Galilee Power Project – Monklands: Air Quality and Greenhouse Gas Assessment

Prepared for:

Waratah Coal Pty Ltd

October 2019

Final

Prepared by:

Katestone Environmental Pty Ltd
ABN 92 097 270 276
Ground Floor, 16 Marie Street | PO Box 2217
Milton, Brisbane, Queensland, 4064, Australia

www.katestone.global
admin@katestone.com.au
Ph +61 7 3369 3699

Document Control

Deliverable #:	D18047-5
Title:	Galilee Power Project – Monklands: Air Quality and Greenhouse Gas Assessment
Version:	1.0 (Final)
Client:	Waratah Coal Pty Ltd
Document reference:	D18047-5 Waratah Coal Galilee Power Project Monklands - AQFINAL.docx
Prepared by:	Natalie Shaw, Lisa Smith, Manning Young
Reviewed by:	Simon Welchman
Approved by:	 Simon Welchman 31/10/2019

Contents

Tables

Figures

Contour Plates

Glossary

Term	Definition
%	percent
µg/m^3	micrograms per cubic metre
µm	microns
°C	degrees Celsius
g/s	gram per second
Gj	gigajoules
kg/annum	kilogram per annum
km	kilometre
ktCO_2-e/y	kilotonnes of carbon dioxide equivalents per year
KV	Kilovolt
m	metre
m/s	metres per second
m^3/s	cubic metres per second
m^3/hour	cubic metres per hour
mg/Nm^3	milligrams per normal cubic metre
MW	megawatt
MWh/y	megawatt hours per year
Nm^3/s	normal cubic metre per second
TJ/y	terajoules per year
Nomenclature	**Definition**
CO	carbon monoxide
CO_2	carbon dioxide
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
PM_{10}	particulate matter with aerodynamic diameter of 10 µm or less
$PM_{2.5}$	particulate matter with aerodynamic diameter of 2.5 µm or less
SO_2	sulfur dioxide
Abbreviations	**Definition**
EP Act	*Environmental Protection Act 1994*
Air EPP	*Environmental Protection (Air) Policy 2008*
DES	Department of Environment and Science
GHG	greenhouse gas
NGER	National Greenhouse and Energy Reporting
NGER Act	*National Greenhouse and Energy Reporting Act 2007*
NPI	National Pollutant Inventory database
TAPM	The Air Pollution Model

EXECUTIVE SUMMARY

Katestone Environmental Pty Ltd (Katestone) was commissioned by Waratah Coal Pty Ltd (Waratah) to complete an Air Quality Assessment of the Galilee Power Station Project (the Project). The Galilee Power Station Project is a proposed coal fired power station located 32 kilometres northwest of Alpha and adjacent to Waratah Coal's Galilee Coal Project in Central Queensland. The assessment is to support a Material Change of Use application for the Project.

The Project involves the construction and operation of a coal fired power station in Central Queensland. Waratah proposes to develop the coal fired power station in conjunction with mining operations. The ultimate capacity of the power station is 1,400 MW (comprised of 2 x 700 MW units).

The air quality assessment has used a dispersion modelling approach. A site-specific meteorological data file has been generated using the TAPM and CALMET meteorological models. The meteorological modelling has accounted for local terrain and land use features of the surrounding region.

Emission rates and stack characteristics have been determined from the manufacturer's specifications, emission limits, and emissions information provided by Waratah. The CALPUFF dispersion model has been used to predict ground-level concentrations of nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulates (PM_{10} and $PM_{2.5}$) and metals that will be generated by the Project. The results of the dispersion modelling have then been assessed against the relevant air quality criteria for the protection of human health and the environment.

Four load scenarios have been considered covering the full range of operations in order to ensure that worst-case potential impacts have been determine, namely:

- Overload operation
- 100% operation
- 60% operation
- 25% operation.

Diesel generators will be utilised during construction, these have also been assessed.

The air quality assessment shows that:

- Construction – predicted ground-level concentrations of NO_2, SO_2, PM_{10} and $PM_{2.5}$ ***comply*** with the air quality objectives at all sensitive receptors.
- Operations
    - Predicted ground-level concentrations of NO_2, SO_2, PM_{10}, $PM_{2.5}$ and metals at sensitive receptors ***comply*** with the air quality objectives at all sensitive residential receptors.
    - Predicted ground-level concentrations of NO_2, SO_2 and fluoride at sensitive environmental receptors ***comply*** with the air quality objectives.

The potential for cumulative dust impacts was assessed and it was concluded that the Project's contribution to any cumulative dust impacts would be minor relative to contributions from the adjacent open cut mines.

The assessment of the GHG and energy use associated with the Project shows that:

- GHG and energy use associated with the construction activities range from 1 to 7 $ktCO_2$-e/y and 10 to 100 TJ/y, respectively.

- Ongoing operation of the Project is expected to result in 9,427 $ktCO_2$-e/y for the 1,400 MW configuration.
- The Project has the potential to achieve a significantly lower GHG emissions intensity, 0.79-0.81 $kgCO_2$-e/kWh in comparison to other coal fired power stations. If the power station, operating at 1,400 MW, displaced electricity production from older less efficient coal fired power stations, GHG emissions at a national level could theoretically be reduced by as much as 5,500 $ktCO_2$-e annually.

1. INTRODUCTION

Katestone Environmental Pty Ltd (Katestone) was commissioned by Waratah Coal Pty Ltd (Waratah) to complete an air quality and greenhouse gas assessment of the Galilee Power Station Project (the Project). The assessment is to support a Material Change of Use application for the Project.

The Project involves the construction and operation of a coal fired power station in Central Queensland. The Project site is located 32 kilometres northwest of Alpha (Figure 1) and adjacent to Waratah's approved Galilee Coal Project. Waratah proposes to develop the coal fired power station in conjunction with mining operations. The ultimate capacity of the power station is 1,400 MW (comprised of 2 x 700 MW units).

The coal handling infrastructure and mine infrastructure area will be located within the approved Galilee Coal Project's mine lease boundary. Coal will be transported from the mine to the Project by conveyor. Infrastructure located within the Project's boundary (Figure 2 and Figure 3) includes:

- The portion of the conveyor that lies within the Project boundary
- Steam boilers and turbines
- Stores hardstand area
- Raw water dams
- Furnace ash cooling ponds
- Ash storage facility
- Administration building
- 275 and 132 kV Power lines.

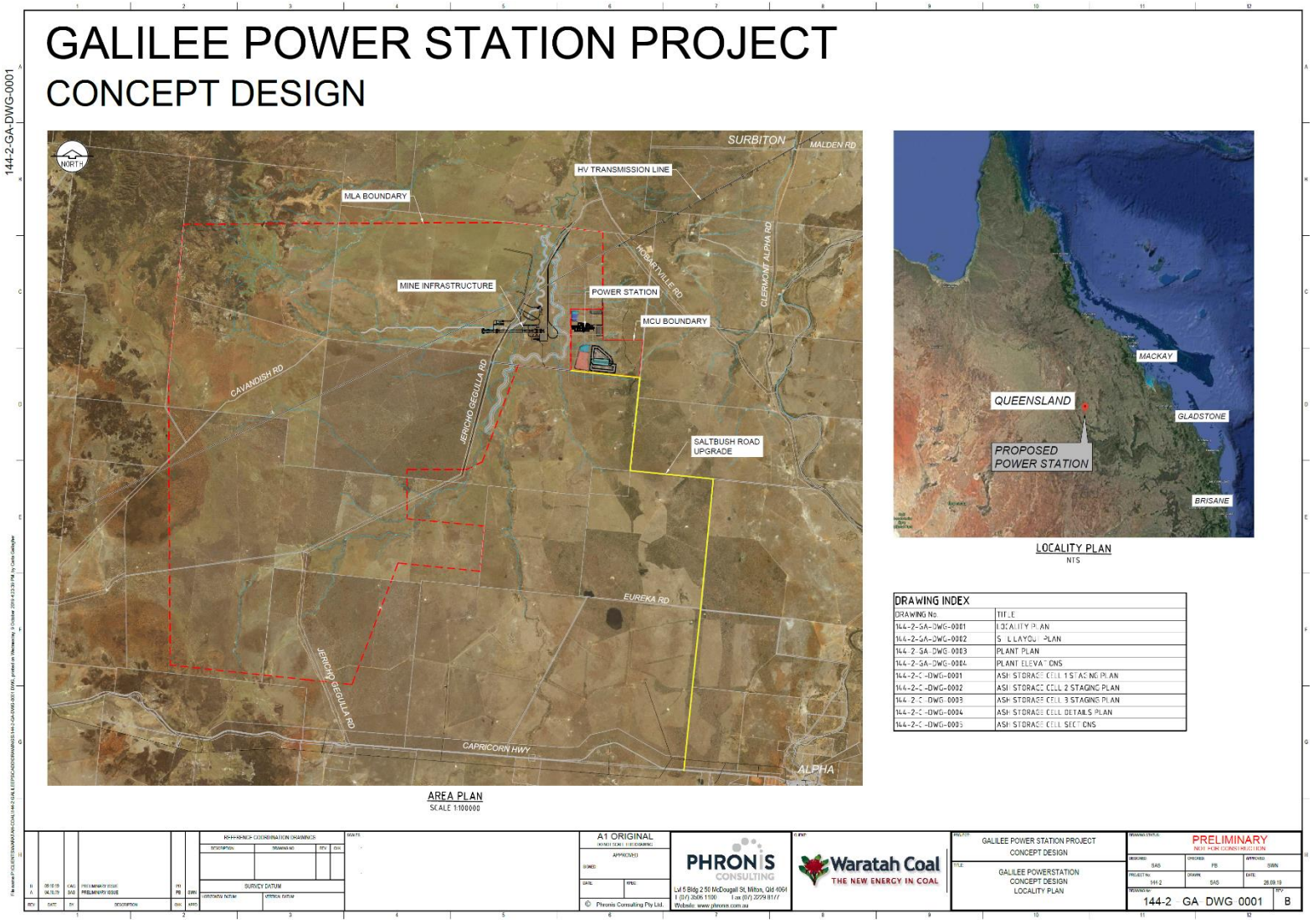

Figure 1 **Galilee Power Station Project location**

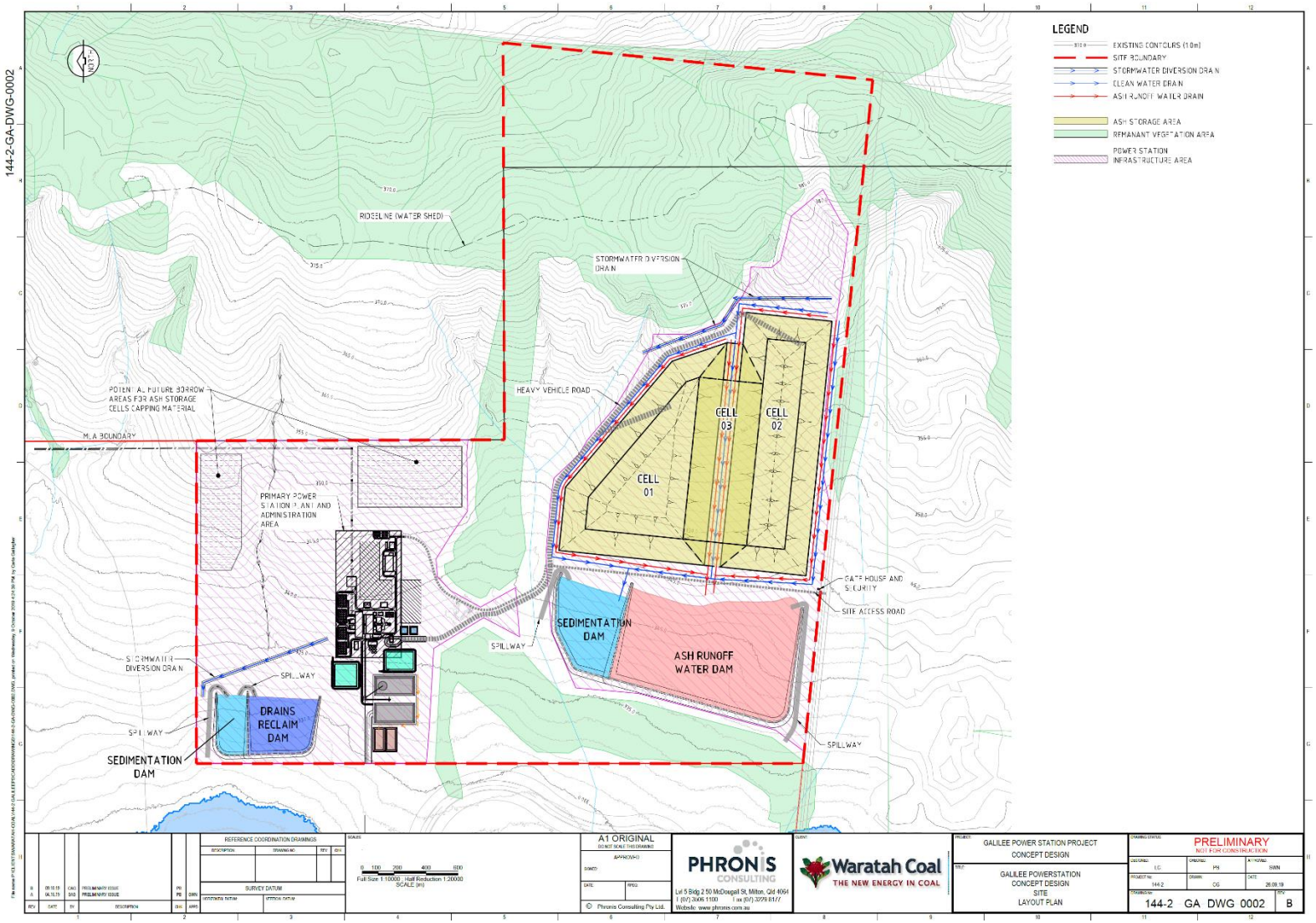

Figure 2 Galilee Power Station site layout

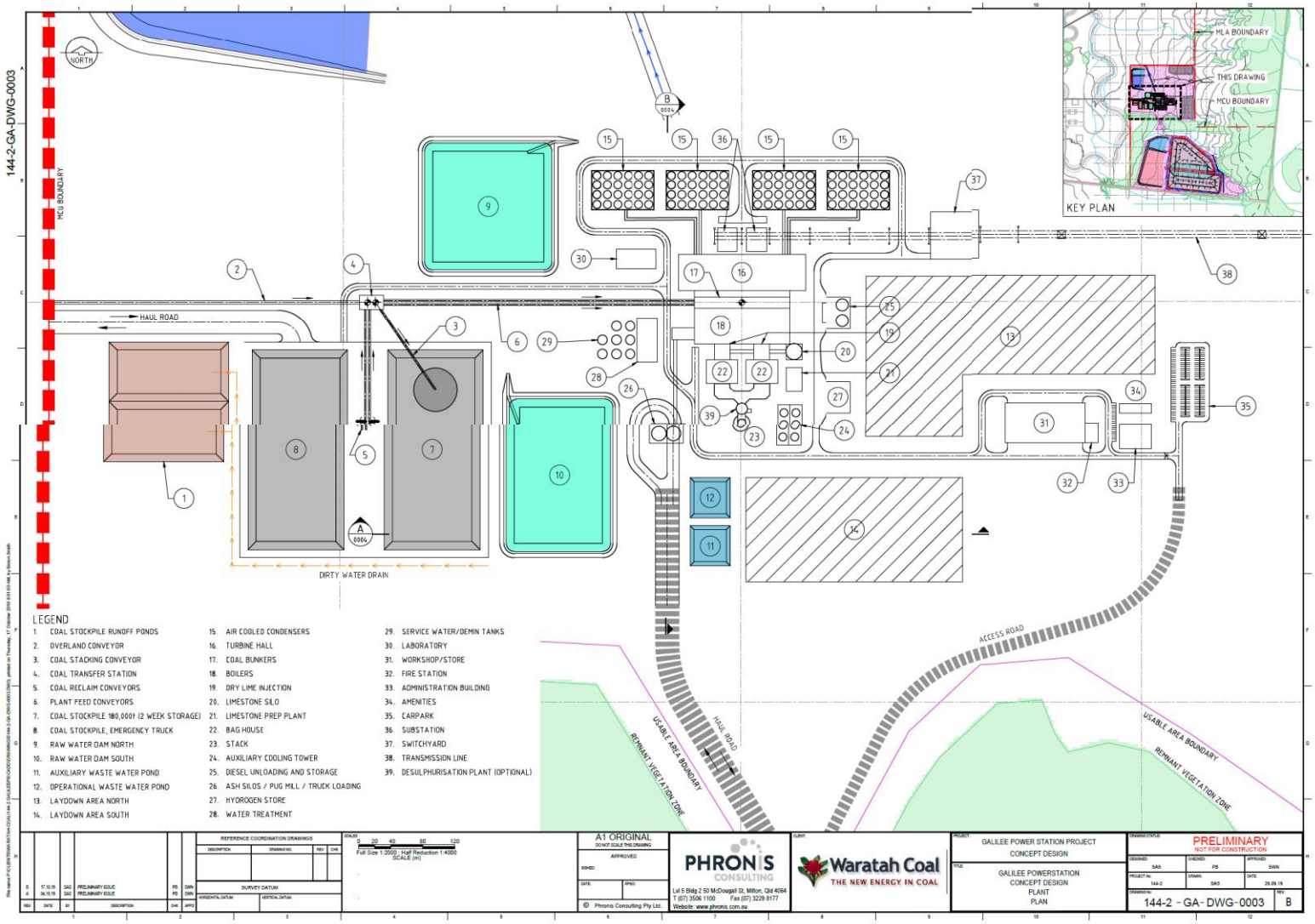

Figure 3 Galilee Power Station plant layout

2. SCOPE OF WORK

This assessment summarises the aspects of the Project that may result in emissions to the atmosphere, as well as the legislation, policies and guidelines that are relevant to the assessment and management of air emissions in Queensland and Australia.

