14.4	24.0
19/03/2015	34.5	5.2	39.7	5/06/2015	17.3	14.1	31.4

ND – No data

Table I-8: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 21

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.6	11.3	83.9				
26/11/2015	56.3	7.9	64.2				
10/03/2015	46.8	0.2	47.0	30/05/2015	10.7	24.0	34.7
12/12/2015	46.2	0.1	46.3	4/06/2015	16.6	21.1	37.7
7/10/2015	40.7	4.6	45.3	29/05/2015	11.5	20.7	32.2
15/12/2015	39.9	1.7	41.6	27/06/2015	19.6	20.7	40.3
11/03/2015	37.8	0.5	38.3	28/07/2015	16.4	18.7	35.1
22/07/2015	37.5	7.4	44.9	28/05/2015	ND	18.6	18.6
17/10/2015	37.4	1.9	39.3	20/05/2015	9.6	18.1	27.7
9/03/2015	37.2	3.0	40.2	5/06/2015	17.3	17.8	35.1
9/02/2015	37.1	0.8	37.9	23/07/2015	18.4	17.4	35.8
11/12/2015	36.2	8.0	44.2	25/05/2015	19.4	17.4	36.8
17/03/2015	35.7	0.9	36.6	7/06/2015	14.6	17.2	31.8
4/03/2015	35.6	0.2	35.8	30/08/2015	14.9	16.7	31.6
19/03/2015	34.5	6.4	40.9	24/04/2015	11	16.6	27.6
21/11/2015	34.5	1.3	35.8	5/07/2015	18.5	16.5	35.0
20/03/2015	33.7	7.9	41.6	7/08/2015	15.6	16.1	31.7

ND – No data

Table I-9: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 23

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.6	14.1	86.7				
26/11/2015	56.3	8.2	64.5				
10/03/2015	46.8	0.3	47.1	30/05/2015	10.7	26.2	36.9
12/12/2015	46.2	0.2	46.4	24/04/2015	11	20.8	31.8
7/10/2015	40.7	4.0	44.7	29/05/2015	11.5	20.6	32.1
15/12/2015	39.9	1.5	41.4	28/05/2015	ND	20.4	20.4
11/03/2015	37.8	0.6	38.4	4/06/2015	16.6	20.2	36.8
22/07/2015	37.5	7.5	45.0	27/06/2015	19.6	19.6	39.2
17/10/2015	37.4	1.6	39.0	7/06/2015	14.6	19.5	34.1
9/03/2015	37.2	3.7	40.9	31/05/2015	8.4	18.9	27.3
9/02/2015	37.1	0.8	37.9	23/07/2015	18.4	18.8	37.2
11/12/2015	36.2	9.4	45.6	5/06/2015	17.3	18.6	35.9
17/03/2015	35.7	0.8	36.5	20/05/2015	9.6	18.4	28.0
4/03/2015	35.6	0.3	35.9	30/08/2015	14.9	18.4	33.3
19/03/2015	34.5	7.2	41.7	5/09/2015	14.7	17.9	32.6
21/11/2015	34.5	1.6	36.1	25/05/2015	19.4	17.8	37.2
20/03/2015	33.7	8.6	42.3	11/07/2015	10.7	17.7	28.4
7/03/2015	33.6	5.9	39.5	28/07/2015	16.4	17.7	34.1
10/10/2015	33.1	4.7	37.8	2/06/2015	19.3	17.3	36.6
5/03/2015	33	6.3	39.3	5/07/2015	18.5	17.2	35.7
24/11/2015	33	0.0	33.0	2/08/2015	18.4	17.1	35.5
17/04/2015	32.8	0.8	33.6	1/07/2015	15.9	17.0	32.9

ND – No data

Table I-10: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 35b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	10.0	82.9				
26/11/2015	50.9	7.2	58.1				
10/03/2015	49.1	0.4	49.5	1/07/2015	11.1	17.4	28.5
15/12/2015	42.3	0.7	43.0	12/07/2015	4.9	14.8	19.7
12/12/2015	41.5	1.2	42.7	14/01/2015	8.2	14.3	22.5
7/10/2015	38.3	0.4	38.7	11/05/2015	15.2	14.0	29.2
9/03/2015	37.4	1.5	38.9	27/03/2015	22.6	13.6	36.2
11/12/2015	36.3	10.0	46.3	24/04/2015	8.8	13.3	22.1
4/03/2015	35.6	0.2	35.8	3/08/2015	9.0	12.3	21.3
9/02/2015	35.1	0.9	36.0	13/07/2015	4.6	12.2	16.8
17/10/2015	35.0	0.9	35.9	26/04/2015	8.4	11.5	19.9
7/03/2015	34.2	2.5	36.7	14/07/2015	4.8	11.3	16.1

Table I-11: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 67

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	7.6	80.5				
26/11/2015	50.9	11.9	62.8				
10/03/2015	49.1	0.5	49.6	14/01/2015	8.2	19.6	27.8
15/12/2015	42.3	0.7	43.0	12/07/2015	4.9	16.0	20.9
12/12/2015	41.5	1.5	43.0	4/08/2015	7.9	14.8	22.7
7/10/2015	38.3	0.3	38.6	25/01/2015	12.2	14.0	26.2
9/03/2015	37.4	1.8	39.2	11/12/2015	36.3	13.3	49.6
11/12/2015	36.3	13.3	49.6	1/07/2015	11.1	13.2	24.3
4/03/2015	35.6	0.3	35.9	26/04/2015	8.4	12.2	20.6
9/02/2015	35.1	1.2	36.3	18/08/2015	12.5	12.1	24.6
17/10/2015	35.0	0.9	35.9	11/05/2015	15.2	12.0	27.2
7/03/2015	34.2	2.4	36.6	26/11/2015	50.9	11.9	62.8

Table I-12: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 112

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	0.9	73.8				
26/11/2015	50.9	3.8	54.7				
10/03/2015	49.1	1.4	50.5	1/06/2015	11.2	16.4	27.6
15/12/2015	42.3	0.6	42.9	24/06/2015	19.0	15.2	34.2
12/12/2015	41.5	5.4	46.9	13/05/2015	16.3	15.0	31.3
7/10/2015	38.3	0.0	38.3	27/05/2015	13.7	14.2	27.9
9/03/2015	37.4	1.7	39.1	1/11/2015	17.1	14.0	31.1
11/12/2015	36.3	7.7	44.0	12/03/2015	31.8	13.8	45.6
4/03/2015	35.6	0.5	36.1	4/09/2015	11.2	12.4	23.6
9/02/2015	35.1	3.8	38.9	19/06/2015	9.1	11.6	20.7
17/10/2015	35.0	1.3	36.3	30/01/2015	15.7	11.4	27.1
7/03/2015	34.2	1.7	35.9	10/10/2015	27.0	11.3	38.3

Table I-13: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 118

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	0.3	73.2				
26/11/2015	50.9	2.1	53.0				
10/03/2015	49.1	1.4	50.5	1/06/2015	11.2	14.9	26.1
15/12/2015	42.3	0.5	42.8	27/05/2015	13.7	13.7	27.4
12/12/2015	41.5	6.0	47.5	24/06/2015	19.0	13.3	32.3
7/10/2015	38.3	0.0	38.3	13/05/2015	16.3	13.0	29.3
9/03/2015	37.4	1.6	39.0	1/11/2015	17.1	12.6	29.7
11/12/2015	36.3	4.9	41.2	12/03/2015	31.8	12.1	43.9
4/03/2015	35.6	0.5	36.1	10/10/2015	27.0	10.6	37.6
9/02/2015	35.1	3.6	38.7	4/09/2015	11.2	10.2	21.4
17/10/2015	35.0	1.0	36.0	19/06/2015	9.1	9.8	18.9
7/03/2015	34.2	1.5	35.7	5/04/2015	8.3	9.2	17.5

Table I-14: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 121

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	0.1	73.0				
26/11/2015	50.9	1.2	52.1				
10/03/2015	49.1	1.6	50.7	1/06/2015	11.2	15.0	26.2
15/12/2015	42.3	0.5	42.8	27/05/2015	13.7	14.0	27.7
12/12/2015	41.5	7.1	48.6	24/06/2015	19.0	13.1	32.1
7/10/2015	38.3	0.0	38.3	13/05/2015	16.3	12.6	28.9
9/03/2015	37.4	1.8	39.2	1/11/2015	17.1	12.6	29.7
11/12/2015	36.3	3.6	39.9	12/03/2015	31.8	11.2	43.0
4/03/2015	35.6	0.5	36.1	10/10/2015	27.0	10.9	37.9
9/02/2015	35.1	3.8	38.9	4/09/2015	11.2	9.4	20.6
17/10/2015	35.0	0.9	35.9	19/06/2015	9.1	9.2	18.3
7/03/2015	34.2	1.4	35.6	26/05/2015	13.0	9.1	22.1

Table I-15: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 35b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	10.8	83.7				
26/11/2015	50.9	7.8	58.7				
10/03/2015	49.1	0.3	49.4	12/07/2015	4.9	17.5	22.4
15/12/2015	42.3	0.6	42.9	24/04/2015	8.8	15.8	24.6
12/12/2015	41.5	0.9	42.4	8/04/2015	8.4	14.8	23.2
7/10/2015	38.3	1.2	39.5	13/07/2015	4.6	14.8	19.4
9/03/2015	37.4	2.0	39.4	1/07/2015	11.1	14.4	25.5
11/12/2015	36.3	10.6	46.9	27/03/2015	22.6	12.5	35.1
4/03/2015	35.6	0.3	35.9	28/05/2015	12.2	12.1	24.3
9/02/2015	35.1	0.4	35.5	11/05/2015	15.2	11.9	27.1
17/10/2015	35.0	0.8	35.8	31/05/2015	5.1	11.4	16.5
7/03/2015	34.2	3.4	37.6	30/05/2015	9.8	11.2	21.0

Table I-16: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 67

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	11.2	84.1				
26/11/2015	50.9	10.7	61.6				
10/03/2015	49.1	0.4	49.5	12/07/2015	4.9	21.8	26.7
15/12/2015	42.3	0.7	43.0	1/07/2015	11.1	17.4	28.5
12/12/2015	41.5	1.0	42.5	13/07/2015	4.6	16.3	20.9
7/10/2015	38.3	1.3	39.6	24/04/2015	8.8	16.1	24.9
9/03/2015	37.4	1.8	39.2	8/04/2015	8.4	15.6	24.0
11/12/2015	36.3	14.2	50.5	11/05/2015	15.2	15.0	30.2
4/03/2015	35.6	0.3	35.9	27/03/2015	22.6	14.6	37.2
9/02/2015	35.1	0.5	35.6	11/12/2015	36.3	14.2	50.5
17/10/2015	35.0	0.9	35.9	14/01/2015	8.2	14.2	22.4
7/03/2015	34.2	4.0	38.2	28/05/2015	12.2	14.0	26.2

