ANTIENE RAIL SPUR MODIFICATION

APPENDIX B

Maxwell Project

Air Quality and Greenhouse Gas Assessment

MAXWELL PROJECT

AIR QUALITY AND GREENHOUSE GAS ASSESSMENT

Malabar Coal Limited

4 July 2019

Job Number 18060848

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Maxwell Project

Air Quality and Greenhouse Gas Assessment

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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 underground coal mining operation, referred to as the Maxwell Project (the Project), located south-southwest of Muswellbrook in the Hunter Valley region of New South Wales.

Maxwell Ventures (Management) Pty Ltd seek to operate the underground mining operation for a period of approximately 26 years and extract run-of-mine (ROM) coal from four seams within the Wittingham Coal Measures. At least 75% of the coal produced by the Project would be capable of being used in the making of steel (coking coals). The balance would be export thermal coals suitable for the new generation High Efficiency, Low Emissions power generators.

The prevailing wind flows in the area surrounding the Project are influenced by the topography of the Hunter Valley region. The ambient air quality levels monitored at various locations surrounding the Project indicate that air quality in the area is generally good and is typically below the relevant New South Wales Environment Protection Authority goals. The exception is the annual average particulate matter less than 2.5 micrometres in diameter ($PM_{2.5}$) in the urban areas of Muswellbrook, where levels near or above criteria occur due to wood heater use in winter.

Three modelling scenarios have been assessed, representing a range of potential likely worst-case air quality impacts over the life of the Project, including the construction and operational phases. The modelling scenarios' years were selected with reference to the location of activities and intensity of operations most likely to contribute 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 to predict the potential air quality effects as a result of the Project.

Consistent with expectations for an underground project, the assessment predicts the operation of the Project is unlikely to result in any adverse dust impacts. The nitrogen dioxide emissions generated from diesel powered equipment (and potentially gas management activities) are not predicted to result in any adverse air quality impacts, consistent with the low ambient levels measured in the environment.

The annual average greenhouse gas emission is conservatively estimated to be 0.41 million tonnes of carbon dioxide equivalent material (Scope 1 and 2), which is calculated to be approximately 0.08% of the Australian greenhouse emissions and approximately 0.31% of the New South Wales greenhouse emissions for the 2016 period.

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1 INTRODUCTION

Maxwell Ventures (Management) Pty Ltd, a wholly owned subsidiary of Malabar Coal Limited (Malabar), is seeking consent to develop an underground coal mining operation, referred to as the Maxwell Project (the Project).

The Project is in the Upper Hunter Valley of New South Wales (NSW), with the mine entry area (MEA) located approximately 15 kilometres (km) south of Muswellbrook.

Underground mining is proposed within Exploration Licence (EL) 5460, which was acquired by Malabar in February 2018. Malabar also acquired existing infrastructure within Coal Lease (CL) 229, Mining Lease (ML) 1531 and CL 395, known as the "Maxwell Infrastructure". The Project would include the use of the substantial existing Maxwell Infrastructure, along with the development of some new infrastructure.

This assessment forms part of an Environmental Impact Statement (EIS) which has been prepared to accompany a Development Application for the Project in accordance with Part 4 of the NSW *Environmental Planning and Assessment Act, 1979*.

2 PROJECT DESCRIPTION

The Project would involve an underground mining operation that would produce high quality coals over a period of approximately 26 years.

At least 75% of coal produced by the Project would be capable of being used in the making of steel (coking coals). The balance would be export thermal coals suitable for the new generation High Efficiency, Low Emissions power generators.

The Project would involve extraction of run-of-mine (ROM) coal, from four seams within the Wittingham Coal Measures using the following mining methods:

- underground bord and pillar mining with partial pillar extraction in the Whynot Seam; and
- underground longwall extraction in the Woodlands Hill Seam, Arrowfield Seam and Bowfield Seam.

The substantial existing Maxwell Infrastructure would be used for handling, processing and transportation of coal for the life of the Project. The Maxwell Infrastructure includes an existing coal handling and preparation plant (CHPP), train load-out facilities and other infrastructure and services (including water management infrastructure, administration buildings, workshops and services).

The Project MEA would be developed in a natural valley in the north of EL 5460 to support underground mining and coal handling activities and provide for personnel and materials access.

ROM coal brought to the surface at the MEA would be transported to the Maxwell Infrastructure area. Early ROM coal would be transported via internal roads during the construction and commissioning of a covered overland conveyor system. Subsequently, ROM coal would be transported to the Maxwell Infrastructure area via the covered overland conveyor system.

The Project would support continued rehabilitation of previously mined areas and overburden emplacements areas within CL 229, ML 1531 and CL 395. The volume of the East Void would be reduced through the emplacement of reject material generated by Project coal processing activities and would be capped and rehabilitated at the completion of mining.

An indicative Project general arrangement showing the underground mining area and key infrastructure is provided on **Figure 2-1**. A detailed description of the Project is provided in the main document of the EIS.

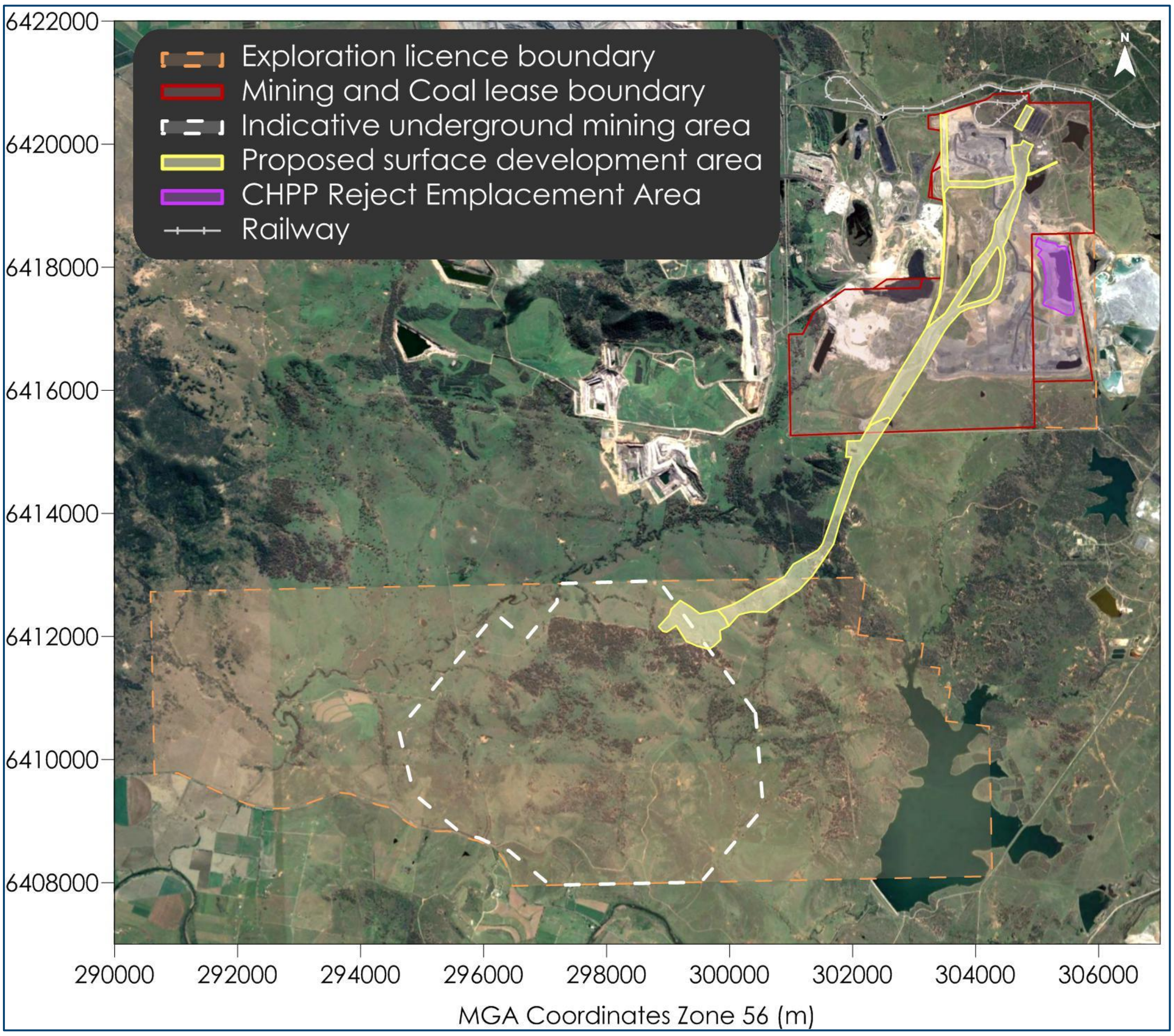

Figure 2-1: Project general arrangement

3 LOCAL SETTING

The general area surrounding the Project is comprised of various open cut coal mining operations, agricultural land, rural residences and the towns of Muswellbrook to the north, Jerrys Plains to the southeast and Denman to the west.

Figure 3-1 presents the location of the Project in relation to the identified privately-owned and mine-owned receptors of relevance to this study. **Appendix A** provides a detailed list of all the privately-owned and mine-owned receptors considered in this assessment.

Figure 3-2 presents a three-dimensional visualisation of the topography in the vicinity of the Project. The topography in the area of the Project comprises principally flats associated with the Hunter River, interspersed with low undulating to steeply sloped hills, ridges and crests over open farmland. Further away, the topographical features include the foothills of the Barrington Tops mountain range to the northeast and the north to southwest aligned Hunter River floodplain to the west which then turns east and flows to the southeast down the valley. The terrain features of the surrounding area have an effect on the local wind distribution patterns and flows. These effects were considered in the assessment.

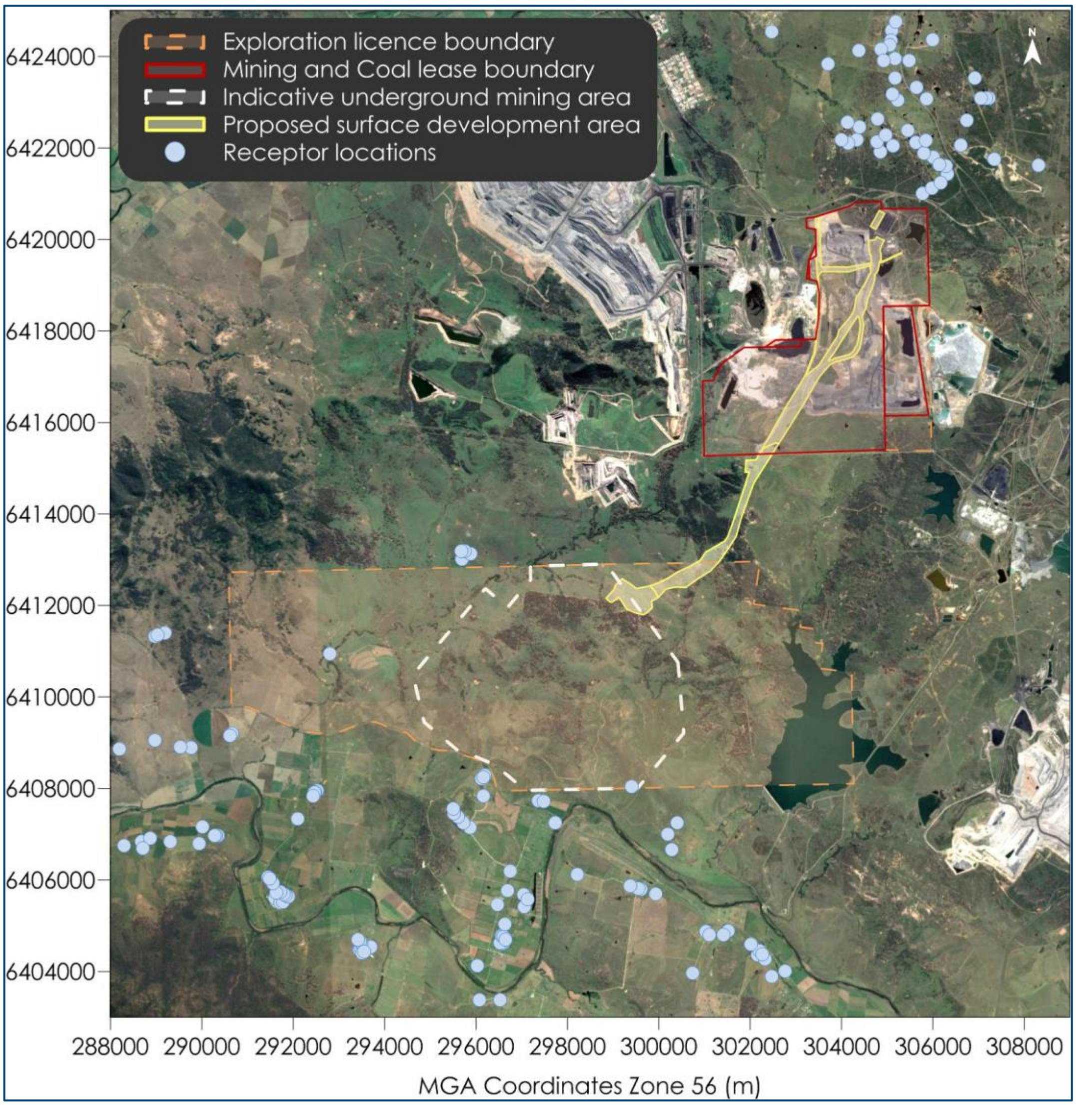

Figure 3-1: Local setting for the Project

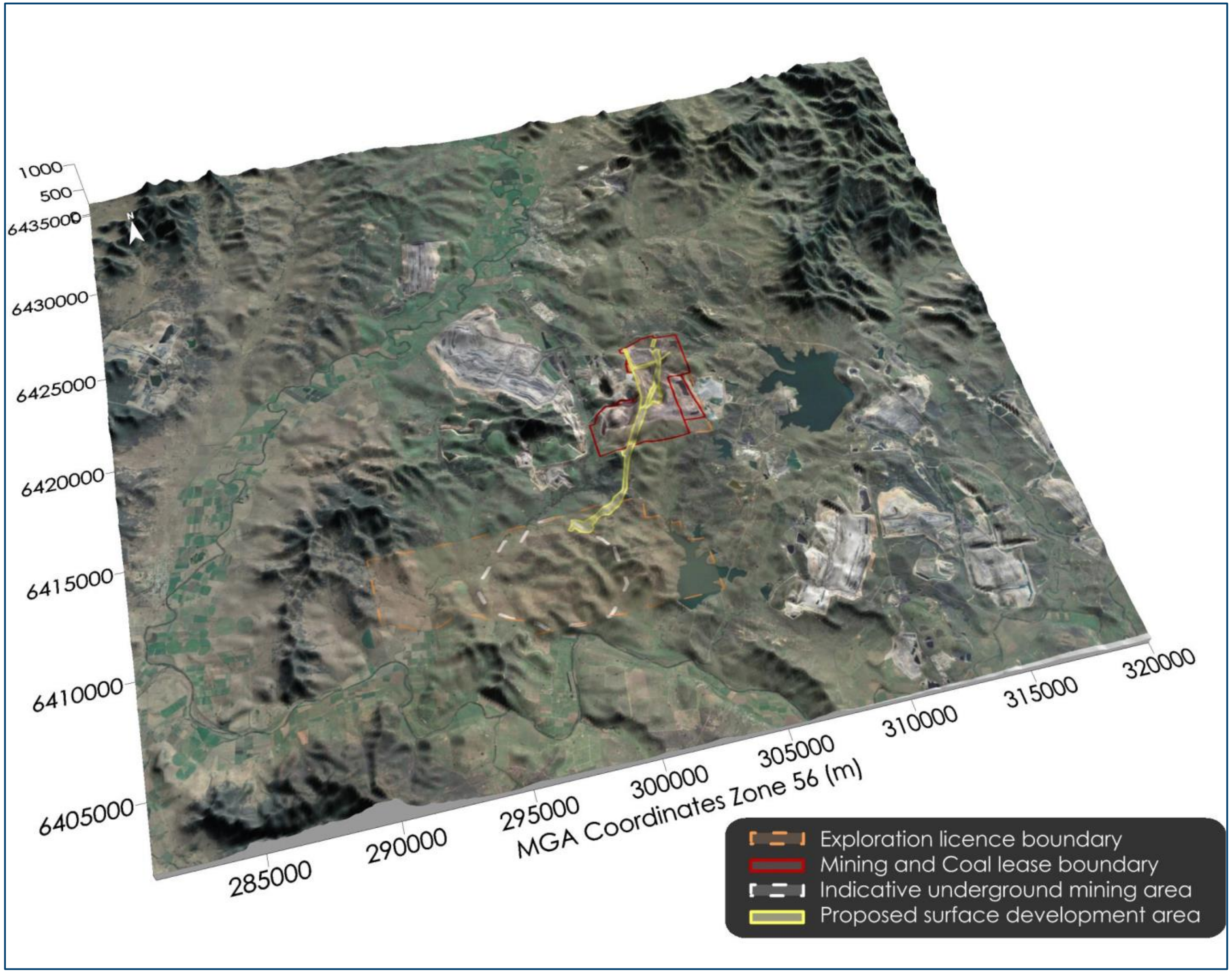

Figure 3-2: Topography surrounding the Project

4 STUDY REQUIREMENTS

The purpose of this report is to provide an assessment of the maximum likely Project-related effects on air quality over the life of the Project. The assessment presented in this report addresses planning and regulatory agency requirements, as set out below.

4.1 Secretary's Environmental Assessment Requirements

In preparing this Air Quality and Greenhouse Gas Assessment, the Secretary's Environmental Assessment Requirements (SEARs), which were first issued for the Project (SSD 18_9526) on 3 September 2018 and re-issued on 17 January 2019, have been addressed and the key matters raised for consideration in the Air Quality and Greenhouse Gas Assessment are outlined in **Table 4-1** along with a reference to where the requirements are addressed in the report.

Table 4-1: Secretary's Environmental Assessment Requirements (SSD 18_9526)

Specific issue	General requirements	Section
Air quality – including:	A detailed assessment of potential construction and operational air quality impacts, in accordance with the *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW,* and with a particular focus on dust emissions including $PM_{2.5}$ and PM_{10}, and having regard to the *Voluntary Land Acquisition and Mitigation Policy*; and	This report
	An assessment of the likely greenhouse gas impacts of the development.	9

4.2 NSW Environment Protection Authority

This Air Quality and Greenhouse Gas Assessment has been prepared in accordance with the NSW Environment Protection Authority (EPA) document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA, 2017**) and the *Indicative Secretary's Environmental Assessment Requirements (SEARs) for State Significant Mining Developments, October 2015* (**NSW Government, 2015**).

4.3 Muswellbrook Shire Council

This Air Quality and Greenhouse Gas Assessment has been prepared in accordance with the comments from the Muswellbrook Shire Council (MSC) on the SEARs outlined in **Table 4-2**.

Table 4-2: Muswellbrook Shire Council comments on the SEARs for air quality

Specific issue	General requirements	Section
Dust and air pollution	There are a number of operating Coal Mines in the Muswellbrook Shire Local Government Area and in close proximity to the Muswellbrook Township. The cumulative impact of dust and air pollution issues associated with mining operations is of increasing concern to the local community and Council. Accordingly, it is Council's position that any EIS should be accompanied by an air quality impact assessment that considers the anticipated dust and pollution outputs from the project against relevant air quality guidelines and in context with the cumulative effect of emissions from existing mining operations in the vicinity of the site. Council also has an interest in ensuring that dust modelling and monitoring carried out to a high standard and accounts for day and night time atmospheric inversions. In recent times Council has become increasingly aware of the impact local atmospheric temperature inversions on the movement of dust particles into upper atmospheric levels. It is understood that these atmospheric inversions which are most prevalent during the colder months of a year restrict the movement of dust particles into the upper atmosphere during night time hours and result in a higher concentration of dust and air pollution in the lower atmosphere levels over prolonged periods. For accurate and reliable dust modelling to be prepared it would be necessary for models to incorporate an understanding of atmospheric inversions into any working, while any proposed operational dust modelling should use both day and night time measurements to present a holistic picture of dust and air quality emissions associated with the Project.	This report
	It was also observed that the project involved a new internal surface road between the mine entry and the CHPP. It is understood that this road would be used 24/7 and would be the route for early ROM coal transported to the CHPP. Council recommends this road to be sealed to minimise dust and noise impacts associated with its use as well as to prevent the potential for possible salinity and sedimentation issues that may occur as a result of regular water cart use on a gravel road.	The site access road will be sealed in the first year of operation.

5 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 Project.

5.1 NSW EPA impact assessment criteria

Table 5-1 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 Project. Consideration of background dust levels needs to be made when using these goals to assess potential impacts.

Table 5-1: NSW EPA air quality impact assessment criteria

Pollutant	Averaging period	Impact	Criterion
Total Suspended Particles (TSP)	Annual	Total	90µg/m³
PM_{10}	Annual	Total	25µg/m³
	24 hour	Total	50µg/m³
$PM_{2.5}$	Annual	Total	8µg/m³
	24 hour	Total	25µg/m³
Deposited dust	Annual	Incremental	2g/m²/month
		Total	4g/m²/month
Nitrogen dioxide (NO_2)	1 hour	Total	246µg/m³
	Annual	Total	62µg/m³

Source: NSW EPA, 2017.
µg/m³ = micrograms per cubic metre.
g/m²/month = grams per square metre per month.

5.2 NSW Voluntary Land Acquisition and Mitigation Policy (VLAMP)

Part of the NSW VLAMP dated September 2018 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 5-2** at any residence on privately-owned land or workplace[1].

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

Table 5-2: Particulate matter mitigation criteria

Pollutant	Averaging period	Mitigation criterion		Impact type
$PM_{2.5}$	Annual	8µg/m³*		Human health
$PM_{2.5}$	24 hour	25µg/m³**		Human health
PM_{10}	Annual	25µg/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 (2018).

*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 over the life of the development.

Voluntary acquisition rights may apply per the VLAMP where, even with best practice management, the development contributes to exceedances of the criteria in **Table 5-3** at any residence on privately-owned land, workplace[2] or on more than 25% 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 5-3: Particulate matter acquisition criteria

Pollutant	Averaging period	Acquisition criterion		Impact type
$PM_{2.5}$	Annual	8µg/m³*		Human health
$PM_{2.5}$	24-hour	25µg/m³**		Human health
PM_{10}	Annual	25µg/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 (2018).

*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.

5.3 Other air pollutants

Emissions of other pollutants, such as carbon monoxide (CO), hydrogen sulfide (H_2S) and sulfur dioxide (SO_2), will also arise due to the mining activities from the use of diesel powered equipment and the exposed coal seams. The overall emissions of these pollutants from the proposed mining activity are generally considered too low to generate any significant off-site concentrations and have not been assessed in detail in this report.

5.4 Protection of the Environment Operations Act, 1997

The general obligations of the NSW *Protection of the Environment Operations Act, 1997* and the Regulations made under the Act (namely the NSW *Protection of the Environment Operations (Clean Air) Regulation, 2010*) would be followed at the Project. The Project would operate in accordance with the relevant regulatory framework for air quality to ensure compliance with this legislation.

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

6 EXISTING ENVIRONMENT

This section provides a summary of the local climate and ambient air quality in the area surrounding the Project.

6.1 Local climate

Long term climatic data collected at the closest Bureau of Meteorology (BoM) weather station at Jerrys Plains Post Office (Station Number 061086) were analysed to characterise the local climate in the proximity of the Project. The Jerrys Plains Post Office is located approximately 10km south-east of the MEA.

The Jerrys Plains Post Office is considered to provide a suitable indication of the climatic conditions of the area surrounding the Project and also has a sufficient long-term database of various meteorological parameters that assist in characterising the inter-annual climatic conditions with the longer term features.

Table 6-1 and **Figure 6-1** show climatic parameters which have been collected from Jerrys Plains Post Office. The data indicate that January is the hottest month with a mean maximum temperature of 31.8 degrees Celsius (ºC) and July is the coldest month with a mean minimum temperature of 3.8ºC. Rainfall peaks during the summer months, and relative humidity levels exhibit variability over the day and seasonal fluctuations. Wind speeds vary across the seasons with higher averages evident during the warmer months.

Table 6-1: Monthly climate statistics summary – Jerrys Plains Post Office

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.	Years
Temperature														
Mean max. temp. (ºC)	31.8	30.9	28.9	25.3	21.3	18.0	17.4	19.4	22.9	26.3	29.1	31.2	25.2	106
Mean min. temp. (ºC)	17.2	17.1	15.0	11.0	7.4	5.3	3.8	4.4	7.0	10.3	13.2	15.7	10.6	106
Rainfall														
Rainfall (mm)	77.1	73.1	59.7	44.0	40.7	48.1	43.4	36.1	41.7	51.9	61.9	67.5	644.5	119
No. of rain days (≥1mm)	6.4	6.0	5.8	4.9	4.9	5.5	5.2	5.2	5.2	5.8	6.3	6.3	67.5	128
9am conditions														
Mean temp. (ºC)	23.4	22.7	21.2	18.0	13.6	10.6	9.4	11.4	15.3	19.0	21.1	23.0	17.4	69
Mean R.H. (%)	67	72	72	72	77	80	78	71	65	59	60	61	70	60
Mean W.S. (km/h)	9.6	9.0	8.8	8.6	9.0	9.4	10.6	11.0	11.7	10.9	10.5	9.9	9.9	53
3pm conditions														
Mean temp. (ºC)	29.8	28.9	27.2	24.1	20.1	17.1	16.4	18.2	21.2	24.2	26.9	29.0	23.6	54
Mean R.H. (%)	47	50	49	49	52	54	51	45	43	42	42	42	47	45
Mean W.S. (km/h)	13.2	13.0	12.4	11.3	11.0	11.5	13.0	14.3	14.7	14.1	14.2	14.2	13.1	52

Source: BoM (2019).

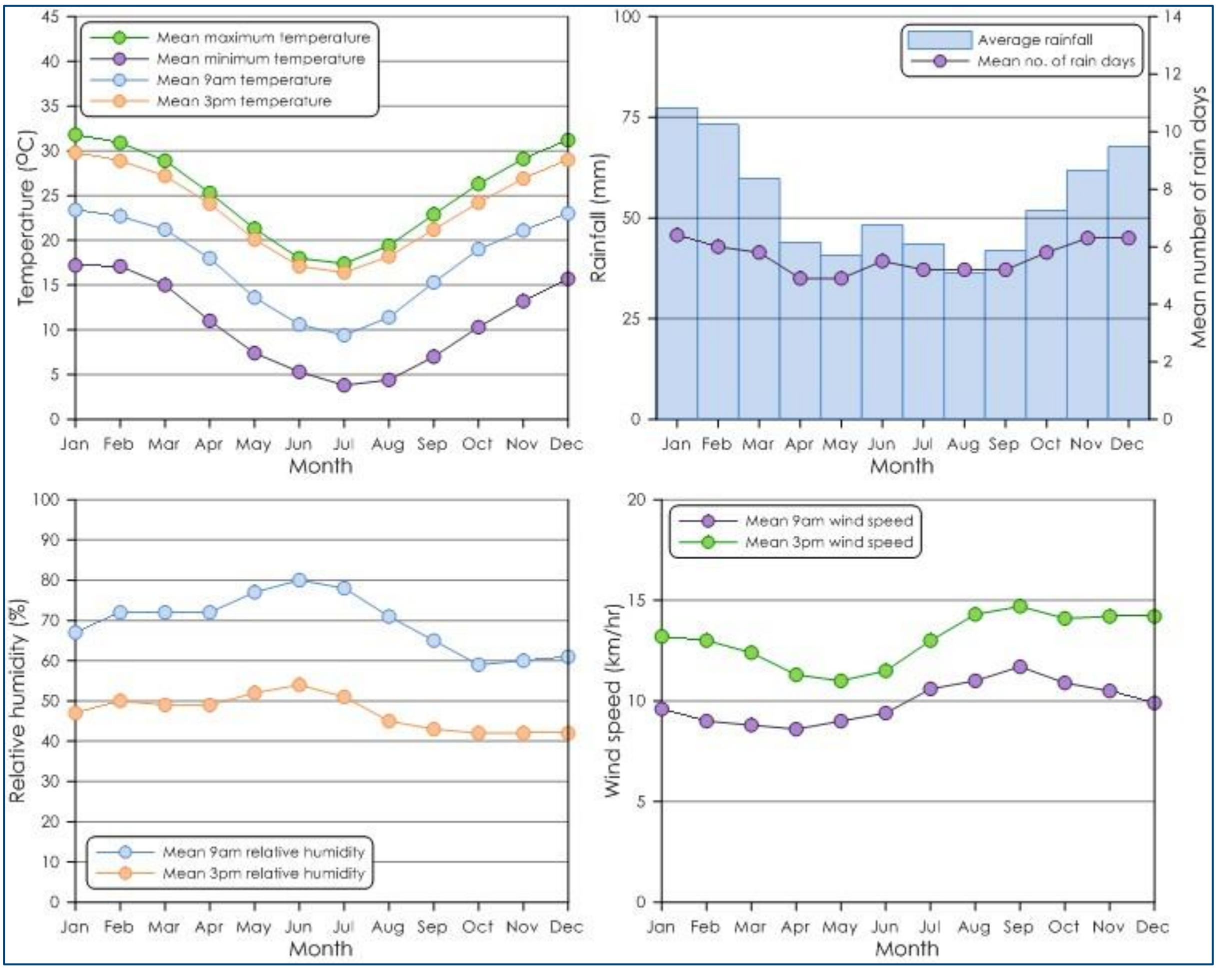

Figure 6-1: Monthly climate statistics summary – Jerrys Plains Post Office

6.2 Local meteorological conditions

Data collected from the Maxwell Infrastructure weather station is presented below to provide context on the local meteorological conditions for the Project. The location of the station is described in **Section 6.3**.

Annual and seasonal windroses have been prepared from the available data collected at the Maxwell Infrastructure weather station for the 2015 period, and are presented in **Figure 6-2**. The 2015 period has been selected as a representative year from a meteorological perspective, based on an analysis of seven consecutive years of monitoring data from the Scone Airport Automatic Weather Station (AWS) (**Appendix B**).

Analysis of the windroses show that on an annual basis the predominant wind flows at the Maxwell Infrastructure weather station are along the northwest to southeast axis, which is typical of the Hunter Valley conditions. Very few winds originate from the northeast and southwest quadrants.

The summer winds are predominately from the southeast and east-southeast. The autumn and spring wind distribution is similar to the annual distribution with winds from the southeast, northwest, and west-northwest. During winter, winds are primarily from the northwest and west-northwest.

Figure 6-2: Annual and seasonal windroses for Maxwell Infrastructure (2015)

6.3 Local air quality monitoring

The main sources of particulate matter in the area surrounding the Project include mining, agriculture, commercial and industrial (including power generation) activities, urban activity and emissions from local anthropogenic activities such as motor vehicle exhaust and domestic wood heaters.

This section reviews the available ambient air quality monitoring data sourced from the Maxwell Infrastructure and surrounding mining operations' air quality monitoring networks along with the Upper Hunter Air Quality Monitoring Network (UHAQMN).

A review of monitoring data sourced from 16 stations has been undertaken and includes ambient PM_{10}, $PM_{2.5}$ and TSP.

Figure 6-3 shows the approximate location of each of the monitoring stations with reference to the Project. The type of air quality monitors used to measure ambient PM_{10}, $PM_{2.5}$ and TSP include Tapered Element Oscillating Microbalances (TEOMs), Beta Attenuation Monitors (BAMs) and High Volume Air Samplers (HVAS).

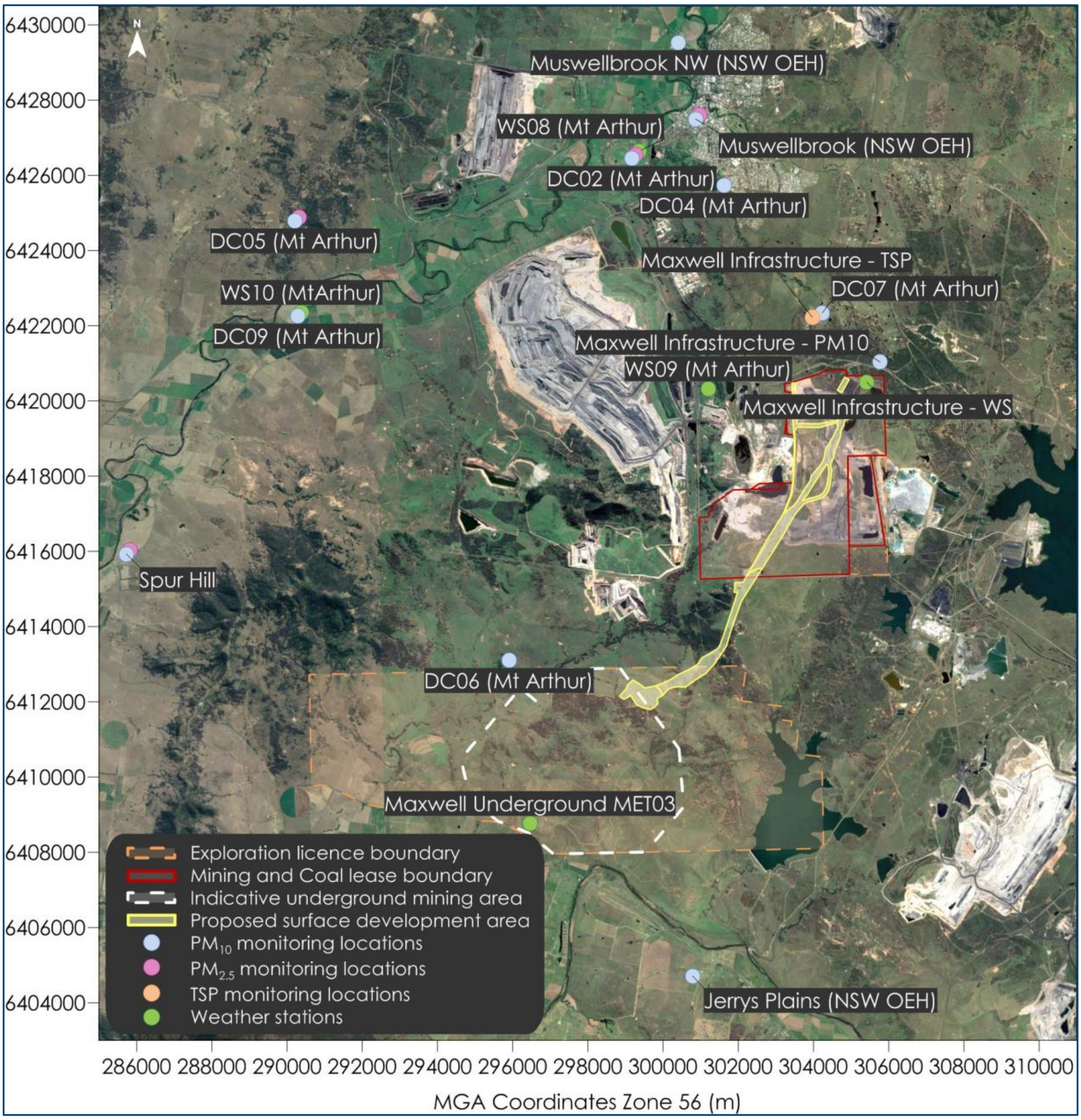

Figure 6-3: Ambient monitoring locations

6.3.1 PM_{10} monitoring

A summary of the available data from the Maxwell Infrastructure monitoring station is presented in **Table 6-2**. Recorded 24-hour average PM_{10} concentrations are presented in **Figure 6-4**.

A review of **Table 6-2** indicates that the annual average PM_{10} concentrations for the monitoring station were below the relevant criterion of 25µg/m³. The maximum 24-hour average PM_{10} concentrations recorded at the station exceeded the relevant criterion of 50µg/m³ on five occasions during the review period. Of these occasions, the two highest recordings are associated with regional dust events as evident by elevated levels also recorded at other monitoring stations in the wider area.

It can be seen from **Figure 6-4** that PM_{10} concentrations show higher readings in the spring and summer months with the warmer weather elevating the potential for drier ground and the occurrence of windblown dust, bushfires and plant pollen. It is noted that all mining, coal processing and coal handling operations at the Maxwell Infrastructure ceased in October 2016. Rehabilitation of the former mining areas at the Maxwell Infrastructure commenced in March 2018. **Figure 6-4** does not appear to indicate any obvious trend in the recorded PM_{10} level due to activity at the Maxwell Infrastructure ceasing operations. This indicates that activities at the Maxwell Infrastructure have a minimal effect on dust levels at the monitoring station.

Table 6-2: Summary of ambient PM_{10} levels from Maxwell Infrastructure (µg/m³)

Year	Annual average	Maximum 24-hour average
2013	19.2	74.1
2014	17.6	50.0
2015	13.8	56.9
2016	14.5	41.6
2017	16.1	47.3

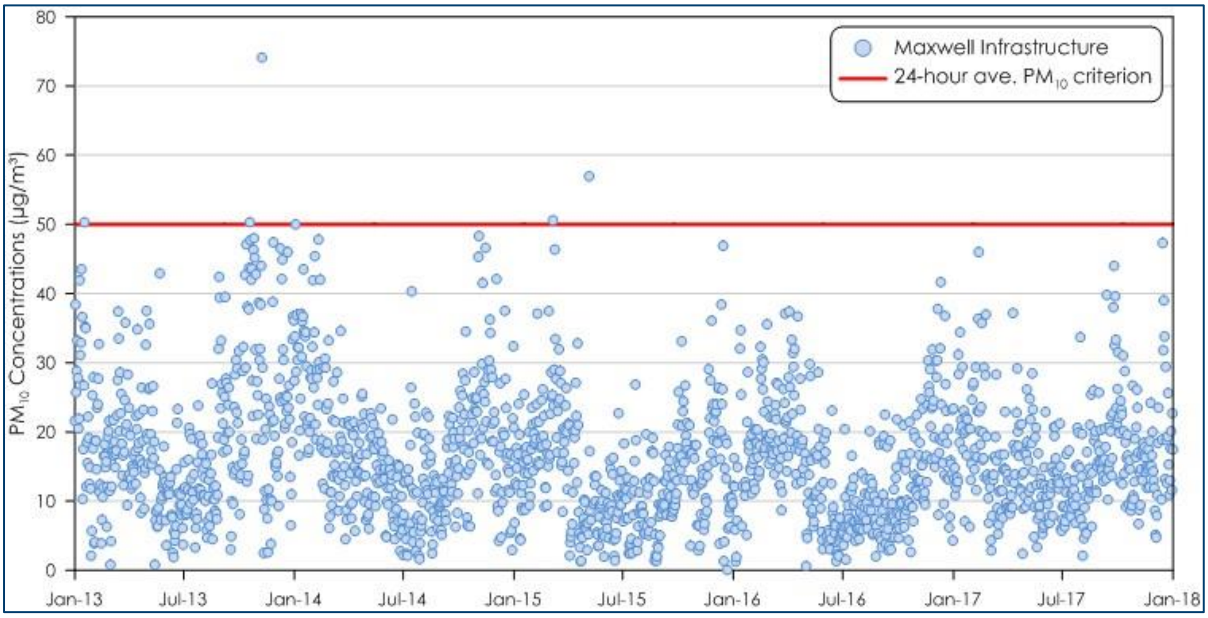

Figure 6-4: 24-hour average PM_{10} concentrations at Maxwell Infrastructure

Malabar operates a monitoring station in the Spur Hill area, which is not linked to a current or active mining operation. Ambient PM_{10} monitoring data from the Spur Hill monitoring station are summarised in **Table 6-3**. Recorded 24-hour average PM_{10} concentrations are presented in **Figure 6-5**.

A review of **Table 6-3** indicates that the annual average PM_{10} concentrations for the Spur Hill monitoring station were below the relevant criterion of 25µg/m^3. The maximum 24-hour average PM_{10} concentrations recorded at the station exceeded the relevant criterion of 50µg/m^3 on six occasions during the review period.

It can be seen from **Figure 6-5** that PM_{10} concentrations follow a similar trend to the Maxwell Infrastructure monitoring station with the higher readings in the spring and summer months. The annual average dust levels are relatively low and are indicative of the dust levels in this generally agricultural area, located away from mining and urban activities.