The key air pollutants that may be emitted to the atmosphere by the Project are oxides of nitrogen (NO_x), carbon dioxide (CO_2) and sulfur dioxide (SO_2). Particulates in the form of PM_{10} and $PM_{2.5}$, and metals, may also be present at trace levels.

Emissions will occur due to the combustion of the coal in the coal fired boilers as well as the combustion of diesel in the diesel generators during construction. Dispersion modelling has been conducted to estimate ground-level concentrations of air pollutants associated with the Project for assessment against amenity and health objectives.

A cumulative impact assessment of the Project has been conducted that accounts for natural and existing and approved future anthropogenic sources of air pollutants.

The assessment has considered the potential impacts from:

- Construction – diesel-fired generators and earthworks
- Operations – coal-fired power station with a total capacity of 1,400 MW operating at four different load scenarios (overload, 100% load, 60% load and 25% load)
- Operations - ash storage facility
- The Project plus ambient background.

There are a number of projects that are approved, or well progressed in the approval process, that have not yet been constructed and so the measured background dust levels do not capture the influence of the projects. Where possible, the potential for cumulative effects of these future projects has been explicitly considered.

A greenhouse gas (GHG) assessment has also been conducted to quantify emissions of CO_2 and other GHGs. The GHG assessment includes a discussion of the relevant legislation, the methodology for the assessment, the estimated GHG emissions and proposed mitigation strategies.

3. LEGISLATIVE FRAMEWORK FOR AIR QUALITY

The *Environmental Protection Act 1994* (EP Act) provides for the management of the air environment in Queensland. The EP Act gives the Department of Environment and Science (DES) the power to create Environmental Protection Policies that identify, and aim to protect, environmental values of the atmosphere that are conducive to the health and well-being of humans and biological integrity. The *Environmental Protection (Air) Policy* (Air EPP) was made under the EP Act and gazetted in 1997; the Air EPP was revised and reissued in 2008.

The purpose of the Air EPP is to identify the environmental values of the air environment to be enhanced or protected and to achieve the objective of the EP Act, which is ecologically sustainable development.

The environmental values to be enhanced or protected under the Air EPP are the qualities of the environment that are conducive to:

- protecting health and biodiversity of ecosystems;
- human health and wellbeing;
- protecting the aesthetics of the environment, including the appearance of building structures and other property; and
- protecting agricultural use of the environment.

The administering authority must consider the requirements of the Air EPP when it decides an application for an environmental authority, amendment of a licence or approval of a draft environmental management plan. Schedule 1 of the Air EPP specifies air quality indicators and objectives for contaminants that may be present in the air environment.

The Air EPP air quality objectives relevant to the key air pollutants that may be generated from the Project are presented in Table 1.

Not all air pollutants that are generated by a coal fired power station are indicators under the Air EPP. It is common practice to consider, and where appropriate adopt, impact assessment criterion for air quality indicators from another jurisdiction if an objective is not defined in the Air EPP. Accordingly, impact assessment criteria from the following guidelines and standards have been adopted:

- Texas Commission on Environmental Quality Effects Screening Levels 2009 (TCEQ, 2009)
- Approved methods for the modelling and assessment of air pollutants in NSW (NSW EPA, 2017).

Also relevant is DES's *Application requirements for activities with impacts to air*, which outlines the information to be provided to DES as part of the application process for environmentally relevant activities and how the information is used. This document outlines how the proposed activity will be assessed by comparison with the requirements stipulated in the EP Act. In particular, this requires an application to include, if applicable:

- description of the site and surrounding areas, including topography, prevailing winds and ambient air quality (Section 4 and 7)
- identification of any nearby sensitive places must be identified and assessed appropriately (Section 4.2)
- identification and evaluation of possible impacts on air quality (Section 8)
- Proposed management (Section 6.2 and 6.4).

This air quality assessment has been conducted in accordance with these requirements.

Table 1 Ambient air quality objectives (Air EPP except where noted)

Pollutant	Environmental value	Averaging period	Air quality objective (µg/m³)	Number of days of exceedance allowed per year
NO_2	Health and wellbeing	1-hour	250	1
		1-year	62	N/A
	Health and biodiversity of ecosystems	1-year	33	N/A
SO_2	Health and wellbeing	1-hour	570	1
		24-hour	230	1
		1-year	57	N/A
	Protecting agriculture	1-year	32	N/A
	Health and biodiversity of ecosystems (for forests and natural vegetation)	1-year	22	N/A
PM_{10}	Health and wellbeing	24-hour	50	5
$PM_{2.5}$	Health and wellbeing	24-hour	25	N/A
		1-year	8	N/A
Arsenic	Health and wellbeing	1-year	0.006	N/A
Boron	Health and wellbeing	1-hour [a]	50	N/A
	Health and wellbeing	Annual [a]	5	N/A
Cadmium	Health and wellbeing	1-year	0.005	N/A
Fluoride	Health and biodiversity of ecosystems (for protected areas)	90-days	0.1	N/A
Lead	Health and wellbeing	1-year	0.5	N/A
Mercury and compounds (organic)	Health and wellbeing	1-hour [b]	0.18	N/A
Mercury and compounds (inorganic)	Health and wellbeing	1-hour [b]	1.8	N/A

Table note:
[a] Effects screening level from TCEQ 2009
[b] Impact assessment criterion from NSW EPA 2017

4. EXISTING ENVIRONMENT

4.1 Local terrain and land-use

The Project is located 32 kilometres northwest of Alpha. The site is located approximately 360m above sea level. It is bordered to the west by the Great Dividing Range, which rises up to an elevation of 500m. Directly north of the site is the Bimblebox Nature Refuge.

The land use in the area is mostly low-density grazing; however, four mining projects, namely: Alpha Coal Project, Galilee Coal Project, South Galilee Coal Mine and Kevin's Corner Project have been approved but are yet to be constructed.

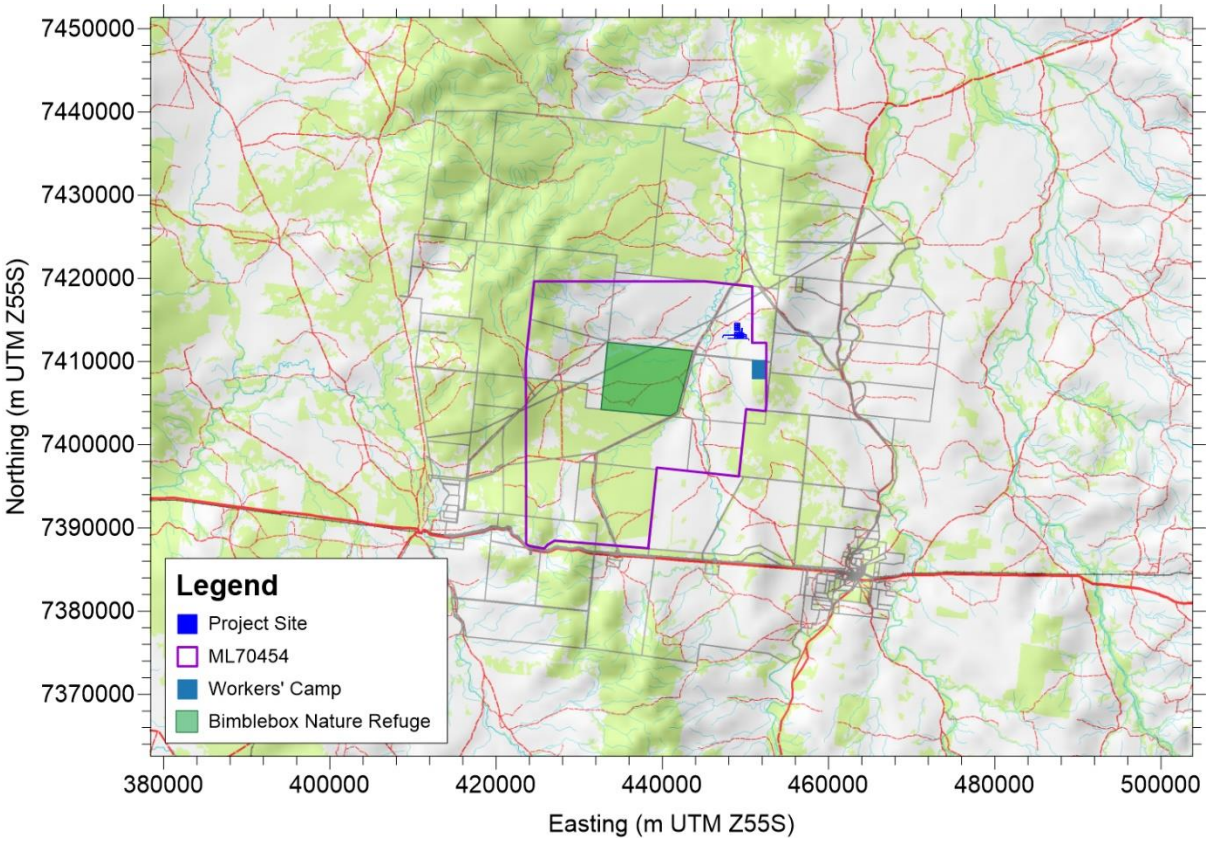

Figure 4 Terrain surrounding the Project

4.2 Sensitive receptors

The sensitive receptors surrounding the Project are presented in Table 2 and Figure 5. The Bimblebox Nature Refuge is approximately 6km to the southwest of the Project site. The Workers' Camp for the Galilee Coal Mine is located 4-5km to the southeast of the Project site.

Table 2 Nearest sensitive receptors to the Project

Receptor ID	Description	Type	Easting (m)	Northing (m)	Distance from Project site (km)
0	Dwelling	Dwelling	458326	7374080	39.9
1	Dwelling	Dwelling	414236	7389710	42.3
2	Dwelling	Dwelling	476354	7444400	41.2
5	Accommodation Village - Alpha Coal Project	Dwelling	455990	7435050	22.9
6	Accommodation Village - South Galilee Coal Project	Dwelling	453070	7381710	31.5
7	Airfield	Commercial / Industrial	411564	7391610	43.6
8	Alpha	Township	463044	7384650	31.4
9	Alpha Coal Bulk Sample	Commercial / Industrial	446310	7430760	18.0
10	Beaufort Homestead	Dwelling	482196	7393550	38.0
11	Bedford Homestead	Dwelling	461878	7385550	30.1
12	Betanga Homestead	Dwelling	433061	7386390	31.4
13	Blairgowrie	Dwelling	404511	7447130	56.5
14	Bonanza Homestead	Dwelling	459400	7378880	35.6
16	Burgoyne Homestead	Dwelling	413173	7383660	46.8
17	Burtle Homestead	Dwelling	464077	7429860	22.2
18	Carinya Homestead	Dwelling	483295	7398380	36.8
19	Cavendish Homestead[a]	Dwelling	427242	7408510	22.8
20	Colorado Homestead	Dwelling	425690	7386800	35.5
21	Corn Top Homestead[a]	Dwelling	433454	7387990	29.8
22	Creek Farm Homestead	Dwelling	457196	7378510	35.4
25	Dwelling	Dwelling	414157	7387740	43.5
26	Dwelling	Dwelling	412328	7389130	44.3
27	Dwelling	Dwelling	412984	7390100	43.2
28	Dwelling	Dwelling	415413	7380810	47.0
29	Dwelling	Dwelling	404063	7391130	50.5
30	Dwelling	Dwelling	415318	7377350	49.5
31	Dwelling	Dwelling	407550	7388490	48.7
32	Dwelling	Dwelling	461709	7384490	31.0
33	Dwelling	Dwelling	461561	7384020	31.4
34	Dwelling	Dwelling	466912	7382620	35.0
35	Dwelling	Dwelling	467480	7383290	34.7
36	Dwelling	Dwelling	468324	7384040	34.5
37	Dwelling	Dwelling	469001	7389630	30.4
38	Dwelling?	Dwelling	468208	7391030	28.8
39	Edwinstowe Homestead	Dwelling	400899	7407010	49.0
40	Elphin Homestead	Dwelling	467229	7378740	38.6
41	Eulimbie Homestead	Dwelling	464125	7453600	43.1
42	Eureka Homestead	Dwelling	440787	7390590	24.1

Receptor ID	Description	Type	Easting (m)	Northing (m)	Distance from Project site (km)
44	Gadwell Homestead	Dwelling	462438	7404300	15.6
46	Glen Innes Homestead[a]	Dwelling	438839	7407510	12.1
47	Hazelbrook Homestead	Dwelling	466198	7383890	33.6
49	Hobartville Homestead[b]	Dwelling	449599	7422950	9.9
50	Inverurie Homestead	Dwelling	410026	7401940	41.1
51	Islay Plains Homestead	Dwelling	487557	7433370	43.1
52	Jericho	Township	410870	7389550	45.3
53	Jordan Avon Homestead	Dwelling	409351	7397260	43.2
54	Kalbar Homestead	Dwelling	480097	7406610	31.2
55	Kerand Homestead	Dwelling	486074	7406330	37.1
56	Kia Ora Homestead[a]	Dwelling	437910	7414870	11.8
57	Lambton Meadows Homestead[a]	Dwelling	431528	7398980	22.9
59	Locharnoch	Dwelling	411166	7421840	39.4
60	Melton Homestead	Dwelling	481860	7396990	36.1
61	Mentmore Homestead	Dwelling	460741	7408730	12.0
62	Milangavla	Shed/Structure	420443	7412890	29.1
63	Monklands[a]	Dwelling	445187	7411120	4.8
64	Moonstone Homestead	Dwelling	474988	7432010	31.7
65	Mossvale Homestead	Dwelling	464819	7389860	27.8
67	Oakleigh Homestead	Dwelling	453342	7390950	22.4
68	Quarry	Commercial / Industrial	410757	7390910	44.7
69	Racecourse	Commercial / Industrial	411723	7390270	44.2
70	Racecourse	Commercial / Industrial	460399	7384860	30.2
71	Rifle Creek Homestead	Dwelling	494263	7413440	51.8
72	Rosedale Homestead	Dwelling	403774	7437190	34.1
73	Rosefield Homestead	Dwelling	419542	7396960	11.8
74	Salt Bush Homestead	Dwelling	454102	7402200	53.0
76	Spring Creek[a]	Dwelling	429260	7415010	20.4
79	Surbiton Homestead	Dwelling	460914	7440140	29.4
81	The Grove Homestead	Dwelling	465831	7392660	46.4
82	Toarbee	Dwelling	425281	7387680	26.1
84	Tressillian Homestead	Dwelling	462377	7416370	35.1
85	Villafield Homestead	Dwelling	458425	7381570	13.2
86	Wendouree Homestead[b]	Dwelling	448337	7437070	32.7
87	Woodbrook Homestead	Dwelling	488114	7416410	24.1
88	Wycheproof Homestead	Dwelling	485017	7387530	38.7
89	Zeta Homestead	Dwelling	471664	7371980	43.7
-	Workers' Camp	Dwelling	451754	7408992	39.9

Table note:
[a] Receptor to be acquired by Waratah
[b] Receptor to be acquired by Alpha Coal

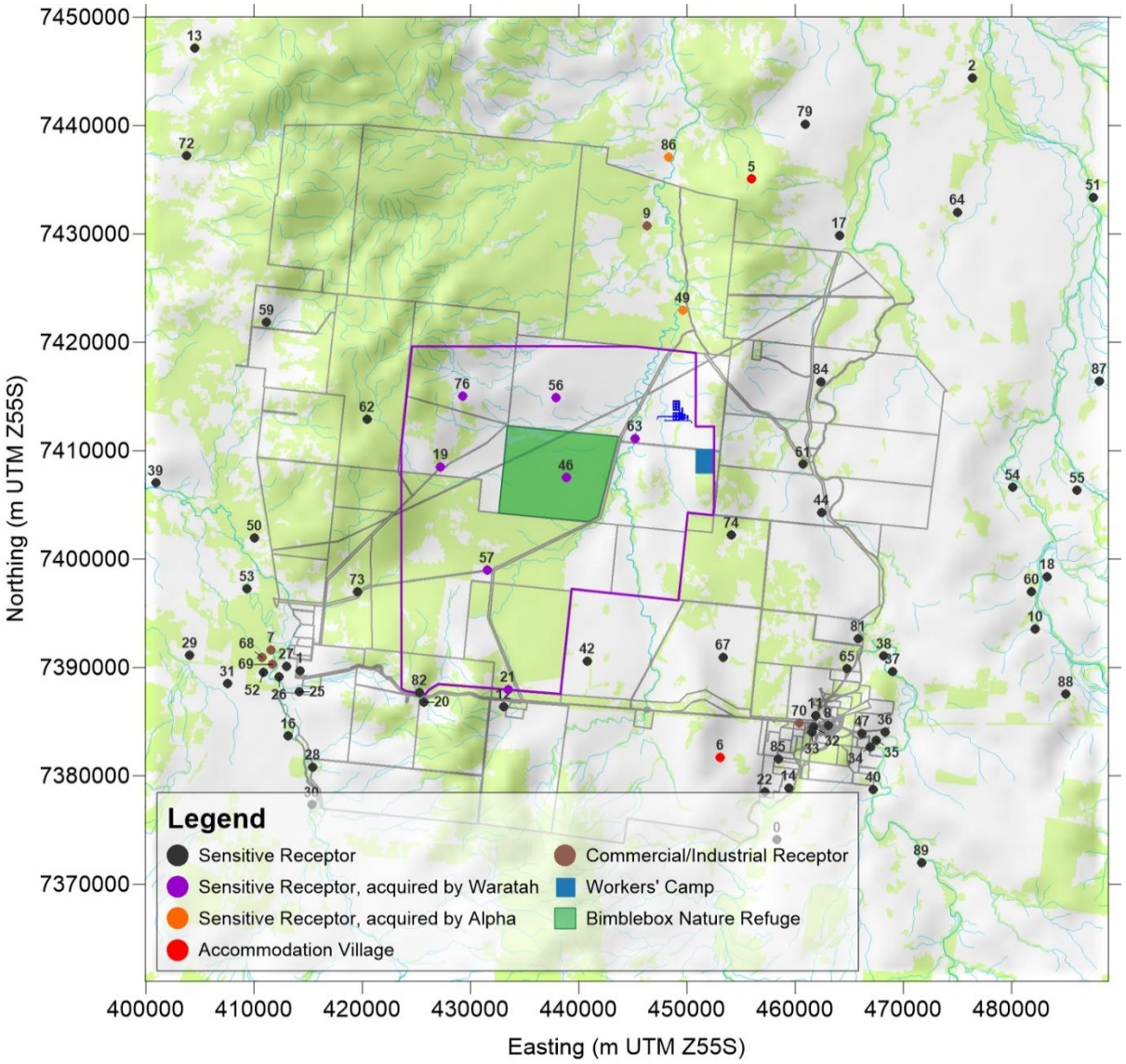

Figure 5 **Location of sensitive receptors**

4.3 Existing air quality

4.3.1 Existing sources of emissions

The existing air quality in the study area will be influenced by natural sources such as wind erosion and fires, and local agriculture or horticulture. Several mines in addition to the Waratah Coal Mine, namely: Alpha Coal, Kevin's Corner and South Galilee Coal Project have been approved. However, these mines are yet to be constructed.