Table I-17: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 112

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	13.9	86.8				
26/11/2015	50.9	18.0	68.9				
10/03/2015	49.1	0.8	49.9	12/07/2015	4.9	35.0	39.9
15/12/2015	42.3	0.9	43.2	14/01/2015	8.2	28.2	36.4
12/12/2015	41.5	1.6	43.1	13/07/2015	4.6	26.2	30.8
7/10/2015	38.3	2.0	40.3	11/12/2015	36.3	25.8	62.1
9/03/2015	37.4	3.4	40.8	28/05/2015	12.2	24.6	36.8
11/12/2015	36.3	25.8	62.1	1/07/2015	11.1	24.0	35.1
4/03/2015	35.6	0.4	36.0	11/05/2015	15.2	23.0	38.2
9/02/2015	35.1	1.1	36.2	6/04/2015	7.7	21.4	29.1
17/10/2015	35.0	1.2	36.2	8/04/2015	8.4	20.7	29.1
7/03/2015	34.2	6.5	40.7	25/01/2015	12.2	20.6	32.8
19/03/2015	34.2	12.3	46.5	23/04/2015	7.5	19.9	27.4
11/03/2015	34.0	0.9	34.9	24/04/2015	8.8	19.7	28.5
17/04/2015	33.4	1.7	35.1	27/05/2015	13.7	19.2	32.9
8/03/2015	33.3	2.7	36.0	11/07/2015	6.4	19.0	25.4
17/03/2015	33.2	0.8	34.0	15/07/2015	8.4	18.1	26.5
30/11/2015	32.5	6.2	38.7	26/11/2015	50.9	18.0	68.9
14/12/2015	32.1	5.8	37.9	26/04/2015	8.4	17.8	26.2

Table I-18: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 118

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	12.6	85.5				
26/11/2015	50.9	15.5	66.4				
10/03/2015	49.1	0.8	49.9	12/07/2015	4.9	34.7	39.6
15/12/2015	42.3	0.8	43.1	14/01/2015	8.2	25.9	34.1
12/12/2015	41.5	1.8	43.3	13/07/2015	4.6	25.1	29.7
7/10/2015	38.3	1.5	39.8	11/12/2015	36.3	24.0	60.3
9/03/2015	37.4	2.9	40.3	11/05/2015	15.2	23.6	38.8
11/12/2015	36.3	24.0	60.3	1/07/2015	11.1	22.3	33.4
4/03/2015	35.6	0.4	36.0	28/05/2015	12.2	20.6	32.8
9/02/2015	35.1	1.0	36.1	25/01/2015	12.2	19.9	32.1
17/10/2015	35.0	1.1	36.1	23/04/2015	7.5	19.0	26.5
7/03/2015	34.2	5.5	39.7	8/04/2015	8.4	18.6	27.0
19/03/2015	34.2	11.2	45.4	6/04/2015	7.7	18.3	26.0
11/03/2015	34.0	0.9	34.9	27/05/2015	13.7	17.7	31.4
17/04/2015	33.4	1.8	35.2	11/07/2015	6.4	17.1	23.5
8/03/2015	33.3	2.5	35.8	3/08/2015	9.0	16.8	25.8
17/03/2015	33.2	0.7	33.9	15/07/2015	8.4	16.6	25.0

Table I-19: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 121

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	12.1	85.0				
26/11/2015	50.9	15.3	66.2				
10/03/2015	49.1	0.9	50.0	12/07/2015	4.9	31.4	36.3
15/12/2015	42.3	0.8	43.1	14/01/2015	8.2	26.6	34.8
12/12/2015	41.5	2.0	43.5	13/07/2015	4.6	24.2	28.8
7/10/2015	38.3	1.4	39.7	11/12/2015	36.3	23.8	60.1
9/03/2015	37.4	2.4	39.8	11/05/2015	15.2	23.2	38.4
11/12/2015	36.3	23.8	60.1	1/07/2015	11.1	22.6	33.7
4/03/2015	35.6	0.4	36.0	25/01/2015	12.2	19.7	31.9
9/02/2015	35.1	1.1	36.2	23/04/2015	7.5	19.3	26.8
17/10/2015	35.0	1.1	36.1	28/05/2015	12.2	19.2	31.4
7/03/2015	34.2	5.2	39.4	8/04/2015	8.4	18.0	26.4
19/03/2015	34.2	11.2	45.4	27/05/2015	13.7	17.9	31.6
11/03/2015	34.0	0.9	34.9	11/07/2015	6.4	17.1	23.5
17/04/2015	33.4	1.9	35.3	4/09/2015	11.2	17.1	28.3
8/03/2015	33.3	2.6	35.9	6/04/2015	7.7	17.1	24.8
17/03/2015	33.2	0.8	34.0	19/06/2015	9.1	16.7	25.8

Table I-20: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 35b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	12.0	84.9				
26/11/2015	50.9	7.2	58.1				
10/03/2015	49.1	0.3	49.4	24/04/2015	8.8	20.2	29.0
15/12/2015	42.3	0.6	42.9	1/07/2015	11.1	19.0	30.1
12/12/2015	41.5	0.9	42.4	28/05/2015	12.2	17.9	30.1
7/10/2015	38.3	2.1	40.4	12/07/2015	4.9	15.7	20.6
9/03/2015	37.4	1.8	39.2	5/06/2015	10.0	15.0	25.0
11/12/2015	36.3	12.7	49.0	25/08/2015	4.6	14.6	19.2
4/03/2015	35.6	0.3	35.9	30/05/2015	9.8	14.6	24.4
9/02/2015	35.1	0.5	35.6	31/05/2015	5.1	14.5	19.6
17/10/2015	35.0	0.9	35.9	27/03/2015	22.6	14.3	36.9
7/03/2015	34.2	5.8	40.0	7/06/2015	11.0	14.0	25.0

Table I-21: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 67

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	12.8	85.7				
26/11/2015	50.9	9.4	60.3				
10/03/2015	49.1	0.4	49.5	24/04/2015	8.8	22.8	31.6
15/12/2015	42.3	0.6	42.9	1/07/2015	11.1	21.9	33.0
12/12/2015	41.5	1.2	42.7	28/05/2015	12.2	21.2	33.4
7/10/2015	38.3	2.6	40.9	12/07/2015	4.9	18.7	23.6
9/03/2015	37.4	2.1	39.5	5/06/2015	10.0	18.1	28.1
11/12/2015	36.3	15.6	51.9	6/04/2015	7.7	16.4	24.1
4/03/2015	35.6	0.4	36.0	25/08/2015	4.6	16.2	20.8
9/02/2015	35.1	0.7	35.8	31/05/2015	5.1	16.2	21.3
17/10/2015	35.0	1.0	36.0	19/06/2015	9.1	16.0	25.1
7/03/2015	34.2	7.1	41.3	7/06/2015	11.0	15.8	26.8
19/03/2015	34.2	8.3	42.5	11/12/2015	36.3	15.6	51.9

Table I-22: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 112

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	16.5	89.4				
26/11/2015	50.9	12.0	62.9				
10/03/2015	49.1	0.8	49.9	28/05/2015	12.2	42.9	55.1
15/12/2015	42.3	0.7	43.0	1/07/2015	11.1	40.2	51.3
12/12/2015	41.5	2.3	43.8	24/04/2015	8.8	36.7	45.5
7/10/2015	38.3	4.1	42.4	6/04/2015	7.7	36.0	43.7
9/03/2015	37.4	5.8	43.2	14/01/2015	8.2	32.1	40.3
11/12/2015	36.3	29.7	66.0	27/05/2015	13.7	31.3	45.0
4/03/2015	35.6	0.5	36.1	11/07/2015	6.4	30.3	36.7
9/02/2015	35.1	1.5	36.6	5/06/2015	10.0	30.3	40.3
17/10/2015	35.0	1.3	36.3	12/07/2015	4.9	30.0	34.9
7/03/2015	34.2	13.6	47.8	11/12/2015	36.3	29.7	66.0
19/03/2015	34.2	18.3	52.5	15/07/2015	8.4	29.6	38.0
11/03/2015	34.0	0.8	34.8	19/06/2015	9.1	29.4	38.5
17/04/2015	33.4	2.4	35.8	23/07/2015	13.5	28.9	42.4
8/03/2015	33.3	2.2	35.5	23/04/2015	7.5	28.2	35.7
17/03/2015	33.2	0.8	34.0	31/05/2015	5.1	27.5	32.6
30/11/2015	32.5	5.6	38.1	5/07/2015	12.8	26.6	39.4
14/12/2015	32.1	6.0	38.1	24/06/2015	19.0	26.6	45.6
12/03/2015	31.8	13.4	45.2	23/06/2015	10.3	25.9	36.2
20/03/2015	31.8	16.6	48.4	16/07/2015	6.0	25.5	31.5
21/11/2015	31.1	0.0	31.1	4/09/2015	11.2	25.3	36.5
8/12/2015	31.1	1.2	32.3	20/06/2015	9.6	24.8	34.4
29/03/2015	31.0	1.1	32.1	27/03/2015	22.6	24.2	46.8
22/07/2015	29.5	12.3	41.8	22/05/2015	7.0	24.0	31.0
5/03/2015	29.4	9.4	38.8	4/10/2015	20.9	23.9	44.8
24/11/2015	29.2	0.0	29.2	25/01/2015	12.2	23.7	35.9
18/03/2015	28.9	8.4	37.3	7/06/2015	11.0	22.9	33.9
15/04/2015	28.9	5.6	34.5	22/04/2015	4.6	22.8	27.4
13/10/2015	28.6	1.7	30.3	5/09/2015	12.7	22.4	35.1
13/12/2015	28.1	0.2	28.3	8/09/2015	8.1	22.3	30.4
10/10/2015	27.0	14.7	41.7	27/07/2015	8.6	22.1	30.7