Table 6-3: Summary of ambient PM_{10} levels from Spur Hill (µg/m^3)

Year	Annual average	Maximum 24-hour average
2013	14.4	83.2
2014	13.8	49.0
2015	12.4	39.1
2016	13.7	38.3
2017	11.6	59.1

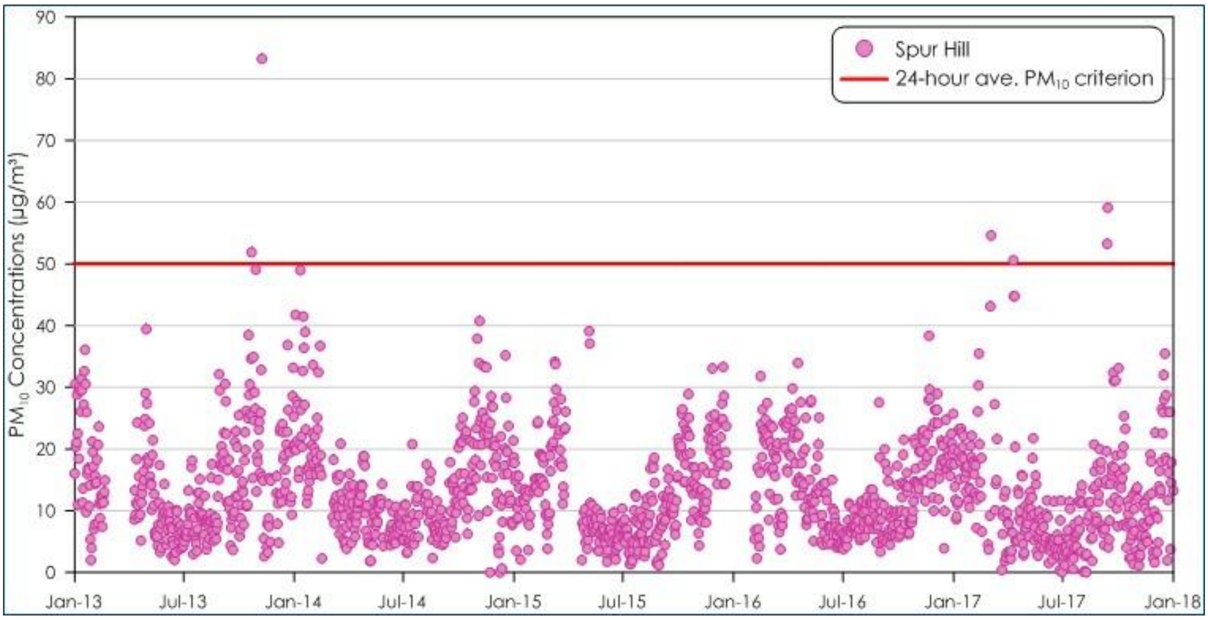

Figure 6-5: 24-hour average PM_{10} concentrations at Spur Hill

The available PM_{10} monitoring data from the UHAQMN monitoring stations have also been reviewed and are summarised in **Table 6-4**. Recorded 24-hour average PM_{10} concentrations are presented graphically in **Figure 6-6**.

A review of **Table 6-4** indicates that the annual average PM_{10} concentrations for each monitoring station were below the relevant criterion of 25µg/m^3. The maximum 24-hour average PM_{10} concentrations recorded at these stations exceeded the relevant criterion of 50µg/m^3 on 14 occasions at Jerrys Plains, eight occasions at Muswellbrook and five occasions at Muswellbrook NW during the review period.

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 including local agriculture, open cut mining activity and localised fires may have contributed to the periods of elevated PM_{10} levels.

Table 6-4: Summary of ambient PM_{10} levels from UHAQMN (µg/m³)

Location	Annual average					Maximum 24-hour average				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
Jerrys Plains (NSW OEH)	18.6	18.2	15.5	16.8	18.0	63.3	64.4	70.0	42.9	50.5
Muswellbrook (NSW OEH)	22.6	21.4	19.1	19.2	21.7	55.6	53.0	72.6	43.9	56.5
Muswellbrook NW (NSW OEH)	18.9	19.2	16.7	16.6	18.5	52.4	50.8	72.9	44.8	51.0

OEH = Office of Environment and Heritage.

Figure 6-6 shows a similar seasonal trend to **Figure 6-4** with PM_{10} concentrations nominally higher in the spring and summer months. However, the Muswellbrook and Muswellbrook NW stations, being located in or adjacent to a larger urban area, both show higher winter and autumn readings relative to the Jerrys Plains data.

Table 6-5 summarises the annual average PM_{10} levels from monitoring stations operated by the open cut Mt Arthur Mine.

For the 2013 to 2015 period, all monitoring stations recorded annual average PM_{10} levels below 25µg/m^3. 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 open cut mining operations record higher PM_{10} levels compared to those located further away.

Table 6-5: Summary of annual average PM_{10} levels from Mt Arthur Mine Monitoring Sites (µg/m³)

Location	2013	2014	2015	2016	2017
DC02 (Mt Arthur Mine)	22.3	20.9	18.3	18.1	21.2
DC04 (Mt Arthur Mine)	19.4	20.3	18.4	18.0	20.2
DC05 (Mt Arthur Mine) (1)	-	-	14.0	12.2	13.5
DC06 (Mt Arthur Mine)	9.6	14.7	10.9	12.2	13.3
DC07 (Mt Arthur Mine) (2)	-	-*	14.4	14.5	15.6
DC09 (Mt Arthur Mine) (3)	-*	15.3	12.9	14.1	16.2

(1) Data available from January 2015. (2) Data available from February 2014. (3) Data available from July 2013.
*insufficient data available to calculate annual average.

Overall, the annual average PM_{10} levels at all monitors reviewed follow similar inter-annual trends. The annual average levels at each of the monitors vary by approximately 9µg/m^3 depending on its location. The monitors located close to Muswellbrook and Jerrys Plains recorded the highest annual average PM_{10} levels and monitors located further away from these urban centres tend to record lower annual average PM_{10} levels.

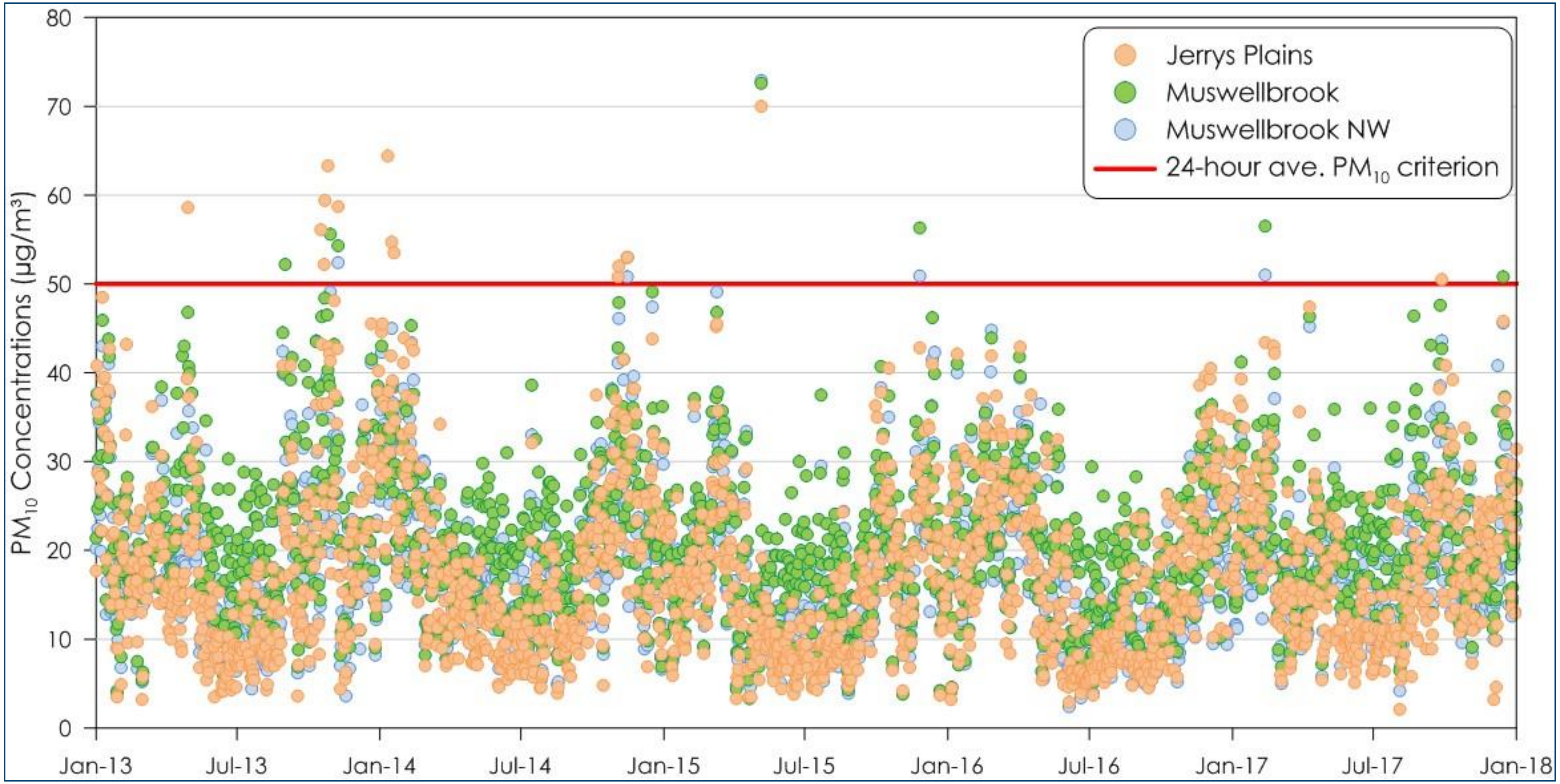

Figure 6-6: 24-hour average PM_{10} concentrations at UHAQMN monitoring stations

6.3.2 $PM_{2.5}$ monitoring

A summary of the available $PM_{2.5}$ monitoring data from the Mt Arthur, Spur Hill and UHAQMN Muswellbrook monitoring stations is presented in **Table 6-6**. The 24-hour average $PM_{2.5}$ concentrations are presented graphically in **Figure 6-7**.

Table 6-6 demonstrates that the annual average $PM_{2.5}$ concentrations for the Muswellbrook monitoring station were above the relevant criterion of 8µg/m^3. The annual average levels $PM_{2.5}$ concentrations for the DC02, DC05 and Spur Hill monitors were below the relevant criterion of 8µg/m^3 with levels approximately half those recorded at Muswellbrook.

The maximum 24-hour average $PM_{2.5}$ concentrations recorded at the Muswellbrook and Spur Hill monitoring stations exceeded the relevant criterion of 25µg/m^3 on six occasions at Spur Hill and 10 occasions at Muswellbrook. The DC02 and DC05 monitors did not record any 24-hour average $PM_{2.5}$ concentrations above the criterion.

Table 6-6: Summary of ambient $PM_{2.5}$ levels (µg/m^3)

	Annual average					Maximum 24-hour average				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
DC02 (Mt Arthur Mine)	4.5	4.4	4.0	4.3	4.2	23.8	24.7	22.0	16.2	15.2
DC05 (Mt Arthur Mine)(1)	-	-	4.3	4.4	-*	-	-	20.1	17.9	15.2
Spur Hill	6.1	5.7	5.3	5.5	5.0	63.7	33.9	21.4	18.0	33.1
Muswellbrook (NSW OEH)	9.4	9.7	8.7	8.4	9.4	36.6	27.4	31.2	29.4	31.1

(1) Data available from January 2015.

* insufficient data available to calculate annual average.

The 24-hour average $PM_{2.5}$ concentrations are presented graphically in **Figure 6-7**. A seasonal trend in 24-hour average $PM_{2.5}$ concentrations for the Muswellbrook monitoring station can be seen in **Figure 6-7** with elevated levels occurring in the cooler months. This is the opposite of 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 $PM_{2.5}$ monitors located near mining operations (and away from towns, i.e. DC02 and DC05) have no significant seasonal trends in comparison to the Muswellbrook monitoring station. This suggests the influence of anthropogenic sources on $PM_{2.5}$ levels are localised to the towns and do not significantly affect the areas that are sparsely populated near the open cut mining operations.

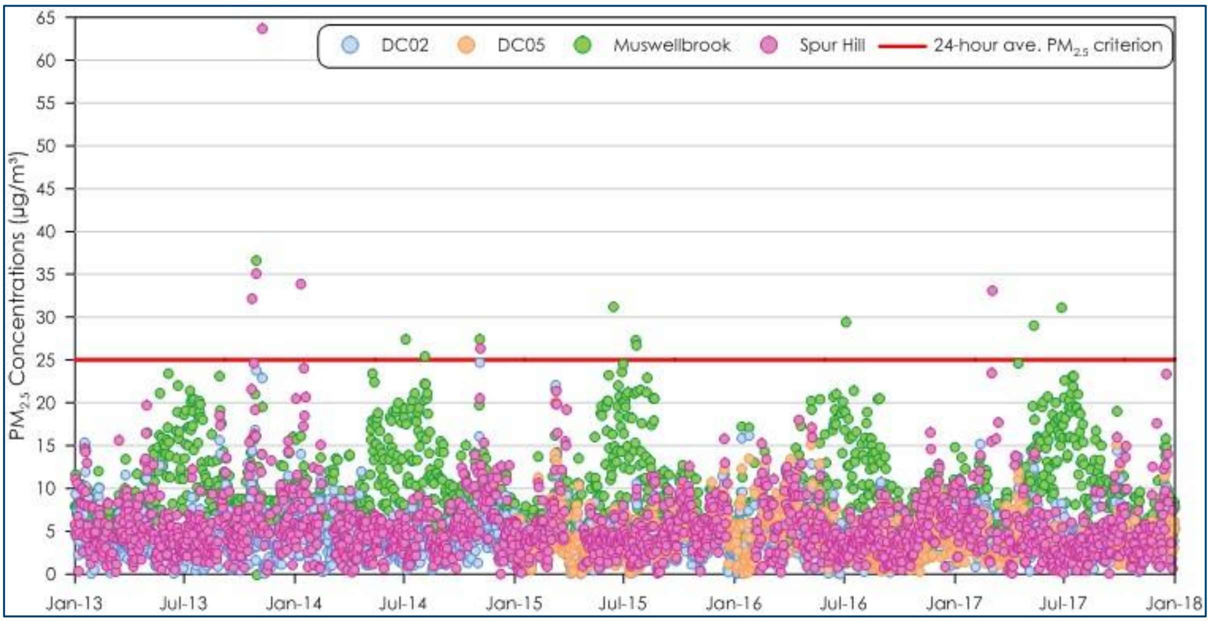

Figure 6-7: 24-hour average $PM_{2.5}$ concentrations

6.3.3 TSP monitoring

TSP monitoring data are available from a HVAS monitor operated at the Maxwell Infrastructure (see **Figure 6-3**). A summary of the results collected between 2013 and 2017 is shown in **Table 6-7**. Recorded 24-hour average TSP concentrations are presented in **Figure 6-8**.

The monitoring data presented in **Table 6-7** indicate that the annual average TSP concentrations at the Maxwell Infrastructure TSP monitor were below the annual average criterion of 90µg/m^3. **Figure 6-8** shows that the recorded 24-hour average TSP concentrations follow a generally similar trend to the PM_{10} monitoring with levels nominally higher during warmer months.

Given that mining operations were suspended at site from October 2016 until March 2018 the similar trend in the data over the years indicates that baseline TSP dust levels are not likely due to mining or coal processing operations at the Maxwell Infrastructure.

Table 6-7: Summary of annual average TSP levels from HVAS monitoring (µg/m³)

Year	Maxwell Infrastructure TSP
2013	54.6
2014	60.9
2015	47.6
2016	49.3
2017	51.9

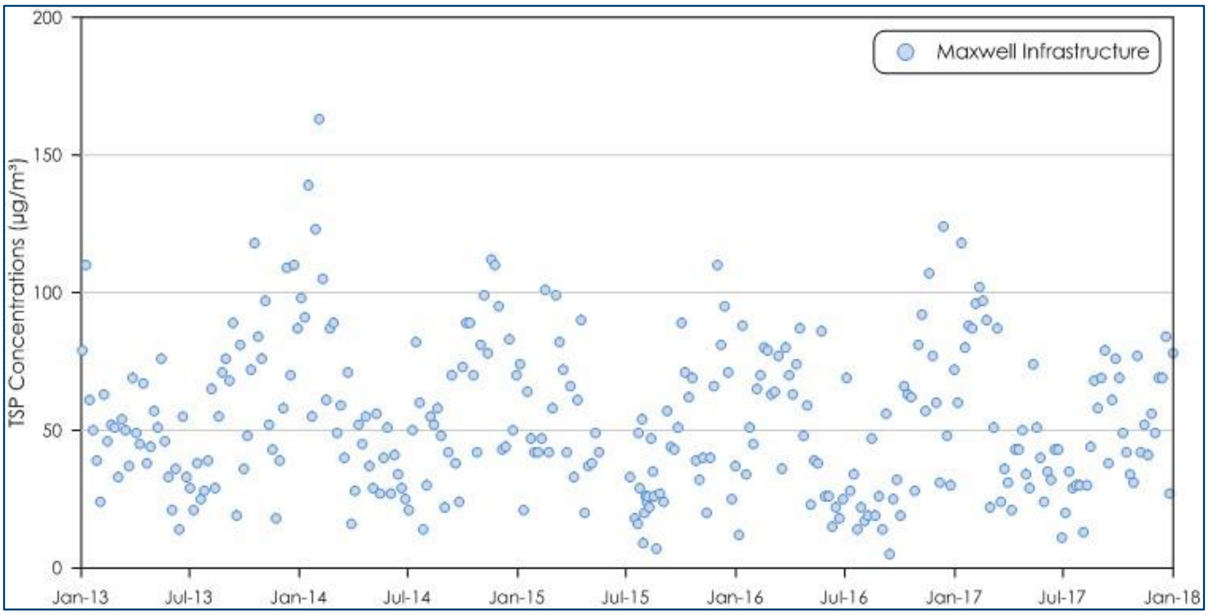

Figure 6-8: HVAS 24-hour average TSP concentrations

6.3.4 Dust deposition monitoring

Dust deposition monitoring conducted at the Maxwell Infrastructure has been reviewed.

Table 6-8 presents the annual average dust deposition levels for the Maxwell Infrastructure during 2013 to 2017. The results indicate that dust deposition levels are below the relevant criterion of 4g/m^2/month and indicate dust deposition levels are generally good in the vicinity of the Maxwell Infrastructure.

As noted, operations at the Maxwell site ceased in October 2016 and did not recommence until March 2018. The dust deposition levels in **Table 6-8** do not indicate any noticeable change due to this and suggest the operations at the Maxwell Infrastructure have minimal influence at these locations.

Table 6-8: Summary of dust deposition levels – Maxwell Infrastructure (g/m²/month)

Year	Monitoring location							
	2197	2230	2157	2208	2247	2235	2175	2130
2013	3.9	2.9	2.3	1.7	1.9	2.2	2.2	2.2
2014	3.1	2.5	2.1	2.0	2.1	2.1	2.1	2.4
2015	3.0	2.2	1.7	1.5	1.8	1.6	1.6	1.9
2016	2.9	2.0	2.1	1.5	1.8	2.0	2.0	2.2
2017	2.3	2.3	1.9	1.6	1.9	2.5	1.9	1.8

6.3.5 Nitrogen dioxide monitoring

Figure 6-9 presents the maximum daily 1-hour average NO_2 concentrations from the UHAQMN Muswellbrook monitoring station from January 2013 to December 2017.

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. It is noted the Redbank Power Station closed in 2014.

The monitoring data are well below the NSW EPA 1-hour average goal of 246µg/m^3 and the data in **Figure 6-9** indicate very little seasonal variation.

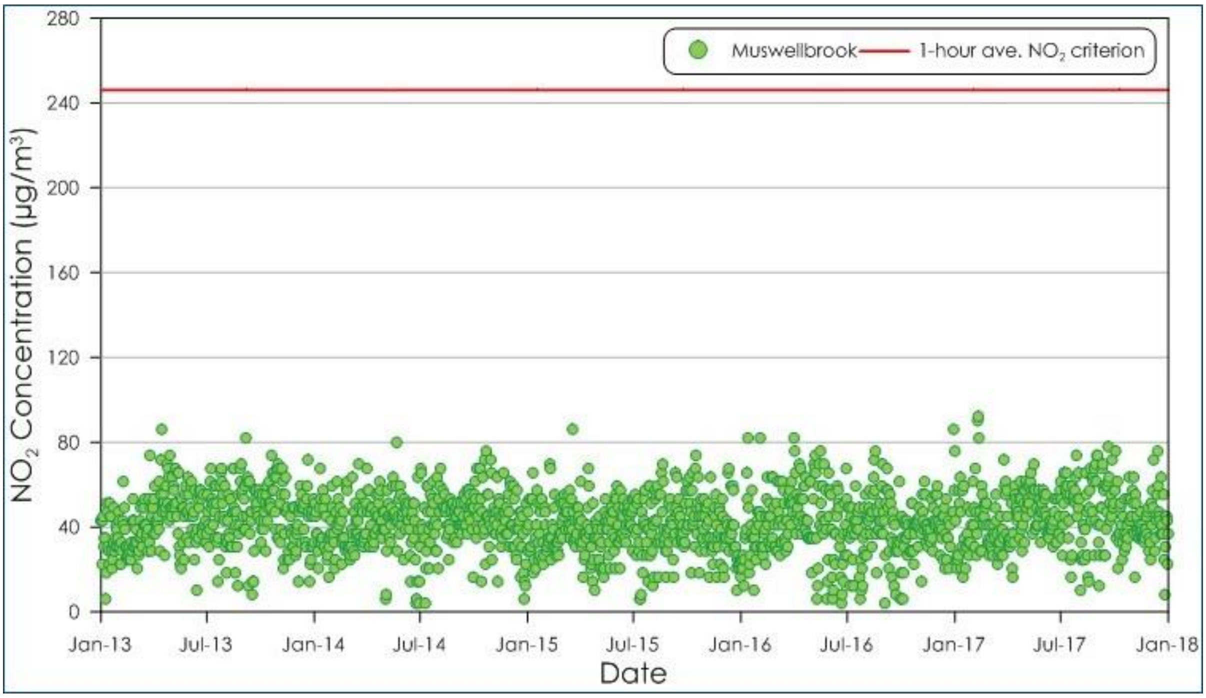

Figure 6-9: Daily 1-hour maximum NO_2 concentrations from UHAQMN Muswellbrook monitoring station

7 DISPERSION MODELLING APPROACH

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**).

7.1 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. The centre of analysis for the TAPM modelling used is 32deg23min south (302000m) and 150deg53.5min east (6415000m). 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 was selected as the period for modelling the Project (refer **Appendix B** for the justification for selecting this particular year). Accordingly, the available meteorological data from 12 nearby meteorological monitoring sites were included in the simulation. **Table 7-1** outlines the parameters used from each station.

Table 7-1: Surface observation stations used in modelling

Weather Stations	Parameters						
	WS	WD	CH	CC	T	RH	SLP
Maxwell Infrastructure	✓	✓			✓	✓	
WS08 (Mt Arthur Mine)	✓	✓			✓	✓	✓
WS09 (Mt Arthur Mine)	✓	✓			✓	✓	
WS10 (Mt Arthur Mine)	✓	✓			✓	✓	
Muswellbrook NW (NSW OEH)	✓	✓			✓	✓	
Muswellbrook (NSW OEH)	✓	✓			✓	✓	
Jerrys Plains (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 and SLP = station level pressure.

The seven critical parameters used in the CALMET modelling are presented in **Table 7-2**.

Table 7-2: 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

7.2 Meteorological modelling evaluation

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

Figure 7-1 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 the simulation produces realistic fine scale flow fields (such as terrain forced flows) in surrounding areas.

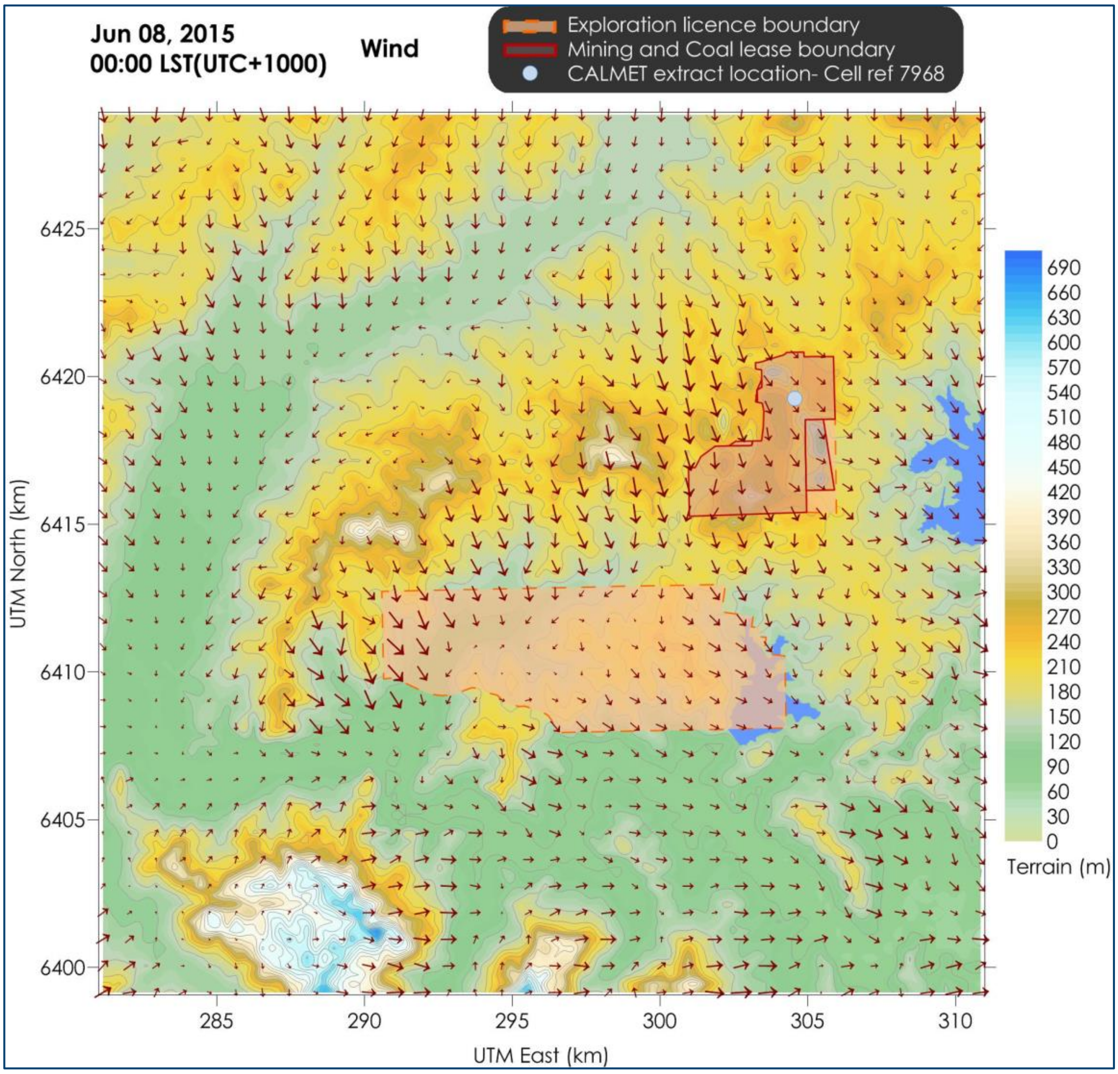

Figure 7-1: Example of the wind field for one of the 8,760 hours of the year that are modelled

CALMET generated meteorological data were extracted at a location within the CALMET domain (see **Figure 7-1**) and are graphically represented in **Figure 7-2** and **Figure 7-3**.

Figure 7-2 presents annual and seasonal windroses extracted at a location within the CALMET domain. The wind distribution patterns are generated in CALMET based on the available measurements and the expected terrain effects on the prevailing winds, and reflect the expected wind distribution patterns of the area. This is evident as the general wind directions and the relative distribution of winds in the windroses based on the CALMET data are similar to the windroses generated with the measured data, as presented in **Figure 6-2**. It is noted that the Maxwell Infrastructure weather station (**Figure 6-2**) is in a slightly different location to the data in **Figure 7-2** extracted from a grid point in the CALMET model and adopts 10-minute averaged data compared to 1-hour averaged data provided by the CALMET model.

Figure 7-3 includes graphs of the temperature, wind speed, mixing height and stability classification over the modelling period and shows trends considered to be representative of the area.

In conclusion, the CALMET generated meteorological data is considered suitable for use in the air dispersion modelling for the Project.

Figure 7-2: Windroses from CALMET extract Cell ref 7968 (2015)

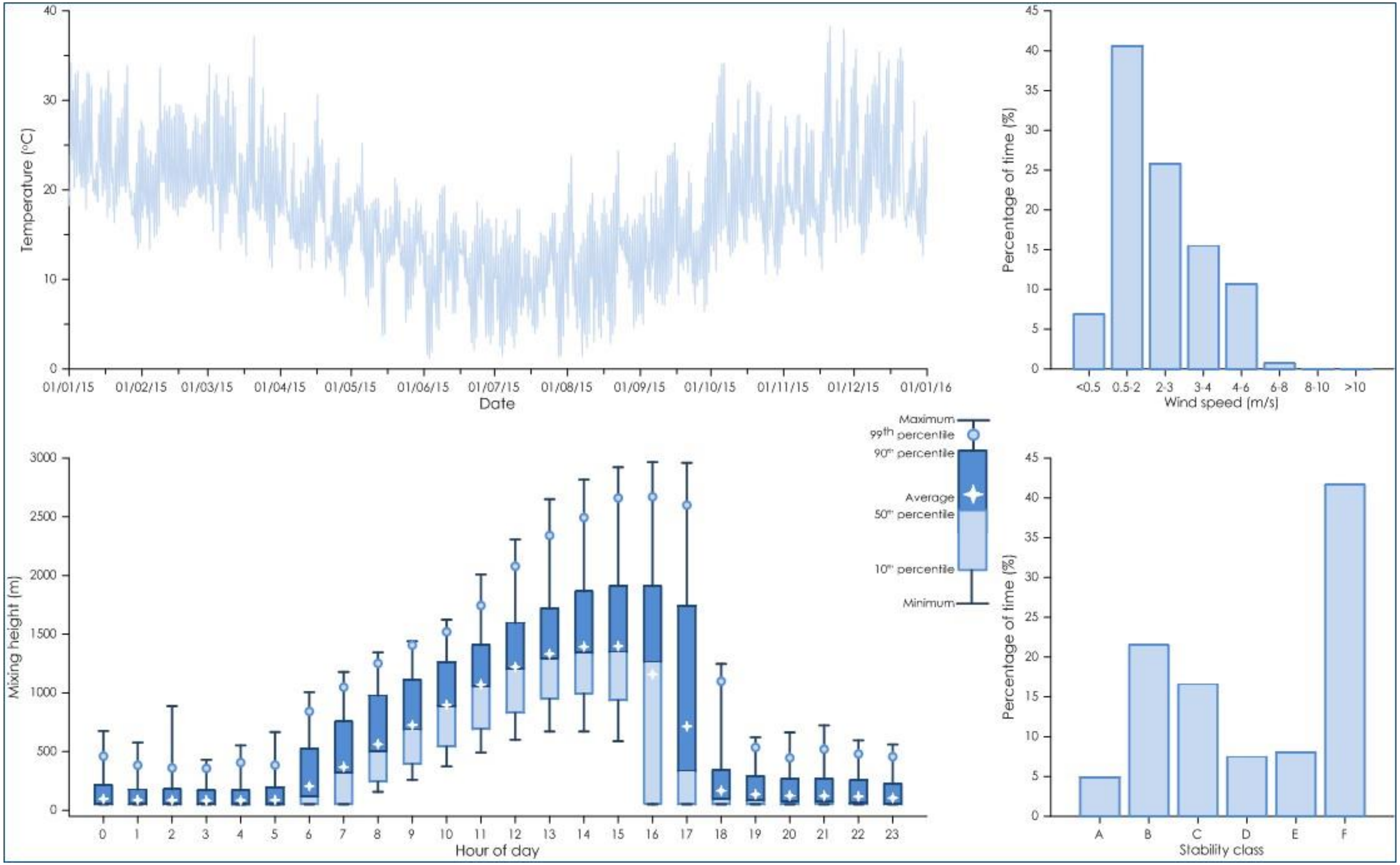

Figure 7-3: Meteorological analysis of CALMET extract Cell ref 7968 (2015)

7.3 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.

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.

7.4 Modelling scenarios

The assessment considers three indicative mine plan years (scenarios) to represent different stages of construction and operation of the Project. 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.

Construction of; the access road to the MEA, the covered overland conveyor, and, the MEA occurs in the first three years of the Project's life. During these years ROM coal is extracted at a reduced rate. In the early years, lower volumes of ROM coal would be transported via trucks to the Maxwell Infrastructure (as the conveyor is constructed) for processing and dispatch via rail to the Port of Newcastle. The site access road to the MEA would be sealed during Year 1.

The covered overland conveyor would be operational when greater volumes of coal are produced when the longwall machine is fully commissioned. This is anticipated to be operational by Year 4.

The three scenarios selected for assessment are described below.

Scenario 1, nominally Year 1. Construction activity is occurring at the MEA and along the transport and services corridor to develop the access to the mine and associated infrastructure. Excess cut material from the MEA is used in the development of the transport and services corridor and any remaining material is emplaced in the South Void. The site access road in the transport and services corridor is sealed before the end of Year 1. Development ROM coal is extracted and loaded to road registrable dump trucks which transport the material to the Maxwell Infrastructure area for processing.

Scenario 2, nominally Year 3. Construction activity continues along the transport and services corridor with the erection of the covered overland conveyor and at the Maxwell Infrastructure area with the development of the new ROM and product stockpiles. Excess cut material from the new ROM stockpile at the Maxwell Infrastructure is emplaced in the North Void. Development ROM coal is extracted at a higher rate and loaded to road registerable dump trucks which transport the material to the Maxwell Infrastructure area for processing.

Scenario 3, nominally Year 4. Construction is completed and mine is fully operational with the commissioning of the longwall machine. ROM coal is extracted at the maximum rate (up to 8 million tonnes per annum) during this period and transported to the Maxwell Infrastructure area via the covered overland conveyor. Reject material is pumped to the East Void.

Indicative plans for each of the respective scenarios are presented in **Figure 7-4** to **Figure 7-6**.

A nominal Year 0, "Construction only" scenario has also been considered in this assessment. This scenario includes the initial construction stages of the Project such as the development of the access to the MEA and associated infrastructure and the initial development of the MEA. This construction activity is estimated to occur over approximately 2 months prior to the commencement of the operations (i.e. Year 1). The estimated dust emissions for the Year 0 "Construction only" period are described in **Section 7.4.1**. A comparison of the estimated total dust emissions indicates that the likely dust generated would be much lower than the other assessed years and hence the potential impacts occurring during this period are expected to be less.

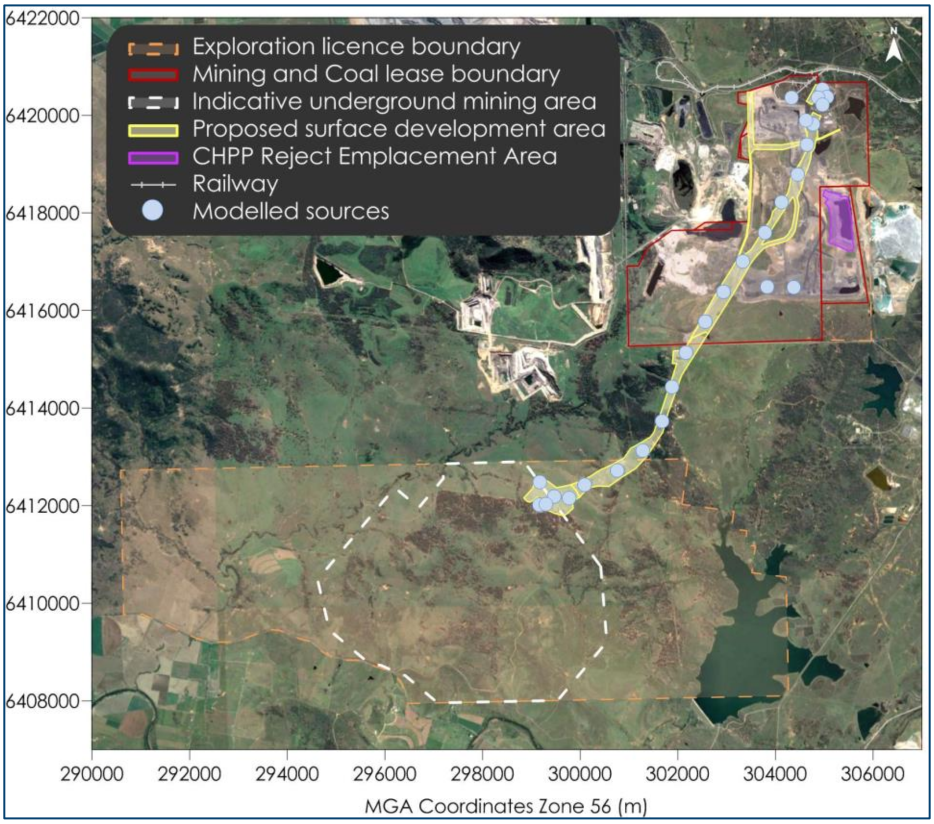

Figure 7-4: Indicative plan – Scenario 1

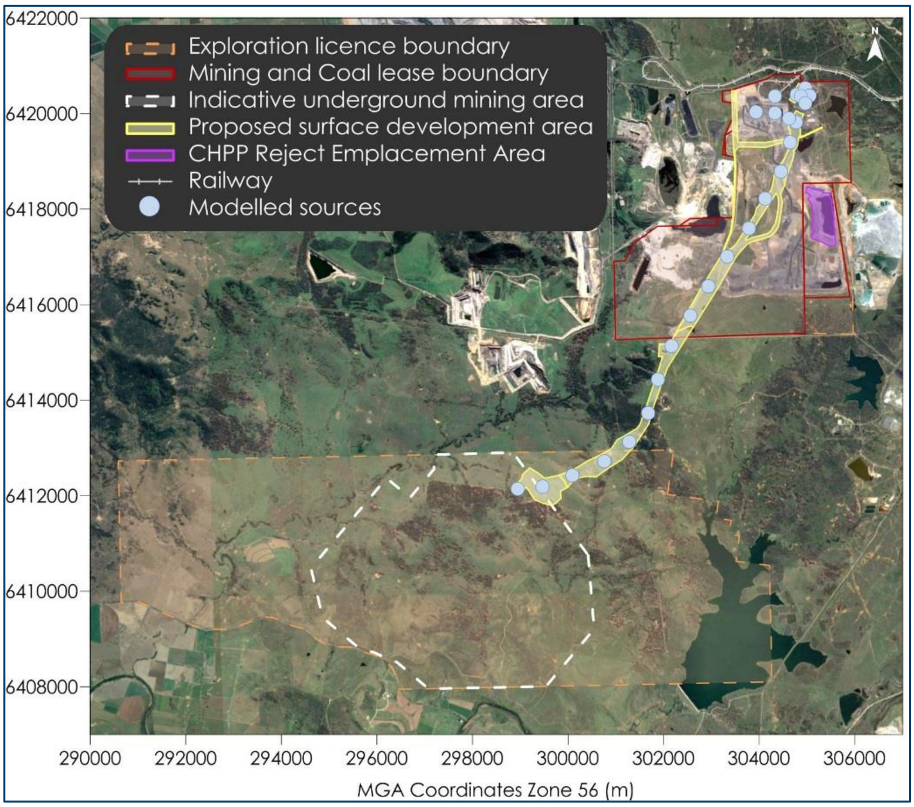

Figure 7-5: Indicative plan – Scenario 2

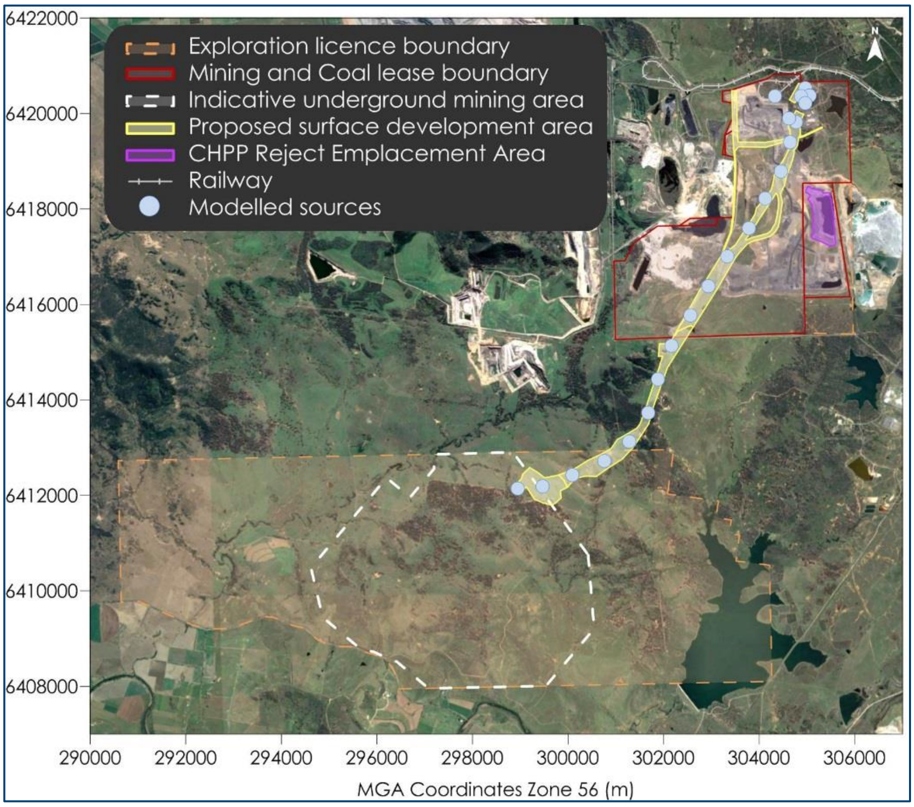

Figure 7-6: Indicative plan – Scenario 3

7.4.1 Emission estimation

For each scenario, emissions have been estimated by analysing the dust generating activities 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 Project are presented in **Table 7-3**. Full emission inventories for TSP, PM_{10} and $PM_{2.5}$ and associated calculations are presented in **Appendix C**.