The National Pollutant Inventory identifies the Barcaldine Power Station, located 114km to the west of the Project site, as the closest significant emitter of air pollutants. Emissions from the Barcaldine Power Station are summarised in Table 3.

Table 3 Barcaldine Power Station - National Pollutant Inventory emissions for the 2017-2018 reporting period

Parameter	Value
Distance	114 km
Description/ ANZSIC Class	Electricity Generation
NOx	470 kg/annum
SO_2	2.8 kg/annum
PM_{10}	36 kg/annum
$PM_{2.5}$	36 kg/annum
Arsenic	0.00094 kg/annum
Cadmium	0.0051 kg/annum
Fluoride	0 kg/annum
Lead & compounds	0.0027 kg/annum
Mercury & compounds	0.0012 kg/annum

4.3.2 Existing ambient air quality

DES operates a network of ambient air quality monitoring stations throughout Queensland. Data recorded in the five years from 2011 to 2015 at the nearest monitoring station, located at Pimlico, has been analysed. This monitoring station was decommissioned in late 2016 and replaced by a monitoring station in North Ward in late 2017. Low data capture rates occurred in these years and, consequently, data from these years have not been included in the following data summary.

Ambient concentrations of NO_2, SO_2 and PM_{10} measured at Pimlico are presented in Table 4, Table 5 and Table 6, respectively. Ambient background levels of air pollutants are lower than the relevant Air EPP objectives with the exception a period of elevated concentrations of PM_{10} that were measured in 2011 due to a bushfire and backburning operations.

Table 4 Concentrations of nitrogen dioxide measured at Pimlico monitoring station 2011 - 2015

Year	Nitrogen dioxide (µg/m^3)			
	1-hour average			Annual average
	Maximum	95th percentile	70th percentile	
2011	84.2	34.9	12.3	10.7
2012	69.8	28.7	10.3	9.9
2013	67.7	22.6	8.2	7.3
2014	63.6	26.7	8.2	8.4
2015	80.1	26.7	8.2	7.7

Table 5 Concentrations of sulfur dioxide measured at Pimlico monitoring station 2011 - 2015

Year	Sulfur dioxide (µg/m^3)						
	1-hour average			24-hour average			Annual average
	Maximum	95th percentile	70th percentile	Maximum	95th percentile	70th percentile	
2011	25.7	11.4	5.7	17.1	11.4	5.7	3.6
2012	17.1	5.7	2.9	8.6	5.7	2.9	1.6
2013	11.4	2.9	2.9	5.7	2.9	2.9	1.1
2014	14.3	5.7	2.9	5.7	2.9	2.9	1.8
2015	11.4	5.7	2.9	8.6	2.9	2.9	1.8

Table 6 Concentrations of PM_{10} measured at Pimlico monitoring station 2011 - 2015

Year	PM_{10} (µg/m^3)			
	24-hour average			Annual average
	Maximum	95th percentile	70th percentile	
2011	64.9	27.5	17.6	15.6
2012	30.0	21.4	14.9	12.9
2013	27.6	24.3	17.5	15.0
2014	29.4	22.5	17.0	15.1
2015	42.0	27.0	20.1	17.7

5. AIR QUALITY ASSESSMENT METHODOLOGY

This air quality assessment was conducted in accordance with standard techniques for dispersion modelling and emission estimation that are recognised by DES. The air quality assessment is based on a dispersion modelling study that incorporates source characteristics and air pollution emission rates, local meteorology, terrain, land use and the geographical location of sensitive receivers.

5.1 Emission rates

Emission rates of NO_2, SO_2, PM_{10} and $PM_{2.5}$ and metals from the coal fired boilers were provided by Waratah for the 1,400 MW capacity power station. Emission rates were provided for four different load scenarios namely: overload, 100%, 60% and 25% load.

Emissions of NO_2, SO_2, PM_{10} and $PM_{2.5}$ for the diesel generators used during construction were calculated using diesel fuel consumption data provided by Waratah and emission factors provided in the National Pollutant Inventory Emission Estimation Technique Handbook for combustion engines.

Section 6 provides a comprehensive discussion of emissions included in the assessment.

5.2 Meteorology

Site-specific meteorological data was generated by coupling the prognostic model TAPM (version 4.0.5) (The Air Pollution Model) with the diagnostic meteorological model CALMET (version 6.5.0). The coupled TAPM/CALMET modelling system was developed to enable high resolution modelling capabilities for regulatory and environmental assessments. The modelling system incorporates synoptic, mesoscale and local atmospheric conditions, detailed topographic and land use categorisation schemes to simulate synoptic and regional scale meteorology for input into pollutant dispersion models such as CALPUFF.

The assessment was conducted using the most recent versions of TAPM and CALMET available at the time of undertaking the study.

A summary of meteorology for the site is provided in Section 7. Technical details of the configuration of the TAPM and CALMET models are discussed in Appendix A.

5.3 Dispersion modelling

The CALPUFF model (version 7.2.1) was used for dispersion modelling. CALPUFF is an advanced non-steady-state air quality modelling system. Twelve months of modelled meteorological data was used as input for the dispersion model in order to include all weather conditions likely to be experienced in the region during a typical year. The modelling has been used to predict ground-level concentrations of air pollutants across a Cartesian grid and at the locations of the nearest sensitive receptors.

Emission sources were configured in CALPUFF using stack characteristics provided by Waratah. Air pollutant emission rates have been modelled over a full year assuming constant emissions from the power station and the diesel-fired generators.

Details of model configuration are provided in Appendix A.

5.4 Methods for the conversion of NO_X to NO_2

Nitric oxide (NO) that is emitted by power stations can undergo chemical transformation in the atmosphere to form nitrogen dioxide (NO_2). NO_2 is more toxic than NO and therefore it is important to quantify the transformation of NO to NO_2 in the atmosphere. Measurements around power stations in Central Queensland show, under worst possible cases, a conversion of 25-40% of the nitric oxide to nitrogen dioxide occurs within the first 10 kilometres of plume travel. During days with elevated background levels of hydrocarbons (generally originating from bushfires, hazard reduction burning or other similar activities), the resulting conversion is usually below 50% in the first 30 kilometres of plume travel (Bofinger et. al., 1986). For this air dispersion modelling assessment, a ratio of 30% conversion of the oxides of nitrogen to nitrogen dioxide has been assumed. This is highly conservative considering the short travel time of the plume to the maximum ground-level concentrations.

5.5 Ambient background levels

The assessment has considered background levels of air pollutants in the region. Table 7 presents the ambient background concentrations selected for this assessment.

Table 7 Ambient background concentrations for use in the assessment

Pollutant	Averaging period	Ambient background concentration (µg/m^3)	Source
NO_2	1-hour	34.9	Highest 70th percentile from Pimlico between 2011 and 2015
	1-year	10.7	Highest annual average from Pimlico between 2011 and 2015
SO_2	1-hour	11.4	Highest 70th percentile from Pimlico between 2011 and 2015
	24-hour	5.7	Highest 70th percentile from Pimlico between 2011 and 2015
	1-year	3.6	Highest annual average from Pimlico between 2011 and 2015
PM_{10}	24-hour	20.4	Highest 70th percentile from Pimlico between 2011 and 2015
$PM_{2.5}$	24-hour	5.0	Calculated from 24-hour PM_{10} from Pimlico using ratio of $PM_{2.5}$ to PM_{10} of 0.25
	1-year	4.4	Calculated from average PM_{10} from Pimlico using ratio of $PM_{2.5}$ to PM_{10} of 0.25

5.6 Cumulative Impacts

There are a number of proposed and/or approved mines in the vicinity of the Project that are not yet constructed. The potential for cumulative impacts due the Project operating at the same time as these mines has also been assessed using data contained in the respective Environmental Impact Assessments. The contribution of these mines to ground-level concentrations of air pollutants is discussed in Section 8.5.

5.7 Presentation of results

The results of dispersion modelling have been presented as ground-level concentrations at sensitive receptors as well as contours across the modelling domain for the key pollutants: NO_2, SO_2, PM_{10} and $PM_{2.5}$.

The maximum predicted concentrations at any sensitive receptor are presented in Section 8.1 for construction activities. The maximum predicted concentrations at any sensitive receptor are presented in Section 8.2 for the four operational loads investigated. The predicted maximum concentrations of key pollutants for each sensitive receptor, including the Workers' Camp, are presented in Appendix B.

The maximum predicted concentrations relating to the Bimblebox Nature Refuge are presented in Section 8.3.

5.8 Photochemical smog

Photochemical smog (ozone) is not directly released from the Project as a primary pollutant rather it is generated through photochemical oxidation of NO_X and nitrates in the atmosphere over time. The exhaust from the Project contains approximately 90-95% of oxides of nitrogen as NO. Once this NO has been transformed into NO_2 and nitrates, ozone may be produced via a multi-stage process. The rate at which photochemical smog is generated is a function of:

- The in-plume concentration of oxides of nitrogen
- The concentration and reactivity of volatile organic compounds in the ambient air
- The rate of plume dispersion
- The prevailing atmospheric conditions, including temperature and solar radiation fluxes.

The transformation of NO_X and possible formation of ozone involves a number of chemical reactions. Generally, during the first phase of chemical transformations, the mixing of the exhaust plume with ambient air results in a local reduction of ambient ozone, through titration of the emitted NO as it reacts with ozone to form NO_2. The second phase (ozone generation) will commence only if the ambient air is sufficiently photochemically aged (i.e. reactions have reached an equilibrium where no more NO_2 is produced). This phase continues with ozone being both generated and diluted in the plume. The generation continues until the final phase, the NO_X-limited state, is reached in the plume. The duration of each phase will depend on the nature of the ambient air, the emission rates and characteristics of the industrial source and the dispersion rates.

The assessment has assumed that each mole of NO_X predicted at ground-level at a distance of ten kilometres from the power station will result in the maximum stoichiometric amount of ozone generation possible. This assessment is conservative as it assumes that the phases described above coincide to provide maximum conversion of NOx to ozone.

5.9 Limitations of dispersion modelling

This study necessarily relies on the accuracy of a number of data sets including, but not limited to:

- Meteorological information
- Analysis and representativeness of coal samples
- Fuel consumption data.

Where uncertainty exists in important properties of the proposed activities within the Project or the environment, this assessment has erred on the side of caution and selected inputs that would provide for overestimates of ground-level concentrations of air pollutants. A number of assumptions have been applied.

It is important to note that numerical models are based on an approximation of governing equations and will inherently be associated with some degree of uncertainty. The more complex the physical model, the greater the number of physical processes that must be included.

6. EMISSIONS TO THE ATMOSPHERE

6.1 Standards of emission concentrations

There is no legislation or regulation in force in Queensland that specifies emission concentration standards; however, DES commonly considers the emission standards set in other jurisdictions. In NSW, the *Protection of the Environment Operations (Clean Air) Regulation 2010* provides standards of emission concentrations for premises that are required to be licensed. The standards for boilers associated with electricity generating systems with a capacity of greater than 30 MW are presented in Table 8. Plant and equipment that are proposed for the Project will comply with these standards of concentration.

Table 8 NSW stack emissions concentration limits for coal-fired power plant associated with electricity generation

Air impurity	Activity or plant	Standard of concentration
Nitrogen dioxide (NO_2) or nitric oxide (NO) or both, as NO_2 equivalent	Any boiler operating on a fuel other than gas, including a boiler used in connection with an electricity generator that forms part of an electricity generating system with a capacity of 30 MW or more	500 mg/Nm^3
Solid particles (total)	Any activity or plant using a liquid or solid standard fuel or a non-standard fuel	50 mg/Nm^3
Table note: Reference conditions: Dry, 273 K, 101.3 kPa, 7% oxygen content		

6.2 Construction

The construction phase of the Project is expected to take three years. Construction phase activities include:

- Site clearance of areas, including vegetation clearance, topsoil removal and storage, and earthworks
- Civil works including temporary and permanent drainage works
- Structure and plant erection and installation
- Commissioning and testing of plant and equipment
- Diesel generators for the provision of power
- Construction site demobilisation.

Dust emissions during the construction phase of the Project will be managed through the implementation of a dust management plan. Measures to minimise dust may include:

- Watering of roads
- Minimising exposed areas as far as practicable
- Limiting vehicle speeds.

The construction phase of the Project is necessarily temporary.

A combination of 100 kW, 200 kW and 500 kW diesel generators will be required throughout the construction period. The number of generators will depend on the construction activities likely to occur within a given period.

Emissions from the diesel generators have been quantified based on diesel usage data provided by Waratah and emission factors contained in the NPI Emission Estimation Technique Manual for Combustion Engines Version 3.0. The stack characteristics and emission rates associated with the operation of the diesel generators during construction are summarised in Table 9.

Table 9 Stack characteristics and emissions data for diesel generators used in construction

Parameter	Units	100 kW	200 kW	500 kW
Number of generators	-	8	1	4
Fuel usage[1] per generator	m^3/hour	0.042	0.017	0.008
Stack height[2]	m	3	3	3
Stack diameter[3]	m	0.25	0.25	0.25
Exit velocity[3]	m/s	25	25	25
Exit temperature[3]	°C	464	464	464
Emission rates (total for each type of generator)				
NOx emission rate	g/s	1.3	0.3	2.4
SOx emission rate	g/s	0.0003	0.00008	0.0008
PM_{10} emission rate	g/s	0.09	0.02	0.08
$PM_{2.5}$ emission rate	g/s	0.09	0.02	0.07

Table notes:

[1] Fuel usage based on maximum consumption for any 3-month period during construction phase. Hourly usage based on 10-hour operation, 78 days per quarter.

[2] Stack height supplied by Waratah

[3] Stack diameter, exit velocity and temperature based on generator specifications for generators with capacities similar to above.

6.3 Operations – 1400 MW (2x700MW) coal fired power station

The stack characteristics and emission rates for the coal fired power station with a generating capacity 1,400 MW are presented in Table 10. Waratah Coal will install scrubber technology to minimise emissions of SO_2. Stack characteristics and emission rates are presented for four load scenarios with scrubber technology installed. The load scenarios relate to the coal fired power station operating at overload, 100% load, 60% load and 25% load.

Table 10 Stack characteristics and emissions data for the 1,400 MW (2 x 700 MW) coal fired power station

Parameter	Units	Overload	100% load	60% load	25 % load
Power generated	MW	756	702	421	176
Stack height	m	100	100	100	100
Stack diameter (effective)[1]	m	9.9	9.9	9.9	9.9
Exit velocity	m/s	23	19	12	6
Exit temperature	°C	120	120	120	120
Stack exhaust moisture content	%	6.7	6.7	6.7	6.7

Parameter	Units	Overload	100% load	60% load	25 % load
Stack exhaust oxygen content - wet	%	3.3	3.3	3.3	3.3
Normalised volume flow - wet	Nm^3/s	1208	1042	651	326
Normalised volume flow – dry, 15% O_2	Nm^3/s	3943	3402	2126	1063
NOx concentration (15% O_2)	mg/Nm^3	200	200	200	200
PM_{10} concentration	mg/Nm^3	50	50	50	50
Emission rates (total for power station)					
NOx emission rate	g/s	789	680	425	213
SOx emission rate	g/s	100	87	54	27
PM_{10} emission rate	g/s	197	170	106	53
$PM_{2.5}$ emission rate	g/s	197	170	106	53
Arsenic emission rate	g/s	8.1E-04	7.0E-04	4.4E-04	2.2E-04
Boron emission rate	g/s	3.7E-02	3.2E-02	2.0E-02	1.0E-02
Cadmium emission rate	g/s	2.2E-05	1.9E-05	1.2E-05	6.1E-06
Fluorine emission rate	g/s	2.8E-02	2.4E-02	1.5E-02	7.5E-03
Mercury emission rate	g/s	1.7E-05	1.5E-05	9.1E-06	4.5E-06
Lead emission rate	g/s	6.8E-03	5.9E-03	3.7E-03	1.8E-03
Selenium emission rate	g/s	9.6E-04	8.3E-04	5.2E-04	2.6E-04

Table notes:
[1] The two power station stacks were modelled as a single stack with an effective diameter

6.4 Operations – ash storage facility

The ash storage facility will be developed progressively as new storage capacity is required.

The ash from the power station will be piped or trucked or conveyed to the ash storage cells. The ash will be of a wet consistency and will be progressively rehabilitated and therefore is not expected to be a major source of dust.

A dust management plan will be implemented to minimise dust from the ash storage cells. Measures to minimise dust may include:

- Progressive rehabilitation
- Addition of water
- Establishing wind breaks such as bunding as required.