Table I-23: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 118

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	13.0	85.9				
26/11/2015	50.9	10.3	61.2				
10/03/2015	49.1	0.8	49.9	1/07/2015	11.1	39.1	50.2
15/12/2015	42.3	0.6	42.9	28/05/2015	12.2	35.6	47.8
12/12/2015	41.5	2.6	44.1	14/01/2015	8.2	33.2	41.4
7/10/2015	38.3	2.5	40.8	6/04/2015	7.7	32.6	40.3
9/03/2015	37.4	5.4	42.8	24/04/2015	8.8	29.7	38.5
11/12/2015	36.3	27.9	64.2	23/04/2015	7.5	29.6	37.1
4/03/2015	35.6	0.5	36.1	27/05/2015	13.7	29.4	43.1
9/02/2015	35.1	1.4	36.5	15/07/2015	8.4	29.0	37.4
17/10/2015	35.0	1.2	36.2	19/06/2015	9.1	28.8	37.9
7/03/2015	34.2	11.3	45.5	11/07/2015	6.4	28.6	35.0
19/03/2015	34.2	17.1	51.3	11/12/2015	36.3	27.9	64.2
11/03/2015	34.0	0.8	34.8	23/07/2015	13.5	27.4	40.9
17/04/2015	33.4	2.4	35.8	16/07/2015	6.0	26.6	32.6
8/03/2015	33.3	2.1	35.4	4/09/2015	11.2	26.3	37.5
17/03/2015	33.2	0.8	34.0	31/05/2015	5.1	25.9	31.0
30/11/2015	32.5	5.3	37.8	24/06/2015	19.0	25.4	44.4
14/12/2015	32.1	5.9	38.0	12/07/2015	4.9	25.2	30.1
12/03/2015	31.8	14.1	45.9	5/06/2015	10.0	25.0	35.0
20/03/2015	31.8	13.6	45.4	5/07/2015	12.8	24.0	36.8
21/11/2015	31.1	0.0	31.1	25/01/2015	12.2	23.8	36.0
8/12/2015	31.1	1.2	32.3	22/05/2015	7.0	23.6	30.6
29/03/2015	31.0	1.1	32.1	20/06/2015	9.6	22.4	32.0
22/07/2015	29.5	12.0	41.5	27/03/2015	22.6	22.1	44.7
5/03/2015	29.4	9.0	38.4	22/04/2015	4.6	22.0	26.6
24/11/2015	29.2	0.0	29.2	4/10/2015	20.9	21.4	42.3
18/03/2015	28.9	6.4	35.3	23/06/2015	10.3	20.6	30.9

Table I-24: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 121

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	72.9	11.6	84.5				
26/11/2015	50.9	9.3	60.2				
10/03/2015	49.1	0.9	50.0	1/07/2015	11.1	40.7	51.8
15/12/2015	42.3	0.6	42.9	14/01/2015	8.2	34.3	42.5
12/12/2015	41.5	2.9	44.4	28/05/2015	12.2	33.0	45.2
7/10/2015	38.3	1.6	39.9	23/04/2015	7.5	32.1	39.6
9/03/2015	37.4	4.6	42.0	6/04/2015	7.7	31.4	39.1
11/12/2015	36.3	27.9	64.2	27/05/2015	13.7	30.1	43.8
4/03/2015	35.6	0.5	36.1	15/07/2015	8.4	30.1	38.5
9/02/2015	35.1	1.4	36.5	19/06/2015	9.1	29.8	38.9
17/10/2015	35.0	1.2	36.2	11/07/2015	6.4	29.7	36.1
7/03/2015	34.2	10.7	44.9	4/09/2015	11.2	29.1	40.3
19/03/2015	34.2	17.5	51.7	23/07/2015	13.5	28.7	42.2
11/03/2015	34.0	0.8	34.8	16/07/2015	6.0	28.6	34.6
17/04/2015	33.4	2.6	36.0	11/12/2015	36.3	27.9	64.2
8/03/2015	33.3	2.2	35.5	31/05/2015	5.1	26.1	31.2
17/03/2015	33.2	0.8	34.0	24/06/2015	19.0	26.1	45.1
30/11/2015	32.5	5.5	38.0	24/04/2015	8.8	25.6	34.4
14/12/2015	32.1	5.8	37.9	22/05/2015	7.0	24.5	31.5
12/03/2015	31.8	15.1	46.9	25/01/2015	12.2	24.2	36.4
20/03/2015	31.8	12.3	44.1	12/07/2015	4.9	23.7	28.6
21/11/2015	31.1	0.0	31.1	5/07/2015	12.8	23.1	35.9
8/12/2015	31.1	1.3	32.4	5/06/2015	10.0	22.7	32.7
29/03/2015	31.0	1.1	32.1	27/03/2015	22.6	22.4	45.0
22/07/2015	29.5	12.8	42.3	20/06/2015	9.6	22.3	31.9
5/03/2015	29.4	9.5	38.9	22/04/2015	4.6	22.2	26.8
24/11/2015	29.2	0.0	29.2	4/10/2015	20.9	20.3	41.2

Table I-25: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 136

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorp. the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorp. the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.0	64.8				
10/03/2015	46.5	2.4	48.9	23/05/2015	12.6	12.8	25.4
26/11/2015	45.1	0.1	45.2	22/07/2015	29.2	10.5	39.7
7/10/2015	41.5	0.0	41.5	27/02/2015	19.8	9.1	28.9
15/12/2015	41.3	0.2	41.5	18/09/2015	15.0	8.2	23.2
12/12/2015	39.7	5.4	45.1	19/09/2015	13.5	7.9	21.4
9/02/2015	33.2	3.0	36.2	16/09/2015	17.3	7.8	25.1
11/03/2015	32.6	1.5	34.1	25/06/2015	8.8	7.7	16.5
9/03/2015	32.3	1.9	34.2	16/06/2015	12.9	7.7	20.6
21/11/2015	31.8	0.0	31.8	31/10/2015	19.7	7.6	27.3
4/03/2015	31.0	0.4	31.4	10/01/2015	19.2	7.4	26.6

Table I-26: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 139

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.0	64.8				
10/03/2015	46.5	1.7	48.2	23/05/2015	12.6	9.5	22.1
26/11/2015	45.1	0.1	45.2	22/07/2015	29.2	7.2	36.4
7/10/2015	41.5	0.0	41.5	27/02/2015	19.8	6.8	26.6
15/12/2015	41.3	0.1	41.4	25/06/2015	8.8	6.1	14.9
12/12/2015	39.7	4.2	43.9	18/09/2015	15.0	5.9	20.9
9/02/2015	33.2	1.9	35.1	21/04/2015	2.5	5.8	8.3
11/03/2015	32.6	1.1	33.7	19/09/2015	13.5	5.7	19.2
9/03/2015	32.3	1.3	33.6	16/09/2015	17.3	5.5	22.8
21/11/2015	31.8	0.0	31.8	16/06/2015	12.9	5.4	18.3
4/03/2015	31.0	0.4	31.4	3/07/2015	17.2	5.3	22.5

Table I-27: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 143

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.0	64.8				
10/03/2015	46.5	3.0	49.5	23/05/2015	12.6	6.7	19.3
26/11/2015	45.1	0.1	45.2	27/02/2015	19.8	6.4	26.2
7/10/2015	41.5	0.0	41.5	30/03/2015	22.9	6.1	29.0
15/12/2015	41.3	0.1	41.4	19/09/2015	13.5	5.3	18.8
12/12/2015	39.7	0.7	40.4	22/07/2015	29.2	4.8	34.0
9/02/2015	33.2	1.2	34.4	3/07/2015	17.2	4.8	22.0
11/03/2015	32.6	2.6	35.2	16/06/2015	12.9	4.8	17.7
9/03/2015	32.3	1.5	33.8	16/09/2015	17.3	4.5	21.8
21/11/2015	31.8	0.0	31.8	3/06/2015	12.4	4.1	16.5
4/03/2015	31.0	0.5	31.5	30/12/2015	13.7	4.1	17.8

Table I-28: Scenario 1 (PM_{10} 24-hr average concentration) – Sensitive receptor location 147

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.0	64.8				
10/03/2015	46.5	4.6	51.1	30/03/2015	22.9	7.3	30.2
26/11/2015	45.1	0.1	45.2	27/02/2015	19.8	6.7	26.5
7/10/2015	41.5	0.0	41.5	19/09/2015	13.5	6.2	19.7
15/12/2015	41.3	0.3	41.6	31/10/2015	19.7	6.2	25.9
12/12/2015	39.7	0.7	40.4	23/05/2015	12.6	5.7	18.3
9/02/2015	33.2	1.5	34.7	16/06/2015	12.9	5.4	18.3
11/03/2015	32.6	3.2	35.8	16/05/2015	13.5	5.1	18.6
9/03/2015	32.3	2.2	34.5	30/12/2015	13.7	5.1	18.8
21/11/2015	31.8	0.0	31.8	3/06/2015	12.4	5.1	17.5
4/03/2015	31.0	0.8	31.8	3/07/2015	17.2	5.0	22.2

Table I-29: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 136

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.5	65.3				
10/03/2015	46.5	0.9	47.4	27/05/2015	12.1	13.7	25.8
26/11/2015	45.1	0.9	46.0	1/06/2015	6.2	12.8	19.0
7/10/2015	41.5	0.0	41.5	12/03/2015	29.9	11.3	41.2
15/12/2015	41.3	0.2	41.5	1/11/2015	16.4	11.2	27.6
12/12/2015	39.7	8.4	48.1	13/05/2015	9.4	11.1	20.5
9/02/2015	33.2	0.8	34.0	19/03/2015	23.5	9.5	33.0
11/03/2015	32.6	0.8	33.4	7/11/2015	12.2	9.1	21.3
9/03/2015	32.3	0.8	33.1	4/09/2015	9.9	8.8	18.7
21/11/2015	31.8	0.0	31.8	5/04/2015	6.5	8.7	15.2
4/03/2015	31.0	0.6	31.6	12/12/2015	39.7	8.4	48.1

Table I-30: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 139

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.0	64.8				
10/03/2015	46.5	0.8	47.3	27/05/2015	12.1	11.6	23.7
26/11/2015	45.1	0.2	45.3	12/03/2015	29.9	8.3	38.2
7/10/2015	41.5	0.0	41.5	13/05/2015	9.4	8.2	17.6
15/12/2015	41.3	0.2	41.5	1/11/2015	16.4	7.5	23.9
12/12/2015	39.7	6.5	46.2	19/03/2015	23.5	7.1	30.6
9/02/2015	33.2	0.6	33.8	25/06/2015	8.8	6.9	15.7
11/03/2015	32.6	0.6	33.2	31/10/2015	19.7	6.7	26.4
9/03/2015	32.3	0.7	33.0	12/12/2015	39.7	6.5	46.2
21/11/2015	31.8	0.0	31.8	1/06/2015	6.2	6.4	12.6
4/03/2015	31.0	0.6	31.6	19/06/2015	7.3	5.8	13.1

Table I-31: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 143

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.0	64.8				
10/03/2015	46.5	2.0	48.5	23/05/2015	12.6	10.2	22.8
26/11/2015	45.1	0.1	45.2	27/02/2015	19.8	9.5	29.3
7/10/2015	41.5	0.1	41.6	22/07/2015	29.2	9.5	38.7
15/12/2015	41.3	0.2	41.5	16/06/2015	12.9	7.9	20.8
12/12/2015	39.7	1.5	41.2	19/09/2015	13.5	7.9	21.4
9/02/2015	33.2	1.5	34.7	3/07/2015	17.2	7.7	24.9
11/03/2015	32.6	2.1	34.7	26/05/2015	11.1	6.7	17.8
9/03/2015	32.3	1.4	33.7	10/01/2015	19.2	6.4	25.6
21/11/2015	31.8	0.0	31.8	16/09/2015	17.3	6.4	23.7
4/03/2015	31.0	0.6	31.6	31/10/2015	19.7	6.2	25.9