The estimated emissions are commensurate with utilising reasonable best practice dust mitigation applied where feasible. Further details on the dust control measures applied for the Project are outlined in **Section 7.6**.

Table 7-3: Estimated emission for the Project (kg of TSP)

Aspect	Activity	Year 0	Year 1	Year 3	Year 4
Construction	Excavator loading cut/fill material to haul truck (Transport and Services Corridor)	38	210	-	-
	Hauling cut/fill material to emplacement area (unpaved)	221	609	-	-
	Hauling cut/fill material to emplacement area (paved)	-	145	-	-
	Emplacing cut/fill material at area (Transport and Services Corridor)	38	210	-	-
	Dozers shaping (Transport and Services Corridor)	4,519	49,704	-	-
	Exposed areas (Transport and Services Corridor)	14,425	13,624	-	-
	Excavator loading cut/fill material to haul truck (Transport and Services Corridor)	-	83	739	-
	Hauling cut/fill material to emplacement area (unpaved)	-	241	-	-
	Hauling cut/fill material to emplacement area (paved)	-	58	1,023	-
	Emplacing cut/fill material at area (Transport and Services Corridor)	-	83	739	-
	Exposed areas (Transport and Services Corridor)	-	9,617	28,850	-
	Excavator loading cut/fill material to haul truck at MEA	326	1,785	-	-
	Hauling cut/fill material to MEA emplacement area	464	2,525	-	-
	Emplacing cut/fill material to MEA emplacement area	65	356	-	-
	Hauling cut/fill material from MEA to Site Access Road (unpaved)	677	1,742	-	-
	Hauling cut/fill material from MEA to Site Access Road (paved)	-	537	-	-
	Emplacing MEA cut/fill material at Site Access Road	10	49	-	-
	Hauling cut/fill material from MEA to Southern Highwall (unpaved)	25,059	68,403	-	-
	Hauling cut/fill material from MEA to Southern Highwall (paved)	-	21,109	-	-
	Emplacing MEA cut/fill material at Southern Highwall	252	1,376	-	-
	Hauling cut/fill material from MEA to Conveyor (unpaved)	-	194	-	-
	Hauling cut/fill material from MEA to Conveyor (paved)	-	60	-	-
	Emplacing MEA cut/fill material at Conveyor	-	5	-	-
	Dozers shaping (MEA)	13,556	99,408	-	-
	Exposed areas (MEA)	9,517	53,929	-	-
	Excavator loading cut/fill material to haul truck at Maxwell Infrastructure	-	-	601	-
	Hauling cut/fill material to Maxwell Infrastructure emplacement area	-	-	252	-
	Emplacing cut/fill material to Maxwell Infrastructure emplacement area	-	-	35	-
	Hauling cut/fill material from Maxwell Infrastructure to North Void	-	-	3,754	-

Aspect	Activity	Year 0	Year 1	Year 3	Year 4
	Emplacing Maxwell Infrastructure cut/fill material at North Void	-	-	529	-
	Dozers shaping	-	-	30,124	-
	Exposed areas	-	-	5,677	-
	Diesel Equipment	406	3,504	972	-
Operation	**MEA**				
	Conveying ROM coal from underground portal	-	46	119	119
	Conveying ROM coal from portal to CHPP at the Maxwell Infrastructure (Year 4)	-	-	-	742
	Unloading ROM coal to surge stockpile at the MEA	-	91	393	1,560
	Dozers on the MEA surge stockpile	-	61,826	72,056	72,056
	Loading ROM coal to haul truck	-	22,338	96,143	-
	Wind erosion from Portal stockpile	-	573	573	573
	Ventilation shaft	-	59,477	59,477	89,215
	Maxwell Infrastructure and Transport and Services Corridor				
	Hauling ROM to hopper	-	73,816	75,883	-
	Unloading ROM into hopper	-	3,351	14,421	-
	Rehandle ROM at hopper (50%)	-	11,169	48,071	-
	Secondary crushing	-	280	1,206	4,782
	Tertiary screen	-	514	2,211	8,767
	Transfer station	-	91	393	1,560
	Unloading to Bypass stockpile	-	7	14	72
	Unloading to Product stockpile	-	32	167	451
	Unloading to western product stockpile	-	-	-	150
	Dozers on ROM stockpiles	-	-	-	122,561
	Dozers on Product stockpiles	-	-	-	30,913
	Conveying Product to train load-out facility	-	33	33	33
	Loading coal to train	-	51	239	982
	Pumping rejects (wet - no emission)	-	-	-	-
	Wind erosion from ROM stockpile	-	1,381	1,381	1,381
	Wind erosion from Product stockpile	-	4,184	8,367	16,734
	Grading roads	-	32,373	-	-
	General				
	Diesel-powered surface fleet	-	1,289	901	659
	Locomotive idling[1]	-	515	515	515
Total TSP emissions		**69,573**	**603,002**	**455,858**	**353,825**

[1] The estimated emissions conservatively assume there are three locomotives idling continuously on the rail loop for all scenarios (Appendix C).
Note: Totals may vary slightly due to rounding.
kg = kilograms.

7.4.2 Emissions from other mining operations

In addition to the estimated dust emissions from the Project, emissions from nearby approved open cut mining operations were also modelled, in accordance with their current consents (or current proposed projects), to assess potential cumulative dust effects. This is consistent with the request from MSC in regard to considering cumulative effects from all such mining activities.

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 7-4 summarises the emissions adopted in this assessment for each nearby mining operation with potential to tangibly influence the dust levels at receptors near the Project.

Table 7-4: Estimated emissions from nearby mining operations (kg of TSP)

Operation	Scenario 1	Scenario 2	Scenario 3
Bengalla Mine (Open cut)(1)	7,814,997	8,077,249	8,208,375
Mt Arthur Mine (Open cut)(2)	16,245,280	16,913,635	17,205,729
Hunter Valley Operations (Open cut)(4)	11,235,404	11,765,165	12,030,045

(1) Todoroski Air Sciences (2013a). (2) PAEHolmes (2013). (3) Todoroski Air Sciences (2013b). (4) PAEHolmes (2010).

The emission estimates for the Mt Arthur Mine were adjusted to account for the different meteorological conditions in this assessment compared with the conditions applied in Mt Arthur Mine's assessment (**PAEHolmes, 2013**). The methodology applied to do this is identical to the methodology applied in the *Cumulative Impact Assessment Mt Arthur, Bengalla and Mangoola Coal Mines* (**Todoroski Air Sciences, 2014**).

In addition to the emissions from nearby open cut mining operations, there would be numerous smaller or more distant sources that contribute to the total background (residual) dust level. The residual level of dust due to all such non-modelled sources has been included in the cumulative results as discussed in **Section 7.5**. The residual level of dust would encompass the mining operations of; Mount Pleasant Operation, Mangoola Mine, Greater Ravensworth Area Operations and Muswellbrook Coal Mine, and other sources such as the Liddell and Bayswater Power Stations. These are located in positions or at distances from the Project, such that their individual explicit inclusion in the model would not make any discernible contribution to dust levels at receptors near the Project.

7.4.3 NO_X emission estimation

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

The diesel-powered mining equipment at the Project are assumed to have an equivalent Tier 1 standard for NO_X emissions of 6.9 grams per brake horsepower per hour (g/bhp.hr). For the road registerable dump trucks, an emission standard of Euro IV is assumed for NO_X emissions, i.e. 3.5 grams per kilowatt hour (g/kWh).

The planned diesel-powered equipment operated at the Project and their forecast emissions are outlined in **Table 7-5**.

The emission rates used in the modelling are considered conservative and likely to overestimate actual emissions from mining equipment as they are based on a worst-case tier emission standard and assumed to operate continuously for the available operational hours in each scenario without taking into account potential equipment downtime.

Table 7-5: Summary of diesel powered equipment and associated emissions (kg/year)

Equipment	Year 0	Year 1	Year 3	Year 4
Construction equipment (various)	25,701	226,249	62,059	-
Road registerable dump trucks	-	13,687	13,687	-
Grader	-	11,094	-	-
Watercart (15,000 litres)	-	13,694	-	-
CAT 992 FEL	-	39,273	39,273	-
D11	-	13,172	13,172	42,150
Locomotive idling[1]	-	17,870	17,870	17,870
Total NO_X emissions	**25,701**	**335,039**	**146,061**	**60,020**

[1] The estimated emissions conservatively assume there are three locomotives idling continuously on the rail loop for all scenarios (Appendix C).

As part of the gas management at the Project, pre-mining gas drainage (completed as a component of underground operations) and goaf gas drainage would occur when required to reduce the content of gas within the coal seams. Gas would be drained through an underground collection system and delivered to a centralised gas management infrastructure at the surface.

The centralised gas management infrastructure is intended to be constructed in the vicinity of the upcast ventilation shaft site. At the centralised gas management infrastructure, the gas would be either vented or flared to the atmosphere depending on the methane content of the gas collected. If feasible (i.e. if there is sufficient methane content), Malabar may also use gas collected from the underground operations for power generation (noting that gas content testing to date indicates that the methane content would be too low).

The use of coal seam methane gas in flaring or power generation has the potential to generate emissions of NO_X. Given that these activities would be practically limited and based on the author's experience, the amount of NO_X emissions from this source is not expected to be significant compared to the other sources associated with the Project and existing sources in the surrounding area. It is noted that with the location of the centralised gas management infrastructure being well away from any nearby receptor locations, and with the emission of NO_X occurring at height (nominally 9 metres [m]) with sufficient velocity (approximately 20 metres per second [m/s]) and temperature (approximately 500°C), the expected contribution due to this source would be minimal at the receptor locations.

7.5 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 address the total potential cumulative impact as described in **Section 7.4.2**.

The contribution to the prevailing annual average background dust level from other non-modelled dust sources was estimated as the difference between the modelled past mining activities (including the distant mines) during 2015 and the actual measured data during 2015. The modelling of the past 2015 mine activities is based on the known rates of activity and mine locations and included activities at the Maxwell Infrastructure, Mt Arthur Mine, Hunter Valley Operations and Bengalla Mine that were occurring in 2015.

Table 7-6 presents a summary of the modelling predictions and measured level at each monitoring location and the calculated difference.

Table 7-6: Summary of background dust level estimation (µg/m³)

Dust metric	Monitor ID	Model Prediction	Measured Level	Difference (Residual Dust Level)
TSP	Maxwell Infrastructure - TSP	16.4	47.6	31.2
PM_{10}	Muswellbrook (NSW OEH)	7.4	19.0	11.6
	Muswellbrook NW (NSW OEH)	33.4	16.7	16.7
	Jerrys Plains (NSW OEH)	1.6	15.5	13.9
	DC02 (Mt Arthur Mine)	11.4	18.3	6.9
	DC04 (Mt Arthur Mine)	8.3	18.4	10.1
	DC06 (Mt Arthur Mine)	5.3	10.9	5.6
	DC07 (Mt Arthur Mine)	10.7	14.4	3.7
	Maxwell Infrastructure - PM10	11.4	13.8	2.4
	Spur Hill	3.2	12.4	9.2
$PM_{2.5}$	Muswellbrook (NSW OEH)	0.7	8.7	8.0
	DC02 (Mt Arthur Mine)	1.1	4.0	2.9
	DC05 (Mt Arthur Mine)	2.3	4.3	2.0
	Spur Hill	0.3	5.3	5.0
Dust deposition	2197	1.6	3.0	1.4
	2230	0.3	2.2	1.9
	2157	0.4	1.7	1.3
	2208	0.1	1.5	1.4
	2247	0.1	1.8	1.7
	2235	0.1	1.6	1.5
	2175	0.1	1.6	1.5
	2130	0.1	1.9	1.7

Note: Residual dust levels may vary slightly due to rounding.

The average difference between the measured and predicted $PM_{2.5}$, PM_{10}, TSP, and, deposited dust levels from each of the monitoring points was considered to be the contribution from other dust sources, and was added to the future predicted values to account for the background dust levels.

The estimated annual average contribution from other dust sources applied in the assessment is presented in **Table 7-7**.

Table 7-7: Estimated contribution from other non-modelled dust sources

Dust metric	Averaging period	Unit	Estimated contribution
TSP	Annual	µg/m³	31.2
PM_{10}	Annual	µg/m³	8.9
$PM_{2.5}$	Annual	µg/m³	4.5
Dust deposition	Annual	g/m²/month	1.6

It is important to recognise that the values in **Table 7-7** are not the total measured background levels, rather they are the residual amount of the background dust that is **not** accounted for in the air dispersion modelling.

The background levels applied in this assessment, includes the contribution from AGL Energy Limited's Liddell Power Station. AGL Energy Limited plan to close the Liddell Power Station in 2022. Therefore, the predictions arising from the modelling are likely to be conservative beyond 2022.

7.6 Dust mitigation and management

Consideration has been made of the mitigation measures that can be applied for the Project.

The measures to be implemented by the Project are commensurate with those 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 which would be applied are shown in **Table 7-8**. Where applicable these controls have been applied in the dust emission estimates shown in **Table 7-3**. It should be noted that in the context of the mainly open cut mining activities nearby, the Project has inherently low emissions because it is an underground mine. Further specific detail on the level of control applied is set out in **Appendix C**.

Table 7-8: Dust mitigation measures applied at the Project

Activity	Dust control
Loading/ emplacing material	Minimise fall height of materials where practicable.
Hauling on unsealed surfaces	Application of water and regular maintenance of unsealed surfaces.
Unloading ROM coal to hopper at the Maxwell Infrastructure 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 as required at transfer points.
Stacking coal onto existing product coal stockpiles at the Maxwell Infrastructure	Luffing stacker to reduce fall height of materials at stockpiles.
Wind erosion on stockpiles	Water application to stabilise surface of stockpiles.
Wind erosion of exposed rock or soils	Water application to stabilise surface of inactive exposed surfaces, as well as areas of primary rehabilitation inactive for extended periods.

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

Reactive dust mitigation strategies can include visual triggers for dust plumes and high dust concentration alarms to alert staff of the potential for off-site dust impacts to arise.

Any substantial dust plumes or high dust concentration alarms generated from the operations would trigger the implementation of dust management measures. These would vary depending on the source of the dust and conditions at the time. The actions may include increasing watering of coal stockpiles or temporarily ceasing non-essential surface operations with the aim to ensure dust levels at dust monitors stay below the criterion level.

Prior to commencement of operations at the Project, a detailed Air Quality Management Plan will be developed for the site. The Air Quality Management Plan would outline the measures to manage air emissions and include aspects such as key performance indicators, monitoring methods, response mechanisms, compliance reporting and complaints management.

7.7 Potential coal dust emissions from train wagons

As coal produced by the Project would be transported via rail to market or the Port of Newcastle for export there is potential to generate coal dust emissions from train wagons.

The dust emissions from this source are not anticipated to generate any significant impact based on a number of different studies that have investigated this activity, including:

- A 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.
- Another study conducted for the Australian Rail Track Corporation (ARTC) (**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 hypothesised that the significant increase of smaller measured particles ($PM_{2.5}$ and PM_1) associated with rail movements indicates that the elevated particulate 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 analysis of these data with additional data in the form of the number of locomotives on each passing train and precipitation data for the general area (**Malecki and Ryan, 2015**) was also conducted. The analysis suggests that the number of locomotives on each passing train has little influence on particulate levels which indicates that diesel particles are not a significant source. The effect of rainfall on a previous day was found to have a significant impact on particulate levels on the following day. This finding would tend to indicate that the key mechanism for the increased particulate levels was due to passing trains stirring up existing dust particles which had previously settled on the tracks and nearby ground and that the influence on particulate levels was the same regardless of the type of train that was passing.
- A review of studies presenting modelling predictions for coal train wagons travelling in the Hunter Valley region (similar to what is proposed for the Project) predicts relatively small dust impacts associated with rail transport with a maximum 24-hour PM_{10} concentration of between 1.2-1.7µg/m^3 50m from the rail centreline (**Todoroski Air Sciences, 2017a & 2017b**). This result is consistent with the findings of the other 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.

Based on the above studies, the transport of coal off-site associated with the Project is unlikely to result in any adverse air quality impacts. The Project would also operate within existing approved limits on rail movements on the Antiene Rail Spur (albeit over a longer period). Nevertheless, the Project would control dust emissions from rail wagons to minimise where possible emissions through application of appropriate mitigation measures such as streamlining and consistent profiling of the coal surface within the rail wagons, minimising spillage and parasitic loading and regular collection and cleaning of any coal spillage.

8 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 receptors of relevance to this study shown in **Figure 3-1**, and detailed in **Appendix A**, were assessed individually as discrete receptors. The predicted results are presented in tabular form for each of the assessed years in **Appendix D**. Associated isopleth diagrams of the dispersion modelling results are presented in **Appendix E**.

8.1 Summary of modelling results

Table 8-1 presents a summary of the highest maximum predicted level at any privately-owned and mine-owned receptors assessed for each scenario. The results in **Table 8-1** indicate that no exceedances of the relevant criteria are predicted to arise for the assessed dust metrics.

Table 8-1: Summary of modelling predictions for all scenarios – highest maximum predicted level at any receptor

Pollutant		Period	Criteria	Results per Modelling Scenario		
				Scenario 1	Scenario 2	Scenario 3
$PM_{2.5}$ (µg/m³)	Project in isolation (Incremental)	24-hr ave.	25*	0.7	0.7	0.7
		Ann. ave.	-	0.1	0.1	0.1
PM_{10} (µg/m³)		24-hr ave.	50*	2.9	3.3	6.2
		Ann. ave.	-	0.4	0.3	0.8
TSP (µg/m³)		Ann. ave.	-	0.8	0.8	1.7
DD (g/m²/mth)		Ann. ave.	2	<0.1	<0.1	<0.1
$PM_{2.5}$ (µg/m³)	Total impact (Cumulative)	Ann. ave.	8	5.4	5.5	5.5
PM_{10} (µg/m³)		Ann. ave.	25	18.4	18.8	19.5
TSP (µg/m³)		Ann. ave.	90	43.3	44.0	45.1
DD (g/m²/mth)		Ann. ave.	4	1.8	1.8	1.8

* Note that cumulative 24-hr average criteria also apply.
DD =Dust Deposition.

8.2 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 the 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 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 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. In simple terms, the contemporaneous assessment involves matching one year of ambient air quality monitoring data with meteorological data representing the same period.

The analysis has focussed on the following assessment locations, which represent the closest and most likely impacted receptor locations surrounding the Project:

- Receptors 410, 390, and 403, which are representative of receptors in the vicinity of the Maxwell Infrastructure (highlighted in a purple box in **Figure 8-1**);
- Receptor 60b, which is representative of receptors to the west and northwest of the MEA (highlighted in a blue box in **Figure 8-1**); and
- Receptors 226c and 536, which are representative of receptors to the south, southeast and southwest of the MEA (highlighted in a green box in **Figure 8-1**).

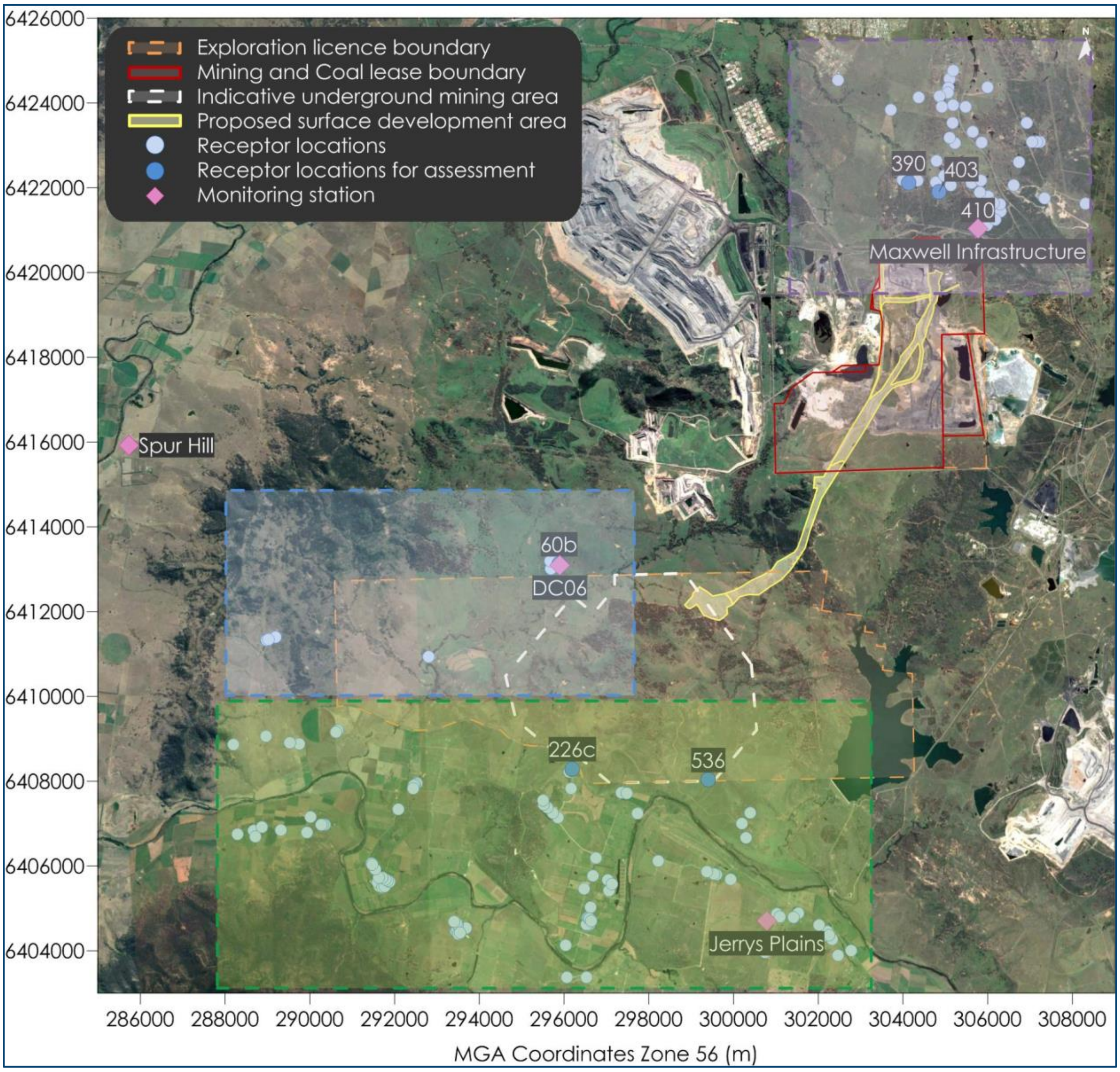

Figure 8-1: Locations considered as part of the contemporaneous cumulative impact assessment

Table 8-2 sets out the monitoring sites that have been adopted as the 24-hour background level for the purposes of the "Level 2 assessment – Contemporaneous impact and background approach". The location of these monitors in relation to the Project and surrounding receptors is shown on **Figure 8-1**.

The Spur Hill monitoring station has been adopted for the assessment of $PM_{2.5}$ cumulative impacts, as it is considered representative of background levels experienced at the assessed receptors.

Table 8-2: Monitoring site adopted as background level for NSW EPA contemporaneous assessment

Receptor ID	Monitoring Year	$PM_{2.5}$ Analysis	PM_{10} Analysis
60b	2015	Spur Hill	DC06
226c	2015	Spur Hill	Jerrys Plains
390	2015	Spur Hill	Jerrys Plains
403	2015	Spur Hill	Maxwell Infrastructure
410	2015	Spur Hill	Maxwell Infrastructure
536	2015	Spur Hill	Maxwell Infrastructure

Where data is unavailable in the monitoring datasets for the contemporaneous period, the 70th percentile of the monitoring dataset has been applied to substitute for these gaps. This approach provides a reasonable indication of the potential background level on day where data is unavailable.

Table 8-3 provides a summary of the contemporaneous assessment at each assessed sensitive receptor location. The results in **Table 8-3** indicate that for the assessed sensitive receptors, no exceedances of the cumulative 24-hour average $PM_{2.5}$ and PM_{10} criteria are predicted due to the operation of the Project.

Detailed tables of the full assessment results are provided in **Appendix F**.

Table 8-3: 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
60b[1]	0	0	0	0	0	0
226c	0	0	0	0	0	0
390	0	0	0	0	0	0
403	0	0	0	0	0	0
410[2]	0	0	0	0	0	0
536[2]	0	0	0	0	0	0

[1] Owned by BHP.

[2] Owned by Malabar.

Further analysis of the predicted cumulative $PM_{2.5}$ and PM_{10} concentrations at Receptor 60b and 410 are presented in **Figure 8-2** to **Figure 8-7**.

The figures show time series predictions of the 24-hour average $PM_{2.5}$ and PM_{10} concentrations as a result of the Project. The orange bars represent the adopted ambient background level for that receptor (**Table 8-2**) and the blue bars represent the predicted incremental contribution due to the Project at that receptor.

Figure 8-2: Predicted 24-hour average $PM_{2.5}$ and PM_{10} concentrations for sensitive receptor location 60b during Scenario 1

Figure 8-3: Predicted 24-hour average $PM_{2.5}$ and PM_{10} concentrations for sensitive receptor location 60b during Scenario 2

Figure 8-4: Predicted 24-hour average $PM_{2.5}$ and PM_{10} concentrations for sensitive receptor location 60b during Scenario 3

Figure 8-5: Predicted 24-hour average $PM_{2.5}$ and PM_{10} concentrations for sensitive receptor location 410 during Scenario 1

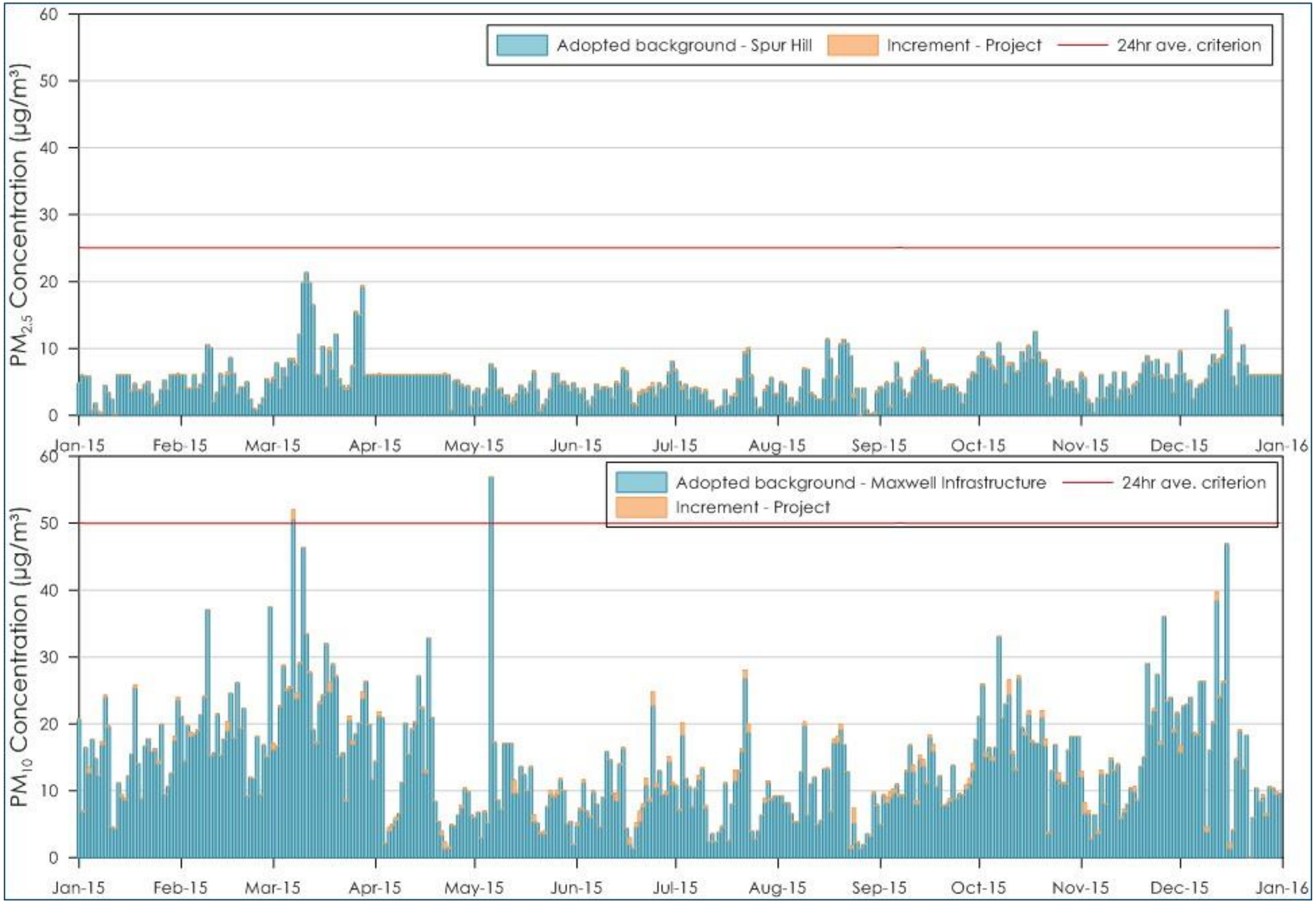

Figure 8-6: Predicted 24-hour average PM$_{2.5}$ and PM$_{10}$ concentrations for sensitive receptor location 410 during Scenario 2

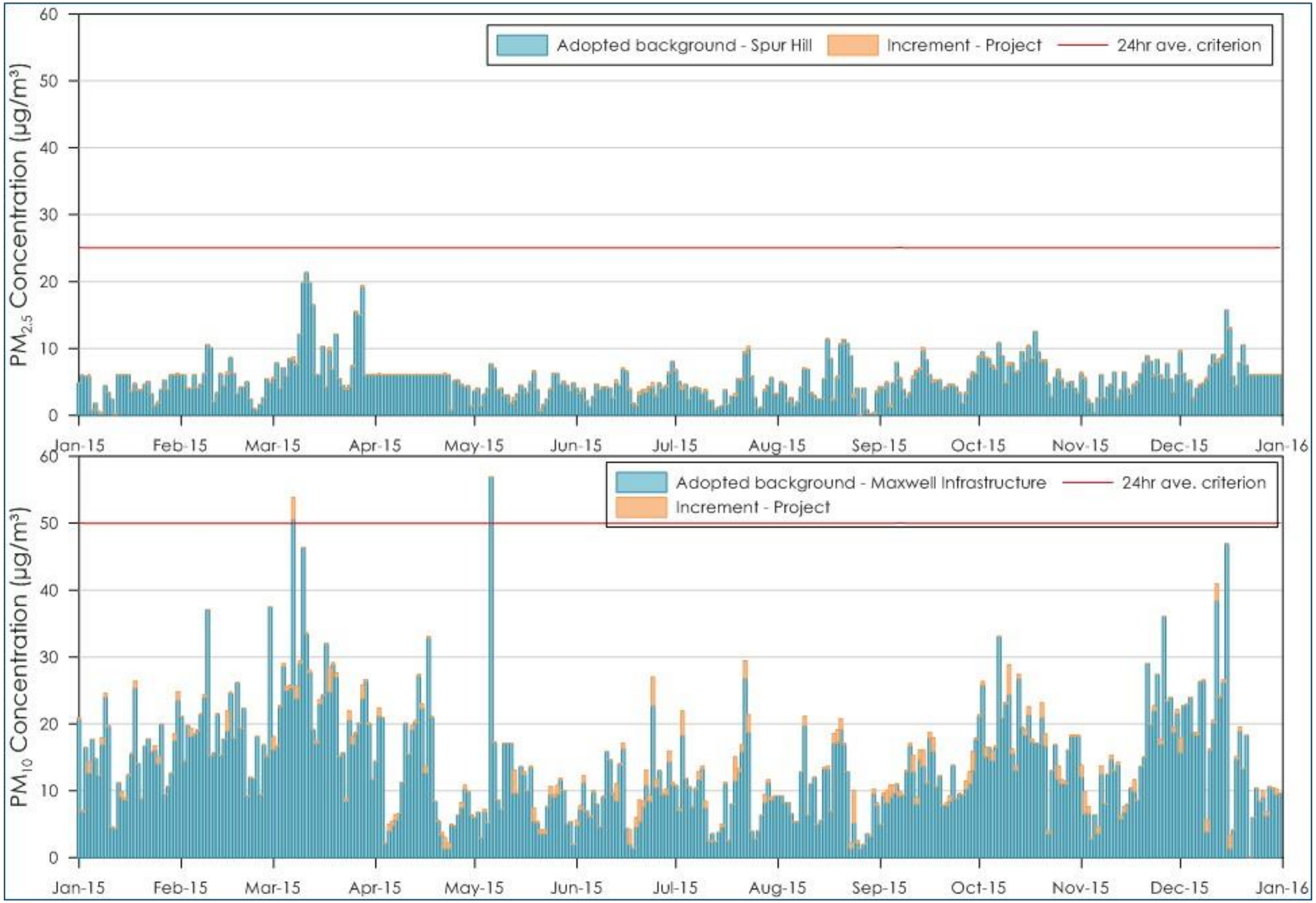

Figure 8-7: Predicted 24-hour average $PM_{2.5}$ and PM_{10} concentrations for sensitive receptor location 410 during Scenario 3

8.3 Assessment of impacts per VLAMP criteria

8.3.1 Summary of modelling predictions

The results in **Table 8-1** indicate the highest maximum predicted level at the assessed receptors would be below the applicable VLAMP mitigation and acquisition criteria outlined **Table 5-2** and **Table 5-3**, respectively, for each scenario.

8.3.2 Dust impacts on privately-owned land

As required by the VLAMP, the potential impacts due to the Project, extending over more than 25% of any privately-owned land, have been evaluated using the predicted pollutant dispersion contours.

The results at the criteria level concentrations show the maximum 24-hour average PM_{10} predictions would have the most spatial extent, relative to any of the other assessed dust metrics and hence 24-hour average PM_{10} represents the most impacting parameter.

Based on the isopleth diagrams in **Appendix E**, the extent of the predicted maximum 24-hour average PM_{10} level of 50µg/m^3 would not extend over more than 25% of any privately-owned land parcels, and it can be concluded that the Project would not cause impact per this criterion.

8.4 Assessment of NO_X emissions

Dispersion modelling of the potential NO_X emissions associated with diesel powered equipment was conducted for each modelling scenario. Modelled sources were described as point sources and impacts due to the Project were added to the ambient background level to assess potential impacts.

The NO_2 monitoring data presented in **Section 6.3.5** show that the maximum measured 1-hour average and annual average NO_2 background level at the Muswellbrook monitor during 2015 was 86.1µg/m^3 and 39.6µg/m^3, respectively.

It is noted that the background levels measured in Muswellbrook are likely to be higher than the levels for the majority of receptor locations as there are many densely positioned sources of NO_X in Muswellbrook, such as motor vehicles. The measured levels are considered to be conservative and likely to overestimate actual levels.

A 25% rate of conversion of NO_X to NO_2 is assumed for the modelling predictions. This is conservative, as a conversion rate of approximately 10% to 20% is typical. For the purposes of this assessment, a hypothetical complete conversion level of 100% has also been considered as a screening level evaluation.

Table 8-4 presents a summary of the highest maximum predicted level at any privately-owned and mine-owned receptors assessed for each scenario. The results in **Table 8-4** indicate that there are no impacts predicted to arise for NO_2. As described in **Section 7.4.3**, there is the potential for a small amount of NO_X emissions to be generated from gas management activities. Given the magnitude of these emissions, the predicted NO_2 concentrations in **Table 8-4** would not materially change if gas management activities were specifically modelled. That is, there would be no exceedances of the 1-hr average or annual average criteria.

Table 8-4: Summary of NO_2 modelling predictions for all scenarios – highest maximum predicted level at any receptor

Pollutant		Period	Air quality impact criteria	Modelling Scenario					
				Maximum potential impact 25% conversion			Hypothetical 100% conversion		
				1	2	3	1	2	3
NO_2 (µg/m³)	Project in isolation	1-hr ave.	-	13.5	8.2	7.0	54.1	32.9	27.9
		Ann. ave.	-	0.4	0.1	0.03	1.5	0.3	0.1
	Total impact	1-hr ave.	246	99.6	94.3	93.1	140.2	119.0	114.0
		Ann. ave.	62	40.1	39.8	39.7	41.2	40.0	39.8

Each of the privately-owned and mine-owned receptors were assessed individually as discrete receptors with the predicted results presented in **Appendix D**. Associated isopleth diagrams of the dispersion modelling results are presented in **Appendix E**.

9 GREENHOUSE GAS ASSESSMENT

9.1 Introduction

This assessment aims to estimate the predicted emissions of greenhouse gases to the atmosphere due to all stages of the Project, including construction, operation and decommissioning, and to provide a comparison of the direct emissions at the state and national level.

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 Project defined as:

> "*...from sources within the boundary of an organisation as a result of that organisation's activities*" (**Department of the Environment and Energy, 2018a**).

Scope 2 and 3 emissions occur due to the indirect sources from the Project 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, 2018a**).

For the purpose of this assessment, emissions generated in all three scopes defined above have been considered.

It is noted that Scope 3 emissions can be a significant component of the total emissions inventory; however, these emissions are not directly controlled by Malabar. These emissions are to be considered in the Scope 1 emissions from other various organisations related to the Project (principally customers).

Scope 3 emissions also arise from a number of various other sources indirectly associated with the operation of the Project such as emissions generated by employees travelling to and from the site. The relatively minor individual contributions of some sources of Scope 3 emissions, which 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 associated with the operation and construction of the Project include emissions of fugitive gases from the exposed coal seams, the on-site consumption of electricity and the on-site combustion of diesel fuel.

The estimated amount of fugitive gases generated from the exposed coal seams were calculated from the average amount of gas generated per tonne of material for each of the different coal seams. These estimates were provided by Malabar and the varying volumes of fugitive gas generated over the life of the Project were estimated based on the production schedule.

Similarly, on-site electricity consumed would also vary over the life of the Project (e.g. increased coal production would require more electricity). The estimated annual quantities of fugitive gas generated and on-site electricity consumed during the life of the Project are summarised in **Table 9-1**.

Table 9-1: Estimated quantities of fugitive gas and electricity consumption for the Project

Period	Fugitive gas ($x10^6$ m^3)	Electricity (GWh)
0	1	-
1	12	19
2	12	24
3	14	28
4	31	73
5	38	73
6	45	71
7	46	69
8	13	71
9	34	70
10	30	64
11	37	71
12	42	68
13	39	57
14	33	55
15	30	53
16	16	54
17	34	50
18	32	53
19	36	53
20	33	55
21	30	55
22	34	54
23	28	51
24	26	55
25	18	27
26	11	23

In contrast to the fugitive gas volumes and electricity consumption, the volume of diesel consumed is expected to be relatively constant throughout the life of the Project as the number of mobile fleet would not vary following the commencement of longwall mining.

The estimated annual volume of diesel used during the operational phase of the Project is 1,540 m^3. In addition, it is estimated that approximately 400 m^3 of diesel would be used for construction and haulage activities in Year 0, 3,200 m^3 in Year 1, and 1,900 m^3 in Year 2.

These quantities of fugitive gas emitted, on-site electricity and diesel fuel usage are worst-case estimates of greenhouse gas emissions. In particular, as noted in **Section 7.4.3**, the Project may include gas management and abatement (e.g. flaring) to reduce the overall amount of methane liberated from the coal seams. Given the expected low inherent methane levels in the ventilation air, the estimated amount of fugitive gas generated assumes that no greenhouse gas abatement occurs due to practical constraints.

Scope 3 emissions have been identified as resulting from the purchase of diesel, electricity and the transport of and final use of product coal by customers. These emissions have the potential to vary in the future depending on the market situation, including the distance to the customers' facilities and use of alternative technologies that capture carbon.

Product coal would be transported to the Port of Newcastle by rail and then transferred to coal loaders then shipped to its final destination. The return rail distance is approximately 240km. The approximate shipping distance of 21,200km (return) for coking coal and 18,400km (return) for thermal coal is based predominately on destinations in the Asian market.

The emissions generated from the end use of coal have been assumed to be used in steel making (75%) and power generation (25%). To calculate the potential greenhouse gas emissions associated with the final use of the product coal in other countries, this assessment has assumed the emissions generated in other countries would be equivalent to those generated in NSW for the same activity.

9.2.2 Emission factors

To quantify the amount of carbon dioxide equivalent (CO_2-e) material generated from the Project, emission factors obtained from the NGA Factors (**Department of the Environment and Energy, 2018a**) and other sources as required are summarised in **Table 9-2**.

Table 9-2: Summary of greenhouse gas emission factors

Type	Energy content factor (GJ/kL or GJ/t)	Emission factor			Units	Scope
		CO_2	CH_4	N_2O		
Diesel	38.6	69.9	0.1	0.2	kg CO_2-e/GJ	1
		3.6	-	-		3
Electricity[1]	-	0.82	-	-	kg CO_2-e/kWh	2
		0.1	-	-		3
Rail transport	-	16.6	-	-	t CO_2-e/Mt-km	3
Ship transport	-	3.7	-	-	t CO_2-e/Mt-km	3
Coking coal	Variable [2]	91.8	0.02	0.2	kg CO_2-e/GJ	3
Thermal coal	Variable [2]	90	0.03	0.2	kg CO_2-e/GJ	3

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

[1] Based on purchased electricity from the NSW grid.

[2] Energy content factors varied per year of operation based on testing data provided by Malabar (energy content factors ranged from 27.1 to 28.4 GJ/t).