7. METEOROLOGY

The following sections describe the meteorology of the region surrounding the Project, focussing on parameters that are important for dispersion of air pollutants, based on data generated for the 2012 calendar year by the TAPM/CALMET models. The summary includes a description of the predicted wind speed, wind direction, temperature, atmospheric stability and mixing height. The dataset has been extracted from the model at the Project site.

7.1 Wind speed and wind direction

The annual, seasonal and diurnal distribution of winds predicted by TAPM/CALMET for the Project site are presented in Figure 6, Figure 7 and Figure 8, respectively. The analysis of the wind speed and wind direction at the site shows that winds are predominantly light to moderate between 1 and 6 m/s. Winds are also predominantly from the north-northeast through to the south, with very few winds predicted to occur from the southwest and northwest sectors.

Seasonal trends show predominant north-easterly sector winds during the spring and summer months that shift to the southeast through to south-southwest during the winter months. Autumn winds show the transition between the predominant summer and winter winds, with autumn winds predominantly from the east-northeast though to south.

Diurnal trends show that wind directions remain fairly consistent throughout the day. Winds are typically lighter during the early morning and in the evening with strongest winds observed during daylight hours.

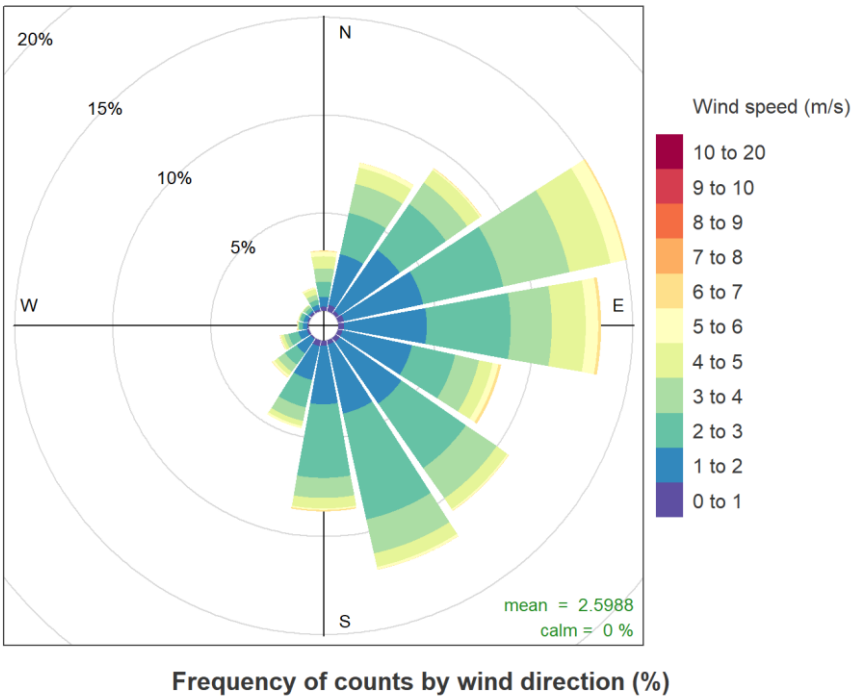

Figure 6 Annual distribution of the TAPM/CALMET generated winds for the Project site

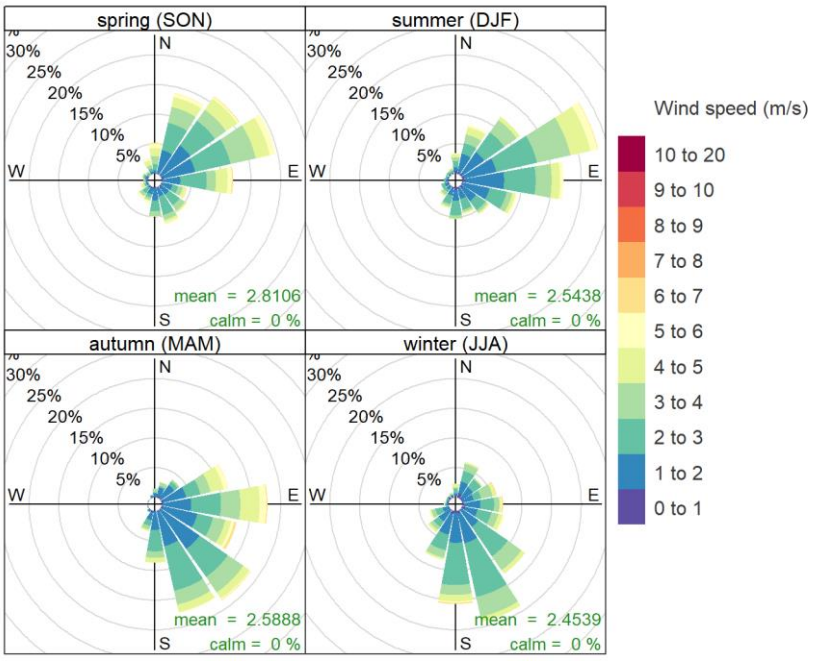

Figure 7 **Seasonal distribution of the TAPM/CALMET generated winds for the Project site**

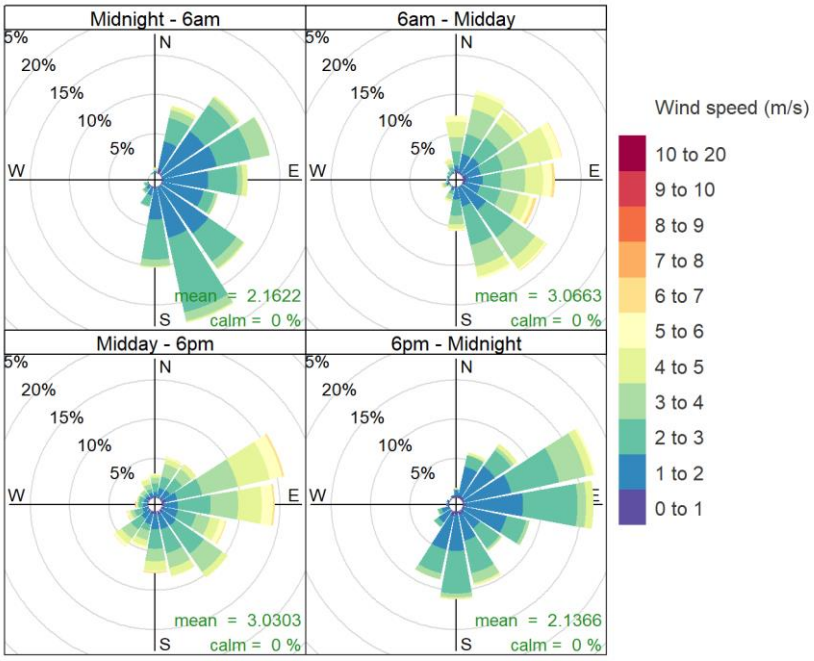

Figure 8 **Diurnal distribution of the TAPM/CALMET generated winds for the Project site**

7.2 Temperature

The temperature data for the Project site show that, for the 12-month CALMET dataset, the temperature was predicted to range between 2.5°C and 38.1°C (average 20.6°C) throughout the year. The temperature was predicted to range between 2.5°C and 27.8°C (average of 13.9°C) during the winter months, and between 15.6°C and 38.1°C (average of 26.0°C) during the summer months.

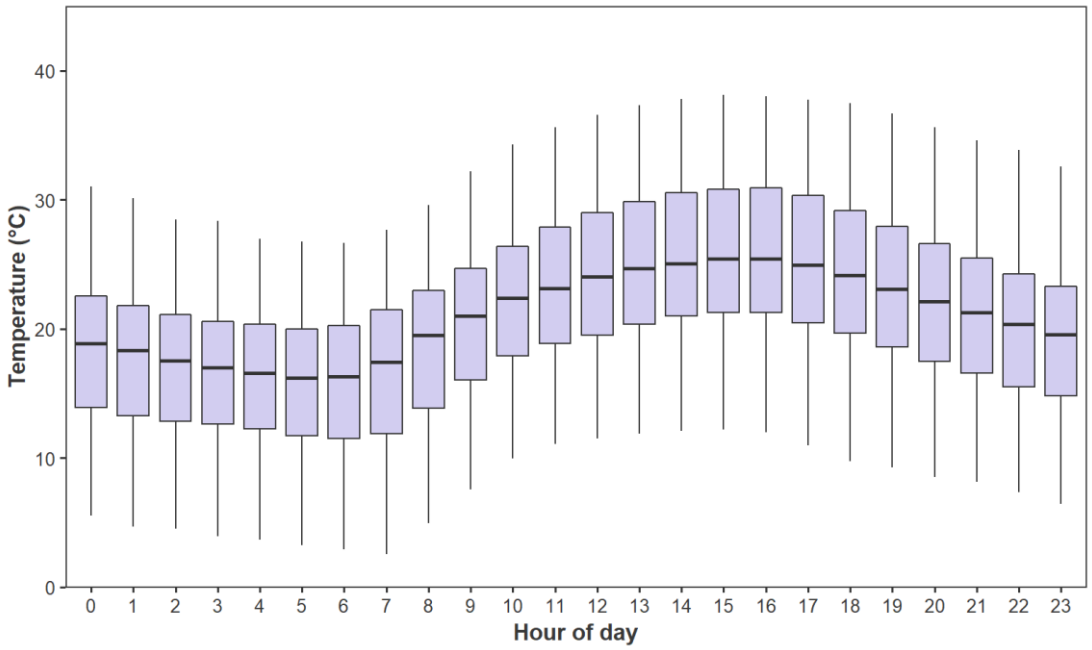

Figure 9 Hourly distribution of TAPM/CALMET predicted temperature at the Project site

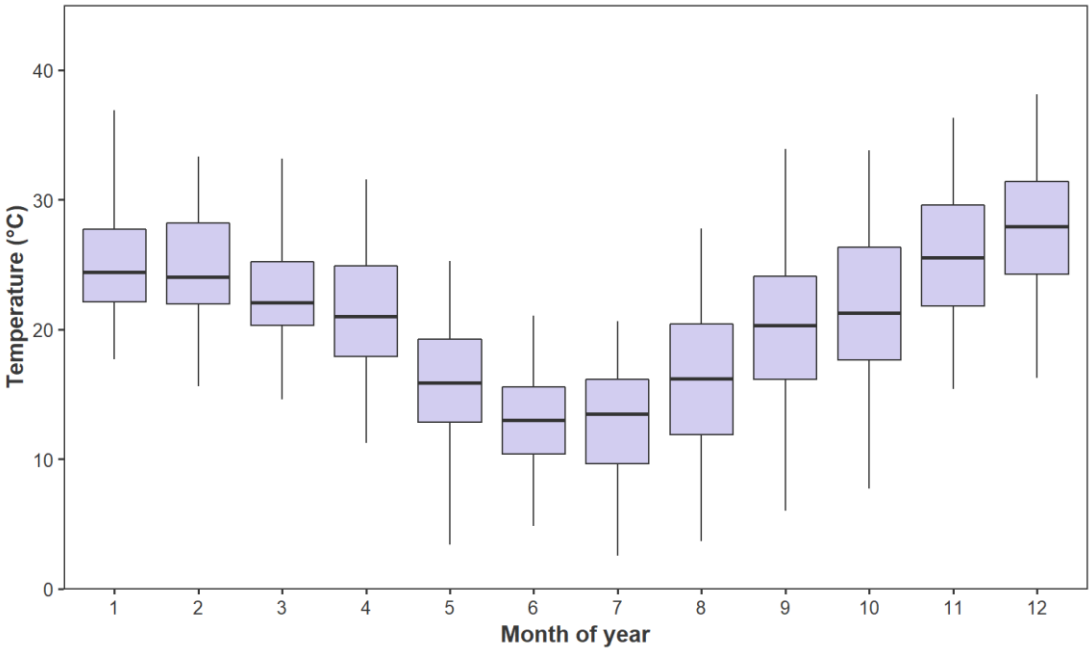

Figure 10 Monthly distribution of TAPM/CALMET predicted temperature at the Project site

7.3 Atmospheric stability

Atmospheric stability is classified under the Pasquil-Gifford scheme and ranges from Class A, which represents very unstable atmospheric conditions that may typically occur on a sunny day, to Class F which represents very stable atmospheric conditions that typically occur during light wind conditions at night. Unstable conditions (Class A-C) are characterised by strong solar heating of the ground that induces turbulent mixing in the atmosphere close to the ground, which usually results in material from a plume reaching the ground closer to the source than it does for neutral conditions or stable conditions.

This turbulent mixing is the main driver of dispersion during unstable conditions. Dispersion processes for neutral conditions (Class D), are dominated by mechanical turbulence generated as the wind passes over irregularities in the local surface, such as terrain features and building structures. During the night, atmospheric conditions are generally neutral or stable (Class D, E and F) with cloud cover reducing solar heating and enhancing stability. Stability refers to the vertical movement of the atmosphere and is therefore an important factor in the dispersion and transport of a plume within the boundary layer.

Stability class is calculated by CALMET and has been extracted at the Project site. Table 11 shows the distribution of stability classes for the site. Figure 11 shows the distribution of stability class predicted at the site by hour of day.

Table 11 Frequency distribution of surface atmospheric stability conditions at the Project Site

Pasquil-Gifford Stability Class	Frequency (%)	Classification
A	2.2%	Extremely unstable
B	12.5%	Unstable
C	16.4%	Slightly unstable
D	25.1%	Neutral
E	8.9%	Slightly stable
F	34.9%	Stable

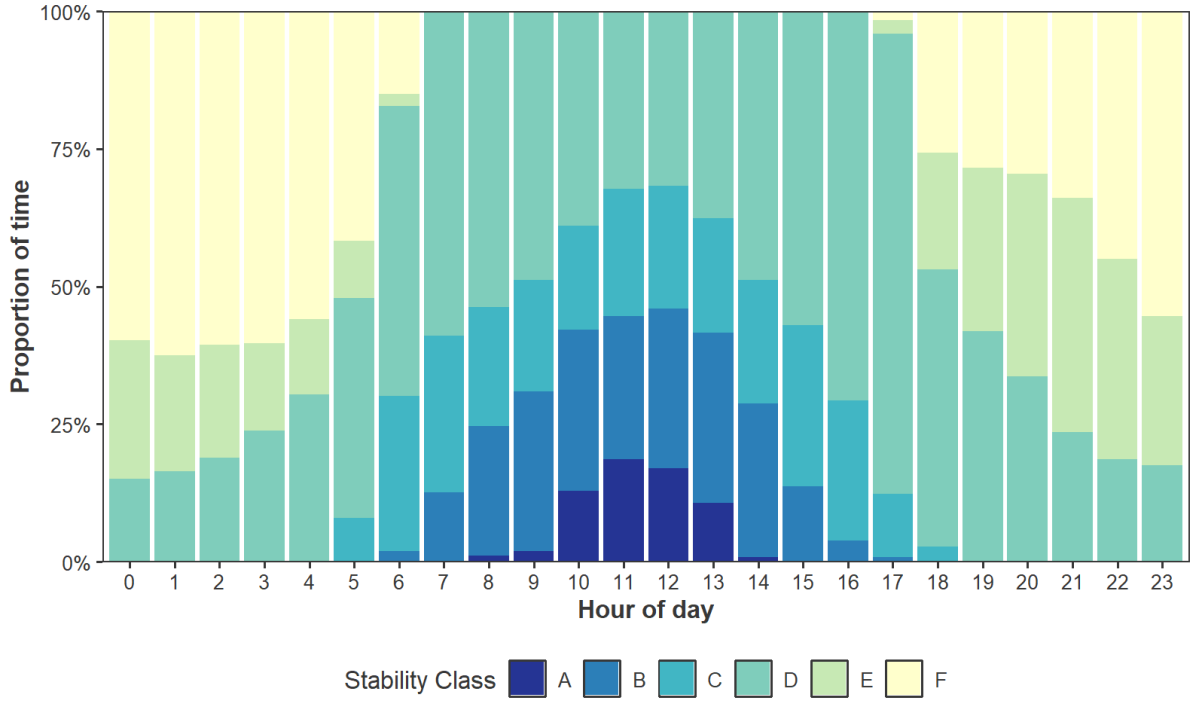

Figure 11 **Proportion of stability class predicted at the Project site by hour of day**

7.4 Mixing height

The mixing height defines the height of the mixed atmosphere above the ground (mixed layer), which varies diurnally. Particulate matter, or other pollutants released at or near the ground, will become dispersed within the mixed layer. During stable atmospheric conditions, the mixing height is often quite low and particulate dispersion is limited to within this layer. During the day, solar radiation heats the ground and causes the air above it to warm, resulting in convection and an increase to the mixing height. The growth of the mixing height is dependent on how well the warmer air from the ground can mix with the cooler upper level air and, therefore, depends on meteorological factors such as the intensity of solar radiation and wind speed. During strong wind speeds, the air will be well mixed, resulting in a high mixing height.

Mixing height information has been extracted from the TAPM/CALMET dataset at the Project site and is presented in Figure 12. The data shows that the mixing height develops at around 6am, increases to a peak around 3pm to 4pm before descending rapidly around 6pm.