Table I-32: Scenario 2 (PM_{10} 24-hr average concentration) – Sensitive receptor location 147

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.0	64.8				
10/03/2015	46.5	6.1	52.6	22/07/2015	29.2	18.2	47.4
26/11/2015	45.1	0.2	45.3	23/05/2015	12.6	14.8	27.4
7/10/2015	41.5	0.2	41.7	16/06/2015	12.9	13.8	26.7
15/12/2015	41.3	0.3	41.6	27/02/2015	19.8	13.5	33.3
12/12/2015	39.7	1.1	40.8	19/09/2015	13.5	12.9	26.4
9/02/2015	33.2	4.6	37.8	31/10/2015	19.7	12.6	32.3
11/03/2015	32.6	7.0	39.6	30/03/2015	22.9	12.0	34.9
9/03/2015	32.3	3.7	36.0	10/01/2015	19.2	11.1	30.3
21/11/2015	31.8	0.0	31.8	8/07/2015	13.3	10.4	23.7
4/03/2015	31.0	1.1	32.1	16/09/2015	17.3	10.2	27.5

Table I-33: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 136

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.2	65.0				
10/03/2015	46.5	1.0	47.5	1/06/2015	6.2	17.6	23.8
26/11/2015	45.1	0.8	45.9	5/04/2015	6.5	16.7	23.2
7/10/2015	41.5	0.0	41.5	4/09/2015	9.9	15.5	25.4
15/12/2015	41.3	0.2	41.5	7/11/2015	12.2	15.3	27.5
12/12/2015	39.7	10.6	50.3	1/11/2015	16.4	15.0	31.4
9/02/2015	33.2	1.0	34.2	19/06/2015	7.3	14.4	21.7
11/03/2015	32.6	0.8	33.4	12/03/2015	29.9	14.3	44.2
9/03/2015	32.3	1.0	33.3	9/06/2015	10.0	13.8	23.8
21/11/2015	31.8	0.0	31.8	19/03/2015	23.5	12.9	36.4
4/03/2015	31.0	0.6	31.6	27/05/2015	12.1	12.9	25.0

Table I-34: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 139

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.0	64.8				
10/03/2015	46.5	0.9	47.4	1/06/2015	6.2	12.4	18.6
26/11/2015	45.1	0.2	45.3	27/05/2015	12.1	12.0	24.1
7/10/2015	41.5	0.0	41.5	12/03/2015	29.9	11.6	41.5
15/12/2015	41.3	0.2	41.5	1/11/2015	16.4	11.3	27.7
12/12/2015	39.7	8.3	48.0	19/03/2015	23.5	10.7	34.2
9/02/2015	33.2	0.8	34.0	5/04/2015	6.5	10.5	17.0
11/03/2015	32.6	0.8	33.4	7/11/2015	12.2	10.4	22.6
9/03/2015	32.3	1.0	33.3	19/06/2015	7.3	10.2	17.5
21/11/2015	31.8	0.0	31.8	4/09/2015	9.9	9.8	19.7
4/03/2015	31.0	0.6	31.6	16/06/2015	12.9	9.4	22.3

Table I-35: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 143

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.0	64.8				
10/03/2015	46.5	2.8	49.3	16/06/2015	12.9	16.2	29.1
26/11/2015	45.1	0.1	45.2	27/02/2015	19.8	13.9	33.7
7/10/2015	41.5	0.1	41.6	23/05/2015	12.6	13.0	25.6
15/12/2015	41.3	0.2	41.5	3/07/2015	17.2	12.8	30.0
12/12/2015	39.7	4.4	44.1	22/07/2015	29.2	12.2	41.4
9/02/2015	33.2	1.8	35.0	9/01/2015	17.7	11.8	29.5
11/03/2015	32.6	2.4	35.0	19/09/2015	13.5	11.6	25.1
9/03/2015	32.3	2.0	34.3	31/10/2015	19.7	11.3	31.0
21/11/2015	31.8	0.0	31.8	25/06/2015	8.8	11.2	20.0
4/03/2015	31.0	0.7	31.7	18/09/2015	15.0	11.1	26.1

Table I-36: Scenario 3 (PM_{10} 24-hr average concentration) – Sensitive receptor location 147

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment (MPO Incorporating the Modification)	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment (MPO Incorporating the Modification	Total cumulative 24-hr average level
6/05/2015	64.8	0.0	64.8				
10/03/2015	46.5	8.5	55.0	23/05/2015	12.6	34.6	47.2
26/11/2015	45.1	0.2	45.3	22/07/2015	29.2	30.6	59.8
7/10/2015	41.5	0.2	41.7	16/06/2015	12.9	28.8	41.7
15/12/2015	41.3	0.3	41.6	19/09/2015	13.5	27.3	40.8
12/12/2015	39.7	1.2	40.9	27/02/2015	19.8	25.9	45.7
9/02/2015	33.2	6.2	39.4	31/10/2015	19.7	21.9	41.6
11/03/2015	32.6	9.7	42.3	10/01/2015	19.2	21.1	40.3
9/03/2015	32.3	5.1	37.4	4/01/2015	16.2	19.8	36.0
21/11/2015	31.8	0.0	31.8	8/07/2015	13.3	19.2	32.5
4/03/2015	31.0	1.0	32.0	26/05/2015	11.1	19.1	30.2
12/03/2015	29.9	1.3	31.2	18/09/2015	15.0	17.6	32.6

Appendix J

Assessment of Diesel Emissions

Approach to assessment of diesel emissions

The assessment of diesel emissions from the Mount Pleasant Operation incorporating the Modification is focused on the potential emissions of oxides of nitrogen (NO_X), generally assessed as NO_2, arising from this equipment.

The ambient air quality goals for CO are set at higher concentration levels than the NO_2 goals. Based on the NO_2 monitoring data which are low compared to the goals, and consideration of the typical mix of ambient pollutant levels and associated emissions of CO, the indication is that predictions of CO would be well below the air quality goals and do not require further consideration.

Emission estimation

Emissions from diesel powered equipment were estimated on the basis of manufacturer's data. It is noted that manufacturer's equipment performance specifications were typically categorised on the basis of the US EPA federal tier standards of emissions for diesel equipment (**Dieselnet**, **2017**).

Emissions for certain plant included non-methane-hydrocarbon (NMHC) and NO_x emissions as a single value. For the purpose of this assessment it has been conservatively assumed that the total emission (NHMC and NO_x) comprises NO_2.

The various types of diesel powered mining equipment operated at the Mount Pleasant Operation incorporating the Modification is outlined in **Table J-1**. For Scenario 1, the equipment are equivalent to Tier 2 and are assumed to be replaced/ retrofitted to be equivalent with Tier 4 equipment in Scenario 2 and 3. Plant hours of operation were based on assumed plant availability and utilisation rates for the specific equipment type, conservatively assuming that all operational plant operates at full power for 50 per cent of the time.

The emission rates used in the modelling are considered conservative and likely to overestimate actual emissions from mining equipment.

Table J-1: Summary of diesel powered equipment and associated emissions

Equipment type	Number of equipment			NO_X / NMHC + NO_X emissions standards	
	2018	2021	2025	Tier 2	Tier 4
Trucks – 789C	1	8	11	6.4	3.69
Trucks – 789C Coal	6	6	6	6.4	3.69
Trucks – EH4500	9	9	8	6.4	3.69
Excavators - 996	2	2	2	6.4	3.69
Excavators - EX3600	1	2	3	6.4	3.69
Dozers (CHPP) – D11T	2	2	2	6.4	3.69
Dozers – D10T	4	4	5	6.4	0.59
Wheel dozers – 854G	1	2	2	6.4	3.69
Loader – 994F	1	1	1	6.4	3.69
Graders – 24M	1	1	1	6.4	0.59
Graders – 16M	1	1	1	6.6	0.59
Water trucks – 777C	1	1	1	6.4	3.69
Water trucks – HD785	1	1	1	6.4	3.69
Blasthole drill – Reedrill SK-F	1	1	1	6.4	3.69
Blasthole drill – D75KS-AU	1	1	1	6.4	3.69
Blasthole drill – DP1100i	0	0	1	6.4	0.59
Topsoil operations - Excavator - 336	1	1	1	6.4	0.59
Topsoil operations - Truck – 793	2	2	2	6.4	3.69

Dispersion modelling

Dispersion modelling of the diesel powered equipment was conducted for each indicative mine plan year. Modelled sources were described as point sources and impacts due to the Mount Pleasant Operation incorporating the Modification were added to the ambient background level to assess potential impacts.

The NO_2 monitoring data presented in **Appendix B** shows that the maximum measured 1-hour average NO_2 background level at the Muswellbrook monitor during 2015 was 86.1µg/m^3. In lieu of any data for the site, per the Victorian EPA approach[2], the 70th percentile level of 49.2µg/m^3 obtained from the Muswellbrook data was used as a constant background level contributing to the total cumulative impact predictions. The annual average NO_2 background level at the Muswellbrook monitor during 2015 was 39.6µg/m^3.

It is noted that the background levels measured in Muswellbrook are likely to be higher than the levels for the majority of sensitive receptor locations because there are many densely positioned sources of NO_X in Muswellbrook, such as motor vehicles. The measured levels would also include some contribution of emissions arising from the existing mining operations and thus are considered to be even more conservative and likely to overestimate actual levels.

[2]The Victorian Government's State Environment Protection Policy (Air Quality Management), **SEPP (2001)** states at Part B, 3(b) *"Proponents required to include background data where no appropriate hourly background data exists must add the 70th percentile of one year's observed hourly concentrations as a constant value to the predicted maximum concentration from the model simulation. In cases where a 24-hour averaging time is used in the model, the background data must be based on 24-hour averages. ".*

The conversion of NO_X to NO_2 was estimated using an empirical equation for estimating the oxidation rate of NO in power plant plumes developed by **Janssen et al. (1988)**. This method is outlined in the Approved Methods **(NSW EPA, 2017)** and is used to calculate the ratio of NO_2 to NO_X as determined by the atmospheric conditions and distance from the maximum recorded level to the source.

The separation distance from the sources to the maximum predicted 1-hour and annual average ground-level concentrations was taken to be the nominal distance from the centroid of all NO_X sources to the nearest maximum affected sensitive receptor locations. Applying conservative "A" and "α" constant values, the ratio of NO_2 to NO_X at receptors due to the diesel powered equipment was calculated to be approximately 13%.

Modelling predictions

Figure J-1 to **Figure J-6** present isopleth diagrams of the predicted modelling results for the assessed 1-hour average and annual average NO_2 concentrations.

Table J-2 and **Table J-3** presents the model predictions at each of the privately-owned and mine-owned sensitive receptor locations for 1-hour average and annual average predictions, respectively.