9.3 Summary of greenhouse gas emissions

Table 9-3 summarises the estimated annual CO_2-e emissions for the construction and operational phases of the Project.

Whilst estimated CO_2-e emissions during decommissioning have not been specifically quantified in **Table 9-3**, they would be significantly less than the estimated operational emissions for the Project because fugitive emissions, electricity use and diesel use would be lower.

Table 9-3: Summary of greenhouse gas emissions for the Project (kt CO_2-e)

Year	Fugitive emissions	Diesel		Electricity		Rail transport	Ship transport	Coking coal	Thermal coal
	Scope								
	1	1	3	2	3	3	3	3	3
0	16	1.1	0.1	-	-	-	-	-	-
1	142	13	0.7	15.9	1.9	1.2	23	573	187
2	148	9	0.5	19.6	2.4	4.6	88	2,161	706
3	177	4.2	0.2	22.8	2.8	5.7	109	2,720	889
4	461	4.2	0.2	59.5	7.3	23.5	448	11,172	3,651
5	521	4.2	0.2	59.7	7.3	23.0	438	10,912	3,567
6	649	4.2	0.2	58.3	7.1	21.1	402	10,120	3,308
7	634	4.2	0.2	56.6	6.9	20.9	398	10,006	3,270
8	156	4.2	0.2	58.0	7.1	22.2	422	10,600	3,464
9	474	4.2	0.2	57.5	7.0	22.7	431	10,859	3,549
10	410	4.2	0.2	52.1	6.4	18.4	350	8,813	2,881
11	506	4.2	0.2	58.5	7.1	24.6	468	11,823	3,864
12	560	4.2	0.2	55.7	6.8	26.7	508	12,935	4,228
13	499	4.2	0.2	46.4	5.7	23.7	451	11,504	3,760
14	411	4.2	0.2	45.5	5.5	22.2	422	10,785	3,525
15	358	4.2	0.2	43.4	5.3	21.8	416	10,607	3,467
16	193	4.2	0.2	44.0	5.4	24.4	465	11,859	3,876
17	485	4.2	0.2	41.1	5.0	19.1	364	9,292	3,037
18	443	4.2	0.2	43.2	5.3	21.9	417	10,647	3,480
19	481	4.2	0.2	43.3	5.3	23.6	448	11,474	3,750
20	438	4.2	0.2	44.9	5.5	21.6	411	10,529	3,441
21	339	4.2	0.2	45.2	5.5	20.2	385	9,844	3,218
22	323	4.2	0.2	44.5	5.4	17.8	339	8,715	2,848
23	225	4.2	0.2	42.2	5.1	15.4	292	7,516	2,457
24	240	4.2	0.2	45.2	5.5	19.5	371	9,518	3,111
25	272	4.2	0.2	21.9	2.7	17.0	323	8,283	2,707
26	172	4.2	0.2	18.5	2.3	10.4	198	5,124	1,675

Note: Some values have been rounded.
kt = kilotonnes.

9.4 Contribution of greenhouse gas emissions

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

Table 9-4: Summary of greenhouse gas emissions per scope (Mt CO_2-e)

Period	Scope 1	Scope 2	Scope 3
Annual	0.37	0.04	12.1
Total over 26 years	**9.9**	**1.1**	**326**

Mt CO_2-e = Million tonnes of carbon dioxide equivalent.

The estimated annual greenhouse gas emissions for Australia during 2016 was 533.0Mt CO_2-e (**Department of the Environment and Energy, 2018b**). In comparison, the estimated annual average greenhouse emission for the Project is 0.41Mt CO_2-e (Scope 1 and 2). Therefore, the annual contribution of greenhouse emissions from the Project in comparison to the Australian greenhouse emissions for the 2016 period is estimated to be approximately 0.08%.

At a state level, the estimated greenhouse emissions for NSW in the 2016 period was 130.3Mt CO_2-e (**Department of the Environment and Energy, 2018b**). The annual contribution of greenhouse emissions from the Project in comparison to the NSW greenhouse emissions for the 2016 period is estimated to be approximately 0.31%.

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 Project are considered conservative.

9.5 Greenhouse gas management

The Project 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 Project 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;
- monitoring the total site electricity consumption and investigating avenues to minimise the requirement;
- use of waste mine gasses to fuel power generation capacity (where feasible); and
- use of electricity from renewable resources (where available).

10 SUMMARY AND CONCLUSIONS

This study has examined the air quality and greenhouse gas impacts which may arise from the proposed Project underground coal mining operation.

The air dispersion modelling methodology uses recent and comprehensive weather and dust monitoring data, incorporates conservative emission estimation and considers activity at other nearby coal mining operations.

The results indicate that for all assessed dust metrics, the Project, given that it would be an underground mining operation, would produce very modest dust emissions with the predicted levels being below the relevant criterion at the assessed privately-owned and mine-owned receptor locations. There are no likely air quality impacts associated with NO_2 emissions from diesel powered equipment and gas management activities.

A contemporary and conservative greenhouse gas assessment of the Project has been completed. The estimated annual average greenhouse emission is 0.41Mt CO_2-e material (Scope 1 and 2), which is calculated to be approximately 0.08% of the Australian greenhouse emissions and approximately 0.31% of the NSW greenhouse emissions for the 2016 period.

Overall, the assessment shows that no adverse air quality impacts would arise due to the construction and operation of the Project.

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12 GLOSSARY

Background levels	Existing concentration of pollutants in the ambient air.
CALPUFF	A multi-layer, multi-species, non-steady state Gaussian puff dispersion model that is able to simulate the effects of time- and space-varying meteorological conditions on pollutant transport.
Dispersion modelling	Modelling by computer to mathematically simulate the effect on plume dispersion under varying atmospheric conditions; used to calculate spatial and temporal fields of concentrations and particle deposition due to emissions from various source types.
Greenhouse gases	Gases with potential to cause climate change (e.g. methane, carbon dioxide and non-methane volatile organic compounds). Usually expressed in terms of carbon dioxide equivalent.
Incremental impact	The impact due to an emission source (or group of sources) in isolation, i.e. without including background levels.
µg	Mass in micrograms.
NO_x	Oxides of nitrogen, including NO and NO_2.
PM_{10}	Particulate matter less than 10 µm in aerodynamic equivalent diameter.
$PM_{2.5}$	Particulate matter less than 2.5 µm in aerodynamic equivalent diameter.
Sensitive receptor	A location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area.
TAPM	CSRIO's PC-based, 3-D prognostic model for air pollution studies.
Total impact	The total impact of an emission source (or group of sources) and existing ambient levels of a pollutant; i.e. the total impact is equal to background levels plus the incremental impact.
TSP	Total suspended particulate (matter).

Appendix A
Sensitive Receptor Locations

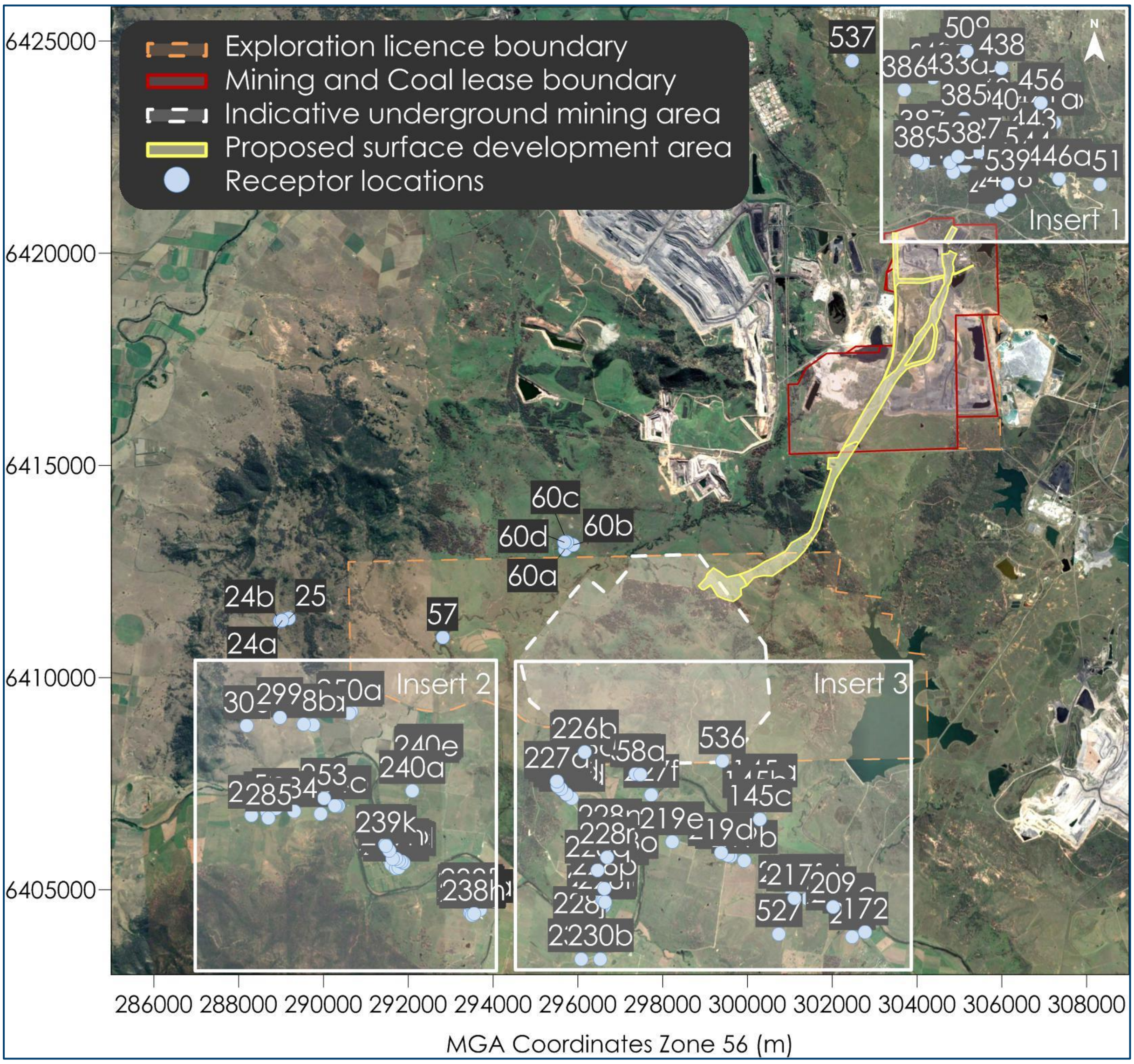

Figure A-1: Location of receptors assessed in this study

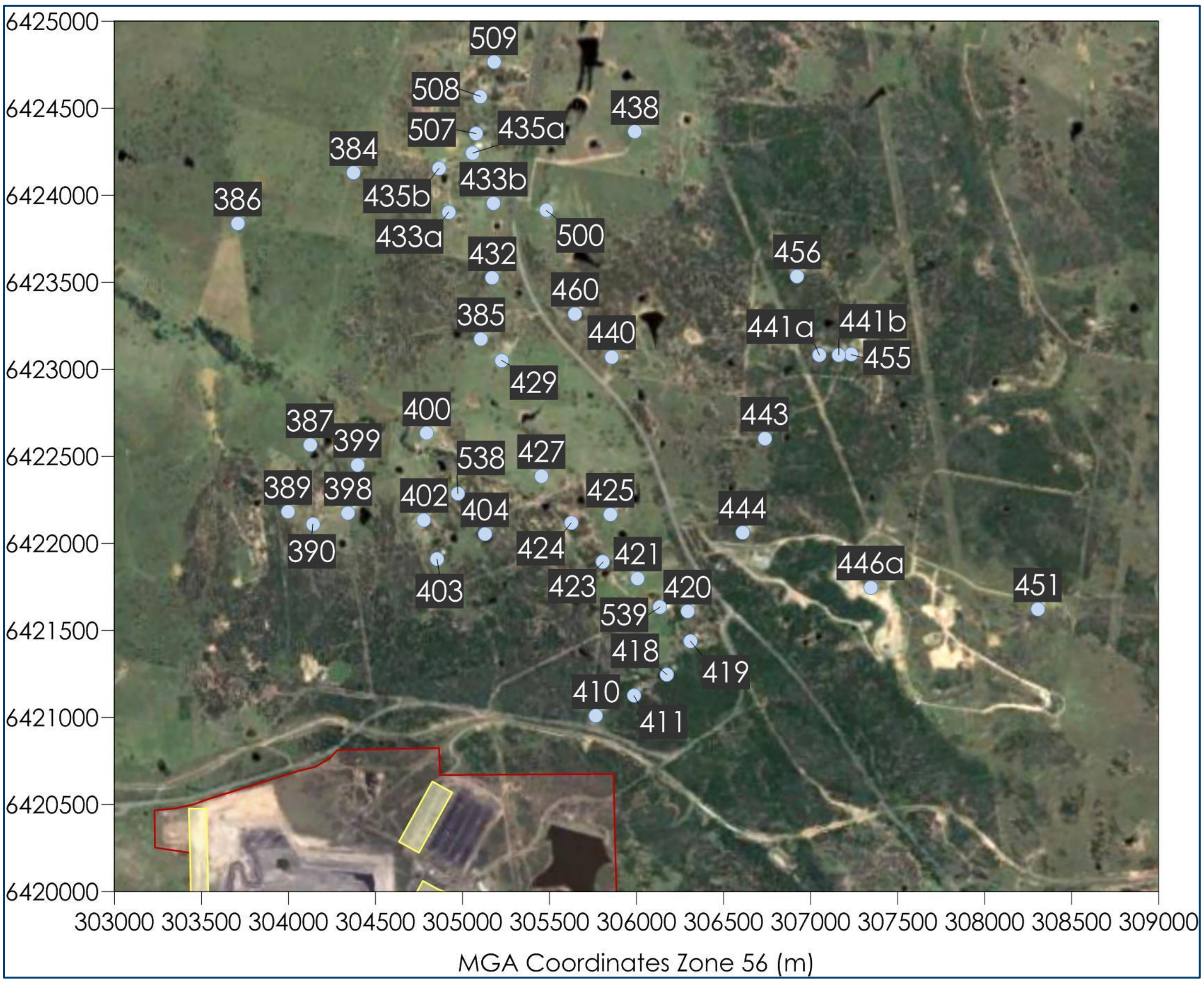

Figure A-2: Location of receptors assessed in this study – Insert 1

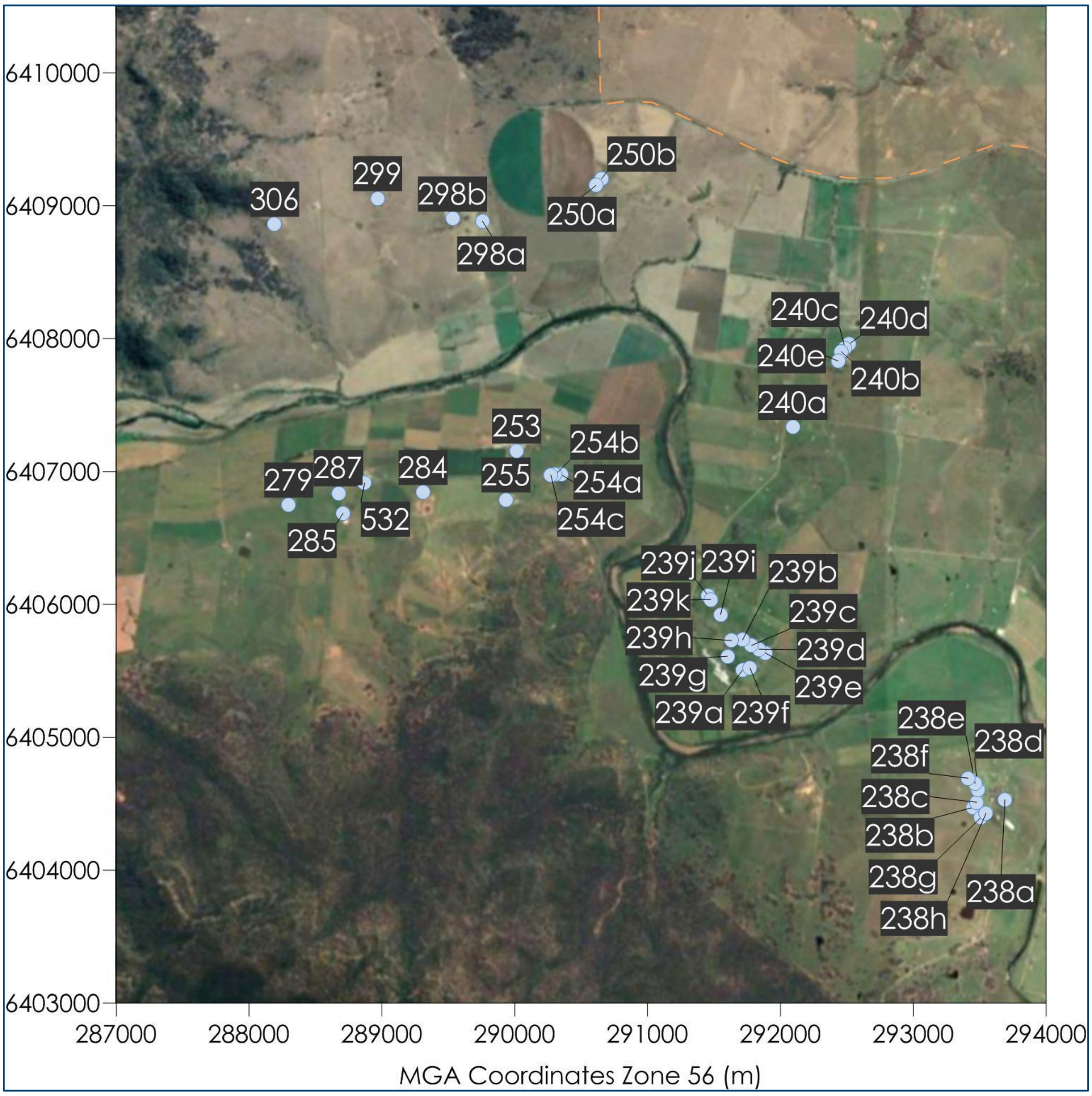

Figure A-3: Location of receptors assessed in this study – Insert 2

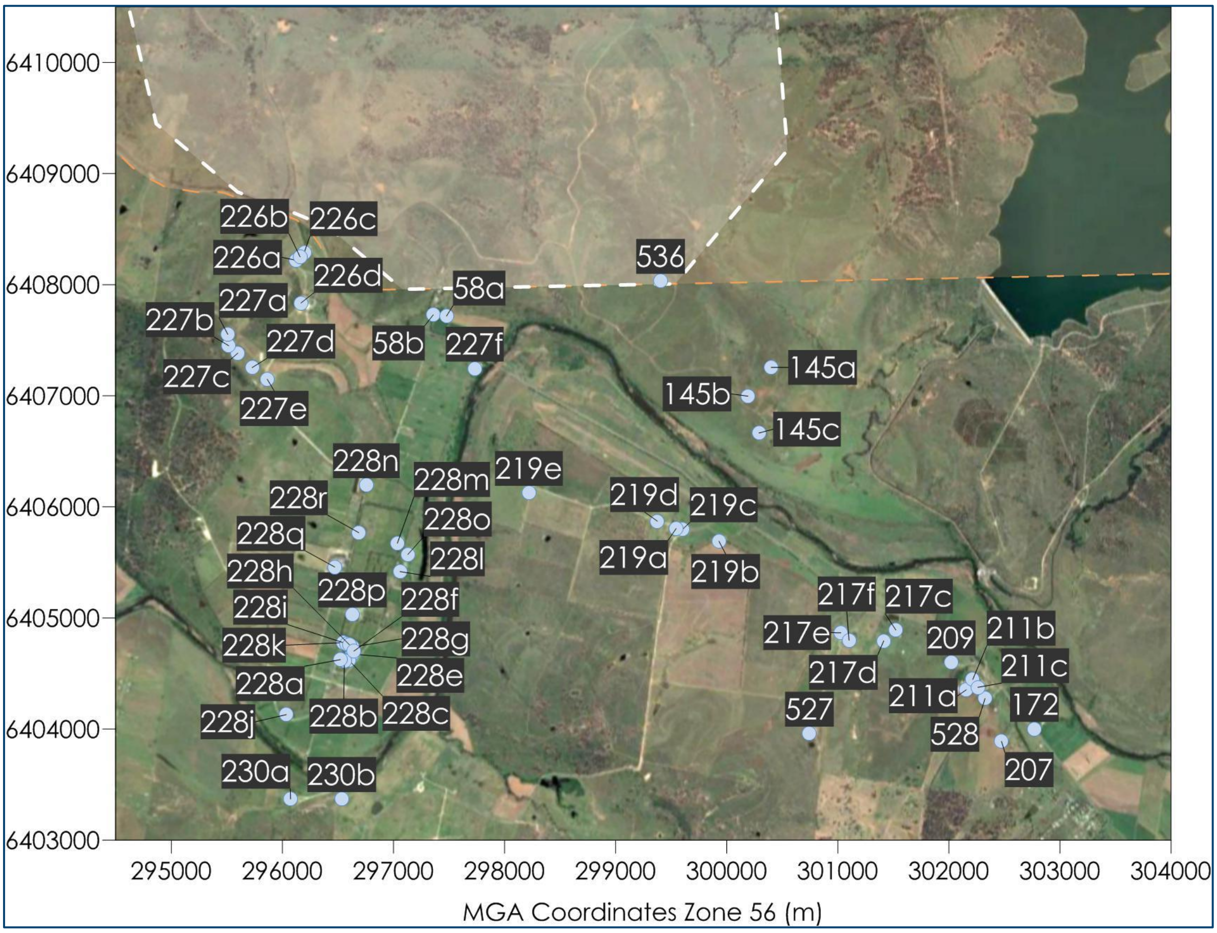

Figure A-4: Location of receptors assessed in this study – Insert 3

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

Easting	Northing	ID	Easting	Northing	ID	Easting	Northing	ID
289028	6411349	24a	297058	6405418	228l	303708	6423839	386
288978	6411330	24b	297035	6405673	228m	304123	6422565	387
289188	6411398	25	296756	6406195	228n	303996	6422182	389
292808	6410941	57	297129	6405571	228o	304139	6422112	390
297477	6407717	58a	296629	6405031	228p	304342	6422175	398
297358	6407729	58b	296472	6405458	228q	304396	6422452	399
295689	6413017	60a	296688	6405768	228r	304794	6422633	400
295883	6413125	60b	296073	6403370	230a	304779	6422137	402
295752	6413191	60c	296534	6403370	230b	304854	6421911	403
295680	6413189	60d	293690	6404530	238a	305128	6422054	404
300400	6407255	145a	293448	6404472	238b	305767	6421009	410
300192	6406996	145b	293477	6404511	238c	305984	6421127	411
300289	6406665	145c	293488	6404605	238d	306175	6421247	418
302770	6404001	172	293464	6404652	238e	306310	6421439	419
292457	6407903	240b	293412	6404692	238f	306292	6421610	420
302473	6403889	207	293509	6404396	238g	306007	6421800	421
302020	6404600	209	293548	6404428	238h	305807	6421894	423
302157	6404354	211a	291713	6405504	239a	305624	6422117	424
302214	6404446	211b	291715	6405733	239b	305849	6422167	425
302260	6404376	211c	291782	6405691	239c	305453	6422388	427
301522	6404891	217c	291838	6405663	239d	305224	6423053	429
301413	6404794	217d	291885	6405635	239e	305171	6423525	432
301028	6404866	217e	291771	6405520	239f	304920	6423905	433a
301100	6404800	217f	291601	6405610	239g	305178	6423954	433b
299545	6405806	219a	291633	6405728	239h	305059	6424243	435a
299930	6405691	219b	291549	6405924	239i	304864	6424156	435b
299603	6405798	219c	291456	6406066	239j	305991	6424365	438
299376	6405871	219d	291475	6406037	239k	305857	6423073	440
298219	6406126	219e	292092	6407335	240a	307051	6423083	441a
296124	6408219	226a	292485	6407928	240c	307163	6423084	441b
296159	6408251	226b	292518	6407959	240d	306736	6422603	443
296197	6408291	226c	292433	6407832	240e	306609	6422064	444
296167	6407835	226d	290612	6409153	250a	307345	6421749	446a
295508	6407554	227a	290653	6409203	250b	308305	6421623	451
295517	6407450	227b	290014	6407156	253	307233	6423085	455
295599	6407384	227c	290350	6406976	254a	306923	6423536	456
295727	6407254	227d	290304	6406976	254b	305647	6423320	460
297732	6407244	227f	290272	6406974	254c	305481	6423913	500
296522	6404625	228a	289934	6406788	255	305078	6424355	507
296558	6404613	228b	288299	6406750	279	305103	6424569	508
296601	6404618	228c	289310	6406844	284	305179	6424765	509
295863	6407149	227e	288709	6406688	285	300744	6403958	527
296627	6404676	228e	289756	6408885	298a	302325	6404276	528
296644	6404702	228f	289532	6408902	298b	288870	6406915	532
296628	6404738	228g	288674	6406836	287	299404	6408034	536
296603	6404759	228h	288968	6409056	299	302472	6424541	537
296579	6404768	228i	288192	6408863	306	304973	6422286	538
296035	6404130	228j	304374	6424129	384	306136	6421635	539
296550	6404778	228k	305106	6423174	385			

Appendix B

Selection of the Modelling Year

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

A statistical analysis of seven contiguous years of meteorological data from the Scone Airport Automatic Weather Station (AWS) is presented in **Table B-1**. The standard deviations of the seven years were analysed against the long-term measured wind speed, temperature and relative humidity spanning a 14 to 19 year period.

The analysis indicates that 2012 is closest to the long-term average for wind speed followed closely by 2014, 2016 and 2015. 2012 and 2013 are 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 or 2015 could be considered for the assessment as they are generally representative of the long-term wind speed, temperature, and relative humidity.

Table B-1: Statistical analysis results of standard deviation from long-term meteorological data at Scone Airport AWS

Year	Wind speed	Temperature	Relative humidity
2011	0.37	1.08	4.33
2012	0.29	0.91	5.23
2013	0.38	0.90	5.42
2014	0.30	1.03	5.82
2015	0.32	0.97	3.76
2016	0.30	1.16	6.35
2017	0.36	1.45	8.32

The analysis shows that of the last seven years, 2015 is not an outlier year in terms of deviation from the long term mean wind speed and relative humidity. On this basis, a further more detailed analysis of 2015 against the last seven years of data was performed to confirm if there may be any potential for significant bias to arise.

Figure B-1 shows the frequency distributions for wind speed, wind direction, temperature and relative humidity of 2015 compared with the mean of the 2011 to 2017 data set. The 2015 data aligned satisfactorily with mean data.

The 2015 data trends satisfactorily with the average of the dataset values for temperature and humidity and overall show little inter-annual variation. The wind speeds are above the monthly average in the first half of the year and typically below in the second half. Wind direction indicates little variation throughout the year.

Therefore, based on a review of all years the 2015 data was selected for modelling.

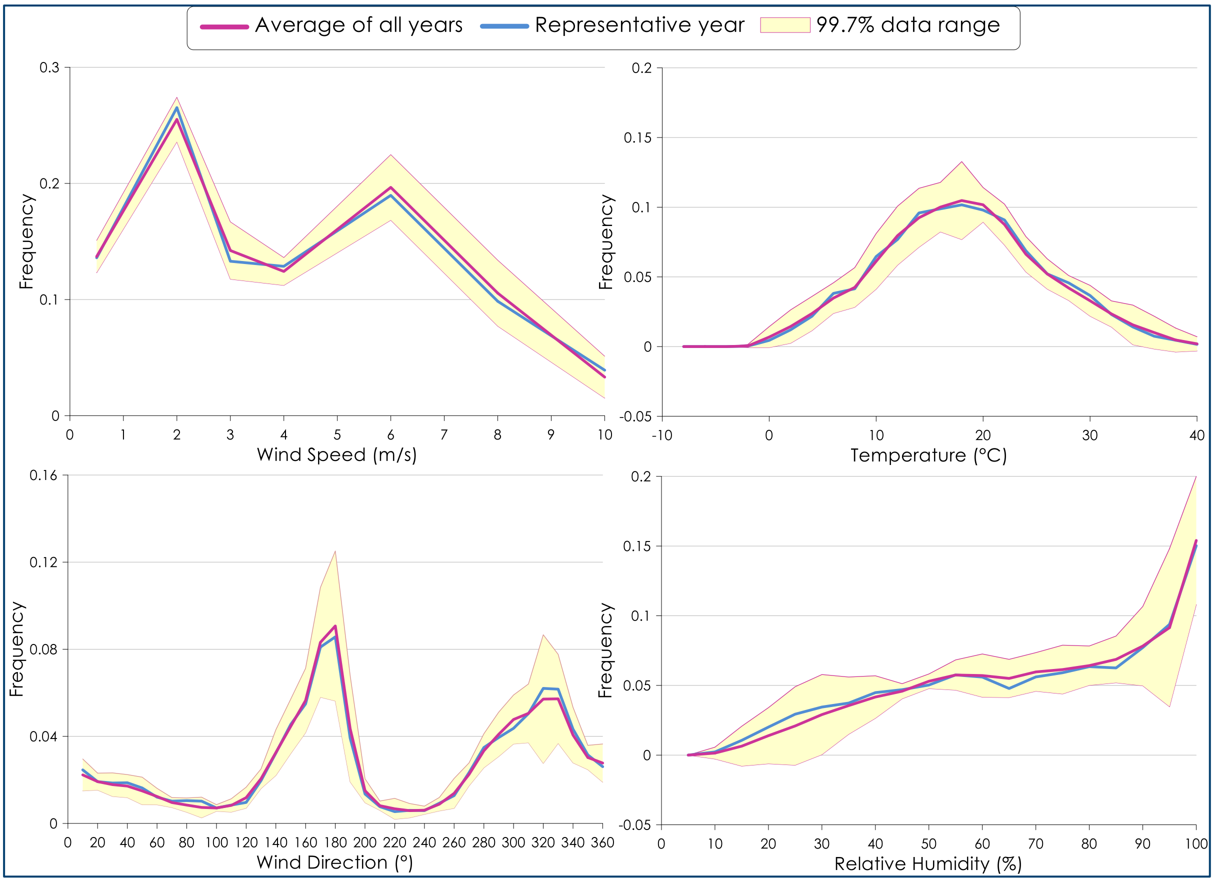

Figure B-1: Graphical analysis of meteorological conditions at Scone Airport AWS

Appendix C

Emission Calculation

Emission Calculation

The mining schedule and mine plan designs provided by Malabar Coal Limited 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 United States Environmental Protection Agency (US EPA) AP42 Emission Factors (**US EPA, 1985 and Updates**), the National Pollutant Inventory (NPI) document *Emission Estimation Technique Manual for Mining, Version 3.1* (**NPI, 2012**) and the New South Wales Environmental Protection Authority 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 C-1** below. Detailed emission inventories for each scenario are presented in **Table C-2** to **Table C-4**.

Control factors include the following:

- Hauling on unpaved surfaces – 85% 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.
- Unloading Run-of-mine (ROM) to hopper at the Coal Handling Preparation Plant (CHPP) – 85% control for use of enclosure and fogging sprays.
- Conveyor transfer points – 70% control enclosures and water sprays as required at transfer points.
- Conveyor – 70% control for enclosed conveyors.
- Loading product coal to existing product stockpiles – 25% for use of luffing stacker.

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 (**Lilley, 1996**).

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**).

Table C-1: Emission factor equations

Activity	Emission factor equation		
	TSP	PM_{10}	$PM_{2.5}$
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	$EF = \left(\frac{0.4536}{1.6093}\right) \times 4.9 \times (s/12)^{0.7} \times (1.1023 \times M/3)^{0.45} kg/VKT$	$EF = \left(\frac{0.4536}{1.6093}\right) \times 1.5 \times (s/12)^{0.9} \times (1.1023 \times M/3)^{0.45} kg/VKT$	$EF = \left(\frac{0.4536}{1.6093}\right) \times 0.15 \times (s/12)^{0.9} \times (1.1023 \times M/3)^{0.45} kg/VKT$
Hauling on sealed surfaces	$EF = 0.00323 \times (sL)^{0.91} \times (1.1023 \times W)^{1.02} kg/VKT$	$EF = 0.00062 \times (sL)^{0.91} \times (1.1023 \times W)^{1.02} kg/VKT$	$EF = 0.00015 \times (sL)^{0.91} \times (1.1023 \times W)^{1.02} kg/VKT$
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, 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), TSP = Total Suspended Particles, kg = kilogram, ha = hectares, sL = silt loading (g/m^2), w = weight (tonnes).

Table C-2: Emission inventory – Scenario 1

Activity	TSP emission	PM10 emission	PM25 emission	Intensity	Units	EF - TSP	EF - PM10	EF - PM25	Units	Var.1	Units	Var.2	Units	Var.3 (TSP PM10/PM2.5)	Units	Var.4	Units	Var.5	Units	Var.6	Units
Excavator loading cut/fill material to haul truck	210	99	15	154,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Hauling cut/fill material to emplacement area (unpaved)	609	150	15	77,000	t/yr	0.053	0.013	0.001	kg/t	40	tonnes/load	1.0	km/return trip	2.1 / 0.5 / 0.1	kg/VKT	4.1	S.C. in %	37	Ave. weight (t)	85	% Control
Hauling cut/fill material to emplacement area (paved)	145	28	7	77,000	t/yr	0.002	0.000	0.000	kg/t	40	tonnes/load	1.0	km/return trip	0.1 / 0.01 / 0.004	kg/VKT	0.5	S.L. in %	37	Ave. weight (t)		
Emplacing cut/fill material at area	210	99	15	154,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.151	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Dozers shaping	49,704	12,011	5,219	2,970	hr/yr	16.7	4.0	1.8	kg/h	10	S.C. in %	2	M.C. in %								
Exposed areas	13,624	6,812	1,022	16.0	ha	850	425	64	kg/ha/yr												
Excavator loading cut/fill material to haul truck	83	39	6	61,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Hauling cut/fill material to emplacement area (unpaved)	241	60	6	30,500	t/yr	0.053	0.013	0.001	kg/t	40	tonnes/load	1.0	km/return trip	2.1 / 0.5 / 0.1	kg/VKT	4.1	S.C. in %	37	Ave. weight (t)	85	% Control
Hauling cut/fill material to emplacement area (paved)	58	11	3	30,500	t/yr	0.002	0.000	0.000	kg/t	40	tonnes/load	1.0	km/return trip	0.1 / 0.01 / 0.004	kg/VKT	0.5	S.L. in %	37	Ave. weight (t)		
Emplacing cut/fill material at area	83	39	6	61,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.151	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Exposed areas	9,617	4,808	721	11.3	ha	850	425	64	kg/ha/yr												
Excavator loading cut/fill material to haul truck	1,785	844	128	1,310,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Hauling cut/fill material to MEA emplacement area	2,525	624	62	261,000	t/yr	0.065	0.016	0.002	kg/t	40	tonnes/load	1.0	km/return trip	2.6 / 0.6 / 0.1	kg/VKT	4.1	S.C. in %	58	Ave. weight (t)	85	% Control
Emplacing cut/fill material to MEA emplacement area	356	168	25	261,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.151	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Hauling cut/fill material from MEA to Access Road (unpaved)	1,742	430	43	18,000	t/yr	0.645	0.159	0.016	kg/t	40	tonnes/load	10.0	km/return trip	2.6 / 0.6 / 0.1	kg/VKT	4.1	S.C. in %	58	Ave. weight (t)	85	% Control
Hauling cut/fill material from MEA to Access Road (paved)	537	103	25	18,000	t/yr	0.030	0.006	0.001	kg/t	40	tonnes/load	10.0	km/return trip	0.1 / 0.01 / 0.004	kg/VKT	0.5	S.L. in %	58	Ave. weight (t)		
Emplacing MEA cut/fill material at Access Road	49	23	4	36,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.151	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Hauling cut/fill material from MEA to Southern Highwall (unpav	68,403	16,892	1,689	505,000	t/yr	0.903	0.223	0.022	kg/t	40	tonnes/load	14.0	km/return trip	2.6 / 0.6 / 0.1	kg/VKT	4.1	S.C. in %	58	Ave. weight (t)	85	% Control
Hauling cut/fill material from MEA to Southern Highwall (paved	21,109	4,052	980	505,000	t/yr	0.042	0.008	0.002	kg/t	40	tonnes/load	14.0	km/return trip	0.1 / 0.01 / 0.004	kg/VKT	0.5	S.L. in %	58	Ave. weight (t)		
Emplacing MEA cut/fill material at Southern Highwall	1,376	651	99	1,010,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.151	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Hauling cut/fill material from MEA to Conveyor (unpaved)	194	48	5	2,000	t/yr	0.645	0.159	0.016	kg/t	40	tonnes/load	10.0	km/return trip	2.6 / 0.6 / 0.1	kg/VKT	4.1	S.C. in %	58	Ave. weight (t)	85	% Control
Hauling cut/fill material from MEA to Conveyor (paved)	60	11	3	2,000	t/yr	0.030	0.006	0.001	kg/t	40	tonnes/load	10.0	km/return trip	0.1 / 0.01 / 0.004	kg/VKT	0.5	S.L. in %	58	Ave. weight (t)		
Emplacing MEA cut/fill material at Conveyor	5	3	0	4,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.151	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Dozers shaping	99,408	24,023	10,438	5,940	t/yr	16.7	4.0	1.8	kg/h	10	S.C. in %	2	M.C. in %								
Exposed areas	53,929	26,964	4,045	63.4	ha	850	425	64	kg/ha/yr												
Diesel Equipment	3,504	3,504	3,399																		
Conveying ROM from portal	46	23	3	0.18	ha	850	425	64	kg/ha/yr											70	% Control
Conveying ROM from portal to CHPP (Year 4)	-	-	-	-	ha	850	425	64	kg/ha/yr											70	% Control
Unloading ROM to stockpile at portal	91	43	7	467,000	t/yr	0.00020	0.00009	0.00001	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	8	M.C. in %								
Dozers on MEA stockpile	61,826	14,302	1,360	4,380	hr/yr	14.1	3.3	0.3	kg/h	5	S.C. in %	9	M.C. in %								
Loading ROM coal to haul truck	22,338	3,213	424	467,000	t/yr	0.048	0.007	0.001	kg/t	8	M.C. in %										
Hauling ROM to hopper (unpaved)	73,816	18,229	1,823	467,000	t/yr	1.054	0.260	0.026	kg/t	40	tonnes/load	20.0	km/return trip	2.1 / 0.5 / 0.1	kg/VKT	4.1	S.C. in %	37	Ave. weight (t)	85	% Control
Unloading ROM to hopper	3,351	482	64	467,000	t/yr	0.048	0.007	0.001	kg/t	8	M.C. in %									85	% Control
Rehandle ROM at hopper (50%)	11,169	1,606	212	233,500	t/yr	0.048	0.007	0.001	kg/t	8	M.C. in %										
Primary crushing	-	-	-	467,000	t/yr	0.0006	0.00027	0.00005	kg/t											100	% Control
Secondary crushing	280	126	23	467,000	t/yr	0.0006	0.00027	0.00005	kg/t												
Tertiary screen	514	173	12	467,000	t/yr	0.0011	0.00037	0.000025	kg/t												
Transfer station	91	43	7	467,000	t/yr	0.00020	0.00009	0.00001	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	8	M.C. in %								
Unloading to Bypass stockpile	7	3	0	47,167	t/yr	0.00020	0.00009	0.00001	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	8	M.C. in %							25	% Control
Unloading to Product stockpile	32	15	2	260,000	t/yr	0.00017	0.00008	0.00001	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	9	M.C. in %							25	% Control
Dozers on ROM stockpiles	-	-	-	-	hr/yr	16.5	3.9	0.4	kg/h	5	S.C. in %	8	M.C. in %								
Dozers on Product stockpiles	-	-	-	-	hr/yr	14.1	3.3	0.3	kg/h	5	S.C. in %	9	M.C. in %								
Conveying Product to train loadout	33	16	2	0.1	ha	850	425	64	kg/ha/yr											70	% Control
Loading coal to train	51	24	4	308,000	t/yr	0.00017	0.00008	0.00001	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	9	M.C. in %								
Pumping rejects	-	-	-	207,000	t/yr																
Portal stockpile	573	287	43	0.7	ha	837	418	63	kg/ha/yr	5	S.C. in %	66	number of rain days (>0.25mm)			4.26	% of time wind speed >5.4m/s				
ROM stockpile	1,381	690	104	1.7	ha	837	418	63	kg/ha/yr	5	S.C. in %	66	number of rain days (>0.25mm)			4.26	% of time wind speed >5.4m/s				
Product stockpile	4,184	2,092	314	5.0	ha	837	418	63	kg/ha/yr	5	S.C. in %	66	number of rain days (>0.25mm)			4.26	% of time wind speed >5.4m/s				
Grading roads	32,373	11,311	1,004	52,600	km	0.62	0.22	0.02	kg/VKT	8	speed of graders in km/h										
Ventilation shaft	59,477	23,244	2,784																		
Mining equipment	1,289	1,289	1,250																		
Locomotive idling	515	515	499																		
Total TSP emissions (kg/yr.)	**603,002**	**180,224**	**37,920**																		