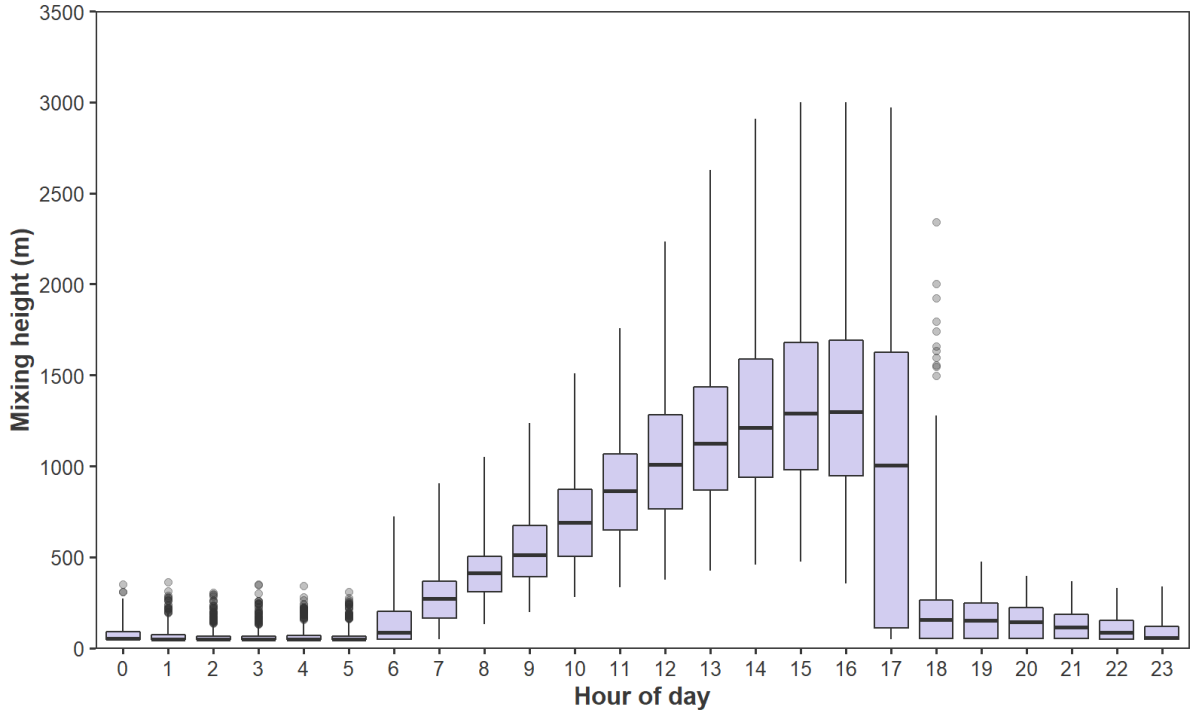

Figure 12 **Box and whisker plot of mixing height data extracted from CALMET at the Project site by hour of day**

8. AIR QUALITY ASSESSMENT RESULTS

This section presents the results of the dispersion modelling assessment for:

- Construction – diesel generators
- Operation – 1,400 MW (2 x 700 MW).

8.1 Construction

The predicted maximum concentrations of NO_2, SO_2, PM_{10} and $PM_{2.5}$ due to the operation of diesel generators at any sensitive receptor are presented in Table 12. The results show predicted concentrations due to the diesel generators in isolation and with an ambient background level. Contours of the predicted concentrations of NO_2 across the modelling domain, including ambient background concentrations, are presented in Plate 1 and Plate 2.

The results show that:

- Predicted maximum 1-hour and annual average ground-level concentrations of NO_2 due to the diesel generators during construction, including ambient background concentrations, are well below the Air EPP objectives of 250 µg/m³ and 62 µg/m³, respectively
- Predicted maximum 1-hour, 24-hour and annual average ground-level concentrations of SO_2 due to the diesel generators during construction, including ambient background concentrations, are well below the Air EPP objectives of 570 µg/m³ and 230 µg/m³ and 57 µg/m³, respectively
- Predicted maximum 24-hour average ground-level concentrations of PM_{10} due to the diesel generators during construction, including ambient background concentrations, are well below the Air EPP objective of 50 µg/m³
- Predicted maximum 24-hour and annual average ground-level concentrations of $PM_{2.5}$ due to the diesel generators during construction, including ambient background concentrations, are well below the Air EPP objectives of 25 µg/m³ and 8 µg/m³.

Table 12 Construction - Predicted ground-level concentrations of NO_2, SO_2, PM_{10} and $PM_{2.5}$ due to diesel generators in isolation and with ambient background

Parameter	Predicted concentrations (µg/m³)							
	NO_2		SO_2			PM_{10}	$PM_{2.5}$	
Averaging period	1-hour	Annual	1-hour	24-hour	Annual	24-hour	24-hour	Annual
Project in isolation	28.4	0.12	0.03	0.004	0.0001	0.6	0.6	0.02
Project with background	63.3	10.8	11.4	5.7	3.6	21.0	5.6	4.4
Objective	**250 µg/m³**	**62 µg/m³**	**570 µg/m³**	**230 µg/m³**	**57 µg/m³**	**50 µg/m³**	**25 µg/m³**	**8 µg/m³**

8.2 Operation - 1,400 MW (2 x 700 MW)

The predicted maximum 1-hour average and annual average ground-level concentrations of NO_2 at any sensitive receptor are presented in Table 13 due to the Project with a 1,400 MW capacity in isolation and due to the Project with an ambient background level. Contours of the predicted concentrations of NO_2 across the modelling domain, including ambient background concentrations are presented in Plate 3 to Plate 10.

The results show that:

- Predicted maximum 1-hour average ground-level concentrations of NO_2 due to the Project, including ambient background concentrations, are well below the Air EPP objective of 250 µg/m³ for all load scenarios
- Predicted annual average ground-level concentrations of NO_2 due to the Project, including ambient background concentrations, are well below the Air EPP objective of 62 µg/m³ for all load scenarios.

The predicted maximum 1-hour average, 24-hour average and annual average ground-level concentrations of SO_2 at any sensitive receptor is presented in Table 13 due to the Project in isolation and due to the Project with an ambient background level. Contours of the predicted concentrations of SO_2 across the modelling domain, including ambient background concentrations are presented in Plate 11 to Plate 22.

The results show that:

- Predicted maximum 1-hour average ground-level concentrations of SO_2 due to the Project, including ambient background concentrations, are below the Air EPP objective of 570 µg/m³ for all load scenarios
- Predicted maximum 24-hour average ground-level concentrations of SO_2 due to the Project, including ambient background concentrations, are below the Air EPP objective of 230 µg/m³ for all load scenarios
- Predicted annual average ground-level concentrations of SO_2 due to the Project, including ambient background concentrations, are well below the Air EPP objective of 57 µg/m³ for all load scenarios.

The predicted maximum 24-hour average ground-level concentrations of PM_{10} and 24-hour average and annual average ground-level concentrations of $PM_{2.5}$ at any sensitive receptor are presented in Table 14 due to the Project in isolation and due to the Project with an ambient background level. Contours of the predicted concentrations of PM_{10} and $PM_{2.5}$ across the modelling, including ambient background concentrations are presented in Plate 23 to Plate 34.

The results show that:

- Predicted maximum 24-hour average ground-level concentrations of PM_{10} due to the Project, including ambient background concentrations, are below the Air EPP objective of 50 µg/m³ for all load scenarios
- Predicted maximum 24-hour average ground-level concentrations of $PM_{2.5}$ due to the Project, including ambient background concentrations, are below the Air EPP objective of 25 µg/m³ for all load scenarios
- Predicted annual average ground-level concentrations of $PM_{2.5}$ due to the Project, including ambient background concentrations, are well below the Air EPP objective of 8 µg/m³ for all load scenarios.

The predicted ground-level concentrations of arsenic, boron, cadmium, lead and mercury due to the Project are presented in Table 15. The results show that:

- Ground-level concentrations of metals are predicted to be well below all relevant objectives at all sensitive receptors
- Ground-level concentrations are predicted to be less than 0.03% of their respective objectives.

Table 13 1,400 MW - Predicted ground-level concentrations of NO_2 and SO_2 due to Project in isolation and with ambient background

Scenario	Project in isolation (µg/m³)					Project with ambient background (µg/m³)				
	NO_2		SO_2			NO_2		SO_2		
	1-hour	Annual	1-hour	24-hour	Annual	1-hour	Annual	1-hour	24-hour	Annual
Overload	179.8	0.9	76.2	5.9	0.4	214.7	11.6	87.6	11.6	4.0
100% load	174.0	0.9	73.7	5.8	0.4	208.9	11.6	85.1	11.5	4.0
60% load	111.4	0.9	47.3	4.1	0.4	146.3	11.6	58.7	9.8	4.0
25% load	73.4	0.7	31.1	3.1	0.3	108.3	11.4	42.5	8.8	3.9
Background included	-	-	-	-	-	35	11	11	6	4
Objective	-	-	-	-	-	**250 µg/m³**	**62 µg/m³**	**570 µg/m³**	**230 µg/m³**	**57 µg/m³**

Table 14 1,400 MW - Predicted ground-level concentrations of PM_{10} and $PM_{2.5}$ due to Project in isolation and with ambient background

Scenario	Project in isolation (µg/m³)			Project with ambient background (µg/m³)		
	PM_{10}	$PM_{2.5}$		PM_{10}	$PM_{2.5}$	
	24-hour	24-hour	Annual	24-hour	24-hour	Annual
Overload	11.7	11.7	0.7	32.1	16.7	5.1
100% load	11.3	11.3	0.7	31.7	16.3	5.1
60% load	8.0	8.0	0.7	28.4	13.0	5.1
25% load	6.1	6.1	0.6	26.5	11.1	5.0
Background included	-	-	-	20	5	4.4
Objective	-	-	-	**50 µg/m³**	**25 µg/m³**	**8 µg/m³**

Table 15 1,400 MW - Predicted ground-level concentrations of metals due to Project in isolation

Scenario	Project in isolation (µg/m^3)						
	Arsenic	Boron		Cadmium	Lead	Mercury	
	Annual	1-hour	Annual	Annual	Annual	1-hour	Annual
Overload	0.000003	0.03	0.0001	0.00000008	0.00003	0.00001	0.00000006
100% load	0.000003	0.03	0.00014	0.00000008	0.00003	0.000012	0.00000006
60% load	0.000003	0.02	0.00014	0.00000008	0.00003	0.000008	0.00000006
25% load	0.000002	0.01	0.00011	0.00000007	0.00002	0.000005	0.00000005
Objective	**0.006 µg/m^3**	**50 µg/m^3**	**5 µg/m^3**	**0.005 µg/m^3**	**0.5 µg/m^3**	**0.18 µg/m^3**	**1.1 µg/m^3**

8.3 Bimblebox Nature Refuge

The maximum predicted annual average ground-level concentrations of NO_2 and SO_2 within the Bimblebox Nature Refuge are presented in Table 16. The maximum predicted 30-day and 90-day average concentrations of fluoride within the area are presented in Table 17.

The results show that predicted ground-level concentrations are well below the Air EPP objectives for protecting the health and biodiversity of ecosystems.

Table 16 Predicted ground-level concentrations of NO_2 and SO_2 due to Project in isolation and with ambient background at the Bimblebox Nature Refuge

Scenario	Project in isolation (µg/m³)		Project with ambient background (µg/m³)	
	NO_2	SO_2	NO_2	SO_2
	Annual	Annual	Annual	Annual
Overload	0.8	0.4	11.5	4.0
100% load	0.8	0.3	11.5	3.9
60% load	0.8	0.3	11.5	3.9
25% load	0.6	0.2	11.3	3.8
Background included	-	-	10.7	3.6
Objective	**-**	**-**	**33 µg/m³**	**22 µg/m³**

Table 17 Predicted ground-level concentrations of fluoride due to Project in isolation at the Bimblebox Nature Refuge

Scenario	Project in isolation (µg/m³)	
	30-day	90-day
Overload	0.00017	0.00015
100% load	0.00017	0.00015
60% load	0.00020	0.00014
25% load	0.00015	0.00012
Objective	**0.84 µg/m³**	**0.1 µg/m³**

8.4 Ozone

The maximum predicted contribution of the Project to levels of NO_2 at 10 km from the site was predicted to be between 60 and 105 µg/m³ (29 - 51 ppb), depending on load. As an extremely conservative assumption, the total amount of NO_2 emitted could react causing the production of ozone. The theoretical maximum amount of ozone that could occur as a result is 29 - 51 ppb (62 to 110 µg/m³). Typical ambient background level of ozone for a rural area is 35 ppb (75 µg/m³). The maximum predicted cumulative 1-hour average concentrations of ozone would 185 µg/m³, which is below the Air EPP objective of 210 µg/m³ for ozone.

8.5 Cumulative impact assessment – other proposed and approved projects

The potential for cumulative impacts due to the Galilee Power Project and other proposed and approved projects in the area has been considered. There are four approved coal mine projects that have the potential to impact the air quality of the region. The mines include (Figure 13):

- Waratah Coal's Galilee Coal Project – a 56 Mtpa open cut and underground mine. The coal from this project will feed the Project.
- Hancock Prospecting Pty Ltd's Alpha Coal Project – a 30 Mtpa open cut thermal coal mine located approximately 18 km to the north-northeast of the Project.
- Hancock Prospecting Pty Ltd's Kevin's Corner Project – a 30 Mtpa open cut coal mine located immediately north of the Alpha Coal Project and approximately 35 km to the north of the Project.
- AMCI's South Galilee Coal Project – a 19 Mtpa open-cut and underground coal mine located 12 km west of Alpha and 35 km southeast of the Project.

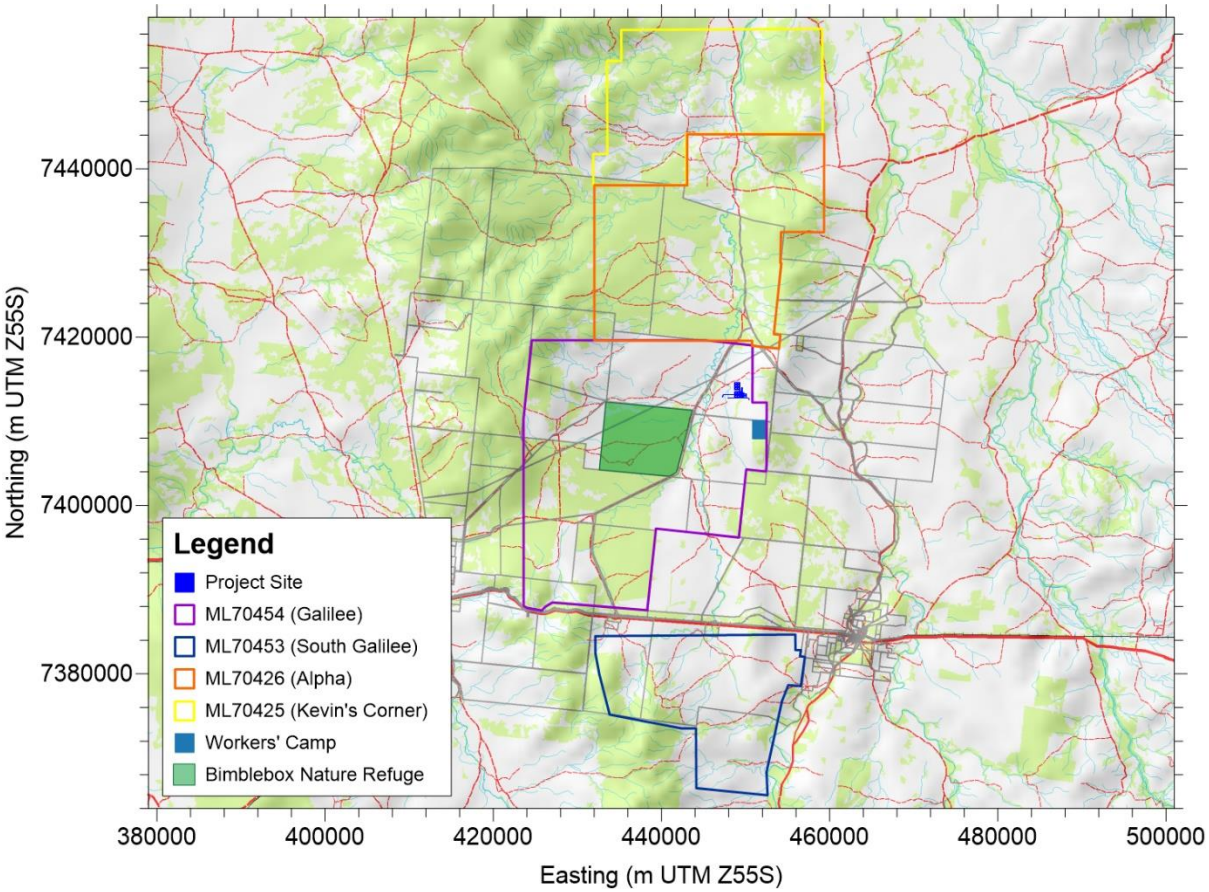

Figure 13 Mining leases for approved mines in the vicinity of the Project

The air quality assessment report for the Galilee Coal Project (Northern Export Facility) prepared by Pacific Environment Limited (July 2013) assessed the potential cumulative impacts of the Galilee Coal Project with the Alpha Coal Project and Kevin's Corner Project for PM_{10} and $PM_{2.5}$. The results were presented for 36 of the 64 receptors considered in this assessment. Appendix C provides a summary of those results as presented in Pacific Environment Limited (July 2013).

At the time of the air quality assessment of the Galilee Coal Project, the Environmental Impact Statement for South Galilee Coal Project had not been released and therefore it was not included in the assessment. The air quality assessment report for the South Galilee Project prepared by Noise Mapping Australia (February 2012) assessed the impacts of the South Galilee Coal Project in isolation for PM_{10} and $PM_{2.5}$. The results were presented for 19 of the 76 receptors considered in this assessment. Appendix C provides a summary of those results.

The cumulative assessment is based on the maximum predictions of PM_{10} and $PM_{2.5}$ from the Project added to the maximum predictions from the Galilee Coal Project EIS and the South Galilee Coal Project EIS. This is likely to be

a conservative assessment because it assumes that the worst-case operational years for each mine overlap, but this is not likely to be the case in reality.