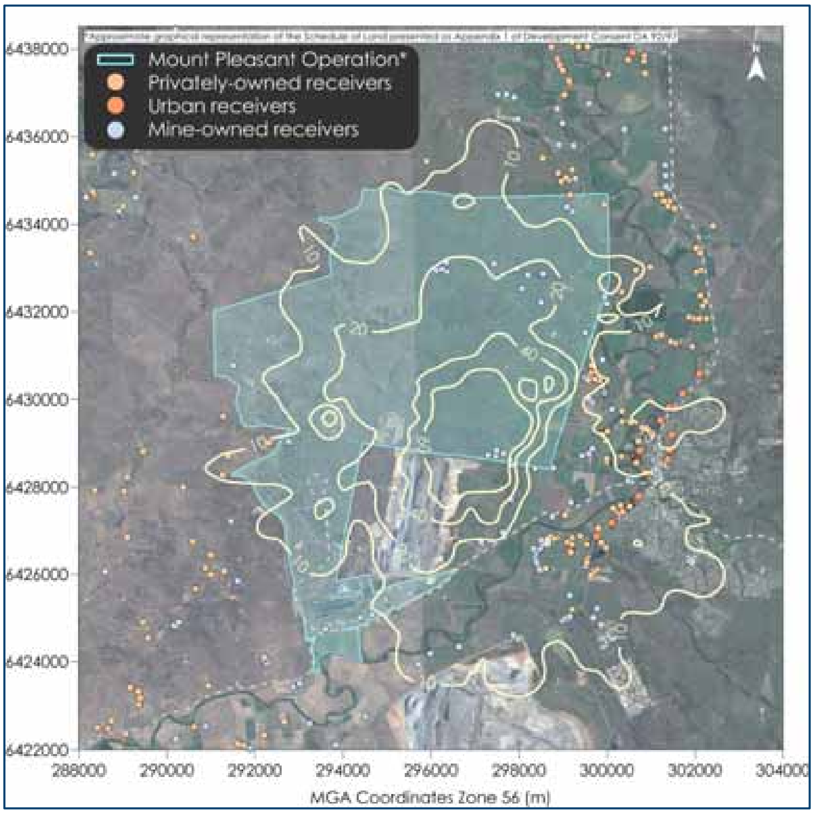

Figure J-1: Predicted 1-hour average NO_2 concentrations due to emissions from the Modification in Scenario 1 (µg/m³)

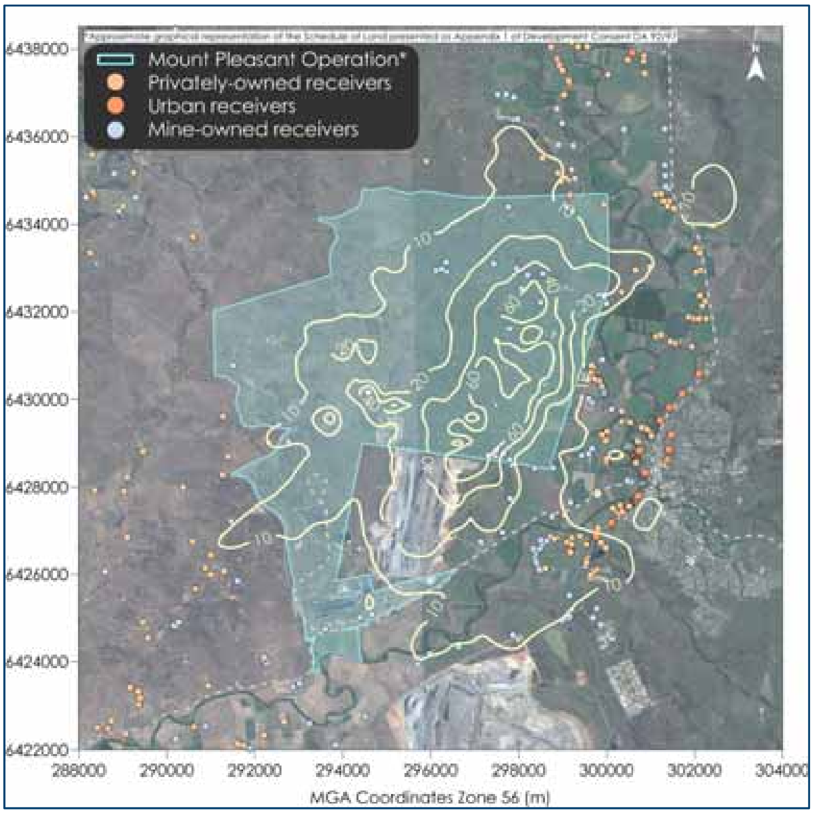

Figure J-2: Predicted 1-hour average NO_2 concentrations due to emissions from the Modification in Scenario 2 (µg/m³)

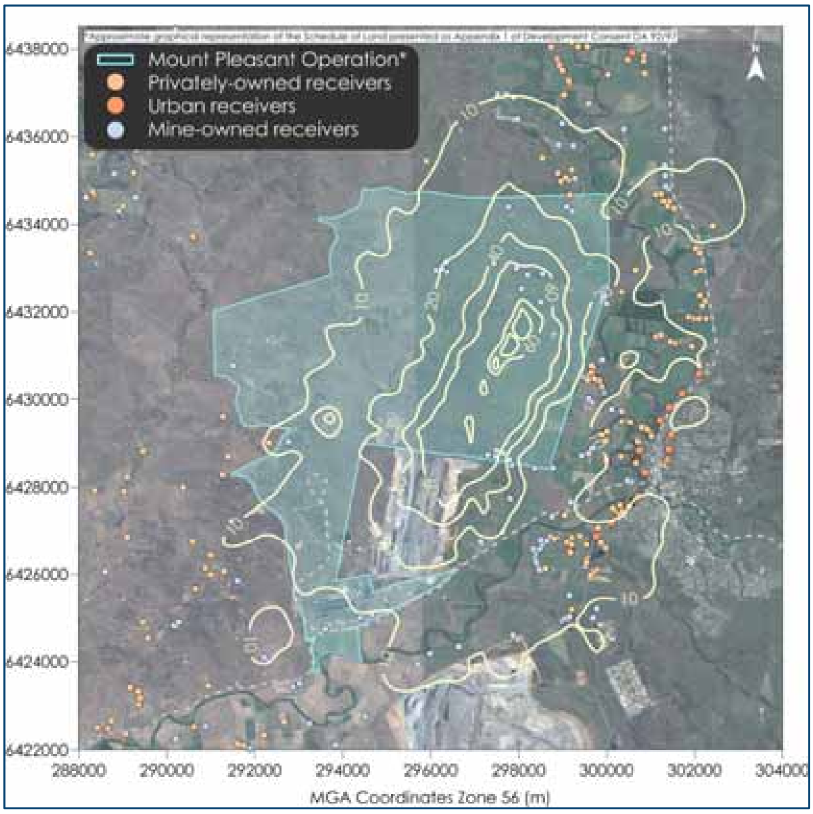

Figure J-3: Predicted 1-hour average NO_2 concentrations due to emissions from the Modification in Scenario 3 (µg/m³)

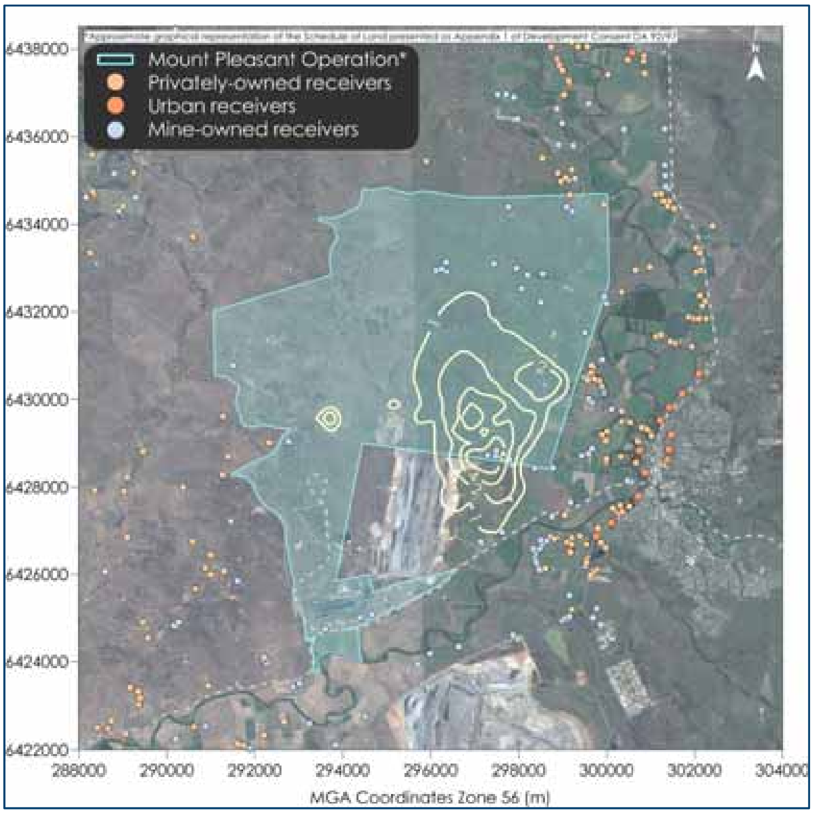

Figure J-4: Predicted annual average NO_2 concentrations due to emissions from the Modification in Scenario 1 (µg/m³)

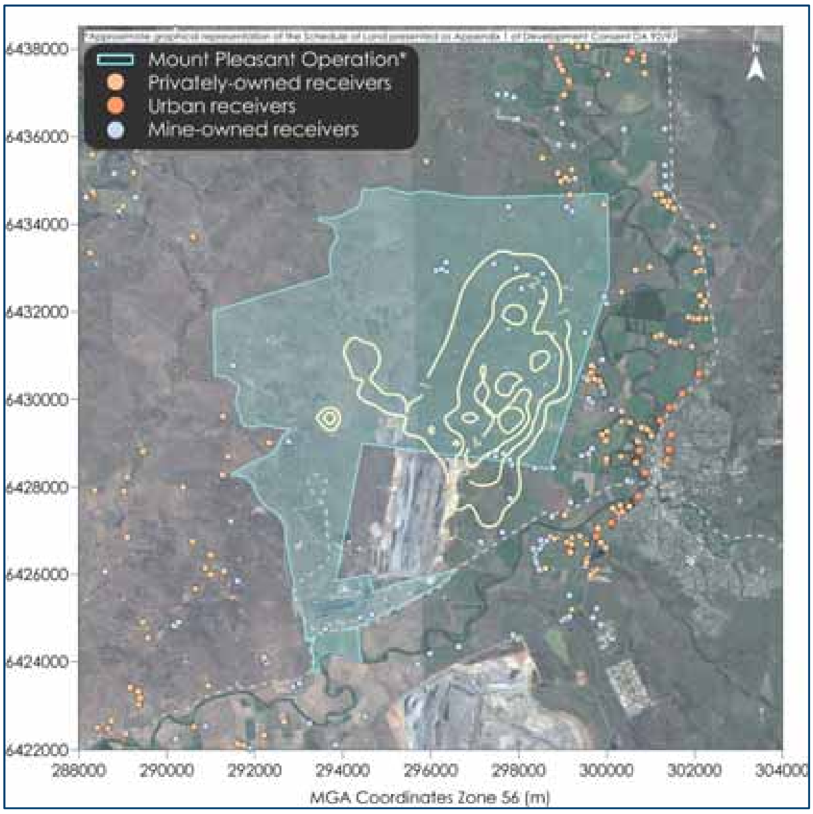

Figure J-5: Predicted annual average NO_2 concentrations due to emissions from the Modification in Scenario 2 (µg/m³)