Table C-3: Emission inventory – Scenario 2

Activity	TSP emission	PM10 emission	PM25 emission	Intensity	Units	EF - TSP	EF - PM10	EF - PM25	Units	Var.1	Units	Var.2	Units	Var.3 (TSP PM10/PM2.5)	Units	Var.4	Units	Var.5	Units	Var.6	Units
Excavator loading cut/fill material to haul truck	737	349	53	542,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Hauling cut/fill material to emplacement area (paved)	1,021	196	47	542,000	t/yr	0.002	0.000	0.000	kg/t	40	tonnes/load	1.0	km/return trip	0.1 / 0.01 / 0.004	kg/VKT	0.5	S.L. in %	37	Ave. weight (t)		
Emplacing cut/fill material at area	737	349	53	542,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.151	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Exposed areas	28,850	14,425	2,164	33.9	ha	850	425	64	kg/ha/year												
Excavator loading cut/fill material to haul truck	600	284	43	441,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Hauling cut/fill material to MI emplacement area	245	61	6	26,000	t/yr	0.065	0.016	0.002	kg/t	40	tonnes/load	1.0	km/return trip	2.6 / 0.6 / 0.1	kg/VKT	4.1	S.C. in %	58	Ave. weight (t)	85	% Control
Emplacing cut/fill material to MI emplacement area	35	16	2	26,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.151	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Hauling cut/fill material from MI to NN Void	3,745	925	92	388,000	t/yr	0.065	0.016	0.002	kg/t	40	tonnes/load	1.0	km/return trip	2.6 / 0.6 / 0.1	kg/VKT	4.1	S.C. in %	58	Ave. weight (t)	85	% Control
Emplacing MI cut/fill material at NN Void	527	249	38	388,000	t/yr	0.00136	0.00064	0.00010	kg/t	1.151	$(WS/2.2)^{1.3}$ in m/s	2	M.C. in %								
Dozers shaping	30,124	7,280	3,163	1,800	hr/yr	16.7	4.0	1.8	kg/h	10	S.C. in %	2	M.C. in %								
Exposed areas	5,677	2,839	426	6.7	ha	850	425	64	kg/ha/year												
Diesel Equipment	972	972	943																		
Conveying ROM from portal	119	60	9	0.467	ha	850	425	64	kg/ha/year											70	% Control
Conveying ROM from portal to CHPP (Year 4)	-	-	-	-	ha	850	425	64	kg/ha/year											70	% Control
Unloading ROM to stockpile at portal	393	186	28	2,010,000	t/yr	0.00020	0.00009	0.00001	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	8	M.C. in %								
Dozers on MEA stockpile	72,056	16,866	1,585	4,380	hr/yr	16.5	3.9	0.4	kg/h	5	S.C. in %	8	M.C. in %								
Loading ROM coal to haul truck	96,143	13,827	1,827	2,010,000	t/yr	0.048	0.007	0.001	kg/t	8	M.C. in %										
Hauling ROM to hopper (paved)	75,883	14,566	3,524	2,010,000	t/yr	0.038	0.007	0.002	kg/t	40	tonnes/load	20.0	km/return trip	0.1 / 0.01 / 0.004	kg/VKT	0.5	S.L. in %	37	Ave. weight (t)		
Unloading ROM to hopper	14,421	2,074	274	2,010,000	t/yr	0.048	0.007	0.001	kg/t	8	M.C. in %									85	% Control
Rehandle ROM at hopper (50%)	48,071	6,913	913	1,005,000	t/yr	0.048	0.007	0.001	kg/t	8	M.C. in %										
Primary crushing	-	-	-	2,010,000	t/yr	0.0006	0.00027	0.00005	kg/t											100	% Control
Secondary crushing	1,206	543	101	2,010,000	t/yr	0.0006	0.00027	0.00005	kg/t												
Tertiary screen	2,211	744	50	2,010,000	t/yr	0.0011	0.00037	0.000025	kg/t												
Transfer station	393	186	28	2,010,000	t/yr	0.00020	0.00009	0.00001	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	8	M.C. in %								
Unloading to Bypass stockpile	14	7	1	95,100	t/yr	0.00020	0.00009	0.00001	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	8	M.C. in %							25	% Control
Unloading to Product stockpile	167	79	12	1,340,000	t/yr	0.00017	0.00008	0.00001	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	9	M.C. in %							25	% Control
Dozers on ROM stockpiles	-	-	-	-	hr/yr	16.5	3.9	0.4	kg/h	5	S.C. in %	8	M.C. in %								
Dozers on Product stockpiles	-	-	-	-	hr/yr	14.1	3.3	0.3	kg/h	5	S.C. in %	9	M.C. in %								
Conveying Product to train loadout	33	16	2	0.129	ha	850	425	64	kg/ha/year											70	% Control
Loading coal to train	239	113	17	1,440,000	t/yr	0.00017	0.00008	0.00001	kg/t	1.15	$(WS/2.2)^{1.3}$ in m/s	9	M.C. in %								
Pumping rejects	-	-	-	755,000	t/yr																
Portal stockpile	573	287	43	0.7	ha	837	418	63	kg/ha/yea	5	S.C. in %	66	number of rain days (>0.25mm)			4.26	% of time wind speed >5.4m/s				
ROM stockpile	1,381	690	104	1.7	ha	837	418	63	kg/ha/yea	5	S.C. in %	66	number of rain days (>0.25mm)			4.26	% of time wind speed >5.4m/s				
Product stockpile	8,367	4,184	628	10.0	ha	837	418	63	kg/ha/yea	5	S.C. in %	66	number of rain days (>0.25mm)			4.26	% of time wind speed >5.4m/s				
Grading roads	-	-	-	-	km	0.62	0.22	0.02	kg/VKT	8	speed of graders in km/h										
Ventilation shaft	59,476.9	23,243.6	2,783.5																		
Mining equipment	901	901	874																		
Locomotive idling	515	515	499																		
Total TSP emissions (kg/yr.)	**455,834**	**113,942**	**20,333**																		

Table C-4: Emission inventory – Scenario 3

Activity	TSP emission	PM10 emission	PM25 emission	Intensity	Units	EF - TSP	EF - PM10	EF - PM25	Units	Var.1	Units	Var.2	Units	Var.3 (TSP PM10/PM2.5)	Units	Var.4	Units	Var.5	Units	Var.6	Units
Conveying ROM from portal	119	60	9	0.467	ha	850	425	64	kg/ha/year											70	% Control
Conveying ROM from portal to CHPP (Year 4)	742	371	56	2.910	ha	850	425	64	kg/ha/year											70	% Control
Dozers on MEA stockpile	72,056	16,866	1,585	4,380	hr/yr	16.5	3.9	0.4	kg/h	5	S.C. in %	8	M.C. in %								
Unloading ROM to stockpile at portal	1,560	738	112	7,970,000	t/yr	0.00020	0.00009	0.00001	kg/t	1.15	(WS/2.2)$^{1.3}$ in m/s	8	M.C. in %								
Loading ROM coal to haul truck	-	-	-	-	t/yr	0.048	0.007	0.001	kg/t	8	M.C. in %										
Hauling ROM to hopper	-	-	-	-	t/yr	1.054	0.260	0.026	kg/t	40	tonnes/load	20.0	km/return trip	2.1 / 0.5 / 0.1	kg/VKT	4.1	S.C. in %	37	Ave. weight (t)		
Unloading ROM to hopper	-	-	-	-	t/yr	0.048	0.007	0.001	kg/t	8	M.C. in %									85	% Control
Rehandle ROM at hopper (50%)	-	-	-	-	t/yr	0.048	0.007	0.001	kg/t	8	M.C. in %										
Primary crushing	-	-	-	7,970,000	t/yr	0.0006	0.00027	0.00005	kg/t											100	% Control
Secondary crushing	4,782	2,152	399	7,970,000	t/yr	0.0006	0.00027	0.00005	kg/t												
Tertiary screen	8,767	2,949	199	7,970,000	t/yr	0.0011	0.00037	0.000025	kg/t												
Transfer station	1,560	738	112	7,970,000	t/yr	0.00020	0.00009	0.00001	kg/t	1.15	(WS/2.2)$^{1.3}$ in m/s	8	M.C. in %								
Unloading to Bypass stockpile	72	34	5	488,000	t/yr	0.00020	0.00009	0.00001	kg/t	1.15	(WS/2.2)$^{1.3}$ in m/s	8	M.C. in %							25	% Control
Unloading to Product stockpiles	451	213	32	3,620,000	t/yr	0.00017	0.00008	0.00001	kg/t	1.15	(WS/2.2)$^{1.3}$ in m/s	9	M.C. in %							25	% Control
Unloading to western product stockpile	150	71	11	1,810,000	t/yr	0.00017	0.00008	0.00001	kg/t	1.15	(WS/2.2)$^{1.3}$ in m/s	9	M.C. in %							50	% Control
Dozers on ROM stockpiles	122,561	28,687	2,696	7,450	hr/yr	16.5	3.9	0.4	kg/h	5	S.C. in %	8	M.C. in %								
Dozers on Product stockpiles	30,913	7,151	680	2,190	hr/yr	14.1	3.3	0.3	kg/h	5	S.C. in %	9	M.C. in %								
Conveying Product to train loadout	33	16	2	0.129	ha	850	425	64	kg/ha/year											70	% Control
Loading coal to train	982	465	70	5,920,000	t/yr	0.00017	0.00008	0.00001	kg/t	1.15	(WS/2.2)$^{1.3}$ in m/s	9	M.C. in %								
Pumping rejects	-	-	-	2,730,000	t/yr																
Portal stockpile	573	287	43	0.7	ha	837	418	63	kg/ha/yea	5	S.C. in %	66	number of rain days (>0.25mm)			4.26	% of time wind speed >5.4m/s				
ROM stockpile	1,381	690	104	1.7	ha	837	418	63	kg/ha/yea	5	S.C. in %	66	number of rain days (>0.25mm)			4.26	% of time wind speed >5.4m/s				
Product stockpile	16,734	8,367	1,255	20.0	ha	837	418	63	kg/ha/yea	5	S.C. in %	66	number of rain days (>0.25mm)			4.26	% of time wind speed >5.4m/s				
Grading roads	-	-	-	-	km	0.62	0.22	0.02	kg/VKT	8	speed of graders in km/h										
Ventilation shaft	89,215.3	34,865.4	4,175.3																		
Mining equipment	659	659.37	640																		
Locomotive idling	515	514.76	499																		
Total TSP emissions (kg/yr.)	**353,825**	**105,893**	**12,684**																		

Appendix D

Modelling Predictions

Table D-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)
	Project alone						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
24a	0.1	0.0	0.2	0.0	0.0	0.0	4.7	11.2	33.9	1.6
24b	0.1	0.0	0.2	0.0	0.0	0.0	4.7	11.2	33.9	1.6
25	0.1	0.0	0.2	0.0	0.0	0.0	4.7	11.2	34.0	1.6
57	0.1	0.0	0.4	0.0	0.1	0.0	4.8	11.7	34.6	1.6
58a	0.1	0.0	0.2	0.0	0.1	0.0	4.8	11.5	34.4	1.6
58b	0.1	0.0	0.2	0.0	0.1	0.0	4.8	11.5	34.3	1.6
60a	0.4	0.1	1.8	0.3	0.6	0.0	5.2	15.9	40.0	1.7
60b	0.4	0.1	2.1	0.4	0.8	0.0	5.3	16.6	40.9	1.7
60c	0.4	0.1	2.0	0.3	0.7	0.0	5.3	16.5	40.8	1.7
60d	0.4	0.1	1.9	0.3	0.7	0.0	5.3	16.3	40.5	1.7
145a	0.1	0.0	0.4	0.1	0.1	0.0	4.9	12.9	36.2	1.7
145b	0.1	0.0	0.3	0.1	0.1	0.0	4.9	12.5	35.6	1.7
145c	0.1	0.0	0.3	0.0	0.1	0.0	4.8	12.2	35.3	1.7
172	0.1	0.0	0.4	0.0	0.1	0.0	4.7	11.2	33.9	1.6
240b	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.6	33.2	1.6
207	0.1	0.0	0.3	0.0	0.0	0.0	4.7	11.0	33.7	1.6
209	0.1	0.0	0.4	0.0	0.1	0.0	4.7	11.3	34.1	1.6
211a	0.1	0.0	0.4	0.0	0.1	0.0	4.7	11.2	34.0	1.6
211b	0.1	0.0	0.4	0.0	0.1	0.0	4.7	11.3	34.1	1.6
211c	0.1	0.0	0.4	0.0	0.1	0.0	4.7	11.3	34.0	1.6
217c	0.1	0.0	0.3	0.0	0.1	0.0	4.7	11.3	34.2	1.6
217d	0.1	0.0	0.3	0.0	0.1	0.0	4.7	11.2	34.0	1.6
217e	0.1	0.0	0.2	0.0	0.0	0.0	4.7	11.1	33.9	1.6
217f	0.1	0.0	0.2	0.0	0.0	0.0	4.7	11.1	33.9	1.6
219a	0.1	0.0	0.2	0.0	0.0	0.0	4.7	11.2	34.0	1.6
219b	0.1	0.0	0.2	0.0	0.0	0.0	4.7	11.2	34.0	1.6
219c	0.1	0.0	0.2	0.0	0.0	0.0	4.7	11.2	34.0	1.6
219d	0.1	0.0	0.2	0.0	0.0	0.0	4.7	11.2	33.9	1.6
219e	0.1	0.0	0.2	0.0	0.0	0.0	4.7	11.0	33.7	1.6
226a	0.1	0.0	0.3	0.0	0.1	0.0	4.8	11.4	34.3	1.6
226b	0.1	0.0	0.3	0.0	0.1	0.0	4.8	11.5	34.3	1.6
226c	0.1	0.0	0.4	0.0	0.1	0.0	4.8	11.5	34.4	1.6
226d	0.1	0.0	0.3	0.0	0.1	0.0	4.7	11.2	34.0	1.6
227a	0.1	0.0	0.3	0.0	0.1	0.0	4.7	11.0	33.7	1.6
227b	0.1	0.0	0.3	0.0	0.1	0.0	4.7	10.9	33.6	1.6
227c	0.1	0.0	0.2	0.0	0.1	0.0	4.7	10.9	33.6	1.6
227d	0.1	0.0	0.2	0.0	0.1	0.0	4.7	10.9	33.6	1.6
227f	0.1	0.0	0.2	0.0	0.1	0.0	4.8	11.3	34.1	1.6
228a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
228b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
228c	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
227e	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.9	33.6	1.6
228e	0.1	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
228f	0.1	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
228g	0.1	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
228h	0.1	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
228i	0.1	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
228j	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
228k	0.1	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
228l	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.4	33.0	1.6

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)
	Project alone						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
228m	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.5	33.1	1.6
228n	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.6	33.3	1.6
228o	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.5	33.1	1.6
228p	0.1	0.0	0.1	0.0	0.0	0.0	4.6	10.3	32.8	1.6
228q	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.4	32.9	1.6
228r	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.5	33.1	1.6
230a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	9.9	32.4	1.6
230b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	9.9	32.4	1.6
238a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	9.9	32.4	1.6
238b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	9.9	32.4	1.6
238c	0.0	0.0	0.1	0.0	0.0	0.0	4.6	9.9	32.4	1.6
238d	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.4	1.6
238e	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.4	1.6
238f	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.4	1.6
238g	0.0	0.0	0.1	0.0	0.0	0.0	4.6	9.9	32.4	1.6
238h	0.0	0.0	0.1	0.0	0.0	0.0	4.6	9.9	32.4	1.6
239a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239b	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239c	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239d	0.1	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239e	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239f	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239g	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239h	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239i	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239j	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239k	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.1	32.6	1.6
240a	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.4	33.0	1.6
240c	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.6	33.2	1.6
240d	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.6	33.2	1.6
240e	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.5	33.1	1.6
250a	0.1	0.0	0.3	0.0	0.1	0.0	4.7	10.7	33.3	1.6
250b	0.1	0.0	0.3	0.0	0.1	0.0	4.7	10.7	33.4	1.6
253	0.1	0.0	0.3	0.0	0.0	0.0	4.6	10.2	32.7	1.6
254a	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.2	32.7	1.6
254b	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.2	32.7	1.6
254c	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.2	32.7	1.6
255	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.1	32.6	1.6
279	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.0	32.5	1.6
284	0.1	0.0	0.3	0.0	0.0	0.0	4.6	10.1	32.6	1.6
285	0.1	0.0	0.2	0.0	0.0	0.0	4.6	10.0	32.5	1.6
298a	0.1	0.0	0.3	0.0	0.0	0.0	4.7	10.5	33.1	1.6
298b	0.1	0.0	0.3	0.0	0.0	0.0	4.7	10.5	33.1	1.6
287	0.1	0.0	0.3	0.0	0.0	0.0	4.6	10.0	32.5	1.6
299	0.1	0.0	0.3	0.0	0.0	0.0	4.6	10.0	33.1	1.6
306	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.4	33.0	1.6
384	0.3	0.0	1.2	0.1	0.1	0.0	5.1	15.3	39.3	1.7
385	0.3	0.0	1.0	0.1	0.1	0.0	5.1	15.1	39.1	1.7
386	0.3	0.0	1.2	0.1	0.2	0.0	5.2	16.4	40.7	1.7
387	0.4	0.0	1.6	0.1	0.2	0.0	5.3	17.2	41.7	1.8
389	0.7	0.1	2.9	0.3	0.5	0.0	5.4	18.4	43.3	1.8

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)
	Project alone						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
390	0.6	0.1	2.4	0.2	0.4	0.0	5.4	18.2	42.9	1.8
398	0.4	0.0	1.6	0.1	0.2	0.0	5.3	17.5	42.1	1.8
399	0.3	0.0	1.1	0.1	0.2	0.0	5.2	16.8	41.2	1.7
400	0.3	0.0	1.0	0.1	0.1	0.0	5.2	16.0	40.1	1.7
402	0.4	0.0	1.3	0.1	0.2	0.0	5.2	16.8	41.2	1.7
403	0.4	0.0	1.6	0.1	0.2	0.0	5.3	17.2	41.6	1.7
404	0.3	0.0	1.2	0.1	0.1	0.0	5.2	16.5	40.7	1.7
410	0.6	0.1	2.1	0.2	0.3	0.0	5.3	17.5	42.1	1.7
411	0.5	0.1	1.9	0.2	0.3	0.0	5.3	17.0	41.4	1.7
418	0.5	0.1	1.9	0.2	0.3	0.0	5.2	16.5	40.9	1.7
419	0.5	0.0	1.8	0.2	0.3	0.0	5.2	16.0	40.3	1.7
420	0.4	0.0	1.4	0.1	0.2	0.0	5.2	15.8	39.9	1.7
421	0.3	0.0	1.1	0.1	0.2	0.0	5.2	15.8	39.9	1.7
423	0.3	0.0	1.2	0.1	0.2	0.0	5.2	15.9	40.0	1.7
424	0.3	0.0	1.0	0.1	0.1	0.0	5.1	15.8	39.9	1.7
425	0.3	0.0	1.1	0.1	0.1	0.0	5.1	15.4	39.5	1.7
427	0.3	0.0	0.9	0.1	0.1	0.0	5.1	15.6	39.6	1.7
429	0.2	0.0	0.9	0.1	0.1	0.0	5.1	15.1	39.0	1.7
432	0.2	0.0	0.7	0.0	0.1	0.0	5.0	14.7	38.6	1.7
433a	0.2	0.0	0.9	0.1	0.1	0.0	5.0	14.7	38.6	1.7
433b	0.2	0.0	0.6	0.0	0.1	0.0	5.0	14.3	38.1	1.7
435a	0.2	0.0	0.6	0.0	0.1	0.0	5.0	14.3	38.0	1.7
435b	0.2	0.0	0.8	0.1	0.1	0.0	5.0	14.6	38.4	1.7
438	0.1	0.0	0.4	0.0	0.0	0.0	4.9	13.3	36.8	1.7
440	0.2	0.0	0.7	0.1	0.1	0.0	5.0	14.5	38.2	1.7
441a	0.2	0.0	0.8	0.1	0.1	0.0	4.9	13.5	37.1	1.7
441b	0.2	0.0	0.8	0.1	0.1	0.0	4.9	13.5	37.0	1.7
443	0.3	0.0	1.0	0.1	0.1	0.0	5.0	14.2	37.9	1.7
444	0.3	0.0	1.1	0.1	0.2	0.0	5.1	14.8	38.7	1.7
446a	0.4	0.0	1.3	0.1	0.2	0.0	5.0	14.5	38.3	1.7
451	0.2	0.0	0.6	0.1	0.1	0.0	4.9	13.6	37.1	1.7
455	0.2	0.0	0.8	0.1	0.1	0.0	4.9	13.4	36.9	1.7
456	0.2	0.0	0.7	0.1	0.1	0.0	4.9	13.4	36.9	1.7
460	0.2	0.0	0.6	0.0	0.1	0.0	5.0	14.4	38.2	1.7
500	0.1	0.0	0.5	0.0	0.1	0.0	5.0	14.1	37.8	1.7
507	0.2	0.0	0.6	0.0	0.1	0.0	5.0	14.2	37.9	1.7
508	0.2	0.0	0.6	0.0	0.1	0.0	5.0	14.0	37.6	1.7
509	0.1	0.0	0.5	0.0	0.1	0.0	4.9	13.7	37.3	1.7
527	0.1	0.0	0.2	0.0	0.0	0.0	4.7	10.6	33.2	1.6
528	0.1	0.0	0.4	0.0	0.1	0.0	4.7	11.2	34.0	1.6
532	0.1	0.0	0.3	0.0	0.0	0.0	4.6	10.1	32.6	1.6
536	0.1	0.0	0.5	0.1	0.1	0.0	4.9	13.0	36.3	1.7
537	0.2	0.0	0.8	0.1	0.2	0.0	5.3	17.6	42.3	1.8
538	0.3	0.0	1.1	0.1	0.1	0.0	5.2	16.3	40.5	1.7
539	0.3	0.0	1.2	0.1	0.2	0.0	5.2	15.9	40.1	1.7

Table D-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)
	Project alone						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
24a	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.2	34.0	1.6
24b	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.2	34.0	1.6
25	0.0	0.0	0.1	0.0	0.0	0.0	4.8	11.3	34.1	1.6
57	0.1	0.0	0.3	0.0	0.1	0.0	4.8	11.8	34.7	1.6
58a	0.0	0.0	0.2	0.0	0.0	0.0	4.8	11.6	34.5	1.6
58b	0.0	0.0	0.2	0.0	0.0	0.0	4.8	11.6	34.4	1.6
60a	0.2	0.0	1.5	0.2	0.6	0.0	5.2	16.1	40.3	1.7
60b	0.2	0.0	1.7	0.3	0.7	0.0	5.3	16.8	41.2	1.7
60c	0.2	0.0	1.6	0.3	0.7	0.0	5.3	16.7	41.1	1.7
60d	0.2	0.0	1.5	0.2	0.6	0.0	5.3	16.5	40.8	1.7
145a	0.0	0.0	0.3	0.0	0.1	0.0	4.9	13.1	36.4	1.7
145b	0.0	0.0	0.2	0.0	0.1	0.0	4.9	12.6	35.8	1.7
145c	0.0	0.0	0.2	0.0	0.1	0.0	4.8	12.3	35.4	1.7
172	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.2	34.0	1.6
240b	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.6	33.2	1.6
207	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.1	33.8	1.6
209	0.0	0.0	0.2	0.0	0.0	0.0	4.8	11.4	34.2	1.6
211a	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.3	34.1	1.6
211b	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.4	34.2	1.6
211c	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.3	34.1	1.6
217c	0.0	0.0	0.2	0.0	0.0	0.0	4.8	11.4	34.3	1.6
217d	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.3	34.1	1.6
217e	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.2	34.0	1.6
217f	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.2	34.0	1.6
219a	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.3	34.0	1.6
219b	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.3	34.1	1.6
219c	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.3	34.1	1.6
219d	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.2	34.0	1.6
219e	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.0	33.8	1.6
226a	0.1	0.0	0.3	0.0	0.1	0.0	4.8	11.5	34.4	1.6
226b	0.1	0.0	0.3	0.0	0.1	0.0	4.8	11.6	34.4	1.6
226c	0.1	0.0	0.3	0.0	0.1	0.0	4.8	11.6	34.5	1.6
226d	0.0	0.0	0.2	0.0	0.1	0.0	4.7	11.3	34.1	1.6
227a	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.1	33.8	1.6
227b	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.0	33.7	1.6
227c	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.0	33.7	1.6
227d	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.0	33.7	1.6
227f	0.0	0.0	0.2	0.0	0.0	0.0	4.8	11.4	34.3	1.6
228a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
228b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
228c	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
227e	0.0	0.0	0.2	0.0	0.0	0.0	4.7	10.9	33.6	1.6
228e	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
228f	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
228g	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
228h	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
228i	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
228j	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
228k	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
228l	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.5	33.1	1.6

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)
	Project alone						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
228m	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.6	33.2	1.6
228n	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.7	33.4	1.6
228o	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.5	33.1	1.6
228p	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.3	32.9	1.6
228q	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.4	33.0	1.6
228r	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.5	33.1	1.6
230a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	9.9	32.4	1.6
230b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.4	1.6
238a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
238b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.4	1.6
238c	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.4	1.6
238d	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
238e	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
238f	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
238g	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.4	1.6
238h	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.4	1.6
239a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239c	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239d	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239e	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239f	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239g	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239h	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239i	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239j	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239k	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
240a	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.4	33.0	1.6
240c	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.6	33.2	1.6
240d	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.6	33.3	1.6
240e	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.6	33.2	1.6
250a	0.0	0.0	0.2	0.0	0.0	0.0	4.7	10.7	33.4	1.6
250b	0.0	0.0	0.2	0.0	0.0	0.0	4.7	10.8	33.4	1.6
253	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
254a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
254b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
254c	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
255	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.7	1.6
279	0.0	0.0	0.2	0.0	0.0	0.0	4.6	10.0	32.5	1.6
284	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
285	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.5	1.6
298a	0.0	0.0	0.2	0.0	0.0	0.0	4.7	10.6	33.2	1.6
298b	0.0	0.0	0.2	0.0	0.0	0.0	4.7	10.6	33.2	1.6
287	0.0	0.0	0.2	0.0	0.0	0.0	4.6	10.1	32.6	1.6
299	0.0	0.0	0.2	0.0	0.0	0.0	4.6	10.1	33.2	1.6
306	0.0	0.0	0.2	0.0	0.0	0.0	4.7	10.4	33.0	1.6
384	0.3	0.0	1.1	0.1	0.1	0.0	5.1	15.5	39.6	1.7
385	0.2	0.0	0.8	0.1	0.1	0.0	5.1	15.3	39.3	1.7
386	0.3	0.0	1.3	0.1	0.2	0.0	5.2	16.7	41.1	1.7
387	0.4	0.0	1.7	0.1	0.3	0.0	5.3	17.5	42.1	1.8
389	0.7	0.1	3.3	0.3	0.8	0.0	5.5	18.8	44.0	1.8

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)
	Project alone						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
390	0.6	0.1	2.6	0.2	0.5	0.0	5.4	18.5	43.5	1.8
398	0.4	0.0	1.6	0.1	0.3	0.0	5.3	17.8	42.5	1.8
399	0.3	0.0	1.1	0.1	0.2	0.0	5.3	17.1	41.6	1.8
400	0.2	0.0	0.9	0.1	0.1	0.0	5.2	16.2	40.4	1.7
402	0.3	0.0	1.2	0.1	0.2	0.0	5.3	17.1	41.6	1.7
403	0.4	0.0	1.4	0.1	0.2	0.0	5.3	17.5	42.0	1.7
404	0.3	0.0	1.0	0.1	0.1	0.0	5.2	16.7	41.1	1.7
410	0.5	0.1	2.3	0.2	0.4	0.0	5.4	17.8	42.6	1.7
411	0.5	0.1	2.0	0.2	0.4	0.0	5.3	17.3	41.9	1.7
418	0.5	0.1	2.3	0.2	0.3	0.0	5.3	16.8	41.3	1.7
419	0.4	0.0	1.9	0.2	0.3	0.0	5.2	16.3	40.7	1.7
420	0.3	0.0	1.5	0.1	0.2	0.0	5.2	16.0	40.3	1.7
421	0.2	0.0	1.0	0.1	0.2	0.0	5.2	16.0	40.2	1.7
423	0.2	0.0	1.2	0.1	0.2	0.0	5.2	16.1	40.4	1.7
424	0.2	0.0	1.0	0.1	0.1	0.0	5.2	16.0	40.2	1.7
425	0.2	0.0	1.1	0.1	0.1	0.0	5.1	15.7	39.8	1.7
427	0.2	0.0	0.8	0.1	0.1	0.0	5.1	15.8	39.9	1.7
429	0.2	0.0	0.7	0.1	0.1	0.0	5.1	15.3	39.3	1.7
432	0.2	0.0	0.6	0.0	0.1	0.0	5.1	14.9	38.8	1.7
433a	0.2	0.0	0.8	0.1	0.1	0.0	5.1	14.9	38.9	1.7
433b	0.1	0.0	0.5	0.0	0.1	0.0	5.0	14.5	38.4	1.7
435a	0.1	0.0	0.5	0.0	0.1	0.0	5.0	14.5	38.3	1.7
435b	0.2	0.0	0.7	0.0	0.1	0.0	5.0	14.8	38.7	1.7
438	0.1	0.0	0.3	0.0	0.0	0.0	4.9	13.5	37.0	1.7
440	0.1	0.0	0.6	0.1	0.1	0.0	5.0	14.7	38.5	1.7
441a	0.2	0.0	0.6	0.1	0.1	0.0	5.0	13.7	37.3	1.7
441b	0.2	0.0	0.6	0.1	0.1	0.0	4.9	13.6	37.2	1.7
443	0.2	0.0	0.8	0.1	0.1	0.0	5.0	14.3	38.1	1.7
444	0.3	0.0	1.2	0.1	0.2	0.0	5.1	15.0	39.0	1.7
446a	0.3	0.0	1.5	0.1	0.2	0.0	5.1	14.7	38.5	1.7
451	0.2	0.0	0.8	0.1	0.1	0.0	5.0	13.7	37.4	1.7
455	0.2	0.0	0.6	0.1	0.1	0.0	4.9	13.6	37.1	1.7
456	0.1	0.0	0.6	0.1	0.1	0.0	4.9	13.5	37.1	1.7
460	0.1	0.0	0.5	0.0	0.1	0.0	5.0	14.6	38.5	1.7
500	0.1	0.0	0.4	0.0	0.0	0.0	5.0	14.2	38.0	1.7
507	0.1	0.0	0.5	0.0	0.1	0.0	5.0	14.3	38.1	1.7
508	0.1	0.0	0.5	0.0	0.1	0.0	5.0	14.1	37.8	1.7
509	0.1	0.0	0.4	0.0	0.0	0.0	5.0	13.8	37.5	1.7
527	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.7	33.3	1.6
528	0.0	0.0	0.2	0.0	0.0	0.0	4.7	11.3	34.1	1.6
532	0.0	0.0	0.2	0.0	0.0	0.0	4.6	10.1	32.6	1.6
536	0.1	0.0	0.4	0.1	0.1	0.0	4.9	13.2	36.5	1.7
537	0.2	0.0	0.7	0.1	0.2	0.0	5.3	17.9	42.7	1.8
538	0.2	0.0	0.9	0.1	0.1	0.0	5.2	16.5	40.8	1.7
539	0.3	0.0	1.3	0.1	0.2	0.0	5.2	16.1	40.4	1.7

Table D-3: Modelling predictions for Scenario 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)
	Project alone						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
24a	0.0	0.0	0.1	0.0	0.0	0.0	4.8	11.3	34.0	1.6
24b	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.3	34.0	1.6
25	0.0	0.0	0.1	0.0	0.0	0.0	4.8	11.3	34.1	1.6
57	0.0	0.0	0.2	0.0	0.0	0.0	4.8	11.8	34.7	1.6
58a	0.0	0.0	0.2	0.0	0.0	0.0	4.8	11.6	34.5	1.6
58b	0.0	0.0	0.2	0.0	0.0	0.0	4.8	11.6	34.5	1.6
60a	0.1	0.0	0.8	0.1	0.3	0.0	5.2	16.1	40.1	1.7
60b	0.1	0.0	0.9	0.2	0.4	0.0	5.3	16.8	41.0	1.7
60c	0.1	0.0	0.8	0.2	0.4	0.0	5.3	16.7	40.9	1.7
60d	0.1	0.0	0.8	0.2	0.3	0.0	5.3	16.5	40.7	1.7
145a	0.0	0.0	0.2	0.0	0.0	0.0	4.9	13.1	36.5	1.7
145b	0.0	0.0	0.1	0.0	0.0	0.0	4.9	12.7	35.9	1.7
145c	0.0	0.0	0.1	0.0	0.0	0.0	4.8	12.4	35.5	1.7
172	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.3	34.0	1.6
240b	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.6	33.3	1.6
207	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.1	33.9	1.6
209	0.0	0.0	0.1	0.0	0.0	0.0	4.8	11.5	34.3	1.6
211a	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.3	34.1	1.6
211b	0.0	0.0	0.1	0.0	0.0	0.0	4.8	11.4	34.2	1.6
211c	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.4	34.2	1.6
217c	0.0	0.0	0.1	0.0	0.0	0.0	4.8	11.5	34.3	1.6
217d	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.4	34.2	1.6
217e	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.2	34.0	1.6
217f	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.2	34.0	1.6
219a	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.3	34.1	1.6
219b	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.4	34.2	1.6
219c	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.3	34.1	1.6
219d	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.3	34.1	1.6
219e	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.1	33.8	1.6
226a	0.0	0.0	0.2	0.0	0.0	0.0	4.8	11.6	34.4	1.6
226b	0.0	0.0	0.2	0.0	0.0	0.0	4.8	11.6	34.4	1.6
226c	0.0	0.0	0.2	0.0	0.0	0.0	4.8	11.6	34.5	1.6
226d	0.0	0.0	0.1	0.0	0.0	0.0	4.8	11.4	34.2	1.6
227a	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.1	33.8	1.6
227b	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.0	33.8	1.6
227c	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.0	33.7	1.6
227d	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.0	33.7	1.6
227f	0.0	0.0	0.1	0.0	0.0	0.0	4.8	11.4	34.3	1.6
228a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
228b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
228c	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
227e	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.0	33.7	1.6
228e	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
228f	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.3	32.8	1.6
228g	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.3	32.8	1.6
228h	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.3	32.8	1.6
228i	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.3	32.8	1.6
228j	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
228k	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.3	32.8	1.6
228l	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.5	33.1	1.6

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)
	Project alone						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
228m	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.6	33.2	1.6
228n	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.7	33.4	1.6
228o	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.6	33.2	1.6
228p	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.3	32.9	1.6
228q	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.4	33.0	1.6
228r	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.6	33.2	1.6
230a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	9.9	32.4	1.6
230b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
238a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
238b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
238c	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
238d	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
238e	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
238f	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
238g	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.4	1.6
238h	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.4	1.6
239a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.0	32.5	1.6
239b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239c	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239d	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239e	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239f	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.5	1.6
239g	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239h	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239i	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239j	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
239k	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.1	32.6	1.6
240a	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.5	33.0	1.6
240c	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.6	33.3	1.6
240d	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.7	33.3	1.6
240e	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.6	33.2	1.6
250a	0.0	0.0	0.2	0.0	0.0	0.0	4.7	10.8	33.4	1.6
250b	0.0	0.0	0.2	0.0	0.0	0.0	4.7	10.8	33.5	1.6
253	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
254a	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.8	1.6
254b	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
254c	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
255	0.0	0.0	0.1	0.0	0.0	0.0	4.6	10.2	32.7	1.6
279	0.0	0.0	0.2	0.0	0.0	0.0	4.6	10.1	32.5	1.6
284	0.0	0.0	0.2	0.0	0.0	0.0	4.6	10.1	32.6	1.6
285	0.0	0.0	0.2	0.0	0.0	0.0	4.6	10.1	32.6	1.6
298a	0.0	0.0	0.2	0.0	0.0	0.0	4.7	10.6	33.2	1.6
298b	0.0	0.0	0.2	0.0	0.0	0.0	4.7	10.6	33.2	1.6
287	0.0	0.0	0.2	0.0	0.0	0.0	4.6	10.1	32.6	1.6
299	0.0	0.0	0.2	0.0	0.0	0.0	4.6	10.1	33.2	1.6
306	0.0	0.0	0.2	0.0	0.0	0.0	4.7	10.5	33.0	1.6
384	0.3	0.0	2.2	0.2	0.3	0.0	5.1	15.7	39.9	1.7
385	0.2	0.0	1.5	0.1	0.2	0.0	5.1	15.5	39.5	1.7
386	0.3	0.0	2.7	0.2	0.5	0.0	5.2	16.9	41.5	1.8
387	0.4	0.0	3.3	0.3	0.5	0.0	5.3	17.8	42.5	1.8
389	0.7	0.1	6.2	0.8	1.7	0.0	5.5	19.5	45.1	1.8

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)
	Project alone						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
390	0.6	0.1	5.0	0.5	1.1	0.0	5.4	19.0	44.2	1.8
398	0.4	0.0	3.2	0.3	0.5	0.0	5.3	18.1	42.9	1.8
399	0.3	0.0	2.3	0.2	0.3	0.0	5.3	17.3	41.9	1.8
400	0.1	0.0	1.3	0.1	0.2	0.0	5.2	16.4	40.7	1.7
402	0.2	0.0	1.6	0.1	0.3	0.0	5.3	17.3	41.8	1.7
403	0.2	0.0	2.0	0.2	0.3	0.0	5.3	17.7	42.4	1.7
404	0.2	0.0	1.4	0.1	0.2	0.0	5.2	16.9	41.3	1.7
410	0.6	0.1	4.9	0.5	0.8	0.0	5.4	18.2	43.2	1.7
411	0.5	0.1	4.3	0.5	0.7	0.0	5.3	17.7	42.4	1.7
418	0.6	0.1	4.9	0.5	0.7	0.0	5.3	17.2	41.9	1.7
419	0.5	0.1	4.3	0.4	0.6	0.0	5.2	16.7	41.2	1.7
420	0.4	0.0	3.2	0.3	0.5	0.0	5.2	16.3	40.7	1.7
421	0.2	0.0	1.9	0.2	0.3	0.0	5.2	16.2	40.5	1.7
423	0.2	0.0	1.9	0.2	0.3	0.0	5.2	16.3	40.6	1.7
424	0.2	0.0	1.5	0.1	0.2	0.0	5.2	16.2	40.4	1.7
425	0.2	0.0	1.8	0.2	0.2	0.0	5.1	15.9	40.0	1.7
427	0.1	0.0	1.2	0.1	0.2	0.0	5.1	16.0	40.1	1.7
429	0.2	0.0	1.3	0.1	0.1	0.0	5.1	15.4	39.5	1.7
432	0.1	0.0	1.1	0.1	0.1	0.0	5.1	15.0	39.0	1.7
433a	0.2	0.0	1.5	0.1	0.2	0.0	5.1	15.1	39.1	1.7
433b	0.1	0.0	0.8	0.1	0.1	0.0	5.0	14.6	38.5	1.7
435a	0.1	0.0	1.0	0.1	0.1	0.0	5.0	14.6	38.4	1.7
435b	0.2	0.0	1.3	0.1	0.1	0.0	5.1	14.9	38.9	1.7
438	0.1	0.0	0.4	0.0	0.1	0.0	4.9	13.6	37.1	1.7
440	0.1	0.0	0.9	0.1	0.1	0.0	5.0	14.8	38.7	1.7
441a	0.2	0.0	1.3	0.1	0.2	0.0	5.0	13.9	37.5	1.7
441b	0.2	0.0	1.3	0.1	0.2	0.0	5.0	13.8	37.4	1.7
443	0.2	0.0	1.8	0.2	0.3	0.0	5.0	14.5	38.4	1.7
444	0.3	0.0	2.6	0.2	0.4	0.0	5.1	15.3	39.3	1.7
446a	0.4	0.0	3.6	0.3	0.4	0.0	5.1	14.9	38.8	1.7
451	0.2	0.0	1.6	0.1	0.2	0.0	5.0	13.9	37.5	1.7
455	0.2	0.0	1.3	0.1	0.2	0.0	4.9	13.7	37.3	1.7
456	0.2	0.0	1.2	0.1	0.2	0.0	4.9	13.7	37.2	1.7
460	0.1	0.0	0.9	0.1	0.1	0.0	5.0	14.8	38.6	1.7
500	0.1	0.0	0.6	0.0	0.1	0.0	5.0	14.3	38.1	1.7
507	0.1	0.0	0.9	0.1	0.1	0.0	5.0	14.5	38.3	1.7
508	0.1	0.0	0.9	0.1	0.1	0.0	5.0	14.2	38.0	1.7
509	0.1	0.0	0.7	0.0	0.1	0.0	5.0	13.9	37.6	1.7
527	0.0	0.0	0.1	0.0	0.0	0.0	4.7	10.7	33.3	1.6
528	0.0	0.0	0.1	0.0	0.0	0.0	4.7	11.3	34.1	1.6
532	0.0	0.0	0.2	0.0	0.0	0.0	4.6	10.1	32.6	1.6
536	0.0	0.0	0.2	0.0	0.1	0.0	4.9	13.2	36.6	1.7
537	0.2	0.0	1.3	0.2	0.4	0.0	5.3	18.2	43.1	1.8
538	0.2	0.0	1.4	0.1	0.2	0.0	5.2	16.7	41.1	1.7
539	0.3	0.0	2.6	0.3	0.4	0.0	5.2	16.4	40.7	1.7