The predicted 24-hour average ground-level concentrations of PM_{10} and the predicted 24-hour average and annual average ground-level concentrations of $PM_{2.5}$ are presented in Table 18 to Table 20 for the Project operating capacity of 1,400 MW. The results show that:

- Predicted 24-hour average ground-level concentrations of PM_{10} and $PM_{2.5}$ as well as annual average ground-level concentrations of $PM_{2.5}$ are likely to exceed the relevant Air EPP objectives at several residences. Monklands, Kia Ora, Glen Innes, Lambton Meadow, Spring Creek, Corn Top and Cavendish Homesteads along with Spring Creek will be acquired by Waratah Coal. Hobartville and Wendouree Homesteads will be acquired by Alpha Coal.
- Whilst the cumulative concentrations are above the relevant Air EPP objectives:
    - The contribution of the Project to 24-hour average ground-level concentrations of PM_{10} is, at most, 7% at these sensitive receptors
    - The contribution of the Project to 24-hour average ground-level concentrations of $PM_{2.5}$ is at most is 20% at these sensitive receptors
    - The contribution of the Project to annual average ground-level concentrations of $PM_{2.5}$ is at most is 6% at these sensitive receptors.

Table 18 Predicted cumulative 24-hour average ground-level concentrations of PM_{10}, including the Project (1,400 MW), approved mines and ambient background levels

ID	Name	24-hr PM_{10} ($\mu g/m^3$)	Contribution as a percentage (%)				
			Project	Ambient bkgd	Galilee Coal Project	Kevin's Corner and Alpha Coal Projects	South Galilee Coal Project
8	Alpha	*40.6*	3%	50%	7%	2%	37%
11	Bedford Homestead	*41.6*	3%	49%	10%	2%	36%
12	Betanga Homestead	***64.2***	3%	32%	36%	6%	23%
13	Blairgowrie	*21.4*	5%	95%	0%	0%	0%
16	Burgoyne Homestead	*32.1*	5%	63%	28%	3%	0%
17	Burtle Homestead	*29.0*	6%	70%	21%	3%	0%
19	Cavendish Homestead[a]	***71.2***	4%	29%	52%	1%	14%
20	Colorado Homestead	***51.2***	4%	40%	29%	8%	20%
21	Corn Top Homestead[a]	***51.5***	4%	40%	49%	8%	0%
22	Creek Farm Homestead	***52.5***	4%	39%	8%	2%	48%
41	Eulimbie Homestead	*28.4*	4%	72%	18%	7%	0%
42	Eureka Homestead	***76.7***	4%	27%	26%	4%	39%
44	Gadwell Homestead	*43.6*	3%	47%	16%	0%	34%
46	Glen Innes Homestead[a]	***492.5***	1%	4%	88%	7%	0%
49	Hobartville Homestead[b]	***67.0***	5%	30%	61%	3%	0%
50	Inverurie Homestead	*31.9*	5%	64%	28%	3%	0%
52	Jericho	*33.7*	7%	61%	30%	3%	0%
53	Jordan Avon Homestead	*31.4*	6%	65%	29%	0%	0%
56	Kia Ora Homestead[a]	***833.9***	1%	2%	96%	0%	0%

ID	Name	24-hr PM_{10} ($\mu g/m^3$)	Contribution as a percentage (%)				
			Project	Ambient bkgd	Galilee Coal Project	Kevin's Corner and Alpha Coal Projects	South Galilee Coal Project
57	Lambton Meadows Homestead[a]	***84.6***	3%	24%	53%	2%	18%
59	Locharnoch	*34.0*	5%	60%	35%	0%	0%
61	Mentmore Homestead	*47.9*	3%	43%	23%	0%	31%
62	Milangavla	*44.4*	5%	46%	45%	5%	0%
63	Monklands[a]	***224.8***	4%	9%	80%	7%	0%
65	Mossvale Homestead	*41.3*	5%	49%	5%	5%	36%
67	Oakleigh Homestead	***70.5***	4%	29%	17%	4%	45%
73	Rosefield Homestead	*43.7*	5%	47%	46%	2%	0%
74	Salt Bush Homestead	***56.4***	4%	36%	19%	9%	32%
75	Speculation Homestead	*21.2*	4%	96%	0%	0%	0%
76	Spring Creek[a]	***83.7***	3%	24%	71%	2%	0%
79	Surbiton Homestead	*33.3*	3%	61%	30%	6%	0%
81	The Grove Homestead	*41.0*	4%	50%	5%	5%	37%
82	Toarbee	*41.0*	4%	50%	37%	10%	0%
84	Tressillian Homestead	*47.8*	3%	43%	31%	2%	21%
86	Wendouree Homestead[b]	***55.7***	6%	37%	31%	27%	0%
Objective		**50**	**-**	**-**	**-**	**-**	**-**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table 19 Predicted cumulative 24-hour average ground-level concentrations of $PM_{2.5}$, including the Project (1,400 MW), approved mines and ambient background levels

ID	Name	24-hr $PM_{2.5}$ ($\mu g/m^3$)	Contribution as a percentage (%)				
			Project	Ambient bkgd	Galilee Coal Project	Kevin's Corner and Alpha Coal Projects	South Galilee Coal Project
8	Alpha	*10.2*	12%	49%	10%	10%	20%
11	Bedford Homestead	*11.2*	11%	45%	18%	9%	18%
12	Betanga Homestead	*19.8*	9%	25%	50%	5%	10%
13	Blairgowrie	*6.0*	17%	83%	0%	0%	0%
16	Burgoyne Homestead	*9.7*	18%	51%	31%	0%	0%
17	Burtle Homestead	*9.6*	17%	52%	31%	0%	0%
19	Cavendish Homestead[a]	***27.8***	10%	18%	58%	7%	7%
20	Colorado Homestead	*15.8*	12%	32%	38%	6%	13%
21	Corn Top Homestead[a]	*19.1*	11%	26%	52%	10%	0%
22	Creek Farm Homestead	*12.1*	18%	41%	16%	0%	25%
41	Eulimbie Homestead	*8.0*	13%	62%	25%	0%	0%

ID	Name	24-hr $PM_{2.5}$ ($\mu g/m^3$)	Contribution as a percentage (%)				
			Project	Ambient bkgd	Galilee Coal Project	Kevin's Corner and Alpha Coal Projects	South Galilee Coal Project
42	Eureka Homestead	*24.3*	14%	21%	41%	8%	16%
44	Gadwell Homestead	*11.2*	10%	45%	27%	0%	18%
46	Glen Innes Homestead[a]	***129.1***	5%	4%	91%	0%	0%
49	Hobartville Homestead[b]	*23.6*	15%	21%	59%	4%	0%
50	Inverurie Homestead	*10.5*	15%	47%	38%	0%	0%
52	Jericho	*11.3*	20%	44%	35%	0%	0%
53	Jordan Avon Homestead	*11.0*	18%	45%	36%	0%	0%
56	Kia Ora Homestead[a]	***223.5***	2%	2%	94%	2%	0%
57	Lambton Meadows Homestead[a]	***30.2***	7%	17%	66%	3%	7%
59	Locharnoch	*10.6*	15%	47%	38%	0%	0%
61	Mentmore Homestead	*12.5*	12%	40%	32%	0%	16%
62	Milangavla	*16.0*	12%	31%	56%	0%	0%
63	Monklands[a]	***69.4***	14%	7%	75%	4%	0%
65	Mossvale Homestead	*10.9*	18%	46%	9%	9%	18%
67	Oakleigh Homestead	*20.1*	16%	25%	30%	10%	20%
73	Rosefield Homestead	*16.3*	14%	31%	49%	6%	0%
74	Salt Bush Homestead	*16.0*	13%	31%	31%	12%	12%
75	Speculation Homestead	*5.8*	13%	87%	0%	0%	0%
76	Spring Creek[a]	***29.3***	8%	17%	75%	0%	0%
79	Surbiton Homestead	*10.9*	9%	46%	37%	9%	0%
81	The Grove Homestead	*12.6*	13%	40%	8%	8%	32%
82	Toarbee	*13.6*	12%	37%	44%	7%	0%
84	Tressillian Homestead	*14.4*	10%	35%	42%	0%	14%
86	Wendouree Homestead[b]	*17.3*	19%	29%	35%	17%	0%
Objective		**25**	**-**	**-**	**-**	**-**	**-**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table 20 Predicted cumulative annual average ground-level concentrations of $PM_{2.5}$, including the Project (1,400 MW), approved mines and ambient background levels

ID	Name	Annual $PM_{2.5}$ ($\mu g/m^3$)	Contribution as a percentage (%)				
			Project	Ambient bkgd	Galilee Coal Project	Kevin's Corner and Alpha Coal Projects	South Galilee Coal Project
8	Alpha	*4.9*	1%	89%	0%	0%	10%
11	Bedford Homestead	*5.0*	1%	89%	0%	0%	10%
12	Betanga Homestead	*6.0*	2%	73%	17%	0%	8%
13	Blairgowrie	*4.5*	1%	99%	0%	0%	0%
16	Burgoyne Homestead	*4.5*	2%	98%	0%	0%	0%

ID	Name	Annual $PM_{2.5}$ ($\mu g/m^3$)	Contribution as a percentage (%)				
			Project	Ambient bkgd	Galilee Coal Project	Kevin's Corner and Alpha Coal Projects	South Galilee Coal Project
17	Burtle Homestead	*4.5*	1%	99%	0%	0%	0%
19	Cavendish Homestead[a]	***10.1***	2%	43%	40%	10%	5%
20	Colorado Homestead	*6.0*	2%	73%	17%	0%	8%
21	Corn Top Homestead[a]	*5.5*	2%	80%	18%	0%	0%
22	Creek Farm Homestead	*5.0*	2%	88%	0%	0%	10%
41	Eulimbie Homestead	*4.4*	1%	99%	0%	0%	0%
42	Eureka Homestead	*6.1*	3%	73%	17%	0%	8%
44	Gadwell Homestead	*4.9*	1%	89%	0%	0%	10%
46	Glen Innes Homestead[a]	***31.8***	1%	14%	82%	3%	0%
49	Hobartville Homestead[b]	*5.6*	3%	79%	18%	0%	0%
50	Inverurie Homestead	*5.5*	3%	79%	18%	0%	0%
52	Jericho	*5.5*	2%	80%	0%	18%	0%
53	Jordan Avon Homestead	*5.5*	3%	79%	18%	0%	0%
56	Kia Ora Homestead[a]	***41.7***	1%	11%	86%	2%	0%
57	Lambton Meadows Homestead[a]	*8.1*	2%	55%	37%	0%	6%
59	Locharnoch	*5.5*	2%	80%	18%	0%	0%
61	Mentmore Homestead	*5.0*	1%	89%	0%	0%	10%
62	Milangavla	*6.6*	3%	67%	30%	0%	0%
63	Monklands[a]	***12.1***	6%	36%	49%	8%	0%
65	Mossvale Homestead	*4.9*	1%	89%	0%	0%	10%
67	Oakleigh Homestead	*5.0*	2%	88%	0%	0%	10%
73	Rosefield Homestead	*6.6*	2%	67%	15%	15%	0%
74	Salt Bush Homestead	*5.0*	3%	88%	0%	0%	10%
75	Speculation Homestead	*4.5*	1%	99%	0%	0%	0%
76	Spring Creek[a]	***10.6***	2%	41%	47%	9%	0%
79	Surbiton Homestead	*4.4*	1%	99%	0%	0%	0%
81	The Grove Homestead	*4.9*	1%	89%	0%	0%	10%
82	Toarbee	*5.5*	2%	80%	18%	0%	0%
84	Tressillian Homestead	*5.0*	1%	89%	0%	0%	10%
86	Wendouree Homestead[b]	*6.5*	1%	68%	15%	15%	0%
Objective		**8**	**-**	**-**	**-**	**-**	**-**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

9. GREENHOUSE GAS ASSESSMENT

9.1 Background

The term greenhouse gases (GHG) comes from the 'greenhouse effect', which refers to the natural process that warms the Earth's surface. GHG in the atmosphere absorb the solar radiation released by the Earth's surface and then radiates some heat back towards the ground, increasing the surface temperature. Human activity, especially burning fossil fuels and deforestation, is increasing the concentration of GHG in the atmosphere and hence increasing the absorption of outgoing heat energy. Even a small increase in long-term average surface temperatures has numerous direct and indirect consequences for climate.

Australia is a signatory to United Nations Framework Convention on Climate Change (UNFCCC), the associated Kyoto Protocol signalling its commitment to reducing GHG emissions at a national level. Under the Paris Agreement, the most recent progression of the UNFCCC, Australia has set an ambitious target to reduce emissions by 26-28 per cent below 2005 levels by 2030, building on the 2020 target of reducing emissions by five per cent below 2000 levels.

The main GHG associated with the Project is carbon dioxide (CO_2), with smaller contributions from methane (CH_4) and nitrous oxide (N_2O). These gases vary in effect and longevity in the atmosphere, however a system named Global Warming Potential (GWP) allows them to be described in terms of CO_2 (the most prevalent greenhouse gas) called carbon dioxide equivalents (CO_2-e). A unit of one tonne of CO_2-e is the basic unit used in carbon accounting. In simple terms the greenhouse gas emissions associated with the Project can be expressed as the sum of the emission rate of each greenhouse gas multiplied by its associated GWP (denoted in squares). For example:

$$\text{tonnes } \mathbf{CO_2\text{-}e} = \text{tonnes } \mathbf{CO_2} \times \boxed{1} + \text{tonnes } \mathbf{CH_4} \times \boxed{25} + \text{tonnes } \mathbf{N_2O} \times \boxed{310}$$

While few, if any, individual Projects would make a noticeable change to the Earth's climate, the summation of human activities increases the concentrations of GHG in the upper atmosphere does. Climate change is an environmental concern at a global level. Governments and the global scientific community have established conventions for accounting for GHG emissions to enable the transparent and verifiable assessment of GHG emissions across all global jurisdictions. This assessment employs these established conventions so that the relative impact of the Project can be assessed and understood.

9.2 Regulatory Framework for Greenhouse Gas Emissions

9.2.1 National policy

Australia will meet its targets through the Government's Direct Action Plan. The Emissions Reduction Fund (ERF) is a central component of the Direct Action policies that is made up of an element to credit emissions reductions, a fund to purchase emissions reductions, and a Safeguard Mechanism.

The Safeguard Mechanism has been put in place to ensure that emissions reductions purchased by the Government through the ERF are not offset by significant increases in emissions by large emitters elsewhere in the economy. The Safeguard Mechanism commenced on 1 July 2016 and requires Australia's largest emitters to keep emissions within baseline levels. It applies to around 140 large businesses that have facilities with direct emissions (Scope 1 Emissions) of more than 100,000 tonnes of carbon dioxide equivalent (tCO_2-e) a year and is expected to cover approximately half of Australia's emissions.

Once the Project is operational (Year 4 onwards) direct emissions of GHG associated with the Project are anticipated to exceed 100,000 tCO_2-e for all years of operation. Annual GHG emissions associated with the construction phase (Year 1 – 3) are not expected to exceed 100,000 tCO_2-e. As a result, the Project will be subject to the requirements of the Safeguard Mechanism from Year 4 onwards.

9.2.2 National Greenhouse and Energy Reporting (NGER)

The *National Greenhouse and Energy Reporting Act 2007* (NGER Act) established a national framework for corporations to report GHG emissions and energy consumption.

The NGER Regulation recognises Scope 1 and Scope 2 emissions as follows:

- Scope 1 emissions – in relation to a facility, means the release of GHG into the atmosphere as a direct result of an activity or series of activities (including ancillary activities) that constitute the facility.
- Scope 2 emissions – in relation to a facility, means the release of GHG into the atmosphere as a direct result of one or more activities that generate electricity, heating, cooling or steam that is consumed by the facility but that do not form part of the facility.

Registration and reporting is mandatory for corporations that have energy production, energy use or GHG emissions that exceed specified thresholds. GHG emission thresholds include Scope 1 and Scope 2 emissions. NGER reporting thresholds are summarised in Table 21.

Table 21 NGER annual reporting thresholds – greenhouse gas emissions and energy use

Threshold level	Threshold type	
	GHG (kt CO_2-e)	Energy consumption (TJ)
Facility	25	100
Corporate	50	200
Note: kt CO_2-e = kilotonnes of carbon dioxide equivalent. TJ = terajoules.		

Annual emissions (Scope 1 + Scope 2) associated with the Project range from:

- 700 MW configuration:
    - Construction: 0.7 to 4.6 ktCO_2-e
    - Operations: 3,536 to 4,714 ktCO_2-e
- 1,400 MW configuration:
    - Construction: 0.7 to 4.6 ktCO_2-e
    - Operations: 7,070 to 9,427 ktCO_2-e

Once operational, GHG emissions associated with the power station will exceed the NGER facility threshold. As a result, Waratah will have reporting obligations associated with the Project under the NGER Scheme, including estimating and reporting their GHG emissions on an annual basis for all years of operations. However, the annual emissions during the construction period do not exceed facility thresholds.

9.3 Methodology

Pollutants of importance to climate change, associated with the Project, are carbon dioxide, methane and nitrous oxide. This study has assessed the emissions of greenhouse gases from the Project during construction and operation based on activity data representative of the proposed activities and the methods described in the following documents:

- The National Greenhouse Accounts, July 2018 (Commonwealth Department of the Environment and Energy, 2018)
- *National Greenhouse and Energy Reporting (Measurement) Determination 2008*
- The Greenhouse Gas Protocol.

9.3.1 Emissions

Scope 1 and 2 greenhouse gas emissions will be estimated on an annual basis for the Project. This will include emissions from:

Scope 1 GHG emissions

- Diesel combustion
    - Construction
        - Heavy machinery including earthmoving equipment
        - Haulage vehicles
        - Site vehicles
        - Diesel generators
    - Operations
        - Coal transfer operations – heavy machinery and haulage vehicles
        - Ash management operations – earthmoving equipment
        - Site vehicles
- Land clearing
- Coal combustion
    - Electricity generation
- Fuel oil combustion
    - Ancillary operations including burner support for start-up and burner group cycling
- Industrial processes
    - SF_6 – fugitive emission from switch gear and transformers

Scope 2 GHG Emissions

- Electricity usage for the cold start of the power station

Grid electricity and Scope 2 emissions

It is anticipated that grid sourced electricity will be used occasionally for the cold start of the power station following either a scheduled shutdown or an unexpected event or equipment failure resulting in a plant shutdown. Preliminary estimates indicate that the use of grid electricity for the Project will be minimal and immaterial to the GHG assessment of the Project. Consequently Scope 2 GHG emissions and energy use associated with the use of grid electricity have not been included in this assessment.