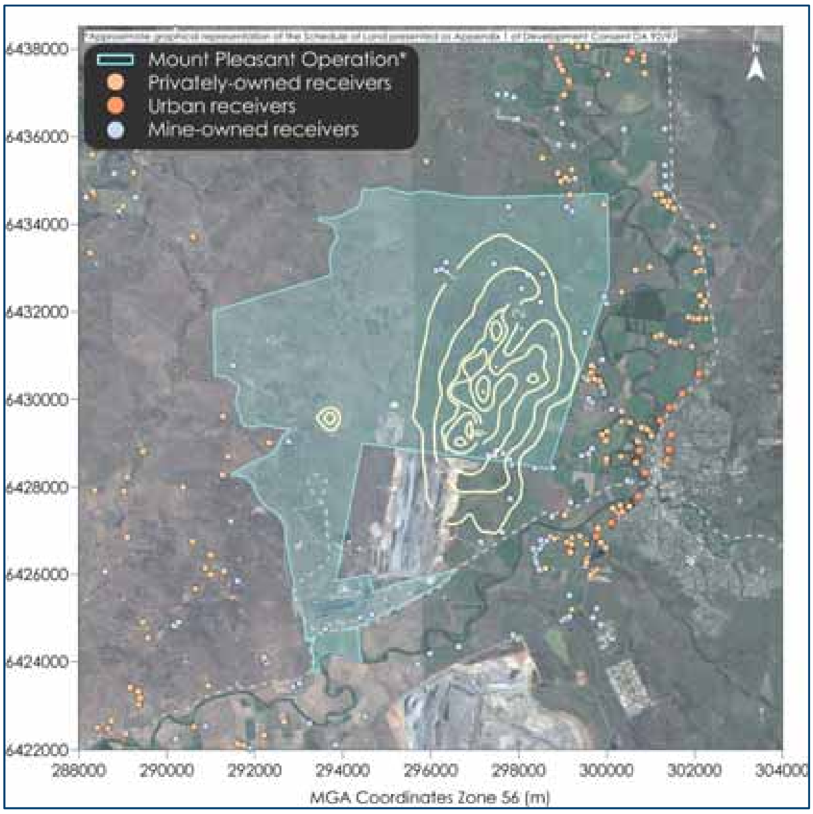

Figure J-6: Predicted annual average NO_2 concentrations due to emissions from the Modification in Scenario 3 (µg/m³)

Table J-2: Predicted 1-hour average NO_2 concentrations (µg/m³)

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 246µg/m³					
Privately-owned receptors						
4	12	9	11	61	59	60
6	16	14	18	65	64	67
19	17	11	12	66	61	61
20	20	12	14	69	61	63
21	20	12	14	69	61	63
23	12	10	11	61	59	60
35	11	10	10	60	59	59
35b	11	10	10	60	59	59
43	11	11	11	60	60	60
44	11	7	8	60	56	57
45	12	5	7	61	54	56
47	4	6	6	53	55	55
67	9	9	9	58	58	58
68	10	9	9	59	58	58
74	8	9	9	57	58	58
77	9	7	8	59	56	57
79	10	7	8	59	57	57
80	10	7	8	59	56	57
82	10	7	7	59	56	57
83	10	7	7	60	56	57
83b	10	7	8	59	56	57
84	10	7	8	59	56	57
84b	6	3	4	55	53	54
86	9	7	8	58	56	58
86b	6	7	9	55	56	58
96	11	7	12	60	56	62
101	11	7	13	60	56	62
102	11	7	13	60	56	62
108	11	7	13	60	57	62
112	11	7	13	61	57	63
118	9	8	14	59	57	63
120	8	8	14	58	57	63
308	9	8	14	58	57	64
120c	9	8	14	58	57	63
121	9	8	15	58	57	64
136	14	15	14	63	64	63
139	11	13	12	61	62	62
140	8	10	9	58	59	58
205	6	8	12	56	57	61
140c	6	8	11	55	57	61
143	5	7	10	55	56	59
161	6	9	14	55	58	63
153	9	7	9	58	56	59
154	7	10	17	56	60	66
156	7	11	16	56	60	65
267	2	2	2	51	51	51
157	6	9	14	56	59	63
266	2	2	2	51	51	51
159	6	8	13	55	57	62
169	5	7	10	54	56	59
171	5	7	8	54	56	57
172	4	6	8	54	55	57
310	4	6	8	54	55	57
173	4	6	7	53	55	56

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 246µg/m³					
174	4	6	7	53	55	56
175	4	6	7	53	55	56
176	4	6	7	54	55	56
177	4	6	7	53	55	56
178	4	5	6	53	54	55
179	4	5	6	53	54	55
180	4	5	6	53	54	55
180b	4	5	6	53	54	55
180c	3	4	5	53	53	54
181	3	4	4	53	53	54
183	3	4	5	52	53	54
181c	4	5	6	53	54	55
182	3	3	4	52	53	53
182b	3	3	4	52	53	53
189	6	8	14	55	57	63
190	6	8	14	55	57	64
191	7	7	13	56	57	62
192	7	7	14	56	56	63
193	6	9	12	56	58	61
311	6	8	13	56	57	62
193c	5	9	11	55	58	61
194	7	8	9	56	58	58
195	8	6	7	58	55	56
196	6	7	8	55	56	58
197	7	6	9	57	55	58
195d	6	7	9	55	56	58
195e	9	5	7	58	55	56
198	6	7	9	55	56	59
199	6	7	10	55	56	59
200	6	7	9	55	56	59
202	7	8	11	56	57	60
204	6	8	11	55	57	60
203	7	8	11	56	57	60
206	11	9	11	61	59	60
207	13	11	12	62	60	61
207b	14	12	14	63	61	63
208	16	11	12	65	60	61
315	15	11	12	65	60	61
212	16	12	15	66	61	64
212b	16	12	15	65	61	64
212c	16	12	14	65	61	64
213	15	12	13	64	62	62
214	15	12	13	64	61	62
215	15	12	13	64	61	62
216	15	12	13	64	61	62
217	15	12	13	64	61	62
218	15	12	12	65	61	62
219	16	12	12	65	61	62
220	16	12	12	65	61	62
221	16	12	12	65	61	62
222	16	12	12	65	61	61
223	16	12	12	66	61	61
224	17	12	12	66	61	61
225	15	12	13	64	61	62
249	4	5	7	54	54	56
252	5	3	4	54	53	53

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 246µg/m³					
252b	5	3	4	54	52	54
257	9	7	6	58	56	56
258a	9	9	9	58	58	58
258b	7	7	7	56	56	56
259	8	8	8	57	57	57
260	8	7	7	58	56	56
261	8	6	6	57	55	55
271	3	2	3	52	51	52
272	6	3	4	55	53	53
272b	6	3	4	55	53	53
273	3	3	3	52	52	52
280	17	11	14	66	61	63
281	16	11	14	65	60	63
282	16	11	12	65	61	62
283	16	11	13	65	61	62
285	11	9	9	60	59	59
285b	10	9	8	59	58	58
285c	10	9	8	59	58	57
286	10	10	10	60	59	59
291	14	11	14	63	60	63
286c	13	11	13	62	60	62
286d	9	9	7	58	58	56
287	12	10	10	61	59	59
288	12	10	10	61	59	59
288b	12	10	10	61	59	59
289	9	10	8	58	59	58
292	3	3	4	52	53	53
298	4	4	4	53	53	53
300	3	3	4	53	53	53
296a	4	4	4	53	53	53
296b	4	4	4	53	53	53
302a	3	3	3	52	52	53
302b	3	3	3	52	52	53
302c	3	3	3	52	52	53
305	15	12	13	64	62	62
401	7	3	4	57	52	54
402	7	3	5	56	52	54
407	3	3	3	52	52	53
413a	2	3	2	51	52	51
413b	2	3	2	51	52	51
415	2	2	1	51	51	51
416	2	2	2	51	51	51
417	2	2	2	51	51	51
418	2	1	2	51	51	51
419	2	2	1	51	52	51
421	3	2	2	52	52	51
422a	4	6	7	53	55	56
422b	4	6	7	53	55	56
434	3	4	5	52	53	54
436	3	4	4	52	53	54
437	3	4	5	52	53	54
453a	2	2	2	52	51	51
453b	2	2	2	51	51	51
454	2	2	2	51	51	51
456	1	1	1	51	51	51
458	2	2	2	52	51	51

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 246µg/m³					
462a	1	1	1	51	50	50
462b	1	1	1	51	50	50
463	1	1	1	51	50	50
464	2	2	2	51	51	51
465	2	3	3	51	52	52
466	3	3	3	52	52	52
467	5	2	3	54	51	53
468a	3	3	4	53	52	53
468b	3	3	3	53	52	53
468c	4	3	4	53	53	53
470	4	4	4	54	53	54
471	5	4	5	54	53	54
472a	5	4	5	54	54	54
472b	5	4	5	54	54	54
474	4	3	4	53	53	53
475	3	3	4	53	52	53
476	3	3	3	52	52	52
477a	3	3	3	52	52	52
477b	3	3	3	52	52	52
481	3	2	3	52	52	52
482	2	2	3	52	52	52
483	2	2	3	52	52	52
484	2	2	3	52	52	52
485a	2	2	2	51	51	51
485b	2	2	2	51	51	51
485c	2	2	2	51	51	51
485d	2	2	2	51	51	51
485e	2	2	2	51	51	51
487a	4	4	4	53	53	54
487b	4	4	5	53	53	54
488a	5	5	6	54	54	55
488b	4	5	5	54	54	54
526	10	7	8	59	56	57
527	8	9	7	57	58	56
528	8	9	7	57	58	56
529	8	9	7	57	58	56
530	8	9	7	58	58	56
531	8	9	7	57	58	56
532	8	9	7	57	58	56
533	8	9	7	57	58	56
534	8	9	7	57	58	56
535	8	8	7	57	58	56
536	8	8	7	57	58	56
537	8	8	7	57	58	56
538	12	9	10	61	58	59
539	12	9	10	61	58	59
540	12	9	10	62	58	59
541	12	9	10	61	58	59
542	12	9	10	61	59	59
543	12	9	10	61	59	59
544	12	9	10	61	59	59
545	12	10	10	61	59	59
546	11	10	10	60	59	59
547	7	8	8	56	57	57
147	7	8	14	56	57	63
158	6	9	14	56	58	63