Table D-4: NO_2 modelling predictions for all scenarios

Receptor ID	Scenario 1		Scenario 2		Scenario 3	
	Total impact – 100% conversion NO_X to NO_2					
	1-hr ave.	Ann. ave.	1-hr ave.	Ann. ave.	1-hr ave.	Ann. ave.
	Air quality impact criteria					
	246	62	246	62	246	62
24a	93.4	39.8	87.6	39.7	86.6	39.7
24b	93.3	39.8	87.6	39.7	86.6	39.7
25	93.6	39.8	87.7	39.7	86.6	39.7
57	115.3	40.0	92.1	39.8	87.8	39.7
58a	96.9	39.8	88.6	39.7	86.8	39.7
58b	97.1	39.8	88.7	39.7	86.8	39.7
60a	136.4	40.9	95.2	39.9	89.5	39.8
60b	140.2	41.2	95.7	40.0	89.6	39.8
60c	137.2	41.2	95.1	40.0	89.6	39.8
60d	135.3	41.1	94.8	39.9	89.2	39.8
145a	99.3	39.8	88.7	39.7	87.1	39.7
145b	99.0	39.8	88.5	39.7	87.0	39.7
145c	97.2	39.8	88.5	39.7	87.0	39.7
172	102.9	39.9	89.2	39.8	87.2	39.7
240b	95.3	39.8	88.2	39.7	86.8	39.7
207	100.6	39.9	89.1	39.7	86.9	39.7
209	103.2	39.9	89.4	39.7	87.1	39.7
211a	102.3	39.9	89.3	39.7	87.0	39.7
211b	102.2	39.9	89.3	39.8	87.1	39.7
211c	101.9	39.9	89.3	39.7	87.1	39.7
217c	105.3	39.9	89.6	39.7	87.2	39.7
217d	104.7	39.9	89.4	39.7	87.2	39.7
217e	102.3	39.8	88.9	39.7	87.1	39.7
217f	102.5	39.8	89.0	39.7	87.1	39.7
219a	92.9	39.8	87.5	39.7	86.6	39.7
219b	93.2	39.8	87.7	39.7	86.6	39.7
219c	93.1	39.8	87.6	39.7	86.6	39.7
219d	92.3	39.8	87.5	39.7	86.6	39.7
219e	95.8	39.8	88.3	39.7	86.7	39.7
226a	106.1	39.9	91.3	39.7	88.1	39.7
226b	105.8	39.9	91.3	39.7	88.1	39.7
226c	108.1	39.9	92.0	39.7	88.4	39.7
226d	97.8	39.8	89.1	39.7	87.2	39.7
227a	106.0	39.8	90.5	39.7	87.8	39.7
227b	102.6	39.8	89.7	39.7	87.5	39.7
227c	100.0	39.8	89.2	39.7	87.3	39.7
227d	97.8	39.8	88.7	39.7	87.1	39.7
227f	98.1	39.8	88.8	39.7	86.8	39.7
228a	95.8	39.8	88.6	39.7	87.1	39.7
228b	95.8	39.8	88.6	39.7	87.1	39.7
228c	95.8	39.8	88.6	39.7	87.1	39.7
227e	96.8	39.8	88.5	39.7	87.0	39.7
228e	96.1	39.8	88.7	39.7	87.1	39.7
228f	96.3	39.8	88.7	39.7	87.1	39.7
228g	96.5	39.8	88.7	39.7	87.1	39.7
228h	96.5	39.8	88.8	39.7	87.1	39.7
228i	96.5	39.8	88.8	39.7	87.1	39.7
228j	92.8	39.8	87.8	39.7	86.8	39.7
228k	96.5	39.8	88.8	39.7	87.1	39.7
228l	98.2	39.8	89.2	39.7	87.3	39.7
228m	97.9	39.8	89.2	39.7	87.3	39.7

Receptor ID	Scenario 1		Scenario 2		Scenario 3	
	Total impact – 100% conversion NO_X to NO_2					
	1-hr ave.	Ann. ave.	1-hr ave.	Ann. ave.	1-hr ave.	Ann. ave.
	Air quality impact criteria					
	246	62	246	62	246	62
228n	97.5	39.8	89.3	39.7	87.3	39.7
228o	97.7	39.8	89.1	39.7	87.2	39.7
228p	97.5	39.8	89.0	39.7	87.2	39.7
228q	97.2	39.8	89.1	39.7	87.3	39.7
228r	97.9	39.8	89.3	39.7	87.3	39.7
230a	91.3	39.8	87.3	39.7	86.6	39.7
230b	92.0	39.8	87.5	39.7	86.6	39.7
238a	90.9	39.8	87.0	39.7	86.5	39.7
238b	90.7	39.8	87.1	39.7	86.5	39.7
238c	90.8	39.8	87.1	39.7	86.5	39.7
238d	90.8	39.8	87.1	39.7	86.5	39.7
238e	90.8	39.8	87.1	39.7	86.5	39.7
238f	90.8	39.8	87.1	39.7	86.5	39.7
238g	90.6	39.8	87.0	39.7	86.5	39.7
238h	90.7	39.8	87.0	39.7	86.5	39.7
239a	90.5	39.8	87.5	39.7	86.7	39.7
239b	90.8	39.8	87.6	39.7	86.8	39.7
239c	90.6	39.8	87.6	39.7	86.8	39.7
239d	90.5	39.8	87.5	39.7	86.7	39.7
239e	90.4	39.8	87.5	39.7	86.7	39.7
239f	90.4	39.8	87.5	39.7	86.7	39.7
239g	90.7	39.8	87.6	39.7	86.8	39.7
239h	90.9	39.8	87.7	39.7	86.8	39.7
239i	91.3	39.8	87.8	39.7	86.8	39.7
239j	91.6	39.8	87.9	39.7	86.9	39.7
239k	91.6	39.8	87.9	39.7	86.9	39.7
240a	94.0	39.8	88.0	39.7	86.9	39.7
240c	95.3	39.8	88.2	39.7	86.8	39.7
240d	95.4	39.8	88.2	39.7	86.9	39.7
240e	95.1	39.8	88.2	39.7	86.8	39.7
250a	103.3	39.9	89.6	39.7	87.3	39.7
250b	103.1	39.9	89.6	39.7	87.3	39.7
253	99.7	39.8	89.1	39.7	87.2	39.7
254a	98.4	39.8	88.9	39.7	87.2	39.7
254b	98.5	39.8	88.9	39.7	87.2	39.7
254c	98.5	39.8	88.9	39.7	87.2	39.7
255	98.3	39.8	88.8	39.7	87.2	39.7
279	97.0	39.8	88.6	39.7	87.1	39.7
284	98.7	39.8	88.9	39.7	87.2	39.7
285	97.6	39.8	88.7	39.7	87.2	39.7
298a	101.8	39.8	89.5	39.7	87.1	39.7
298b	101.6	39.8	89.3	39.7	87.0	39.7
287	97.9	39.8	88.7	39.7	87.2	39.7
299	100.1	39.8	89.0	39.7	86.9	39.7
306	97.9	39.8	88.6	39.7	87.0	39.7
384	102.9	39.8	107.0	39.8	100.8	39.8
385	97.4	39.8	102.4	39.8	92.5	39.7
386	97.4	39.8	101.9	39.9	95.3	39.8
387	95.4	39.8	103.4	39.9	92.6	39.8
389	100.5	39.9	108.1	40.0	98.4	39.8
390	97.5	39.8	105.4	39.9	96.5	39.8
398	95.7	39.8	101.7	39.9	93.8	39.8

Receptor ID	Scenario 1		Scenario 2		Scenario 3	
	Total impact – 100% conversion NO_X to NO_2					
	1-hr ave.	Ann. ave.	1-hr ave.	Ann. ave.	1-hr ave.	Ann. ave.
	Air quality impact criteria					
	246	62	246	62	246	62
399	94.7	39.8	100.8	39.8	91.8	39.7
400	94.9	39.8	100.7	39.8	91.7	39.7
402	96.0	39.8	98.9	39.8	93.3	39.7
403	96.6	39.8	100.0	39.9	93.2	39.8
404	96.3	39.8	98.9	39.8	92.8	39.7
410	107.6	39.9	113.2	40.0	103.8	39.8
411	109.2	39.9	112.3	39.9	106.8	39.8
418	116.5	39.9	116.8	39.9	114.0	39.8
419	114.7	39.9	119.0	39.9	113.6	39.8
420	106.1	39.8	109.1	39.9	105.1	39.8
421	99.5	39.8	104.7	39.8	96.1	39.7
423	98.8	39.8	105.2	39.9	95.1	39.7
424	97.2	39.8	100.5	39.8	93.3	39.7
425	98.5	39.8	103.0	39.8	94.8	39.7
427	96.6	39.8	97.7	39.8	93.1	39.7
429	96.3	39.8	100.9	39.8	91.9	39.7
432	95.7	39.8	99.2	39.8	91.2	39.7
433a	96.0	39.8	98.5	39.8	91.3	39.7
433b	94.4	39.8	95.7	39.8	90.5	39.7
435a	94.3	39.8	95.9	39.8	90.5	39.7
435b	95.5	39.8	97.0	39.8	91.0	39.7
438	93.2	39.8	93.8	39.8	90.7	39.7
440	96.1	39.8	95.8	39.8	91.8	39.7
441a	101.0	39.8	104.3	39.8	96.1	39.8
441b	102.7	39.8	108.1	39.8	96.8	39.8
443	99.9	39.8	105.5	39.8	99.4	39.8
444	107.7	39.8	108.4	39.9	107.1	39.8
446a	117.5	39.9	115.2	39.9	106.4	39.8
451	105.1	39.8	94.4	39.8	92.2	39.7
455	103.2	39.8	110.4	39.8	98.4	39.8
456	102.3	39.8	105.4	39.8	99.0	39.8
460	95.8	39.8	97.2	39.8	92.1	39.7
500	93.9	39.8	95.7	39.8	91.1	39.7
507	94.2	39.8	95.5	39.8	90.3	39.7
508	94.2	39.8	94.9	39.8	90.2	39.7
509	93.6	39.8	94.0	39.8	89.9	39.7
527	94.6	39.8	87.8	39.7	86.7	39.7
528	101.6	39.9	89.3	39.7	87.0	39.7
532	98.5	39.8	88.8	39.7	87.2	39.7
536	98.6	39.8	88.8	39.7	87.0	39.7
537	93.2	39.8	96.5	39.9	91.6	39.8
538	95.9	39.8	98.3	39.8	93.1	39.7
539	101.3	39.8	109.2	39.9	99.2	39.8

Appendix E

Isopleth Diagrams

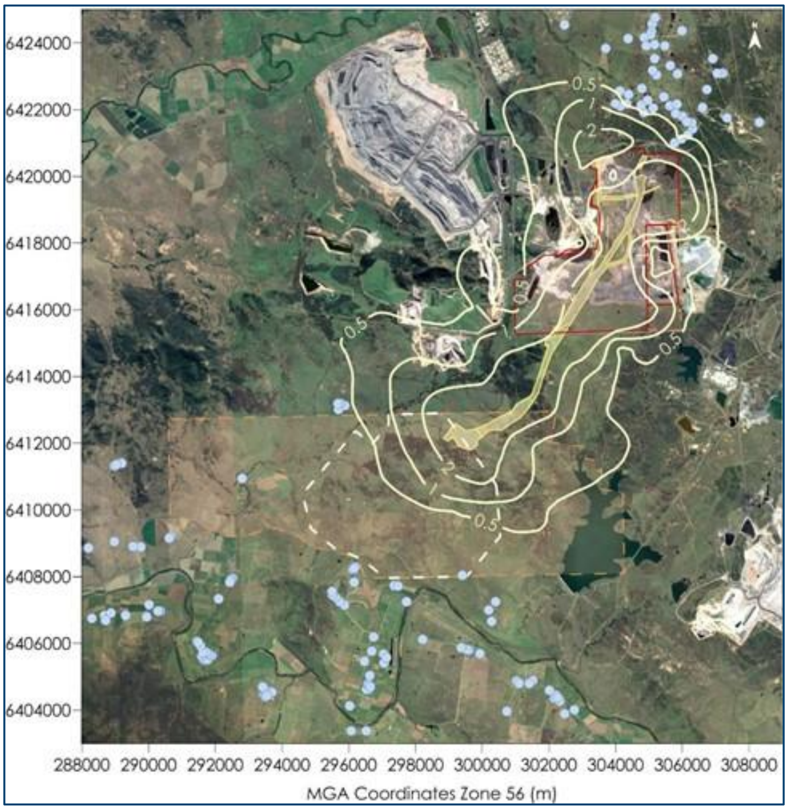

Figure E-1: Predicted maximum 24-hour average $PM_{2.5}$ concentrations due to emissions from the Project in Scenario 1 (µg/m³)

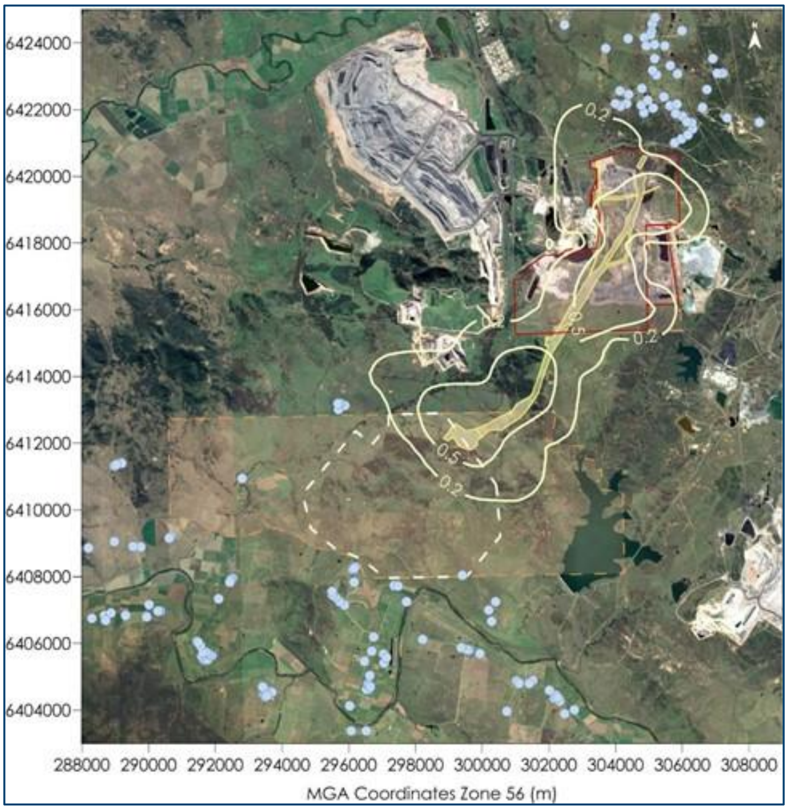

Figure E-2: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Project in Scenario 1 (µg/m³)

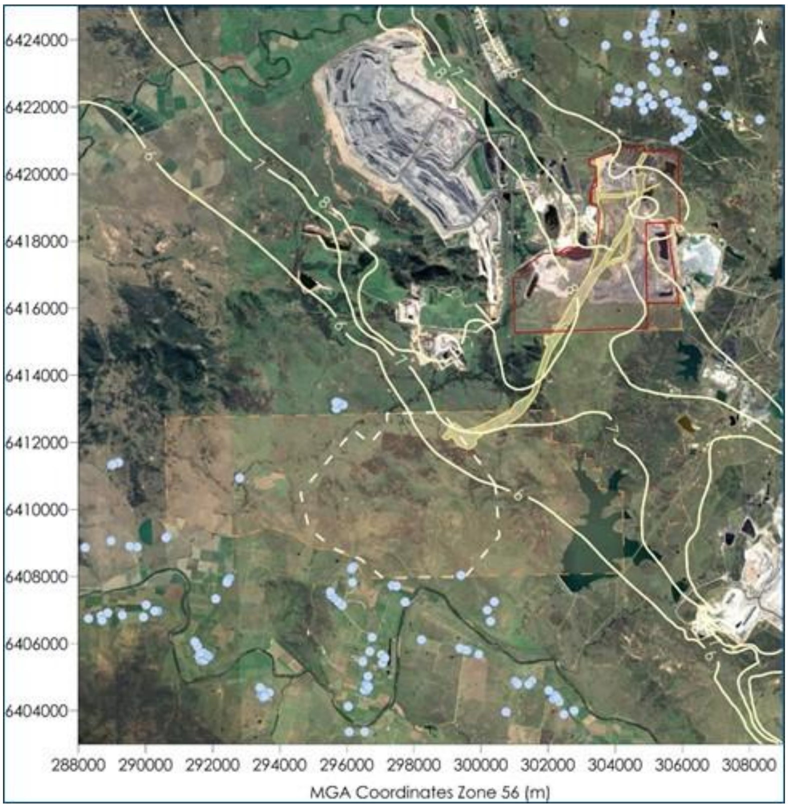

Figure E-3: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Project and other sources in Scenario 1 (µg/m³)

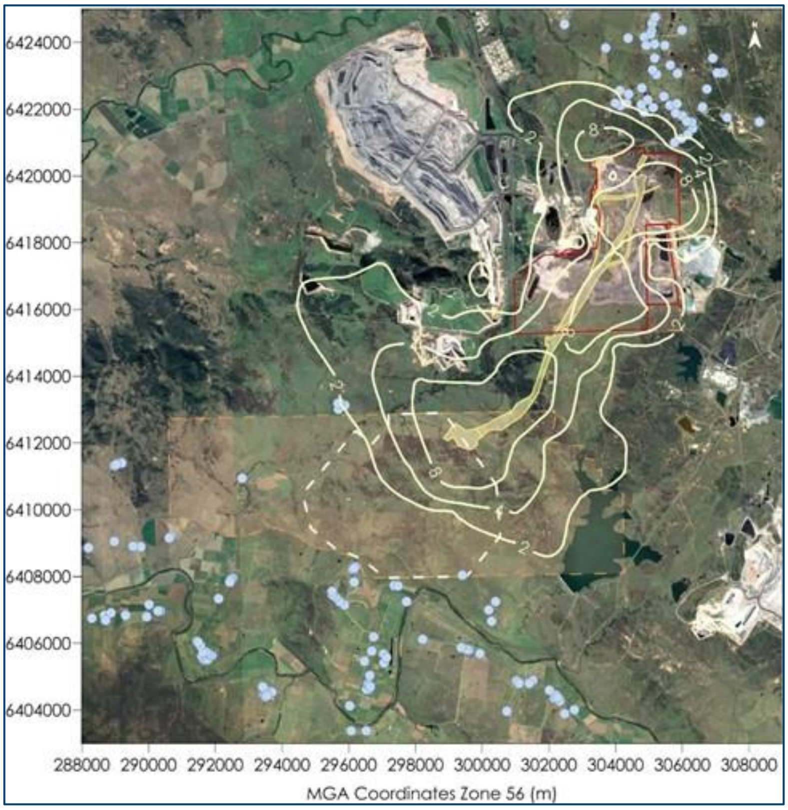

Figure E-4: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from the Project in Scenario 1 (µg/m³)

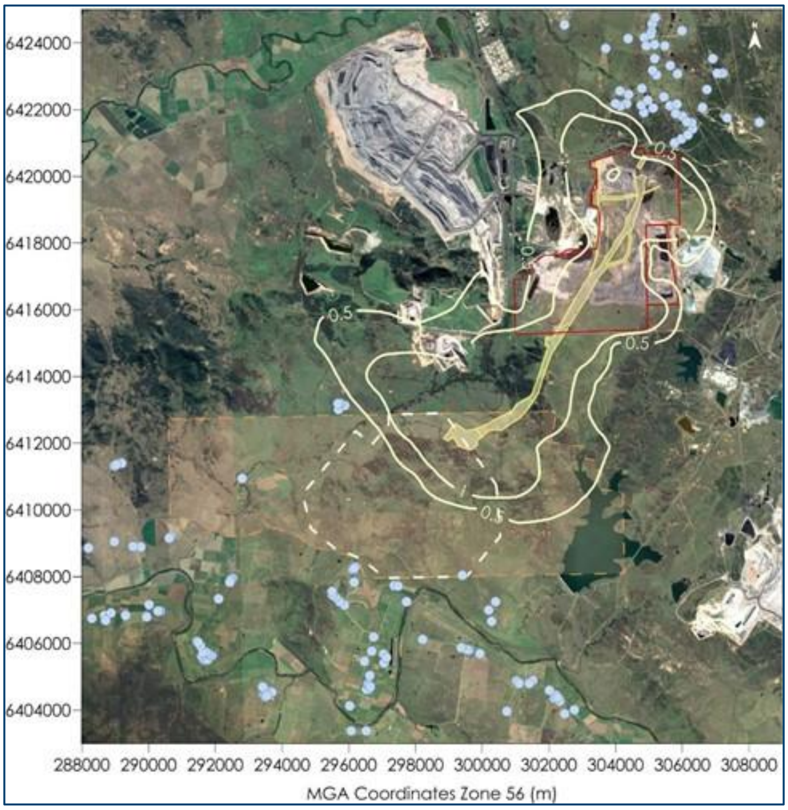

Figure E-5: Predicted annual average PM_{10} concentrations due to emissions from the Project in Scenario 1 (µg/m³)

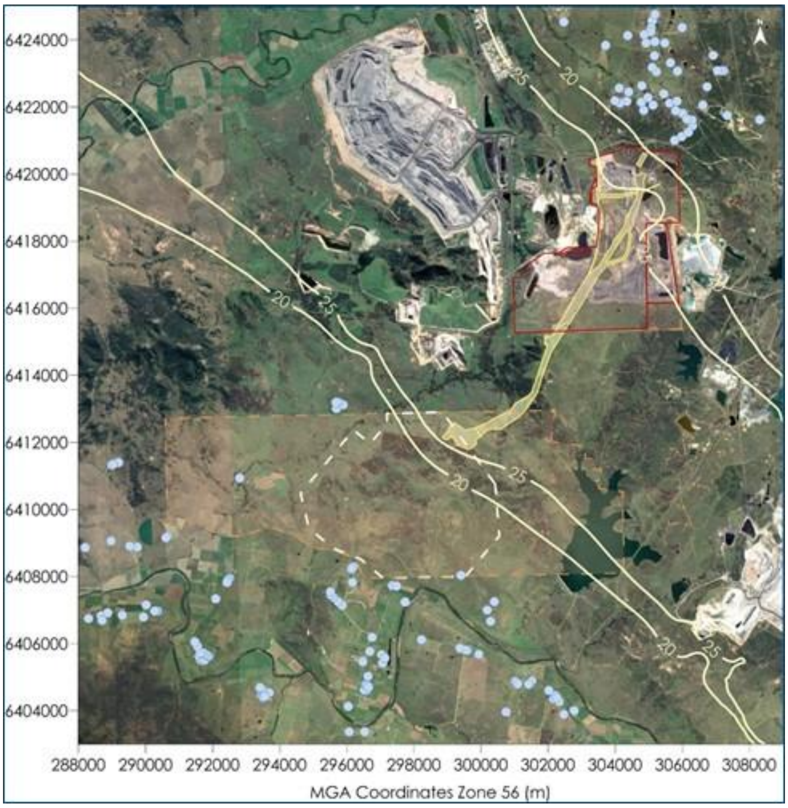

Figure E-6: Predicted annual average PM_{10} concentrations due to emissions from the Project and other sources in Scenario 1 (µg/m³)

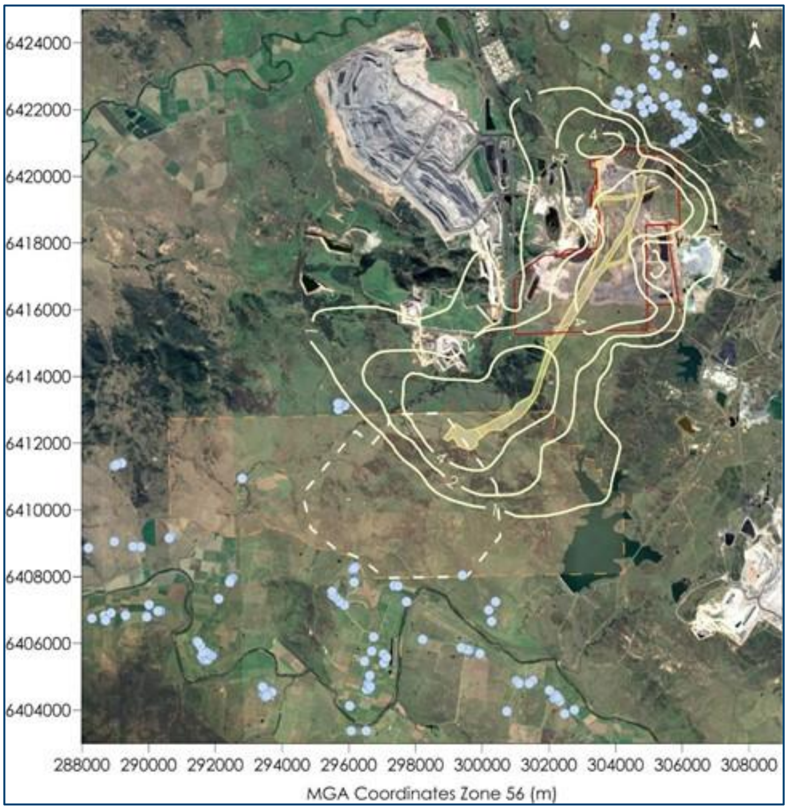

Figure E-7: Predicted annual average TSP concentrations due to emissions from the Project in Scenario 1 (µg/m³)

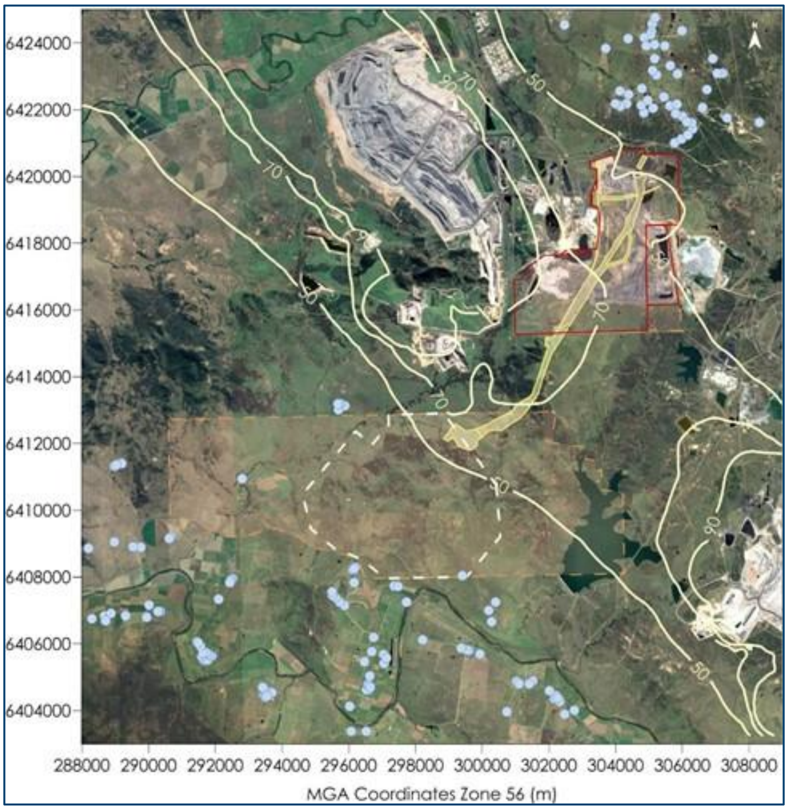

Figure E-8: Predicted annual average TSP concentrations due to emissions from the Project and other sources in Scenario 1 (µg/m³)

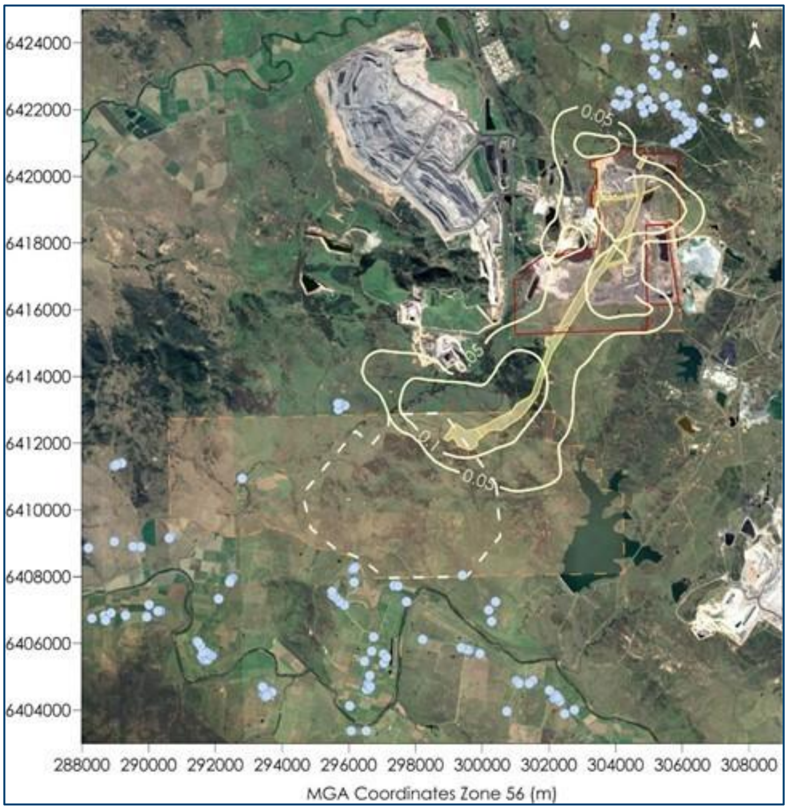

Figure E-9: Predicted annual average dust deposition levels due to emissions from the Project in Scenario 1 (g/m²/month)

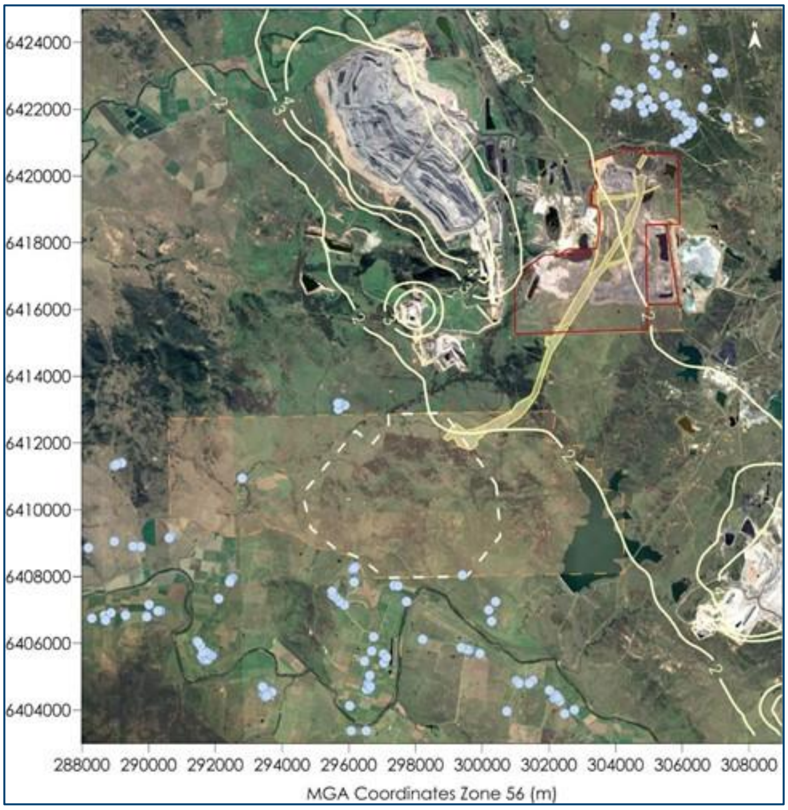

Figure E-10: Predicted annual average dust deposition levels due to emissions from the Project and other sources in Scenario 1 (g/m²/month)

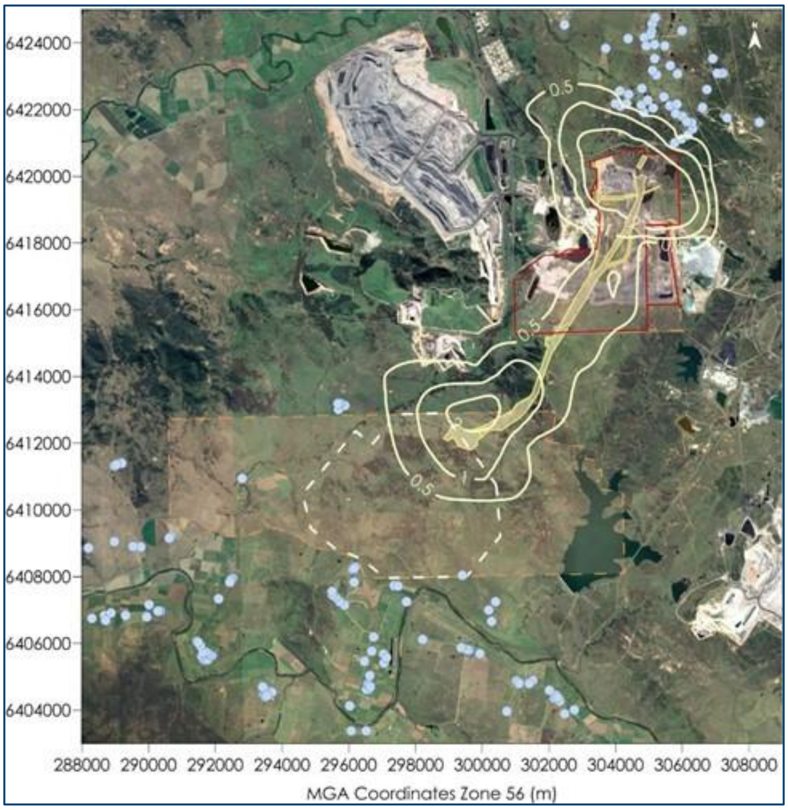

Figure E-11: Predicted maximum 24-hour average $PM_{2.5}$ concentrations due to emissions from the Project in Scenario 2 (µg/m³)

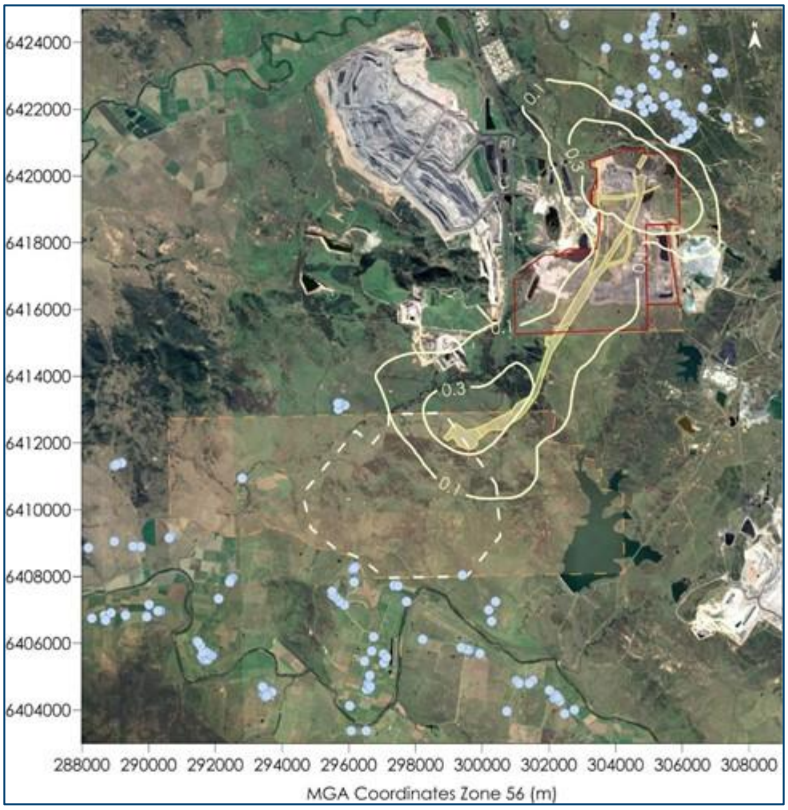

Figure E-12: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Project in Scenario 2 (µg/m³)

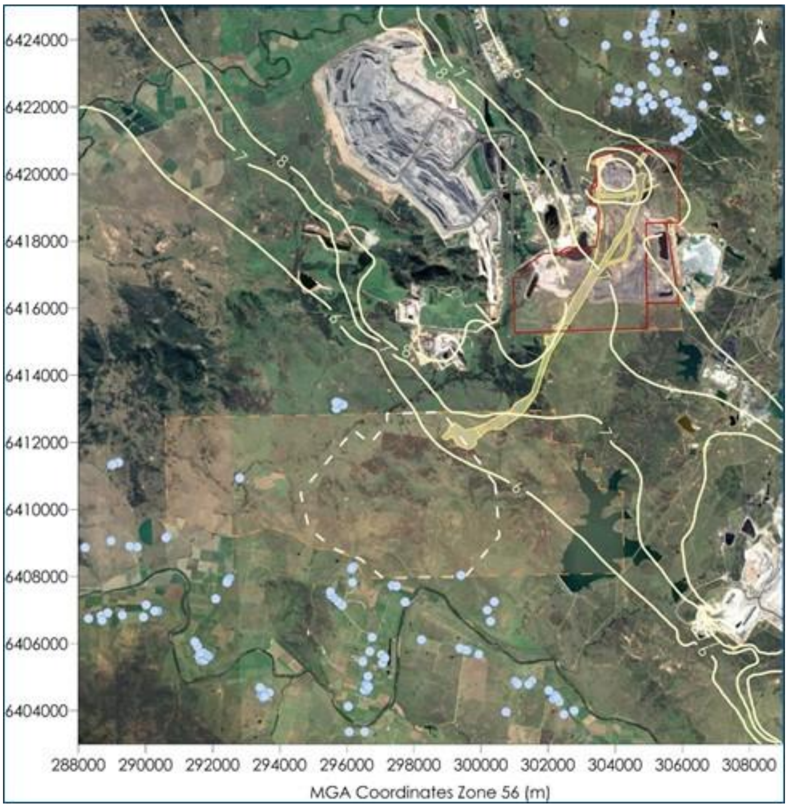

Figure E-13: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Project and other sources in Scenario 2 (µg/m³)

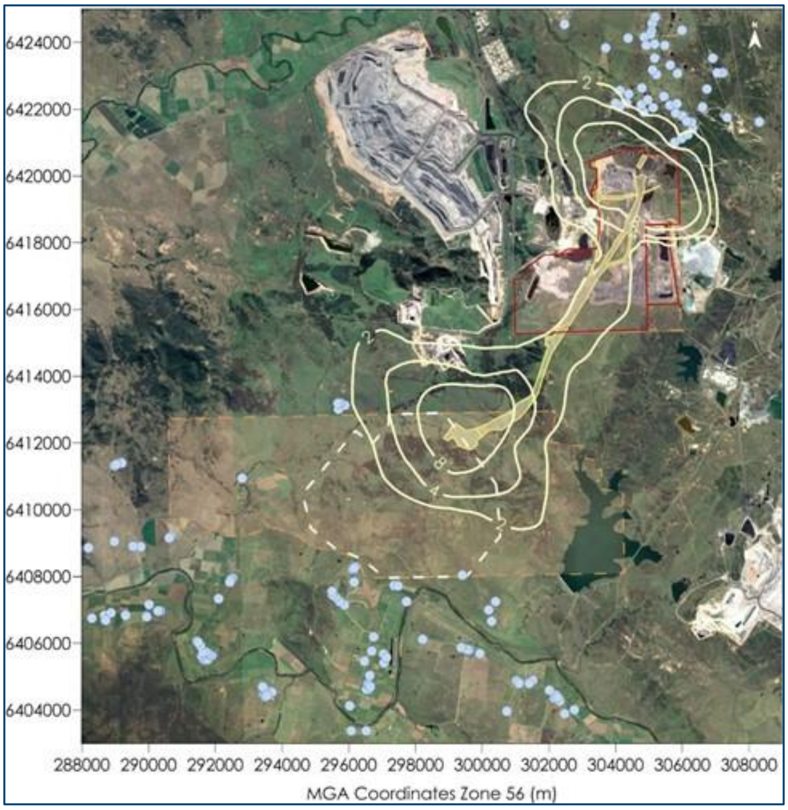

Figure E-14: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from the Project in Scenario 2 (µg/m³)