Land clearing

Land clearing was also considered. There is a limited amount of land clearing associated with the Project due to the site being cleared previously for cattle grazing. The footprint of the Project will be relatively small and the resulting GHG emissions originating from land clearing have not been included as they are not significant compared to the annual GHG emissions associated with the Project.

9.3.2 Emissions estimation

GHG emissions associated with the Project have been considered on an annual basis for the life of the Project. The configuration considered in the GHG assessment was 1,400 MW (2 x 700 MW generation units).

The heat rate or electrical efficiency that can be achieved by the generation units is in the range of 8,800-8,972 kJ/kWh (40-41% electrical efficiency). GHG emissions and energy use associated with coal combustion has been estimated for the lower and higher limits of this range referred to as the Lower Heat Rate (LHR) and the Higher Heat Rate (HHR), respectively.

In this section a summary of estimated annual GHG emissions associated with the Project, expressed as tonnes of CO_2-e per annum is presented. Reporting obligations based on this conservative estimate of annual GHG emissions are summarised, along with measures to mitigate GHG emissions through avoidance and minimisation.

The methodologies used to estimate the GHG emissions resulting from the Project are consistent with:

1. *National Greenhouse and Energy Reporting (Measurement) Determination 2008*
2. The National Greenhouse Accounts, July 2018 (Commonwealth Department of the Environment and Energy, 2018)
3. The Greenhouse Gas Protocol.

In particular, the methodology is consistent with a Method 1 approach as detailed in the *National Greenhouse and Energy Reporting (Measurement) Determination*.

The emission factors and energy content for each of the emissions sources that have been used in the assessment are summarised in Table 22.

Table 22 Emission factors and energy content for GHG emission sources

Emission source	Scope	Energy content	Units	Emission factor	Units
Diesel - transport	1	38.6	GJ/kL	70.5	kgCO_2-e/GJ
Diesel - stationary	1	38.6	GJ/kL	70.2	kgCO_2-e/GJ
Sulfur Hexafluoride (SF_6)	1	-	-	22,800	kgCO_2-e/kgSF_6
Electricity (Queensland)	2	3.6	MJ/kWh	0.79	kg CO_2-e/kWh
Sources: *National Greenhouse and Energy Reporting (Measurement) Determination*, National Greenhouse Accounts Factors (July 2018), Notes: GJ/kL = gigajoules per kilolitres. GJ/t = gigajoules per tonne. MJ/kWh = megajoules per kilowatt hour. Kg CO_2-e/GJ = kilograms of carbon dioxide equivalent per gigajoule. T CO_2-e/t ROM = tonnes of carbon dioxide equivalent per tonne of ROM coal. T CO_2-e/t ANFO = tonnes of carbon dioxide equivalent per tonne of ANFO. Kg CO_2-e/kWh = kilograms of carbon dioxide equivalent per kilowatt hour.					

Coal for the Project will be sourced from the adjacent Galilee Coal Project. Average properties of the coal are summarised in Table 23.

Table 23 Average coal properties

Properties*	Value	Unit
Moisture	8.80	%
Ash	8.35	%
Volatile matter	35.43	%
Fixed Carbon	47.42	%
Carbon	66.2	%
Hydrogen	4.1	%
Nitrogen	1.6	%
Sulfur	0.6	%
Oxygen	10.4	%
Gross energy	26.80	GJ/t
Net energy	25.78	GJ/t
Table notes: *proximate air-dried properties		

9.4 Results

9.4.1 GHG emissions and energy use summary

Construction and commissioning activities associated with the Project are anticipated to take just over 3 years with operations of the Project scheduled to commence in the second quarter of Year 4 of the Project. Although the timing of the Project may not be exactly aligned with a calendar year, the schedule of the Project has been approximated on an annual basis commencing at the outset of the construction phase of the Project.

Anticipated emission sources associated with the Project against the approximated Project schedule are summarised in Table 24. Estimated annual GHG emissions and energy use associated with the Project are summarised in Table 25 and Table 26 respectively.

Table 24 Emission source summary

Stage	Emission source			Year				
	Description	Type	Units	1	2	3	4	5+
Construction	Power generation	Diesel	L	86,225	711,353	431,123	35,927	-
	Vehicles (transport)	Diesel	L	174,247	1,809,583	1,260,464	107,371	-
	Vehicles/equipment (stationary)	Diesel	L	3,000	3,000	-	-	-
Operation (2 x 700 MW)	Power generation (LHR)	Coal	GJ	-	-	-	75,038,309	100,051,079
	Power generation (HHR)			-	-	-	73,599,768	98,133,024
	Ancillary operation	Fuel oil	L	-	-	-	966,770	1,289,026
	Vehicles (transport)	Diesel	L	-	-	-	100,310	133,746
	Vehicles/equipment (stationary)	Diesel	L	-	-	-	92,215	122,953
	Transformers/switch gear	SF_6	kg	-	-	-	3	4
Table notes: Low Heat Rate (LHR), High Heat Rate (HHR)								

Table 25 GHG emissions summary

Stage	Emission source			Year (tCO_2-e)				
	Description	Type	Scope	1	2	3	4	5+
Construction	Power generation	Diesel	1	234	1,928	1,168	97	-
	Vehicles (transport)	Diesel	1	474	4,925	3,431	292	-
	Vehicles/equipment (stationary)	Diesel	1	8	8	-	-	-
Operation (2 x 700 MW)	Power generation (LHR)	Coal	1	-	-	-	7,067,171	9,422,895
	Power generation (HHR)			-	-	-	6,931,688	9,242,251
	Ancillary operation	Fuel oil	1	-	-	-	2,620	3,493
	Vehicles (transport)	Diesel	1	-	-	-	273	364
	Vehicles/equipment (stationary)	Diesel	1	-	-	-	250	333
	Transformers/switch gear	SF_6	1	-	-	-	68	91
	2 x 700 MW	**LHR**		**716**	**6,861**	**4,599**	**7,070,772**	**9,427,176**
		HHR		**716**	**6,861**	**4,599**	**6,935,289**	**9,246,532**
Table notes: Low Heat Rate (LHR), High Heat Rate (HHR)								

Table 26 Energy consumption summary

Stage	Emission source			Year (GJ)				
	Description		Type	1	2	3	4	5+
Construction	Power generation		Diesel	3,328	27,458	16,641	1,387	-
	Vehicles (transport)		Diesel	6,726	69,850	48,654	4,145	-
	Vehicles/equipment (stationary)		Diesel	116	116	-	-	-
Operations (2 x 700 MW)	Power generation (LHR)		Coal	-	-	-	75,038,309	100,051,079
	Power generation (HHR)						73,599,768	98,133,024
	Ancillary operation		Fuel oil	-	-	-	37,317	49,756
	Vehicles (transport)		Diesel	-	-	-	3,872	5,163
	Vehicles/equipment (stationary)		Diesel	-	-	-	3,559	4,746
	Transformers/switch gear		SF_6	-	-	-	-	-
Totals	**2 x 700 MW**	**LHR**		**10,170**	**97,424**	**65,295**	**75,088,589**	**100,110,744**
		HHR		**10,170**	**97,424**	**65,295**	**73,650,048**	**98,192,689**
Table notes: Low Heat Rate (LHR), High Heat Rate (HHR)								

Once the Project becomes operational the vast majority of GHG emissions (over 99.95%) are associated with the combustion of coal for electricity generation with the remainder of emissions being associated with fuel oil for ancillary operations, diesel use for vehicles and other equipment and to an even lesser extent SF_6 used for the insulation of switchgear.

For comparative purposes the latest GHG inventory estimates for Australia and Queensland (including Land Use, Land Use Change and Forestry [LULUCF]) are 534 Mt CO_2-e and 151 Mt CO_2-e, respectively (Commonwealth of Australia, 2018a and Commonwealth of Australia, 2018b). With maximum annual GHG emissions of 9,427 ktCO2-e, the Project could contribute up to 1.8% of national emissions and 2.6% of Queensland emissions. At a national level, the Project has the potential to reduce GHG emissions of between 2,500 and 5,500 ktCO_2-e annually through the displacement of emissions from older less efficient power stations.

9.4.2 Regulatory obligations – NGER and the safeguard mechanism

A summary of GHG emissions and energy use based on power station configuration is provided in Table 27.

Table 27 GHG emissions and energy use summary

Description	Units	Year 1	Year 2	Year 3	Year 4	Year 5+
GHG emissions*	ktCO_2-e/y	1	7	5	7,071	9,427
Energy consumption**	TJ/y	10	97	65	75,089	100,111
Energy production***	GWh/y	-	-	-	8,364	11,151
	TJ/y	-	-	-	30,109	40,145
Table notes: *Maximum annual GHG emissions based on LHR, **Maximum annual energy consumption based on LHR, ***Total energy generated by the power station including energy generated and subsequently used by the power station						

Based on the NGER Reporting thresholds detailed in Table 21, with the exception of the construction period (Years 1 to 3), the Project will exceed the facility-based thresholds of 25 ktCO2-e/y and 100 TJ/y from Year 4 onwards. From this time Waratah will have ongoing reporting obligations associated with the Project including annual assessment of GHG emissions as set out by the *NGER Act* and the *National Greenhouse and Energy Reporting (Measurement) Determination*. As Waratah is the corporate entity for both the Galilee Coal Project and the Project, it is likely that the NGER corporate reporting responsibilities will mean that the Project is reported earlier than year 4.

Once operational annual Scope 1 GHG emissions associated with the Project are anticipated to exceed 100 kt CO_2-e/y for all years of operation. Under the current Safeguard Mechanism facilities with Scope 1 emissions of more than 100 kt CO2-e/y are required to keep their emissions within baseline levels. This Safeguard Mechanism would apply to the Project, however the exact implications of this would need to be reviewed on an annual basis in communication with the regulator.

9.4.3 GHG emissions intensity

A key driver for the Project is to achieve industry best practice in terms of the GHG emissions intensity of electricity produced by the Project in comparison to other coal fired power stations. The Project will achieve this objective through the implementation of ultra-supercritical electricity generation technology. Based on data provided to the Clean Energy Regulator, the lowest GHG emissions intensity for coal fired power generation in Australia is 0.82 tCO_2-e/MWh achieved by Millmerran Power Station and Kogan Creek Power Station. Preliminary estimates indicate that the Project could achieve in the range of 0.79-0.81 tCO_2-e/MWh, comparable to what could be considered best practice in terms of coal fired power generation. Figure 14 provides a pictorial summary of the GHG emissions intensity of electricity produced by coal fired power stations in Australia.

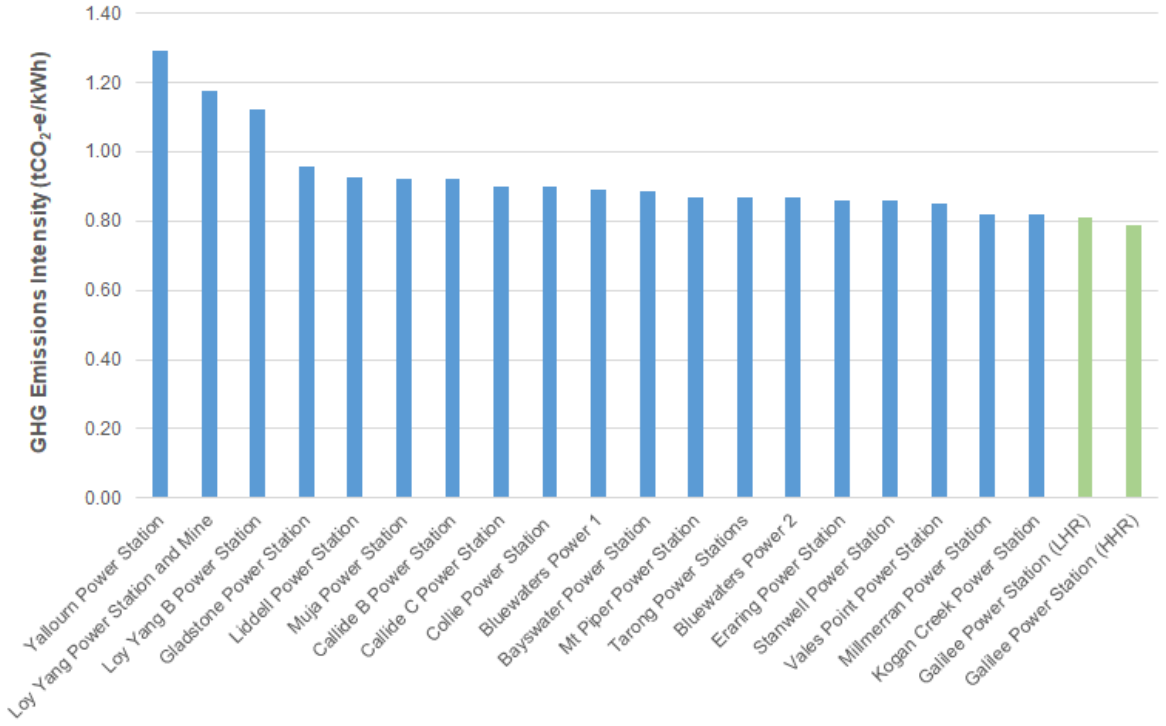

Figure 14 **GHG emissions intensity of electricity from coal fired power stations in Australia (CER, 2018)**

9.4.3.1 GHG emissions reduction

Electricity generated by the Project has the potential to displace electricity with a higher GHG emissions intensity. For example, if electricity from the Project were used to replace electricity from Yallourn Power Station (a lignite fired power station located in Victoria, built progressively from the 1920s to the 1960s with an GHG emissions intensity of 1.29 tCO_2-e/MWh) an annual reduction in GHG emissions of between 2,500 and 5,500 $ktCO_2$-e could be achieved at a national level.

9.4.4 GHG mitigation and management

A range of options for Waratah to manage Project related GHG emissions include:

General

- Continuous improvement approach through ongoing monitoring and reporting GHG emissions and identifying opportunities to reduce GHG emissions
- Use of solar photovoltaic (PV) cells to supplement electricity requirements.

Coal

- Power generation should be optimised to achieve the most efficient use of coal
- Consider using solar-power for lighting and other ancillary uses to reduce parasitic electricity demand and hence coal consumption.

Diesel

- Reduce mine equipment diesel consumption through equipment selection, load optimisation, route optimisation and production scheduling as well as reduced idle time
- Maintain equipment based on manufacturer/supplier guidelines and recommendations
- Reduce generator diesel consumption through selecting a flexible configuration that allows for electricity output to be adjusted in line with demand.

10. CONCLUSIONS

Katestone Environmental Pty Ltd (Katestone) was commissioned by Waratah Coal Pty Ltd (Waratah) to complete an Air Quality Assessment of the Galilee Power Station Project (the Project). The Galilee Power Station Project is a proposed coal fired power station located 32 kilometres northwest of Alpha and adjacent to Waratah Coal's Galilee Coal Project in Central Queensland. The assessment is to support a Material Change of Use application for the Project.

The Project involves the construction and operation of a coal fired power station in Central Queensland. Waratah proposes to develop the coal fired power station in conjunction with mining operations. The ultimate capacity of the power station is 1,400 MW (comprised of 2 x 700 MW units).

The air quality assessment has used a dispersion modelling approach. A site-specific meteorological data file has been generated using the TAPM and CALMET meteorological models. The meteorological modelling has accounted for local terrain and land use features of the surrounding region.

Emission rates and stack characteristics have been determined from the manufacturer's specifications, emission limits, and emissions information provided by Waratah. The CALPUFF dispersion model has been used to predict ground-level concentrations of nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulates (PM_{10} and $PM_{2.5}$) and metals that will be generated by the Project. The results of the dispersion modelling have then been assessed against the relevant air quality criteria for the protection of human health and the environment.

Four load scenarios have been considered covering the full range of operations in order to ensure that worst-case potential impacts have been determine, namely:

- Overload operation
- 100% operation
- 60% operation
- 25% operation.

Diesel generators will be utilised during construction, these have also been assessed.

The air quality assessment shows that:

- Construction – predicted ground-level concentrations of NO_2, SO_2, PM_{10} and $PM_{2.5}$ ***comply*** with the air quality objectives at all sensitive receptors.
- Operations
    - Predicted ground-level concentrations of NO_2, SO_2, PM_{10}, $PM_{2.5}$ and metals at sensitive receptors ***comply*** with the air quality objectives at all sensitive residential receptors.
    - Predicted ground-level concentrations of NO_2 and SO_2 at sensitive environmental receptors ***comply*** with the air quality objectives.

The potential for cumulative dust impacts was assessed and it was concluded that the Project's contribution to any cumulative dust impacts would be minor, relative to contributions from the adjacent open cut mines.

The assessment of the GHG and energy use associated with the Project shows that:

- GHG and energy use associated with the construction activities range from 1 to 7 $ktCO_2$-e/y and 10 to 100 TJ/y, respectively.
- Ongoing operation of the Project is expected to result in 9,427 $ktCO_2$-e/y for the 1,400 MW configuration.

11. REFERENCES

Bofinger ND, Best PR, Cliff DI and Stumer LJ (1986), "The oxidation of nitric oxide to nitrogen dioxide in power station plumes", Proceedings of the Seventh World Clean Air Congress, Sydney, 384-392.