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 246µg/m³					
A	6	6	10	55	55	59
B	11	7	8	61	56	57
C	9	9	7	58	58	56
D	13	8	10	62	58	59
E	12	11	12	61	60	62
F	10	8	8	60	57	57
G	12	9	10	62	59	59
H	8	7	8	57	56	57
I	3	4	4	52	53	53
J	9	7	9	59	56	58
K	10	7	8	59	57	57
L	12	8	9	62	57	58
M	9	7	8	58	57	57
Mine-owned receptors						
107	11	7	13	60	57	62
129	28	57	95	78	107	145
130	29	71	92	78	121	141
135	13	14	17	62	63	66
231	10	7	8	59	56	57
263	9	9	8	58	58	58
309	18	21	18	68	70	67
1h	11	7	13	60	57	62
1i	11	7	13	60	56	62
1j	11	7	13	60	56	62
1k	11	7	13	60	57	63
1l	11	7	13	60	57	62
1m	11	8	14	60	57	64
1n	11	8	14	60	57	63
1o	6	5	5	56	54	54
1p	8	8	13	57	57	62
1q	12	10	17	61	59	66
1r	24	55	75	73	104	125
1s	24	47	66	73	97	116
1t	25	13	22	74	62	71
1u	22	11	18	71	60	67
1v	23	12	20	72	61	69
1w	20	33	66	69	83	115
1x	18	24	43	68	73	92
1y	21	11	20	70	60	70
1z	7	9	14	57	59	63
1aa	10	14	28	59	63	77
1ab	7	9	15	57	58	64
1ac	12	9	11	62	58	60
1ad	4	4	5	53	53	54
1ae	14	10	12	63	60	61
1af	13	9	10	63	58	60
1ag	13	9	10	63	58	60
1ah	9	9	9	58	58	58
1ai	9	9	9	58	58	58
1aj	9	9	9	58	58	58
1ak	8	9	9	58	58	58
1al	8	9	9	57	58	58
1am	9	8	9	58	57	58
1an	8	8	11	57	57	60
1ao	10	8	11	59	57	61
1ap	8	7	11	57	56	60

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 246µg/m³					
1aq	8	7	11	58	56	60
1ar	9	7	11	58	56	60
1as	9	7	11	58	56	61
1at	10	7	12	59	56	61
1au	10	7	12	59	56	61
1av	11	7	13	60	56	62
1aw	11	7	13	60	56	62
1ax	11	7	13	60	56	62
1ay	11	7	13	60	57	62
1az	11	7	13	60	57	62
1ba	11	7	13	60	57	62
246	4	5	5	54	54	54
2b	36	23	29	85	72	79
2c	11	8	7	60	58	57
2d	10	8	7	59	58	57
2e	17	12	13	66	61	62
2f	42	20	30	92	70	80
2g	44	20	30	94	69	79
2h	114	48	63	164	97	112
2i	14	9	11	63	58	60
2j	132	60	68	181	109	117
2k	95	39	56	144	88	106
2l	148	57	77	198	107	126
2m	12	11	11	62	60	61
2n	5	5	6	54	54	55
2o	6	7	10	55	56	59
2p	6	7	10	56	57	60
2q	8	8	12	57	58	61
2r	7	8	11	56	57	61
2s	8	9	12	57	58	61
2t	6	6	7	55	55	56
2u	8	8	8	57	58	58
2v	9	8	9	58	57	58
2w	7	6	9	56	56	58
2x	17	11	14	66	60	63
2y	18	12	14	67	61	63
2z	19	12	14	68	62	63
2aa	18	12	14	67	62	64
2ab	20	13	14	69	62	64
2ac	16	13	15	65	62	65
2ad	20	13	15	70	62	64
2ae	18	14	16	67	63	66
2af	21	13	15	70	62	64
2ag	20	13	15	70	63	65
2ah	21	13	15	70	62	64
2ai	23	17	19	72	66	68
2aj	15	11	13	64	61	62
2ak	35	22	28	84	71	77
2al	38	23	29	87	72	78
3a	7	7	13	56	57	62
3b	6	8	13	55	57	62
3c	6	8	13	55	57	62
3d	5	8	11	54	57	61
3e	5	7	11	54	57	60
3f	4	7	9	54	56	59
3g	5	8	11	54	57	61

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 246µg/m³					
3h	6	9	14	55	58	63
3i	6	6	8	55	55	58
3j	3	5	6	53	54	55
3k	5	7	11	54	57	60
3l	10	11	14	59	60	64
3m	10	11	14	59	60	63
3n	4	6	8	54	56	58
3o	6	6	9	55	56	58
3p	7	6	9	56	55	58
3q	7	6	9	56	55	58
3r	5	6	7	54	55	56
3s	4	5	6	54	54	56
5	15	11	13	64	60	62
7	15	14	17	64	63	66
211	16	12	14	65	61	63
299	3	3	4	53	53	53
5e	14	13	16	64	63	65
5f	15	13	16	64	62	65
5g	16	12	15	65	61	64
5h	3	3	3	52	52	52
5i	4	3	4	53	52	53
5j	3	3	3	52	52	52
5k	4	3	4	53	53	53
5l	4	4	4	53	53	53
5m	8	7	7	57	56	57
5n	3	3	4	53	53	53
5o	3	3	4	52	53	53
5p	6	5	6	55	54	55
5q	8	8	9	57	57	58
5r	12	10	12	61	59	61
5s	12	10	12	62	59	62
5t	13	9	13	62	58	62
5u	16	13	15	66	62	64
5v	5	4	6	54	53	55
5w	5	4	6	54	53	55
5x	5	4	6	54	53	55
5y	13	9	12	63	59	61
5z	12	9	11	61	58	60
5aa	13	9	12	62	59	61
5ab	13	7	9	62	57	58
5ac	12	9	11	61	58	60
5ad	12	7	8	62	57	57
5ae	15	14	17	64	63	66
274	3	2	2	52	51	51
7b	3	3	3	52	52	52
7c	3	3	3	52	52	52
7d	3	3	3	52	52	52
7e	2	2	3	51	52	52
7f	2	1	2	51	51	51
7g	2	2	2	51	51	51
7h	3	2	3	52	51	52
7i	2	2	2	51	51	51
7j	3	2	3	52	52	52
7k	4	3	3	53	53	52
8a	2	2	2	51	51	51
8b	2	2	2	51	51	52

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 246µg/m³					
8c	2	2	2	51	51	52
8d	3	3	3	52	52	52
8e	2	2	2	52	51	52
8f	2	2	3	52	52	52
8g	2	2	3	51	52	52
8h	2	2	3	51	51	52
8i	2	1	2	51	51	51

Table J-3: Predicted annual average NO_2 concentrations (µg/m³)

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 62µg/m³					
Privately-owned receptors						
4	0	0	0	50	50	50
6	0	0	1	50	50	50
19	1	1	1	50	50	50
20	1	1	1	50	50	50
21	1	1	1	50	50	50
23	0	1	1	50	50	50
35	0	0	0	49	50	50
35b	0	0	0	49	50	50
43	0	0	0	49	49	49
44	0	0	0	49	49	49
45	0	0	0	49	49	49
47	0	0	0	49	49	49
67	0	0	0	49	50	50
68	0	0	0	49	50	50
74	0	0	0	49	50	50
77	0	0	0	49	49	50
79	0	0	0	49	49	50
80	0	0	0	49	49	50
82	0	0	0	49	49	49
83	0	0	0	49	49	49
83b	0	0	0	49	49	50
84	0	0	0	49	49	50
84b	0	0	0	49	49	49
86	0	0	0	49	49	50
86b	0	0	0	49	49	49
96	0	0	0	49	49	50
101	0	0	0	49	49	50
102	0	0	0	49	49	50
108	0	0	1	49	50	50
112	0	0	1	49	50	50
118	0	0	1	49	50	50
120	0	0	1	49	49	50
308	0	0	1	49	49	50
120c	0	0	1	49	49	50
121	0	0	1	49	49	50
136	0	0	0	49	49	49
139	0	0	0	49	49	49
140	0	0	0	49	49	49
205	0	0	0	49	49	49
140c	0	0	0	49	49	49
143	0	0	0	49	49	49
161	0	0	0	49	49	49

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 62µg/m³					
153	0	0	0	49	49	50
154	0	0	0	49	49	49
156	0	0	0	49	49	49
267	0	0	0	49	49	49
157	0	0	0	49	49	49
266	0	0	0	49	49	49
159	0	0	0	49	49	49
169	0	0	0	49	49	49
171	0	0	0	49	49	49
172	0	0	0	49	49	49
310	0	0	0	49	49	49
173	0	0	0	49	49	49
174	0	0	0	49	49	49
175	0	0	0	49	49	49
176	0	0	0	49	49	49
177	0	0	0	49	49	49
178	0	0	0	49	49	49
179	0	0	0	49	49	49
180	0	0	0	49	49	49
180b	0	0	0	49	49	49
180c	0	0	0	49	49	49
181	0	0	0	49	49	49
183	0	0	0	49	49	49
181c	0	0	0	49	49	49
182	0	0	0	49	49	49
182b	0	0	0	49	49	49
189	0	0	0	49	49	49
190	0	0	0	49	49	49
191	0	0	0	49	49	49
192	0	0	0	49	49	49
193	0	0	0	49	49	49
311	0	0	0	49	49	49
193c	0	0	0	49	49	49
194	0	0	0	49	49	49
195	0	0	0	49	49	49
196	0	0	0	49	49	49
197	0	0	0	49	49	49
195d	0	0	0	49	49	49
195e	0	0	0	49	49	49
198	0	0	0	49	49	49
199	0	0	0	49	49	49
200	0	0	0	49	49	49
202	0	0	0	49	49	49
204	0	0	0	49	49	49
203	0	0	0	49	49	49
206	0	0	0	50	50	50
207	0	0	1	50	50	50
207b	0	0	1	50	50	50
208	0	1	1	50	50	50
315	0	1	1	50	50	50
212	0	0	1	50	50	50
212b	1	0	1	50	50	50
212c	1	0	1	50	50	50
213	1	1	1	50	50	50
214	1	1	1	50	50	50
215	1	1	1	50	50	50