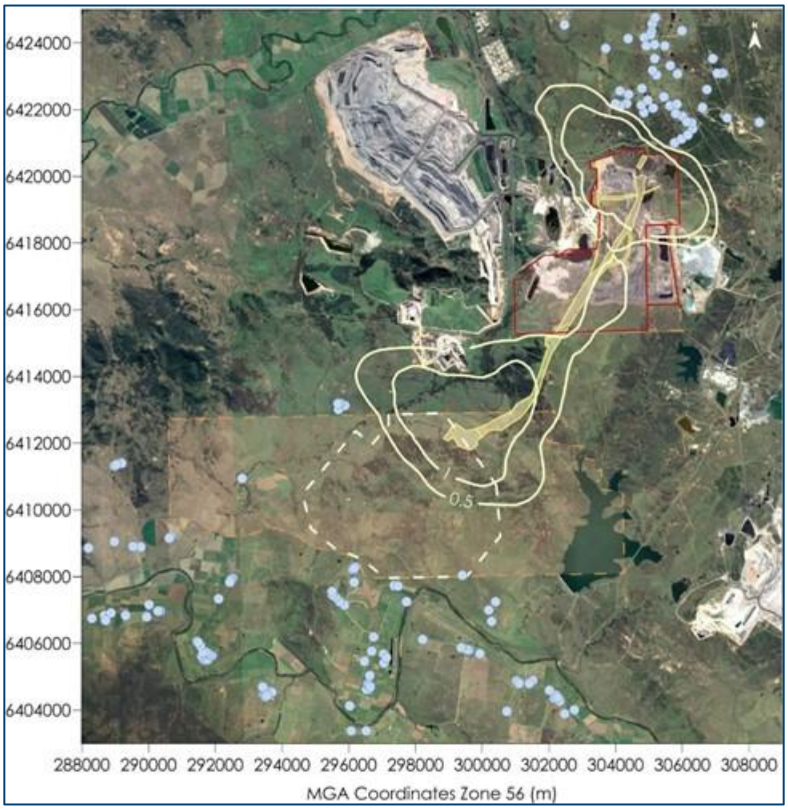

Figure E-15: Predicted annual average PM_{10} concentrations due to emissions from the Project in Scenario 2 (µg/m³)

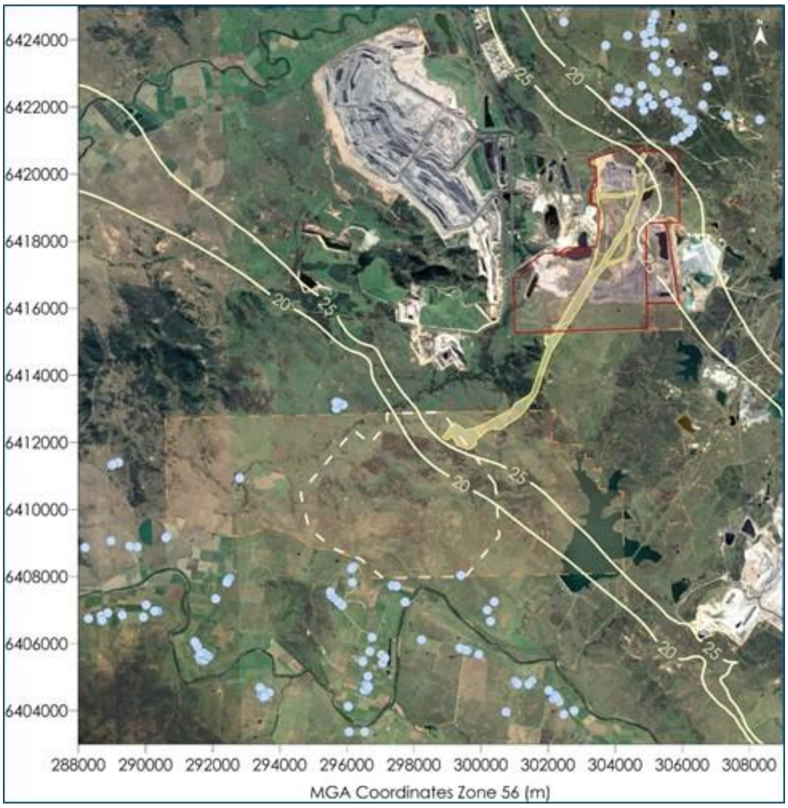

Figure E-16: Predicted annual average PM_{10} concentrations due to emissions from the Project and other sources in Scenario 2 (µg/m³)

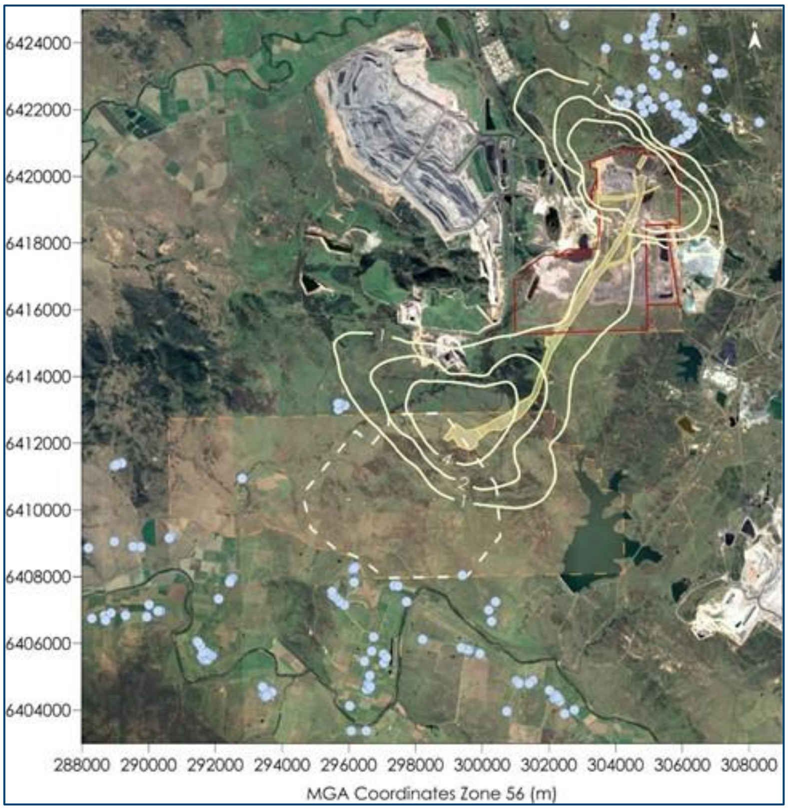

Figure E-17: Predicted annual average TSP concentrations due to emissions from the Project in Scenario 2 (µg/m³)

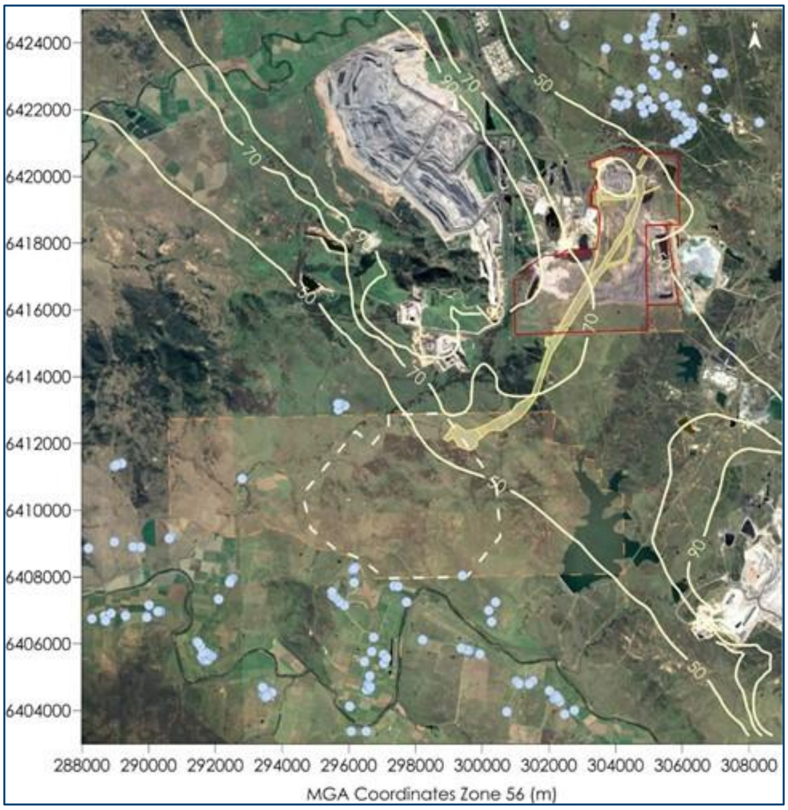

Figure E-18: Predicted annual average TSP concentrations due to emissions from the Project and other sources in Scenario 2 (µg/m³)

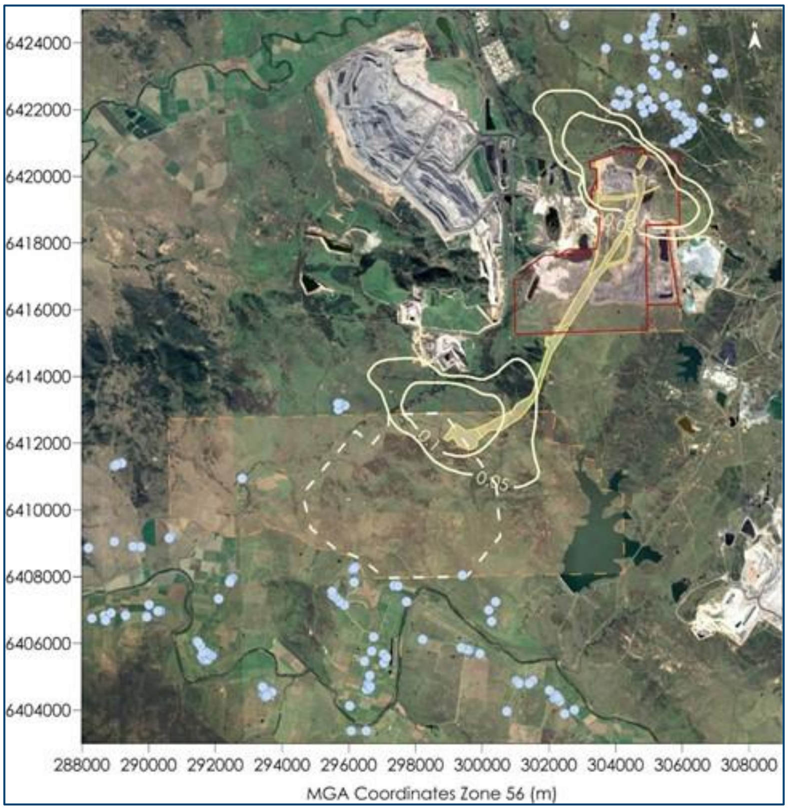

Figure E-19: Predicted annual average dust deposition levels due to emissions from the Project in Scenario 2 (g/m²/month)

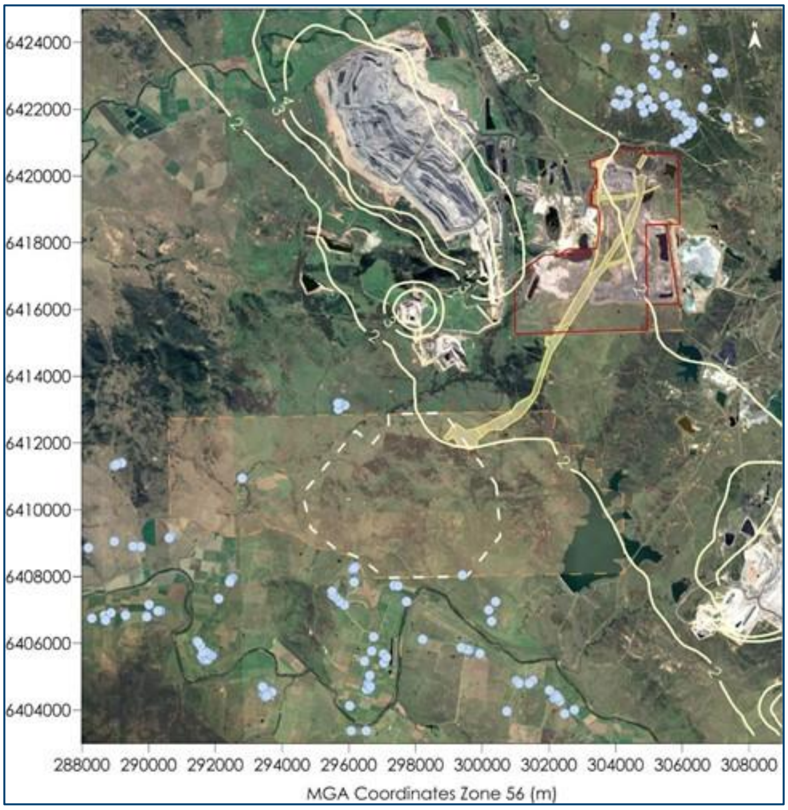

Figure E-20: Predicted annual average dust deposition levels due to emissions from the Project and other sources in Scenario 2 (g/m²/month)

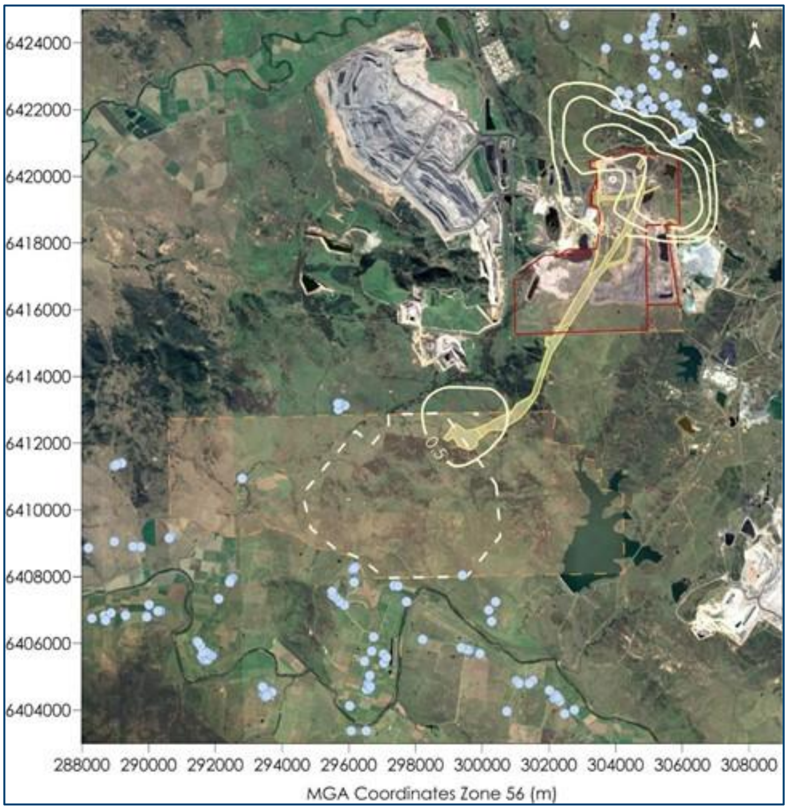

Figure E-21: Predicted maximum 24-hour average $PM_{2.5}$ concentrations due to emissions from the Project in Scenario 3 (µg/m³)

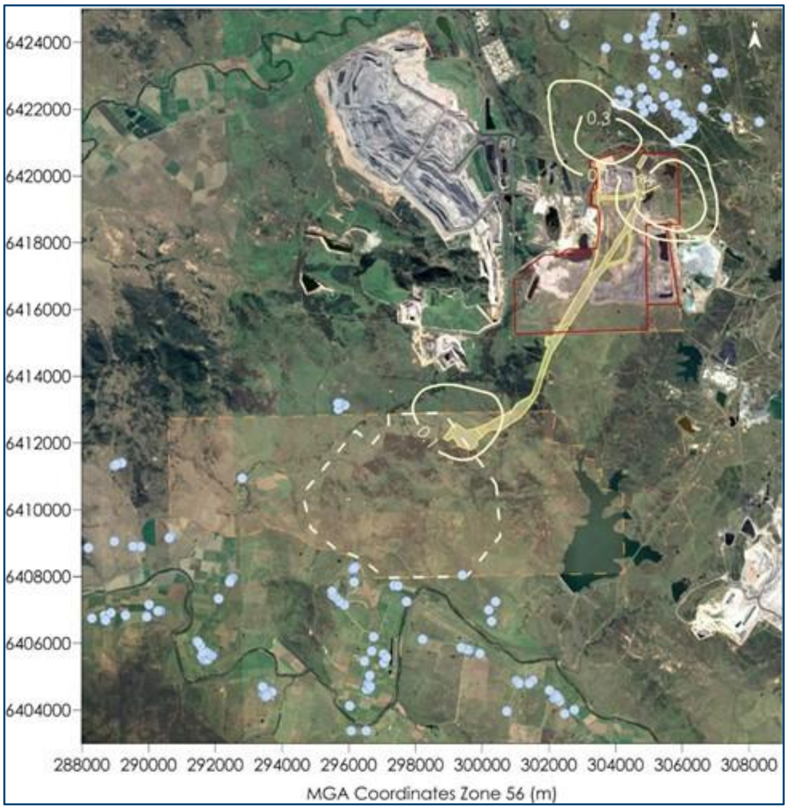

Figure E-22: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Project in Scenario 3 (µg/m³)

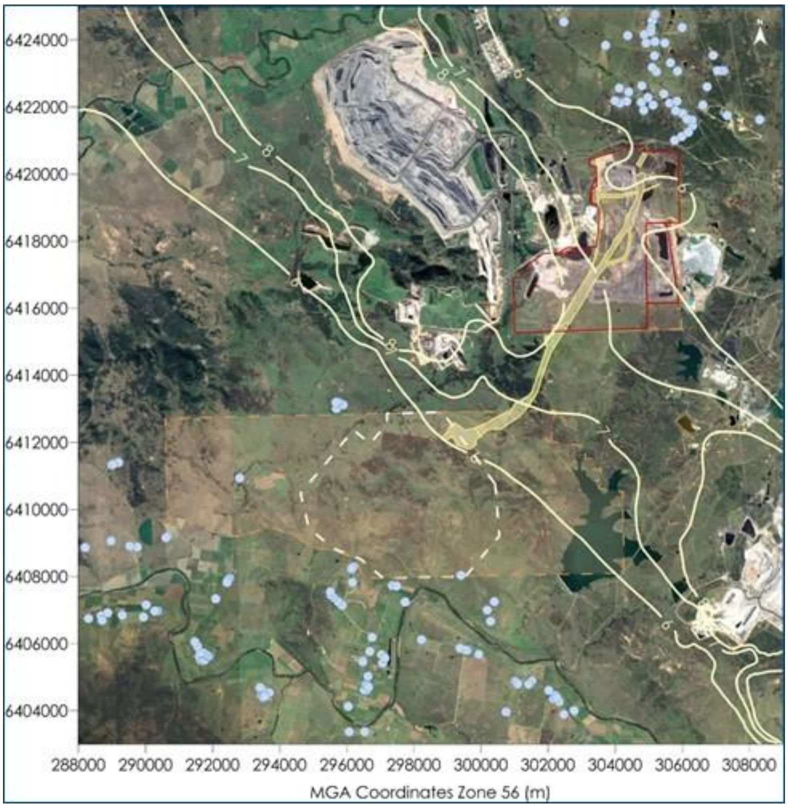

Figure E-23: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Project and other sources in Scenario 3 (µg/m³)

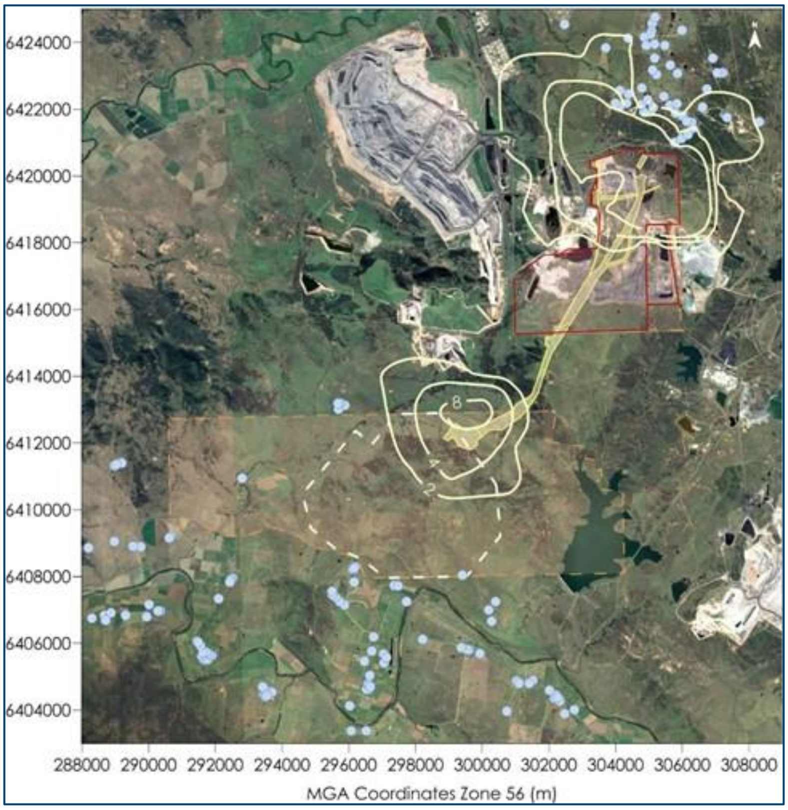

Figure E-24: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from the Project in Scenario 3 (µg/m³)

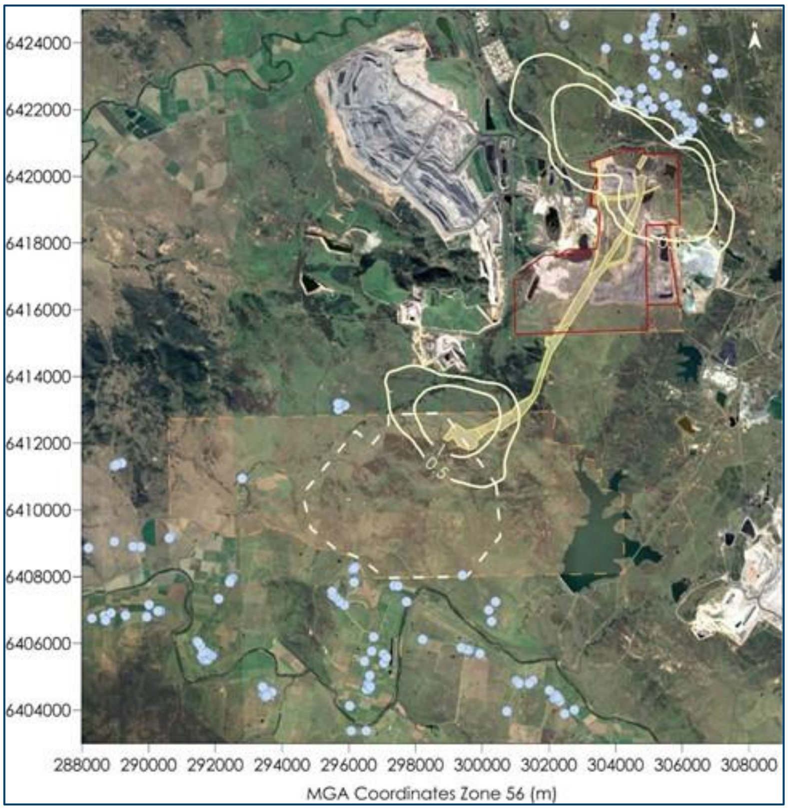

Figure E-25: Predicted annual average PM_{10} concentrations due to emissions from the Project in Scenario 3 (µg/m³)

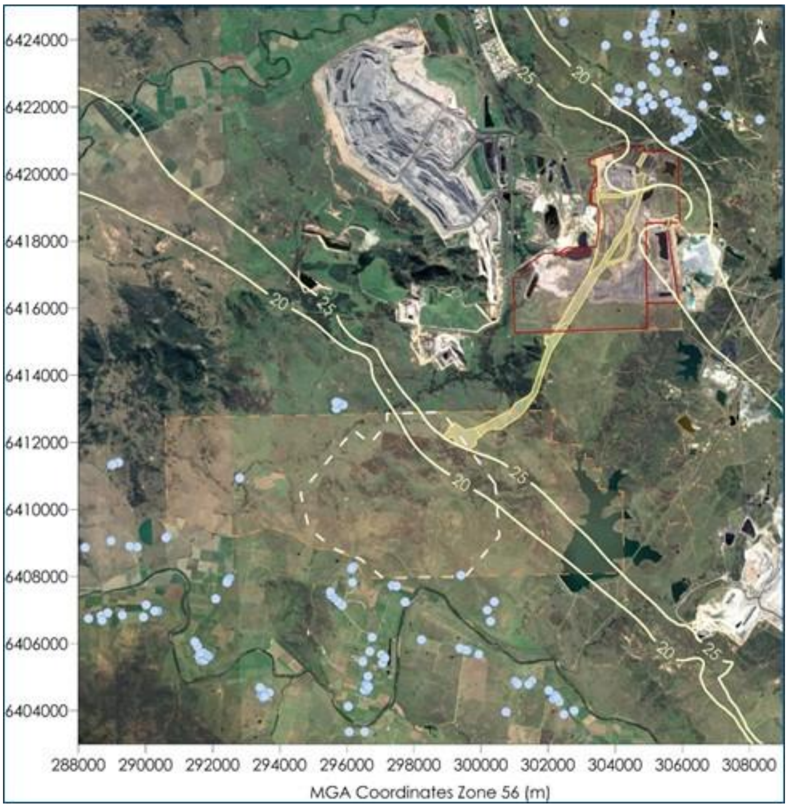

Figure E-26: Predicted annual average PM_{10} concentrations due to emissions from the Project and other sources in Scenario 3 (µg/m³)

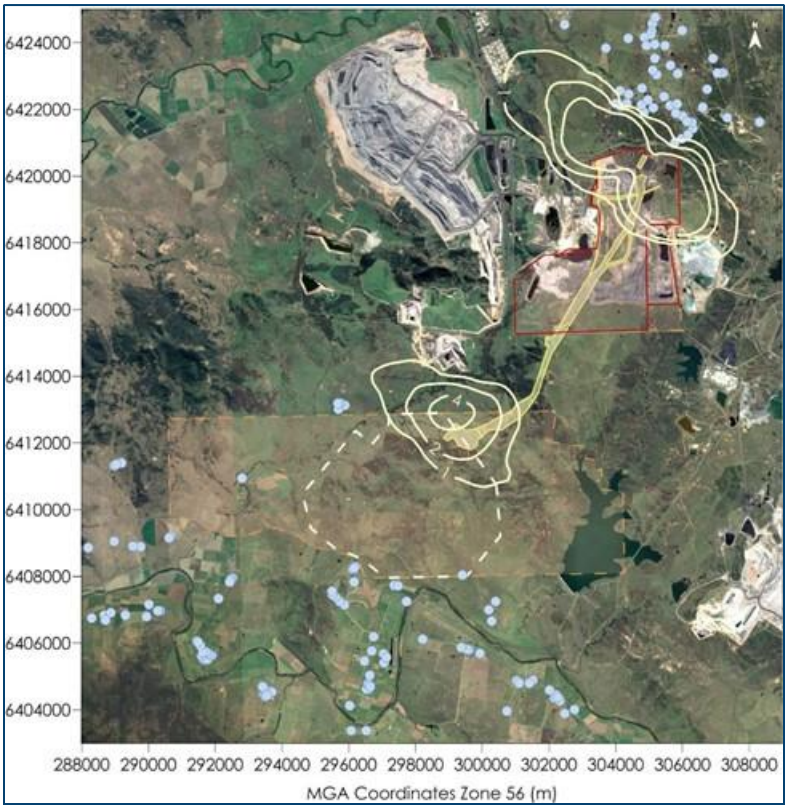

Figure E-27: Predicted annual average TSP concentrations due to emissions from the Project in Scenario 3 (µg/m³)

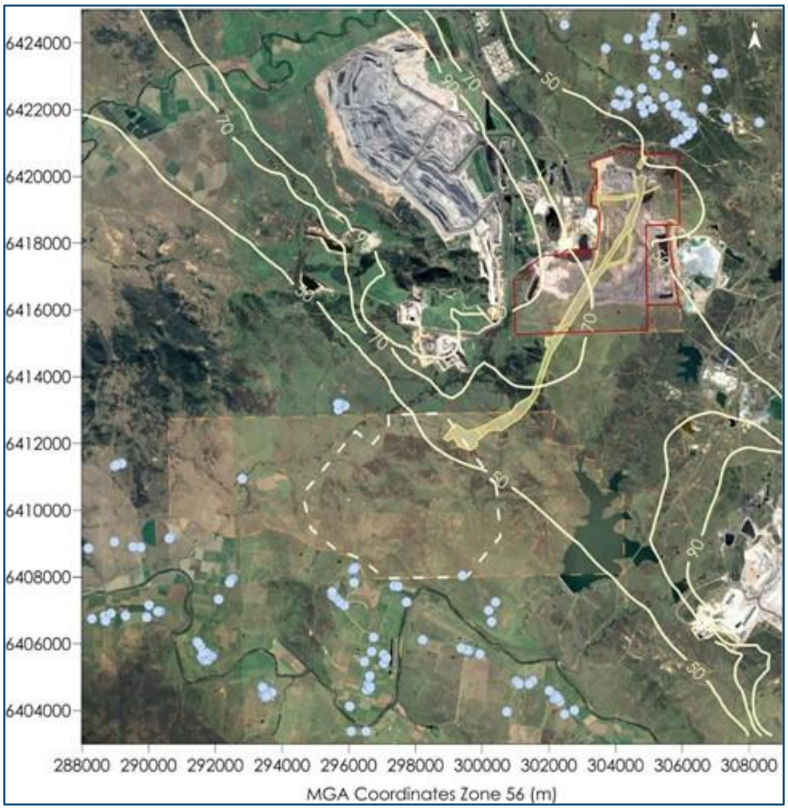

Figure E-28: Predicted annual average TSP concentrations due to emissions from the Project and other sources in Scenario 3 (µg/m³)

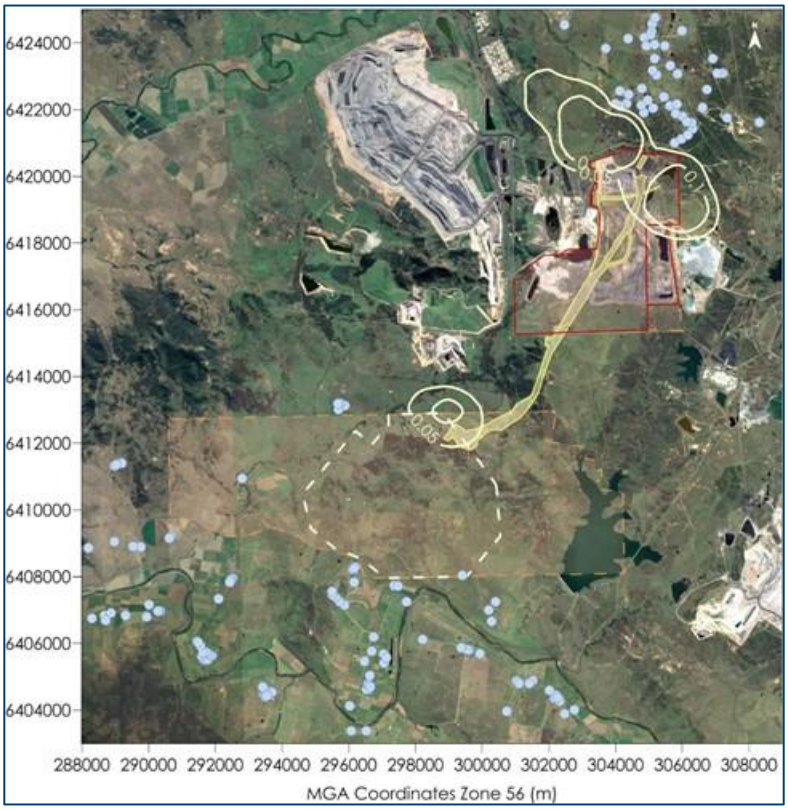

Figure E-29: Predicted annual average dust deposition levels due to emissions from the Project in Scenario 3 (g/m²/month)

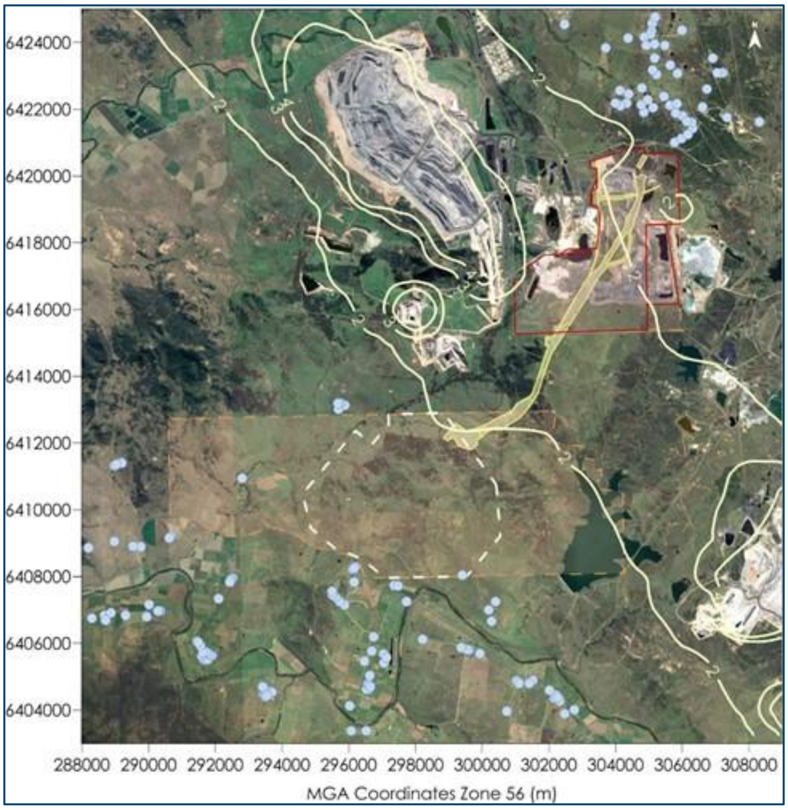

Figure E-30: Predicted annual average dust deposition levels due to emissions from the Project and other sources in Scenario 3 (g/m²/month)

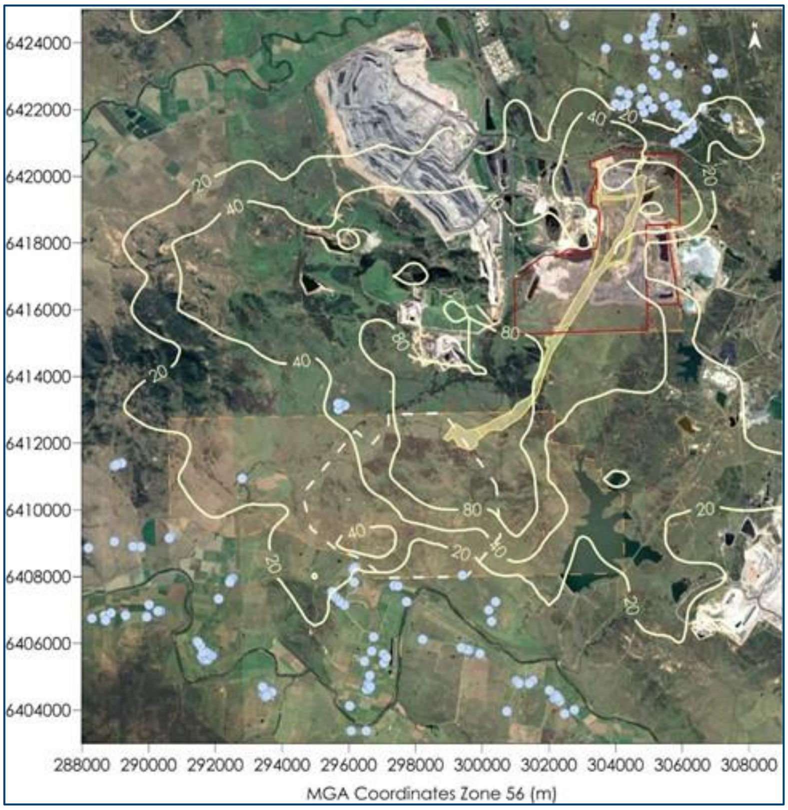

Figure E-31: Predicted 1-hour average NO_2 concentrations due to emissions from the Project in Scenario 1 (µg/m³) (hypothetical 100% conversion of NO_x to NO_2)

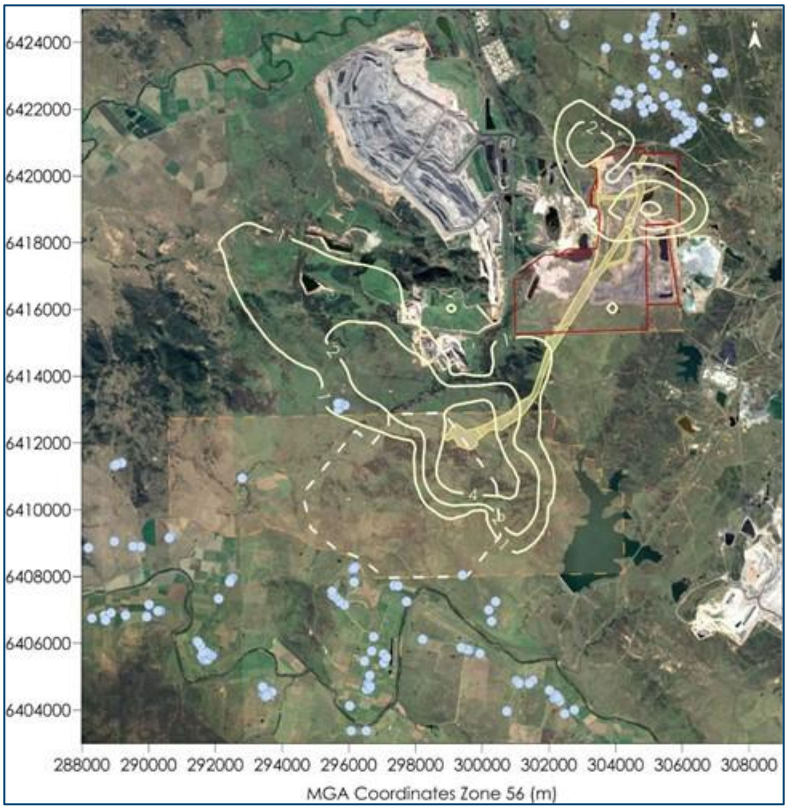

Figure E-32: Predicted annual average NO_2 concentrations due to emissions from the Project in Scenario 1 (µg/m³) (hypothetical 100% conversion of NO_x to NO_2)

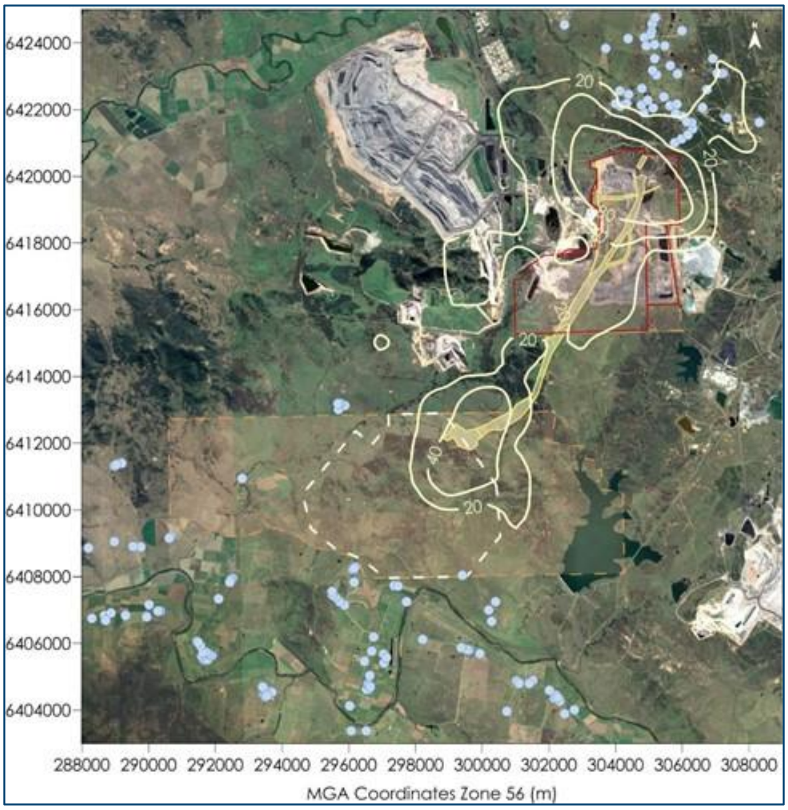

Figure E-33: Predicted 1-hour average NO_2 concentrations due to emissions from the Project in Scenario 2 (µg/m³) (hypothetical 100% conversion of NO_x to NO_2)

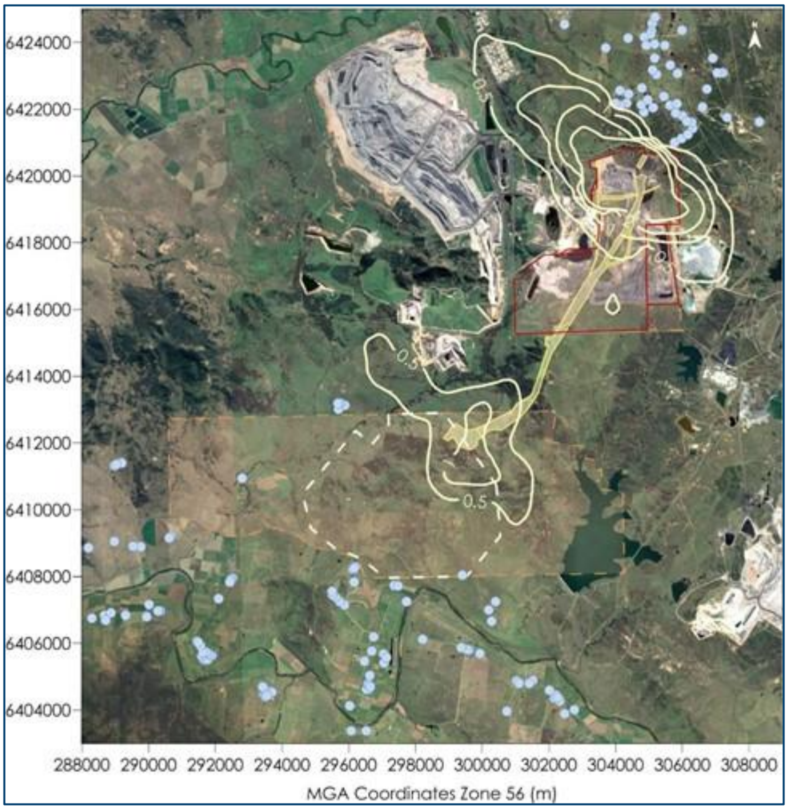

Figure E-34: Predicted annual average NO_2 concentrations due to emissions from the Project in Scenario 2 (µg/m³) (hypothetical 100% conversion of NO_x to NO_2)