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 62μg/m³					
216	1	1	1	50	50	50
217	1	1	1	50	50	50
218	1	1	1	50	50	50
219	1	1	1	50	50	50
220	1	1	1	50	50	50
221	1	1	1	50	50	50
222	1	1	1	50	50	50
223	1	1	1	50	50	50
224	1	1	1	50	50	50
225	1	1	1	50	50	50
249	0	0	0	49	49	49
252	0	0	0	49	49	49
252b	0	0	0	49	49	49
257	0	0	0	49	49	49
258a	0	0	0	49	49	49
258b	0	0	0	49	49	49
259	0	0	0	49	49	49
260	0	0	0	49	49	49
261	0	0	0	49	49	49
271	0	0	0	49	49	49
272	0	0	0	49	49	49
272b	0	0	0	49	49	49
273	0	0	0	49	49	49
280	0	0	0	50	50	50
281	0	0	0	50	50	50
282	0	0	0	50	50	50
283	0	0	0	50	50	50
285	0	0	0	50	50	50
285b	0	0	0	50	50	50
285c	0	0	0	50	50	50
286	0	0	0	50	50	50
291	0	0	0	50	50	50
286c	0	0	0	50	50	50
286d	0	0	0	49	49	50
287	0	0	0	50	50	50
288	0	0	0	50	50	50
288b	0	0	0	50	50	50
289	0	0	0	49	50	50
292	0	0	0	49	49	49
298	0	0	0	49	49	49
300	0	0	0	49	49	49
296a	0	0	0	49	49	49
296b	0	0	0	49	49	49
302a	0	0	0	49	49	49
302b	0	0	0	49	49	49
302c	0	0	0	49	49	49
305	1	0	1	50	50	50
401	0	0	0	49	49	49
402	0	0	0	49	49	49
407	0	0	0	49	49	49
413a	0	0	0	49	49	49
413b	0	0	0	49	49	49
415	0	0	0	49	49	49
416	0	0	0	49	49	49
417	0	0	0	49	49	49
418	0	0	0	49	49	49

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 62µg/m³					
419	0	0	0	49	49	49
421	0	0	0	49	49	49
422a	0	0	0	49	49	49
422b	0	0	0	49	49	49
434	0	0	0	49	49	49
436	0	0	0	49	49	49
437	0	0	0	49	49	49
453a	0	0	0	49	49	49
453b	0	0	0	49	49	49
454	0	0	0	49	49	49
456	0	0	0	49	49	49
458	0	0	0	49	49	49
462a	0	0	0	49	49	49
462b	0	0	0	49	49	49
463	0	0	0	49	49	49
464	0	0	0	49	49	49
465	0	0	0	49	49	49
466	0	0	0	49	49	49
467	0	0	0	49	49	49
468a	0	0	0	49	49	49
468b	0	0	0	49	49	49
468c	0	0	0	49	49	49
470	0	0	0	49	49	49
471	0	0	0	49	49	49
472a	0	0	0	49	49	49
472b	0	0	0	49	49	49
474	0	0	0	49	49	49
475	0	0	0	49	49	49
476	0	0	0	49	49	49
477a	0	0	0	49	49	49
477b	0	0	0	49	49	49
481	0	0	0	49	49	49
482	0	0	0	49	49	49
483	0	0	0	49	49	49
484	0	0	0	49	49	49
485a	0	0	0	49	49	49
485b	0	0	0	49	49	49
485c	0	0	0	49	49	49
485d	0	0	0	49	49	49
485e	0	0	0	49	49	49
487a	0	0	0	49	49	49
487b	0	0	0	49	49	49
488a	0	0	0	49	49	49
488b	0	0	0	49	49	49
526	0	0	0	49	49	50
527	0	0	0	49	49	50
528	0	0	0	49	49	50
529	0	0	0	49	49	50
530	0	0	0	49	49	50
531	0	0	0	49	49	50
532	0	0	0	49	49	50
533	0	0	0	49	49	50
534	0	0	0	49	49	50
535	0	0	0	49	49	50
536	0	0	0	49	49	50
537	0	0	0	49	49	50

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 62µg/m³					
538	0	0	0	49	50	50
539	0	0	0	49	50	50
540	0	0	0	49	50	50
541	0	0	0	49	50	50
542	0	0	0	49	50	50
543	0	0	0	49	50	50
544	0	0	0	50	50	50
545	0	0	0	50	50	50
546	0	0	0	50	50	50
547	0	0	0	49	49	49
147	0	0	0	49	49	49
158	0	0	0	49	49	49
A	0	0	0	49	49	49
B	0	0	0	49	49	49
C	0	0	0	49	49	50
D	0	0	0	50	50	50
E	0	0	0	50	50	50
F	0	0	0	49	50	50
G	0	0	0	49	50	50
H	0	0	0	49	49	49
I	0	0	0	49	49	49
J	0	0	0	49	49	49
K	0	0	0	49	49	49
L	0	0	0	49	49	49
M	0	0	0	49	49	49
Mine-owned receptors						
107	0	0	1	49	50	50
129	1	2	4	50	52	53
130	1	2	2	50	51	51
135	0	0	0	49	49	49
231	0	0	0	49	49	50
263	0	0	0	49	49	49
309	0	0	0	49	49	49
1h	0	0	1	49	50	50
1i	0	0	1	49	50	50
1j	0	0	1	49	50	50
1k	0	0	1	49	50	50
1l	0	0	1	49	50	50
1m	0	0	1	49	50	50
1n	0	0	1	49	50	50
1o	0	0	0	49	49	49
1p	0	0	0	49	49	50
1q	0	0	0	49	49	50
1r	1	2	2	50	51	51
1s	0	1	1	50	51	50
1t	1	1	1	50	50	50
1u	1	0	1	50	50	50
1v	1	1	1	50	50	50
1w	1	2	2	50	51	51
1x	1	1	2	50	50	51
1y	1	1	1	50	50	50
1z	0	0	0	49	49	49
1aa	0	0	1	49	50	50
1ab	0	0	0	49	49	49
1ac	0	0	1	50	50	50
1ad	0	0	0	49	49	49

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 62µg/m³					
1ae	0	1	1	50	50	50
1af	0	0	1	49	50	50
1ag	0	0	0	49	50	50
1ah	0	0	0	49	50	50
1ai	0	0	0	49	50	50
1aj	0	0	0	49	50	50
1ak	0	0	0	49	50	50
1al	0	0	0	49	50	50
1am	0	0	0	49	49	50
1an	0	0	1	49	50	50
1ao	0	0	1	49	50	50
1ap	0	0	0	49	49	50
1aq	0	0	0	49	49	50
1ar	0	0	0	49	49	50
1as	0	0	0	49	49	50
1at	0	0	0	49	49	50
1au	0	0	0	49	49	50
1av	0	0	0	49	49	50
1aw	0	0	1	49	49	50
1ax	0	0	0	49	49	50
1ay	0	0	1	49	49	50
1az	0	0	1	49	49	50
1ba	0	0	1	49	49	50
246	0	0	0	49	49	49
2b	2	1	1	51	50	51
2c	0	0	0	49	50	50
2d	0	0	0	49	50	50
2e	1	1	1	50	50	50
2f	2	1	1	51	50	51
2g	2	1	1	51	51	51
2h	6	3	3	55	52	53
2i	0	0	1	50	50	50
2j	7	3	4	56	53	54
2k	4	2	3	53	52	52
2l	7	4	4	56	53	53
2m	0	0	0	49	49	49
2n	0	0	0	49	49	49
2o	0	0	0	49	49	49
2p	0	0	0	49	49	49
2q	0	0	0	49	49	49
2r	0	0	0	49	49	49
2s	0	0	0	49	49	49
2t	0	0	0	49	49	49
2u	0	0	0	49	49	49
2v	0	0	0	49	49	49
2w	0	0	0	49	49	49
2x	0	0	1	50	50	50
2y	0	1	1	50	50	50
2z	0	1	1	50	50	50
2aa	0	1	1	50	50	50
2ab	0	1	1	50	50	50
2ac	0	1	1	50	50	50
2ad	1	1	1	50	50	50
2ae	0	1	1	50	50	50
2af	1	1	1	50	50	50
2ag	1	1	1	50	50	50

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 62μg/m³					
2ah	1	1	1	50	50	50
2ai	1	1	1	50	50	50
2aj	0	1	1	50	50	50
2ak	2	1	1	51	50	51
2al	2	1	1	51	50	51
3a	0	0	0	49	49	49
3b	0	0	0	49	49	49
3c	0	0	0	49	49	49
3d	0	0	0	49	49	49
3e	0	0	0	49	49	49
3f	0	0	0	49	49	49
3g	0	0	0	49	49	49
3h	0	0	0	49	49	49
3i	0	0	0	49	49	49
3j	0	0	0	49	49	49
3k	0	0	0	49	49	49
3l	0	0	0	49	49	50
3m	0	0	0	49	49	50
3n	0	0	0	49	49	49
3o	0	0	0	49	49	49
3p	0	0	0	49	49	49
3q	0	0	0	49	49	49
3r	0	0	0	49	49	49
3s	0	0	0	49	49	49
5	0	0	0	50	50	50
7	0	0	1	50	50	50
211	1	0	1	50	50	50
299	0	0	0	49	49	49
5e	0	0	1	50	50	50
5f	0	0	1	50	50	50
5g	0	0	1	50	50	50
5h	0	0	0	49	49	49
5i	0	0	0	49	49	49
5j	0	0	0	49	49	49
5k	0	0	0	49	49	49
5l	0	0	0	49	49	49
5m	0	0	0	49	49	49
5n	0	0	0	49	49	49
5o	0	0	0	49	49	49
5p	0	0	0	49	49	49
5q	0	0	0	49	49	49
5r	0	0	0	49	49	49
5s	0	0	0	49	49	49
5t	0	0	0	50	49	50
5u	0	0	0	50	50	50
5v	0	0	0	49	49	49
5w	0	0	0	49	49	49
5x	0	0	0	49	49	49
5y	0	0	0	50	50	50
5z	0	0	0	50	50	50
5aa	0	0	0	50	50	50
5ab	0	0	0	50	49	50
5ac	0	0	0	50	50	50
5ad	0	0	0	50	50	50
5ae	0	0	1	50	50	50
274	0	0	0	49	49	49

Receptor ID	Mount Pleasant Operation impact			Total impact		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
	Air quality impact criteria - 62µg/m³					
7b	0	0	0	49	49	49
7c	0	0	0	49	49	49
7d	0	0	0	49	49	49
7e	0	0	0	49	49	49
7f	0	0	0	49	49	49
7g	0	0	0	49	49	49
7h	0	0	0	49	49	49
7i	0	0	0	49	49	49
7j	0	0	0	49	49	49
7k	0	0	0	49	49	49
8a	0	0	0	49	49	49
8b	0	0	0	49	49	49
8c	0	0	0	49	49	49
8d	0	0	0	49	49	49
8e	0	0	0	49	49	49
8f	0	0	0	49	49	49
8g	0	0	0	49	49	49
8h	0	0	0	49	49	49
8i	0	0	0	49	49	49

Summary

The modelling predictions in **Table J-2** and **Table J-3** indicate that in all the assessed years, all privately-owned and mine-owned sensitive receptor locations are predicted to experience maximum 1-hour average and annual average NO_2 concentrations below the relevant criteria of 246µg/m^3 and 63µg/m^3, respectively.

The Mount Pleasant Operation incorporating the Modification would ensure diesel emissions from the site are minimised where possible through diesel consumption monitoring and regular maintenance of equipment and plant.