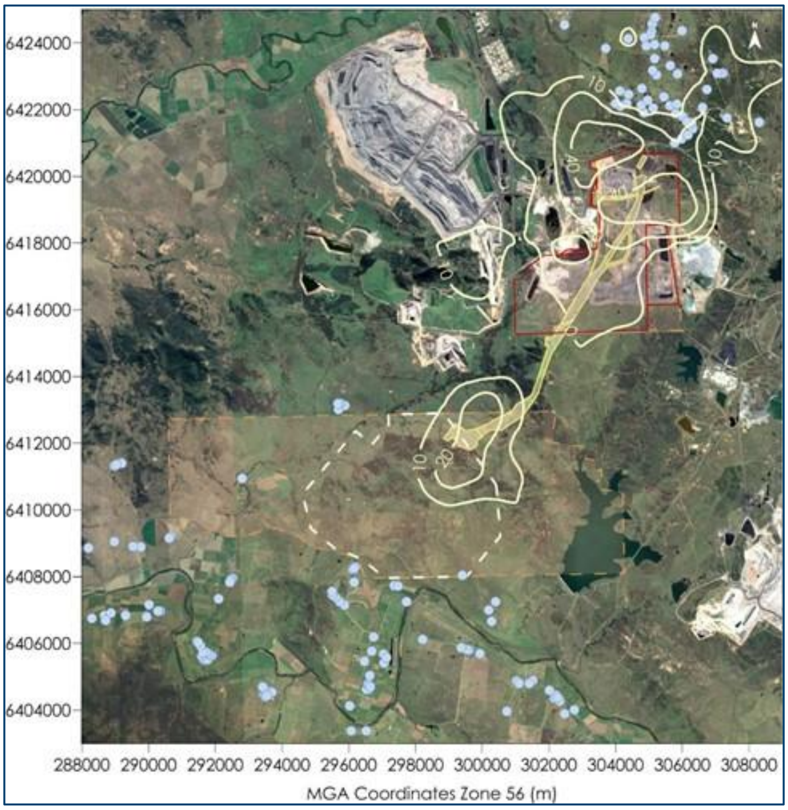

Figure E-35: Predicted 1-hour average NO_2 concentrations due to emissions from the Project in Scenario 3 (µg/m³) (hypothetical 100% conversion of NO_x to NO_2)

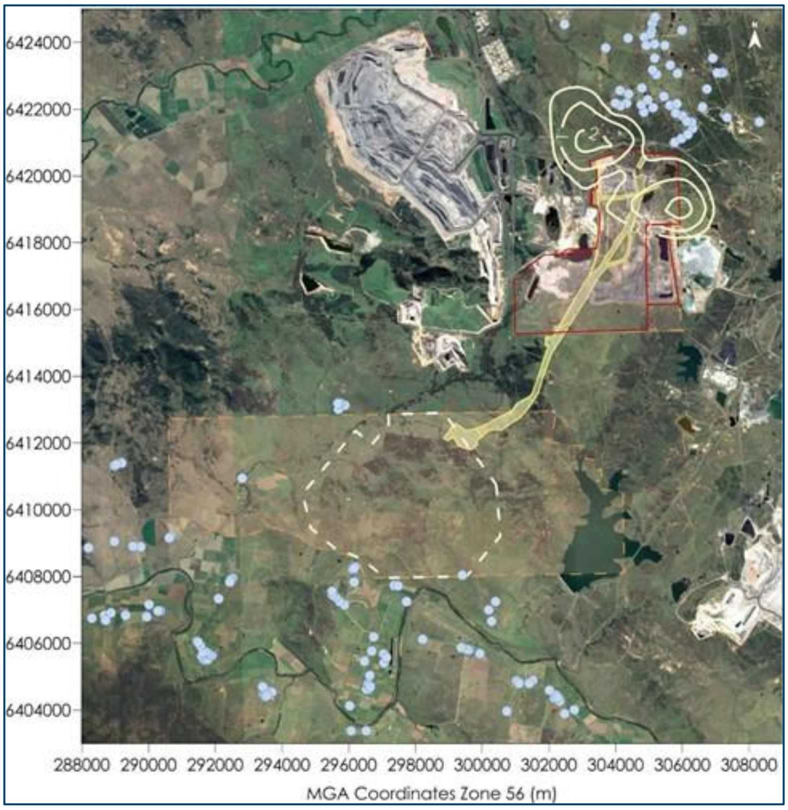

Figure E-36: Predicted annual average NO_2 concentrations due to emissions from the Project in Scenario 3 (µg/m³) (hypothetical 100% conversion of NO_x to NO_2)

Appendix F

Further Detail regarding 24-hour $PM_{2.5}$ and PM_{10} Analysis

Table F-1: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 60b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.2	21.5	16/06/2015	6.6	0.4	7.0
10/03/2015	19.9	0.1	20.0	17/04/2015	6.0	0.4	6.4
12/03/2015	19.8	0.1	19.9	2/01/2015	6.0	0.3	6.3
28/03/2015	19.2	0.0	19.2	31/10/2015	3.4	0.3	3.7
13/03/2015	16.5	0.0	16.5	14/02/2015	4.4	0.3	4.7
15/12/2015	15.8	0.2	16.0	21/07/2015	5.3	0.3	5.6
26/03/2015	15.5	0.0	15.5	12/06/2015	2.6	0.3	2.8
27/03/2015	15.0	0.0	15.0	19/07/2015	2.9	0.3	3.2
16/12/2015	13.0	0.2	13.1	15/06/2015	6.9	0.3	7.2
18/10/2015	12.6	0.0	12.6	8/12/2015	4.8	0.3	5.0

Table F-2: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 226c

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	23/07/2015	9.9	0.1	10.0
10/03/2015	19.9	0.0	19.9	14/09/2015	9.8	0.1	9.9
12/03/2015	19.8	0.0	19.8	22/07/2015	9.2	0.1	9.3
28/03/2015	19.2	0.0	19.2	12/09/2015	6.5	0.1	6.6
13/03/2015	16.5	0.0	16.5	22/06/2015	3.6	0.1	3.6
15/12/2015	15.8	0.0	15.8	24/01/2015	1.4	0.1	1.4
26/03/2015	15.5	0.0	15.5	29/06/2015	6.3	0.1	6.3
27/03/2015	15.0	0.0	15.0	17/11/2015	4.5	0.1	4.6
16/12/2015	13.0	0.0	13.0	5/10/2015	7.3	0.1	7.4
18/10/2015	12.6	0.0	12.6	4/09/2015	1.3	0.1	1.4

Table F-3: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 390

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	24/09/2015	4.2	0.6	4.8
10/03/2015	19.9	0.0	19.9	3/07/2015	3.9	0.4	4.3
12/03/2015	19.8	0.0	19.9	19/07/2015	2.9	0.3	3.2
28/03/2015	19.2	0.1	19.3	26/05/2015	6.2	0.3	6.5
13/03/2015	16.5	0.0	16.5	21/04/2015	6.0	0.3	6.4
15/12/2015	15.8	0.0	15.8	4/01/2015	5.8	0.3	6.1
26/03/2015	15.5	0.0	15.5	10/10/2015	7.4	0.3	7.7
27/03/2015	15.0	0.0	15.0	23/05/2015	2.5	0.3	2.8
16/12/2015	13.0	0.2	13.2	2/04/2015	6.0	0.3	6.3
18/10/2015	12.6	0.0	12.6	24/03/2015	4.3	0.3	4.5

Table F-4: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 403

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	3/07/2015	3.9	0.4	4.4
10/03/2015	19.9	0.0	19.9	24/09/2015	4.2	0.2	4.4
12/03/2015	19.8	0.0	19.8	26/05/2015	6.2	0.2	6.4
28/03/2015	19.2	0.1	19.3	24/08/2015	2.6	0.2	2.9
13/03/2015	16.5	0.0	16.5	19/07/2015	2.9	0.2	3.1
15/12/2015	15.8	0.0	15.8	14/09/2015	9.8	0.2	10.0
26/03/2015	15.5	0.0	15.5	18/03/2015	9.7	0.2	9.9
27/03/2015	15.0	0.0	15.0	10/10/2015	7.4	0.2	7.6
16/12/2015	13.0	0.1	13.1	8/07/2015	4.0	0.2	4.2
18/10/2015	12.6	0.0	12.6	24/03/2015	4.3	0.2	4.4

Table F-5: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 410

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	24/08/2015	2.6	0.6	3.2
10/03/2015	19.9	0.0	19.9	3/07/2015	3.9	0.6	4.5
12/03/2015	19.8	0.0	19.9	10/10/2015	7.4	0.5	7.9
28/03/2015	19.2	0.2	19.4	24/06/2015	4.3	0.4	4.7
13/03/2015	16.5	0.0	16.5	19/07/2015	2.9	0.4	3.3
15/12/2015	15.8	0.0	15.8	18/03/2015	9.7	0.4	10.1
26/03/2015	15.5	0.0	15.5	20/06/2015	3.1	0.4	3.5
27/03/2015	15.0	0.0	15.0	2/11/2015	5.4	0.3	5.7
16/12/2015	13.0	0.2	13.2	7/03/2015	8.2	0.3	8.5
18/10/2015	12.6	0.0	12.6	14/09/2015	9.8	0.3	10.1

Table F-6: Scenario 1 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 536

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	14/09/2015	9.8	0.1	9.9
10/03/2015	19.9	0.0	19.9	12/09/2015	6.5	0.1	6.7
12/03/2015	19.8	0.0	19.8	23/07/2015	9.9	0.1	10.0
28/03/2015	19.2	0.0	19.2	28/05/2015	5.1	0.1	5.2
13/03/2015	16.5	0.0	16.5	29/09/2015	6.2	0.1	6.3
15/12/2015	15.8	0.0	15.8	19/05/2015	6.5	0.1	6.5
26/03/2015	15.5	0.0	15.5	24/01/2015	1.4	0.1	1.4
27/03/2015	15.0	0.0	15.0	29/06/2015	6.3	0.1	6.4
16/12/2015	13.0	0.0	13.0	21/08/2015	11.3	0.1	11.4
18/10/2015	12.6	0.0	12.6	22/07/2015	9.2	0.1	9.3

Table F-7: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 60b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.1	21.4	16/06/2015	6.6	0.2	6.8
10/03/2015	19.9	0.1	19.9	2/01/2015	6.0	0.2	6.2
12/03/2015	19.8	0.0	19.9	21/07/2015	5.3	0.2	5.5
28/03/2015	19.2	0.0	19.2	31/10/2015	3.4	0.2	3.6
13/03/2015	16.5	0.0	16.5	17/04/2015	6.0	0.2	6.2
15/12/2015	15.8	0.1	15.9	19/07/2015	2.9	0.2	3.1
26/03/2015	15.5	0.0	15.5	12/06/2015	2.6	0.2	2.7
27/03/2015	15.0	0.0	15.0	15/06/2015	6.9	0.2	7.1
16/12/2015	13.0	0.1	13.0	29/06/2015	6.3	0.1	6.4
18/10/2015	12.6	0.0	12.6	14/02/2015	4.4	0.1	4.6

Table F-8: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 226c

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	23/07/2015	9.9	0.1	10.0
10/03/2015	19.9	0.0	19.9	14/09/2015	9.8	0.1	9.8
12/03/2015	19.8	0.0	19.8	22/07/2015	9.2	0.0	9.3
28/03/2015	19.2	0.0	19.2	22/06/2015	3.6	0.0	3.6
13/03/2015	16.5	0.0	16.5	5/10/2015	7.3	0.0	7.3
15/12/2015	15.8	0.0	15.8	24/01/2015	1.4	0.0	1.4
26/03/2015	15.5	0.0	15.5	29/06/2015	6.3	0.0	6.3
27/03/2015	15.0	0.0	15.0	12/09/2015	6.5	0.0	6.6
16/12/2015	13.0	0.0	13.0	17/11/2015	4.5	0.0	4.6
18/10/2015	12.6	0.0	12.6	29/09/2015	6.2	0.0	6.2

Table F-9: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 390

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	24/09/2015	4.2	0.6	4.8
10/03/2015	19.9	0.0	19.9	3/07/2015	3.9	0.4	4.3
12/03/2015	19.8	0.0	19.9	21/04/2015	6.0	0.3	6.4
28/03/2015	19.2	0.1	19.3	26/05/2015	6.2	0.3	6.5
13/03/2015	16.5	0.0	16.5	19/07/2015	2.9	0.3	3.2
15/12/2015	15.8	0.0	15.8	4/01/2015	5.8	0.3	6.1
26/03/2015	15.5	0.0	15.5	24/03/2015	4.3	0.3	4.5
27/03/2015	15.0	0.0	15.0	10/10/2015	7.4	0.3	7.7
16/12/2015	13.0	0.2	13.2	22/05/2015	1.5	0.3	1.8
18/10/2015	12.6	0.0	12.6	2/04/2015	6.0	0.3	6.3

Table F-10: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 403

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	3/07/2015	3.9	0.4	4.3
10/03/2015	19.9	0.0	19.9	24/08/2015	2.6	0.2	2.9
12/03/2015	19.8	0.0	19.8	18/03/2015	9.7	0.2	9.9
28/03/2015	19.2	0.1	19.3	19/07/2015	2.9	0.2	3.1
13/03/2015	16.5	0.0	16.5	10/10/2015	7.4	0.2	7.6
15/12/2015	15.8	0.0	15.8	14/09/2015	9.8	0.2	9.9
26/03/2015	15.5	0.0	15.5	26/05/2015	6.2	0.2	6.4
27/03/2015	15.0	0.0	15.0	21/04/2015	6.0	0.2	6.2
16/12/2015	13.0	0.1	13.1	24/09/2015	4.2	0.2	4.3
18/10/2015	12.6	0.0	12.6	17/06/2015	3.8	0.2	3.9

Table F-11: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 410

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	24/08/2015	2.6	0.5	3.2
10/03/2015	19.9	0.0	19.9	24/06/2015	4.3	0.5	4.8
12/03/2015	19.8	0.0	19.8	10/10/2015	7.4	0.5	7.9
28/03/2015	19.2	0.2	19.4	3/07/2015	3.9	0.4	4.4
13/03/2015	16.5	0.0	16.5	13/05/2015	2.3	0.4	2.7
15/12/2015	15.8	0.0	15.8	20/06/2015	3.1	0.4	3.6
26/03/2015	15.5	0.0	15.5	19/07/2015	2.9	0.4	3.3
27/03/2015	15.0	0.0	15.0	18/03/2015	9.7	0.4	10.1
16/12/2015	13.0	0.2	13.2	7/03/2015	8.2	0.4	8.6
18/10/2015	12.6	0.0	12.6	2/11/2015	5.4	0.4	5.8

Table F-12: Scenario 2 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 536

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	23/07/2015	9.9	0.1	10.0
10/03/2015	19.9	0.0	19.9	12/09/2015	6.5	0.1	6.6
12/03/2015	19.8	0.0	19.8	14/09/2015	9.8	0.1	9.8
28/03/2015	19.2	0.0	19.2	28/05/2015	5.1	0.1	5.2
13/03/2015	16.5	0.0	16.5	21/08/2015	11.3	0.1	11.4
15/12/2015	15.8	0.0	15.8	19/05/2015	6.5	0.0	6.5
26/03/2015	15.5	0.0	15.5	29/09/2015	6.2	0.0	6.3
27/03/2015	15.0	0.0	15.0	23/06/2015	4.1	0.0	4.2
16/12/2015	13.0	0.0	13.0	29/06/2015	6.3	0.0	6.3
18/10/2015	12.6	0.0	12.6	24/01/2015	1.4	0.0	1.4

Table F-13: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 60b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	16/06/2015	6.6	0.1	6.7
10/03/2015	19.9	0.0	19.9	17/04/2015	6.0	0.1	6.1
12/03/2015	19.8	0.0	19.8	29/06/2015	6.3	0.1	6.4
28/03/2015	19.2	0.0	19.2	3/01/2015	5.9	0.1	6.0
13/03/2015	16.5	0.0	16.5	2/01/2015	6.0	0.1	6.1
15/12/2015	15.8	0.0	15.8	12/06/2015	2.6	0.1	2.6
26/03/2015	15.5	0.0	15.5	31/10/2015	3.4	0.1	3.5
27/03/2015	15.0	0.0	15.0	14/06/2015	4.5	0.1	4.6
16/12/2015	13.0	0.0	13.0	14/02/2015	4.4	0.1	4.5
18/10/2015	12.6	0.0	12.6	10/04/2015	6.0	0.1	6.1

Table F-14: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 226c

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	23/07/2015	9.9	0.0	9.9
10/03/2015	19.9	0.0	19.9	24/01/2015	1.4	0.0	1.4
12/03/2015	19.8	0.0	19.8	14/09/2015	9.8	0.0	9.8
28/03/2015	19.2	0.0	19.2	9/07/2015	3.2	0.0	3.2
13/03/2015	16.5	0.0	16.5	29/06/2015	6.3	0.0	6.3
15/12/2015	15.8	0.0	15.8	16/06/2015	6.6	0.0	6.6
26/03/2015	15.5	0.0	15.5	5/10/2015	7.3	0.0	7.3
27/03/2015	15.0	0.0	15.0	22/06/2015	3.6	0.0	3.6
16/12/2015	13.0	0.0	13.0	22/07/2015	9.2	0.0	9.2
18/10/2015	12.6	0.0	12.6	17/11/2015	4.5	0.0	4.5

Table F-15: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 390

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	24/09/2015	4.2	0.6	4.7
10/03/2015	19.9	0.0	19.9	21/04/2015	6.0	0.3	6.4
12/03/2015	19.8	0.0	19.9	4/01/2015	5.8	0.3	6.1
28/03/2015	19.2	0.1	19.2	23/05/2015	2.5	0.3	2.8
13/03/2015	16.5	0.0	16.5	20/04/2015	6.0	0.3	6.3
15/12/2015	15.8	0.1	15.8	22/05/2015	1.5	0.3	1.8
26/03/2015	15.5	0.0	15.5	2/04/2015	6.0	0.2	6.3
27/03/2015	15.0	0.0	15.0	10/10/2015	7.4	0.2	7.7
16/12/2015	13.0	0.2	13.1	24/03/2015	4.3	0.2	4.5
18/10/2015	12.6	0.0	12.6	26/05/2015	6.2	0.2	6.4

Table F-16: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 403

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	3/07/2015	3.9	0.2	4.1
10/03/2015	19.9	0.0	19.9	24/09/2015	4.2	0.2	4.3
12/03/2015	19.8	0.0	19.8	21/04/2015	6.0	0.2	6.2
28/03/2015	19.2	0.1	19.2	24/08/2015	2.6	0.1	2.8
13/03/2015	16.5	0.0	16.5	10/10/2015	7.4	0.1	7.6
15/12/2015	15.8	0.0	15.8	22/05/2015	1.5	0.1	1.7
26/03/2015	15.5	0.0	15.5	18/03/2015	9.7	0.1	9.9
27/03/2015	15.0	0.0	15.0	24/03/2015	4.3	0.1	4.4
16/12/2015	13.0	0.1	13.0	19/07/2015	2.9	0.1	3.0
18/10/2015	12.6	0.0	12.6	26/05/2015	6.2	0.1	6.3

Table F-17: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 410

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	24/08/2015	2.6	0.6	3.2
10/03/2015	19.9	0.0	19.9	24/06/2015	4.3	0.5	4.8
12/03/2015	19.8	0.0	19.8	10/10/2015	7.4	0.5	7.9
28/03/2015	19.2	0.3	19.4	3/07/2015	3.9	0.4	4.4
13/03/2015	16.5	0.0	16.5	18/03/2015	9.7	0.4	10.1
15/12/2015	15.8	0.0	15.8	19/07/2015	2.9	0.4	3.3
26/03/2015	15.5	0.0	15.5	20/06/2015	3.1	0.4	3.6
27/03/2015	15.0	0.0	15.0	13/05/2015	2.3	0.4	2.7
16/12/2015	13.0	0.2	13.2	7/03/2015	8.2	0.4	8.6
18/10/2015	12.6	0.0	12.6	2/11/2015	5.4	0.4	5.8

Table F-18: Scenario 3 ($PM_{2.5}$ 24-hr average concentration) – Receptor location 536

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
11/03/2015	21.4	0.0	21.4	12/09/2015	6.5	0.0	6.6
10/03/2015	19.9	0.0	19.9	23/07/2015	9.9	0.0	9.9
12/03/2015	19.8	0.0	19.8	28/05/2015	5.1	0.0	5.2
28/03/2015	19.2	0.0	19.2	21/08/2015	11.3	0.0	11.4
13/03/2015	16.5	0.0	16.5	14/09/2015	9.8	0.0	9.8
15/12/2015	15.8	0.0	15.8	19/05/2015	6.5	0.0	6.5
26/03/2015	15.5	0.0	15.5	6/10/2015	6.9	0.0	6.9
27/03/2015	15.0	0.0	15.0	23/06/2015	4.1	0.0	4.2
16/12/2015	13.0	0.0	13.0	24/01/2015	1.4	0.0	1.4
18/10/2015	12.6	0.0	12.6	22/08/2015	10.8	0.0	10.8

Table F-19: Scenario 1 (PM_{10} 24-hr average concentration) – Receptor location 60b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
15/12/2015	37.9	1.0	38.9	16/06/2015	6.2	2.1	8.3
17/10/2015	30.2	0.2	30.3	17/04/2015	24.4	2.0	26.4
6/10/2015	29.8	0.0	29.8	14/02/2015	5.8	1.7	7.6
1/12/2015	29.6	0.1	29.8	2/01/2015	14.6	1.7	16.2
4/10/2015	29.0	0.0	29.0	31/10/2015	14.9	1.7	16.6
7/10/2015	29.0	0.0	29.0	21/07/2015	8.7	1.5	10.2
14/12/2015	27.5	0.3	27.7	8/12/2015	18.6	1.4	20.1
5/10/2015	27.3	0.2	27.6	12/06/2015	7.9	1.4	9.3
12/12/2015	27.1	0.1	27.1	19/07/2015	7.8	1.3	9.1
2/10/2015	26.7	0.6	27.3	3/01/2015	17.8	1.3	19.1

Table F-20: Scenario 1 (PM_{10} 24-hr average concentration) – Receptor location 226c

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**70.0**	0.0	**70.0**				
10/03/2015	45.5	0.0	45.5	23/07/2015	9.6	0.4	10.0
9/03/2015	45.2	0.1	45.3	14/09/2015	16.8	0.3	17.1
26/11/2015	42.8	0.0	42.8	24/01/2015	15.8	0.3	16.1
12/12/2015	41.0	0.0	41.0	22/07/2015	12.6	0.3	12.9
17/10/2015	40.5	0.1	40.6	29/06/2015	11.2	0.2	11.4
7/10/2015	37.8	0.0	37.8	22/06/2015	4.7	0.2	4.9
9/02/2015	36.3	0.0	36.3	9/07/2015	12.2	0.2	12.4
30/09/2015	36.3	0.0	36.3	5/10/2015	18.5	0.2	18.7
11/03/2015	35.7	0.1	35.8	16/06/2015	7.7	0.2	7.9
2/10/2015	35.0	0.1	35.1	12/09/2015	15.0	0.2	15.2

Table F-21: Scenario 1 (PM_{10} 24-hr average concentration) – Receptor location 390

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**56.9**	0.0	**56.9**				
7/03/2015	**50.6**	0.3	**50.9**				
15/12/2015	46.9	0.1	47.0	24/09/2015	8.8	2.4	11.2
10/03/2015	46.4	0.0	46.4	21/04/2015	3.3	1.4	4.7
12/12/2015	38.4	0.4	38.8	3/07/2015	18.3	1.4	19.7
28/02/2015	37.5	0.1	37.6	19/07/2015	11.5	1.2	12.7
9/02/2015	37.1	0.0	37.1	4/01/2015	12.6	1.2	13.8
26/11/2015	36.1	0.2	36.3	26/05/2015	9.5	1.1	10.7
11/03/2015	33.4	0.1	33.6	22/05/2015	3.6	1.1	4.7
7/10/2015	33.1	0.0	33.1	10/10/2015	24.4	1.1	25.5
17/04/2015	32.8	0.1	32.9	23/05/2015	7.7	1.1	8.8
17/03/2015	31.9	0.2	32.1	2/04/2015	21.2	1.0	22.2

Table F-22: Scenario 1 (PM_{10} 24-hr average concentration) – Receptor location 403

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**56.9**	0.0	**56.9**				
7/03/2015	**50.6**	0.4	**50.9**				
15/12/2015	46.9	0.0	46.9	3/07/2015	18.3	1.6	19.9
10/03/2015	46.4	0.0	46.4	24/09/2015	8.8	0.8	9.6
12/12/2015	38.4	0.2	38.6	24/08/2015	5.2	0.8	5.9
28/02/2015	37.5	0.1	37.5	19/07/2015	11.5	0.7	12.2
9/02/2015	37.1	0.0	37.1	26/05/2015	9.5	0.7	10.2
26/11/2015	36.1	0.1	36.1	10/10/2015	24.4	0.7	25.1
11/03/2015	33.4	0.1	33.5	18/03/2015	24.7	0.7	25.4
7/10/2015	33.1	0.0	33.1	21/04/2015	3.3	0.6	3.9
17/04/2015	32.8	0.0	32.8	14/09/2015	13.6	0.6	14.3
17/03/2015	31.9	0.1	32.0	8/07/2015	11.6	0.6	12.2

Table F-23: Scenario 1 (PM_{10} 24-hr average concentration) – Receptor location 410

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**56.9**	0.0	**56.9**				
7/03/2015	**50.6**	1.2	**51.8**				
15/12/2015	46.9	0.0	46.9	24/08/2015	5.2	2.1	7.2
10/03/2015	46.4	0.0	46.4	10/10/2015	24.4	1.9	26.4
12/12/2015	38.4	1.1	39.5	3/07/2015	18.3	1.9	20.2
28/02/2015	37.5	0.0	37.5	24/06/2015	22.7	1.4	24.1
9/02/2015	37.1	0.0	37.1	19/07/2015	11.5	1.4	13.0
26/11/2015	36.1	0.0	36.1	18/03/2015	24.7	1.4	26.1
11/03/2015	33.4	0.1	33.5	2/11/2015	6.5	1.3	7.9
7/10/2015	33.1	0.0	33.1	20/06/2015	5.4	1.3	6.6
17/04/2015	32.8	0.1	32.9	7/03/2015	**50.6**	1.2	**51.8**
17/03/2015	31.9	0.1	32.0	12/12/2015	38.4	1.1	39.5

Table F-24: Scenario 1 (PM_{10} 24-hr average concentration) – Receptor location 536

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**70.0**	0.0	**70.0**				
10/03/2015	45.5	0.0	45.5	12/09/2015	15.0	0.5	15.5
9/03/2015	45.2	0.1	45.3	23/07/2015	9.6	0.5	10.1
26/11/2015	42.8	0.0	42.8	14/09/2015	16.8	0.5	17.3
12/12/2015	41.0	0.0	41.0	28/05/2015	9.2	0.4	9.6
17/10/2015	40.5	0.2	40.7	19/05/2015	9.6	0.4	10.0
7/10/2015	37.8	0.0	37.8	21/08/2015	16.8	0.4	17.2
9/02/2015	36.3	0.0	36.3	23/06/2015	6.2	0.3	6.5
30/09/2015	36.3	0.1	36.4	24/01/2015	15.8	0.3	16.1
11/03/2015	35.7	0.1	35.8	29/06/2015	11.2	0.3	11.5
2/10/2015	35.0	0.0	35.0	29/09/2015	20.7	0.3	21.0

Table F-25: Scenario 2 (PM_{10} 24-hr average concentration) – Receptor location 60b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
15/12/2015	37.9	0.7	38.7	16/06/2015	6.2	1.7	7.9
17/10/2015	30.2	0.1	30.3	17/04/2015	24.4	1.3	25.7
6/10/2015	29.8	0.0	29.8	2/01/2015	14.6	1.3	15.9
1/12/2015	29.6	0.1	29.7	31/10/2015	14.9	1.2	16.1
4/10/2015	29.0	0.0	29.0	21/07/2015	8.7	1.2	9.9
7/10/2015	29.0	0.0	29.0	12/06/2015	7.9	1.2	9.1
14/12/2015	27.5	0.2	27.7	19/07/2015	7.8	1.1	8.9
5/10/2015	27.3	0.2	27.6	10/04/2015	13.3	1.1	14.4
12/12/2015	27.1	0.1	27.1	14/02/2015	5.8	1.1	6.9
2/10/2015	26.7	0.5	27.2	15/06/2015	11.6	1.1	12.7

Table F-26: Scenario 2 (PM_{10} 24-hr average concentration) – Receptor location 226c

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**70.0**	0.0	**70.0**				
10/03/2015	45.5	0.0	45.5	23/07/2015	9.6	0.3	9.9
9/03/2015	45.2	0.1	45.3	14/09/2015	16.8	0.3	17.1
26/11/2015	42.8	0.0	42.8	24/01/2015	15.8	0.2	16.0
12/12/2015	41.0	0.0	41.0	5/10/2015	18.5	0.2	18.7
17/10/2015	40.5	0.1	40.6	29/06/2015	11.2	0.2	11.4
7/10/2015	37.8	0.0	37.8	22/06/2015	4.7	0.2	4.9
9/02/2015	36.3	0.0	36.3	22/07/2015	12.6	0.2	12.8
30/09/2015	36.3	0.0	36.3	29/09/2015	20.7	0.2	20.9
11/03/2015	35.7	0.1	35.8	9/07/2015	12.2	0.2	12.4
2/10/2015	35.0	0.1	35.1	23/06/2015	6.2	0.2	6.4

Table F-27: Scenario 2 (PM_{10} 24-hr average concentration) – Receptor location 390

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**56.9**	0.0	**56.9**				
7/03/2015	**50.6**	0.3	**50.9**				
15/12/2015	46.9	0.2	47.1	24/09/2015	8.8	2.6	11.4
10/03/2015	46.4	0.0	46.4	21/04/2015	3.3	1.7	5.0
12/12/2015	38.4	0.4	38.8	22/05/2015	3.6	1.4	4.9
28/02/2015	37.5	0.1	37.6	3/07/2015	18.3	1.4	19.7
9/02/2015	37.1	0.0	37.1	4/01/2015	12.6	1.3	13.9
26/11/2015	36.1	0.3	36.3	19/07/2015	11.5	1.2	12.7
11/03/2015	33.4	0.1	33.6	26/05/2015	9.5	1.2	10.7
7/10/2015	33.1	0.0	33.1	23/05/2015	7.7	1.2	8.9
17/04/2015	32.8	0.1	32.9	10/10/2015	24.4	1.1	25.6
17/03/2015	31.9	0.2	32.1	2/04/2015	21.2	1.1	22.3

Table F-28: Scenario 2 (PM_{10} 24-hr average concentration) – Receptor location 403

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**56.9**	0.0	**56.9**				
7/03/2015	**50.6**	0.4	**50.9**				
15/12/2015	46.9	0.0	46.9	3/07/2015	18.3	1.4	19.7
10/03/2015	46.4	0.0	46.4	24/08/2015	5.2	0.8	6.0
12/12/2015	38.4	0.2	38.6	21/04/2015	3.3	0.7	4.0
28/02/2015	37.5	0.0	37.5	18/03/2015	24.7	0.7	25.4
9/02/2015	37.1	0.0	37.1	24/09/2015	8.8	0.7	9.4
26/11/2015	36.1	0.1	36.1	10/10/2015	24.4	0.7	25.1
11/03/2015	33.4	0.1	33.5	19/07/2015	11.5	0.6	12.2
7/10/2015	33.1	0.0	33.1	24/03/2015	20.5	0.6	21.1
17/04/2015	32.8	0.1	32.9	14/09/2015	13.6	0.6	14.2
17/03/2015	31.9	0.1	32.0	17/06/2015	2.0	0.6	2.6

Table F-29: Scenario 2 (PM_{10} 24-hr average concentration) – Receptor location 410

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**56.9**	0.0	**56.9**				
7/03/2015	**50.6**	1.4	**52.0**				
15/12/2015	46.9	0.0	46.9	24/08/2015	5.2	2.3	7.5
10/03/2015	46.4	0.0	46.4	10/10/2015	24.4	2.1	26.5
12/12/2015	38.4	1.4	39.8	24/06/2015	22.7	2.0	24.7
28/02/2015	37.5	0.0	37.5	13/05/2015	9.7	1.9	11.6
9/02/2015	37.1	0.0	37.1	3/07/2015	18.3	1.7	20.1
26/11/2015	36.1	0.0	36.1	2/11/2015	6.5	1.6	8.2
11/03/2015	33.4	0.1	33.5	20/06/2015	5.4	1.6	6.9
7/10/2015	33.1	0.0	33.1	19/07/2015	11.5	1.6	13.1
17/04/2015	32.8	0.1	32.9	18/03/2015	24.7	1.5	26.2
17/03/2015	31.9	0.1	32.0	7/03/2015	**50.6**	1.4	**52.0**

Table F-30: Scenario 2 (PM_{10} 24-hr average concentration) – Receptor location 536

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**70.0**	0.0	**70.0**				
10/03/2015	45.5	0.0	45.5	12/09/2015	15.0	0.4	15.4
9/03/2015	45.2	0.1	45.3	23/07/2015	9.6	0.4	10.0
26/11/2015	42.8	0.0	42.8	28/05/2015	9.2	0.4	9.6
12/12/2015	41.0	0.0	41.0	21/08/2015	16.8	0.4	17.2
17/10/2015	40.5	0.2	40.7	14/09/2015	16.8	0.3	17.1
7/10/2015	37.8	0.0	37.8	19/05/2015	9.6	0.3	9.9
9/02/2015	36.3	0.0	36.3	6/10/2015	24.8	0.3	25.1
30/09/2015	36.3	0.1	36.4	22/08/2015	18.0	0.3	18.3
11/03/2015	35.7	0.1	35.8	23/06/2015	6.2	0.3	6.5
2/10/2015	35.0	0.0	35.0	29/09/2015	20.7	0.3	21.0

Table F-31: Scenario 3 (PM_{10} 24-hr average concentration) – Receptor location 60b

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
15/12/2015	37.9	0.4	38.4	16/06/2015	6.2	0.9	7.1
17/10/2015	30.2	0.1	30.3	17/04/2015	24.4	0.8	25.3
6/10/2015	29.8	0.0	29.8	2/01/2015	14.6	0.7	15.3
1/12/2015	29.6	0.1	29.7	3/01/2015	17.8	0.7	18.5
4/10/2015	29.0	0.0	29.0	12/06/2015	7.9	0.7	8.6
7/10/2015	29.0	0.0	29.0	29/06/2015	10.0	0.7	10.6
14/12/2015	27.5	0.1	27.6	31/10/2015	14.9	0.7	15.6
5/10/2015	27.3	0.1	27.5	14/02/2015	5.8	0.6	6.5
12/12/2015	27.1	0.1	27.1	10/04/2015	13.3	0.6	13.9
2/10/2015	26.7	0.3	27.0	14/06/2015	8.9	0.6	9.5

Table F-32: Scenario 3 (PM_{10} 24-hr average concentration) – Receptor location 226c

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**70.0**	0.0	**70.0**				
10/03/2015	45.5	0.0	45.5	24/01/2015	15.8	0.2	16.0
9/03/2015	45.2	0.0	45.2	23/07/2015	9.6	0.2	9.8
26/11/2015	42.8	0.0	42.8	9/07/2015	12.2	0.1	12.3
12/12/2015	41.0	0.0	41.0	29/06/2015	11.2	0.1	11.3
17/10/2015	40.5	0.0	40.5	16/06/2015	7.7	0.1	7.8
7/10/2015	37.8	0.0	37.8	14/09/2015	16.8	0.1	16.9
9/02/2015	36.3	0.0	36.3	5/10/2015	18.5	0.1	18.6
30/09/2015	36.3	0.0	36.3	21/07/2015	9.4	0.1	9.5
11/03/2015	35.7	0.0	35.7	9/08/2015	17.0	0.1	17.1
2/10/2015	35.0	0.0	35.0	14/06/2015	14.0	0.1	14.1

Table F-33: Scenario 3 (PM_{10} 24-hr average concentration) – Receptor location 390

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	56.9	0.0	56.9				
7/03/2015	50.6	0.6	51.1				
15/12/2015	46.9	0.4	47.3	24/09/2015	8.8	5.0	13.7
10/03/2015	46.4	0.1	46.5	21/04/2015	3.3	2.9	6.2
12/12/2015	38.4	0.6	39.0	23/05/2015	7.7	2.6	10.3
28/02/2015	37.5	0.4	37.9	4/01/2015	12.6	2.5	15.2
9/02/2015	37.1	0.2	37.3	22/05/2015	3.6	2.3	5.9
26/11/2015	36.1	0.5	36.5	2/04/2015	21.2	2.2	23.4
11/03/2015	33.4	0.4	33.8	20/04/2015	5.4	2.1	7.5
7/10/2015	33.1	0.1	33.2	18/07/2015	8.0	2.1	10.1
17/04/2015	32.8	0.2	33.0	10/10/2015	24.4	2.1	26.6
17/03/2015	31.9	0.5	32.5	24/03/2015	20.5	2.1	22.6

Table F-34: Scenario 3 (PM_{10} 24-hr average concentration) – Receptor location 403

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	56.9	0.0	56.9				
7/03/2015	50.6	0.6	51.1				
15/12/2015	46.9	0.1	47.0	3/07/2015	18.3	2.0	20.3
10/03/2015	46.4	0.0	46.4	24/09/2015	8.8	1.4	10.2
12/12/2015	38.4	0.4	38.8	21/04/2015	3.3	1.3	4.6
28/02/2015	37.5	0.1	37.6	10/10/2015	24.4	1.2	25.7
9/02/2015	37.1	0.0	37.1	24/08/2015	5.2	1.2	6.4
26/11/2015	36.1	0.1	36.2	18/03/2015	24.7	1.1	25.9
11/03/2015	33.4	0.1	33.6	22/05/2015	3.6	1.1	4.7
7/10/2015	33.1	0.0	33.1	24/03/2015	20.5	1.0	21.5
17/04/2015	32.8	0.1	32.9	4/01/2015	12.6	1.0	13.6
17/03/2015	31.9	0.3	32.2	17/06/2015	2.0	0.9	3.0

Table F-35: Scenario 3 (PM_{10} 24-hr average concentration) – Receptor location 410

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**56.9**	0.0	**56.9**				
7/03/2015	**50.6**	3.2	**53.8**				
15/12/2015	46.9	0.0	46.9	24/08/2015	5.2	4.9	10.0
10/03/2015	46.4	0.0	46.4	10/10/2015	24.4	4.4	28.8
12/12/2015	38.4	2.5	40.9	24/06/2015	22.7	4.3	27.0
28/02/2015	37.5	0.0	37.5	3/07/2015	18.3	3.6	21.9
9/02/2015	37.1	0.0	37.1	18/03/2015	24.7	3.6	28.3
26/11/2015	36.1	0.1	36.2	19/07/2015	11.5	3.5	15.0
11/03/2015	33.4	0.1	33.6	13/05/2015	9.7	3.5	13.1
7/10/2015	33.1	0.0	33.1	2/11/2015	6.5	3.4	9.9
17/04/2015	32.8	0.3	33.1	20/06/2015	5.4	3.4	8.7
17/03/2015	31.9	0.2	32.1	7/03/2015	**50.6**	3.2	**53.8**

Table F-36: Scenario 3 (PM_{10} 24-hr average concentration) – Receptor location 536

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	**70.0**	0.0	**70.0**				
10/03/2015	45.5	0.0	45.5	12/09/2015	15.0	0.2	15.2
9/03/2015	45.2	0.0	45.2	23/07/2015	9.6	0.2	9.8
26/11/2015	42.8	0.0	42.8	21/08/2015	16.8	0.2	17.0
12/12/2015	41.0	0.0	41.0	28/05/2015	9.2	0.2	9.4
17/10/2015	40.5	0.1	40.6	19/05/2015	9.6	0.2	9.8
7/10/2015	37.8	0.0	37.8	6/10/2015	24.8	0.2	25.0
9/02/2015	36.3	0.0	36.3	14/09/2015	16.8	0.2	17.0
30/09/2015	36.3	0.1	36.4	22/08/2015	18.0	0.2	18.2
11/03/2015	35.7	0.1	35.8	28/02/2015	15.8	0.2	16.0
2/10/2015	35.0	0.0	35.0	23/06/2015	6.2	0.2	6.4