Clean Energy Regulator (CER), 2018, Greenhouse and energy information for designated generation facilities. Available online: http://www.cleanenergyregulator.gov.au/NGER/National%20greenhouse%20and%20energy%20reporting%20data/electricity-sector-emissions-and-generation-data/electricity-sector-emissions-and-generation-data-2016-17

Commonwealth of Australia, 2007, *National Greenhouse and Energy Reporting Act*

Commonwealth of Australia, 2008 *National Greenhouse and Energy Reporting (Measurement) Determination*

Commonwealth of Australia, 2018. Quarterly Update of Australia's National Greenhouse Gas Inventory: September 2018a. Available online: http://www.environment.gov.au/system/files/resources/e2b0a880-74b9-436b-9ddd-941a74d81fad/files/nggi-quarterly-update-june-2018.pdf

Commonwealth of Australia, 2018b. State and Territory Greenhouse Gas Inventories 2016. Available online: http://www.environment.gov.au/system/files/resources/a97b89a6-d103-4355-8044-3b1123e8bab6/files/state-territory-inventories-2016.pdf

Department of Environment and Conservation, 2017, Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, NSW Department of Environment and Conservation, NSW Government Gazette, Sydney.

Department of Environment and Energy (DEE), 2018. National Greenhouse Accounts (NGA) Factors, Australia National Greenhouse Accounts, Australian Government

Department of Environment and Heritage Protection, 2017a. *Application requirements for activities with impacts to air*

National Pollutant Inventory (NPI), 2016/17 Database, Available online at: http://www.npi.gov.au/npi-data (accessed December 2017)

Noise Mapping Australia, 2012. South Galilee Coal Project Air Quality Assessment. Prepared for MET Serve.

Pacific Environment Limited, 2013. Galilee Coal Project (Northern Export Facility) Air Quality Assessment. Prepared for Waratah Coal.

Queensland Government 1994. *Environmental Protection Act*.

Queensland Government 2008. *Environmental Protection (Air) Policy 2008.*

TCEQ, 2009. Texas Commission on Environmental Quality Effects Screening Levels 2009

World Resources Institute/World Business Council for Sustainable Development, 2004, The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard Revised Edition March 2004. Available online: http://www.ghgprotocol.org/corporate-standard.

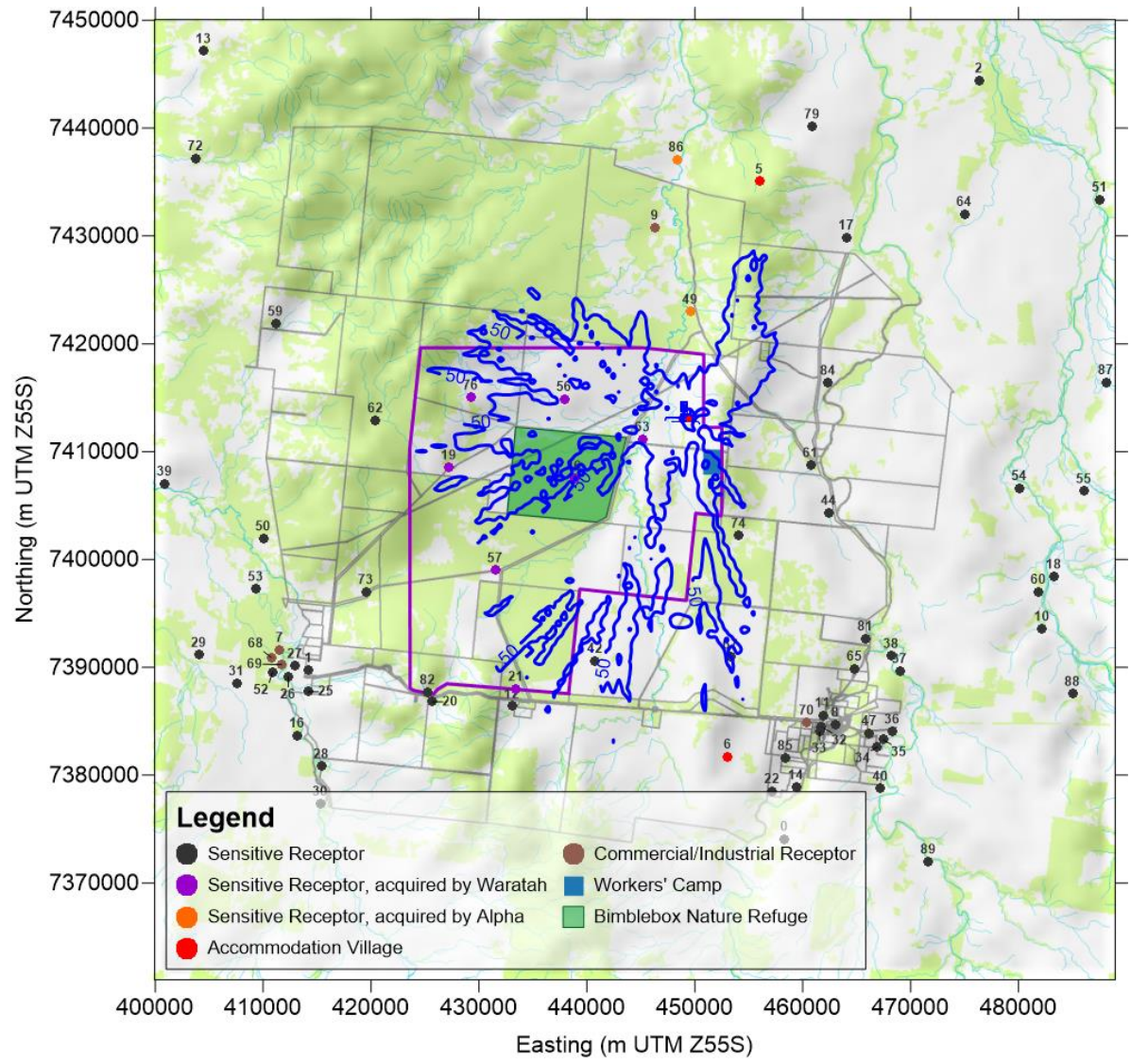

Plate 1 **Construction – Diesel Generators – Predicted maximum 1-hour average ground-level concentrations of NO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	1-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	250 µg/m^3	Natalie Shaw	August 2019

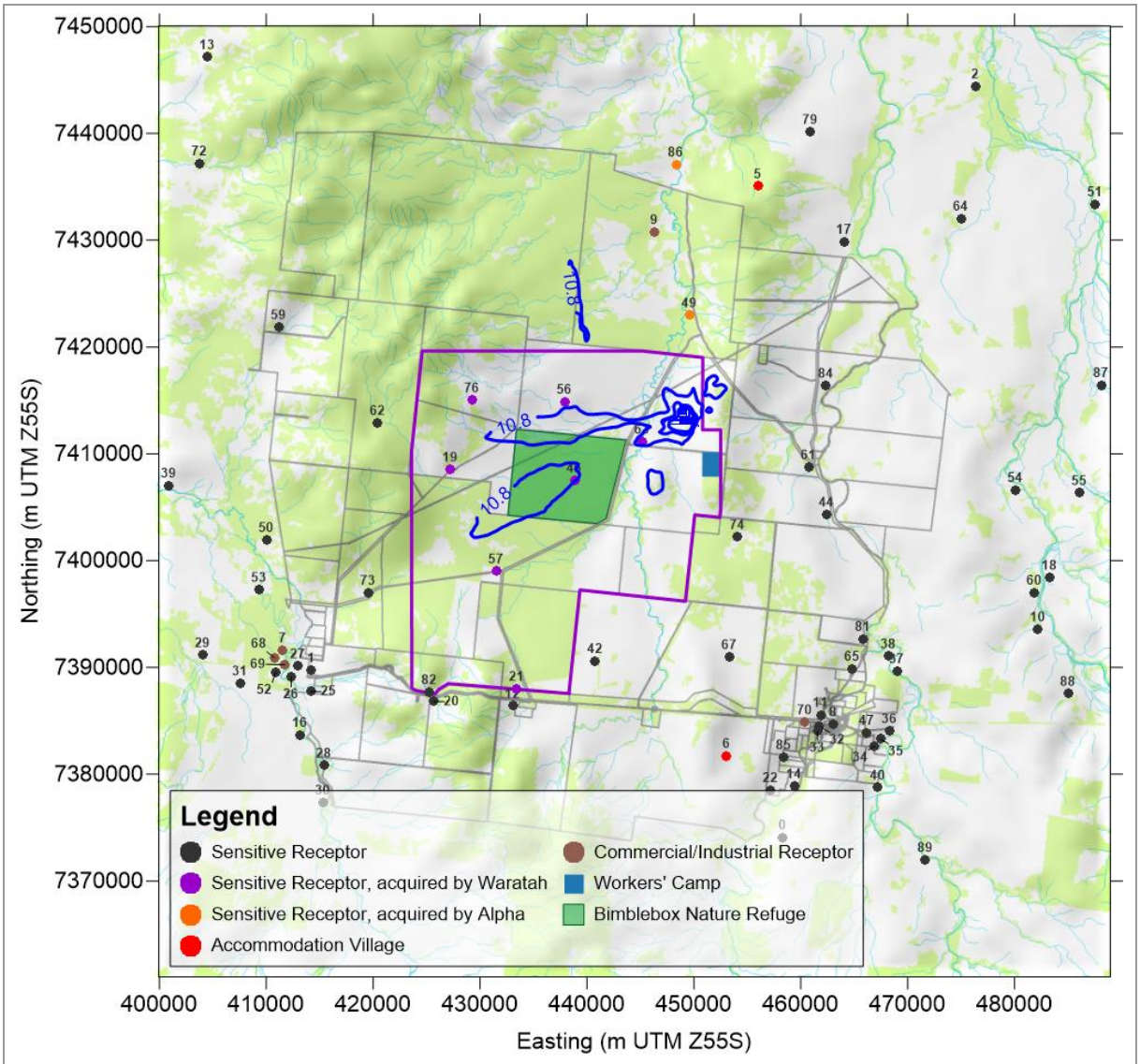

Plate 2 **Construction – Diesel Generators – Predicted annual average ground-level concentrations of NO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	Annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	62 µg/m^3	Natalie Shaw	August 2019

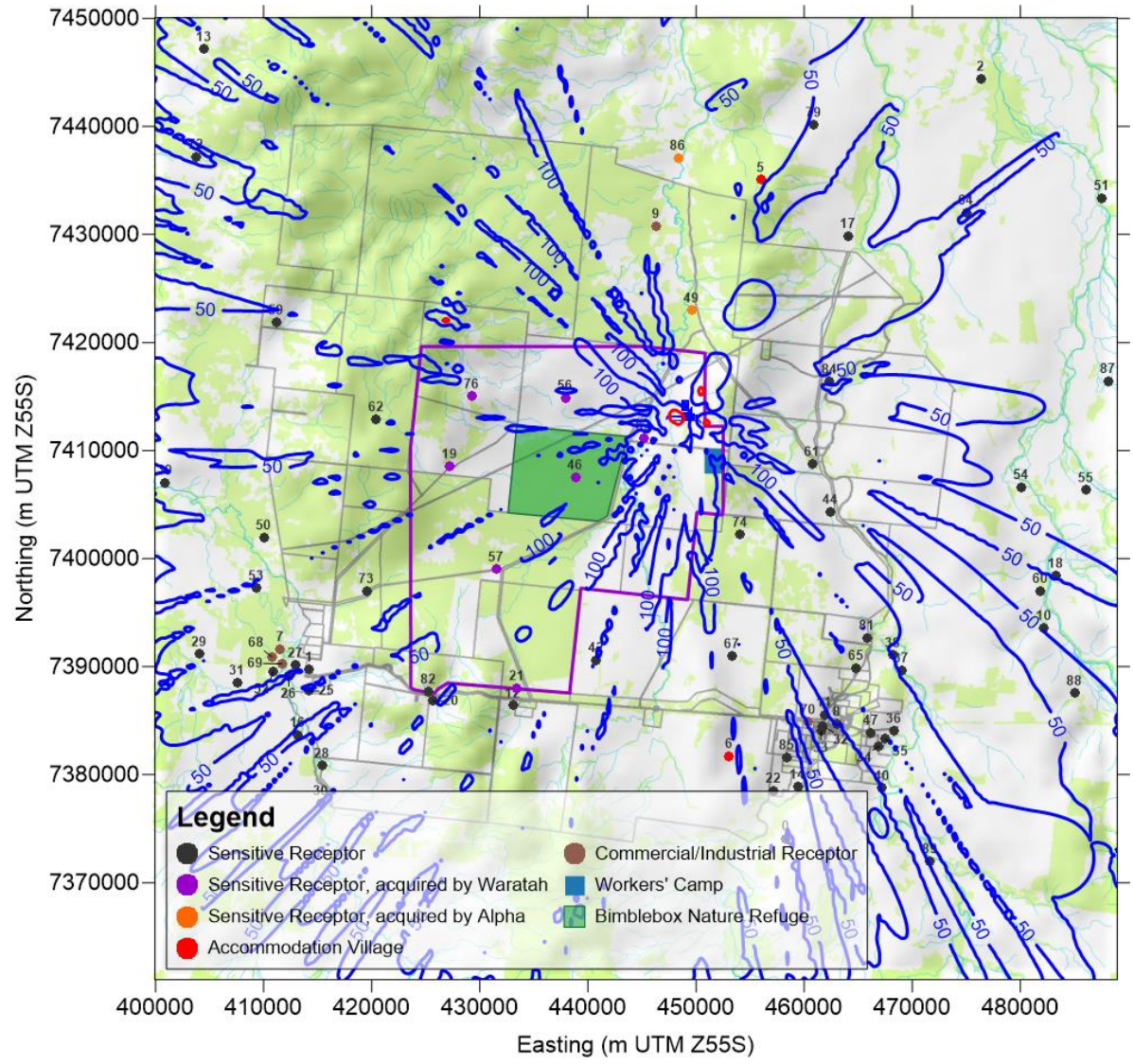

Plate 3 **1,400 MW – Overload – Predicted maximum 1-hour average ground-level concentrations of NO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	1-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	250 µg/m^3	Natalie Shaw	August 2019

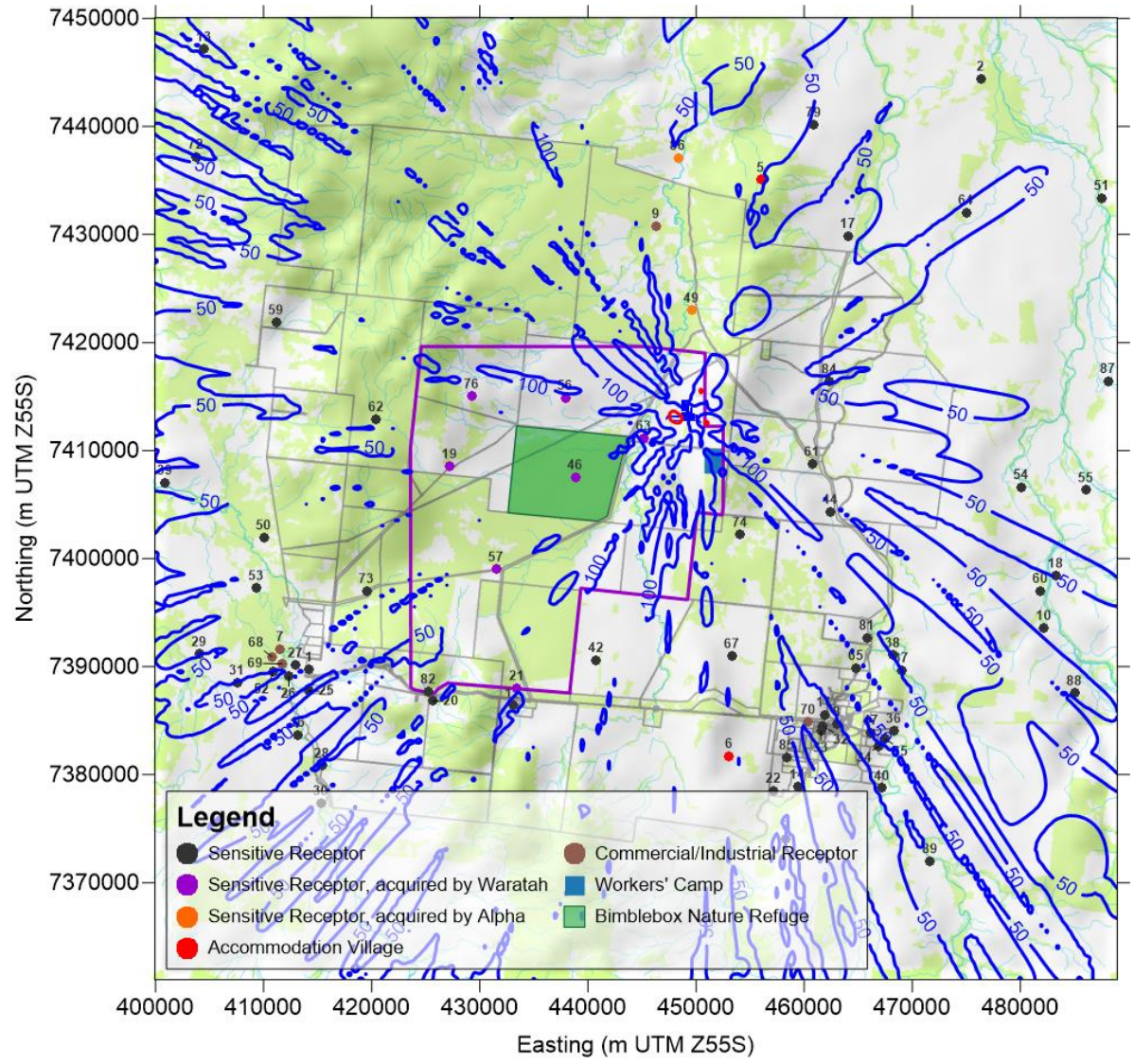

Plate 4 **1,400 MW – 100% load – Predicted maximum 1-hour average ground-level concentrations of NO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	1-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	250 µg/m^3	Natalie Shaw	August 2019

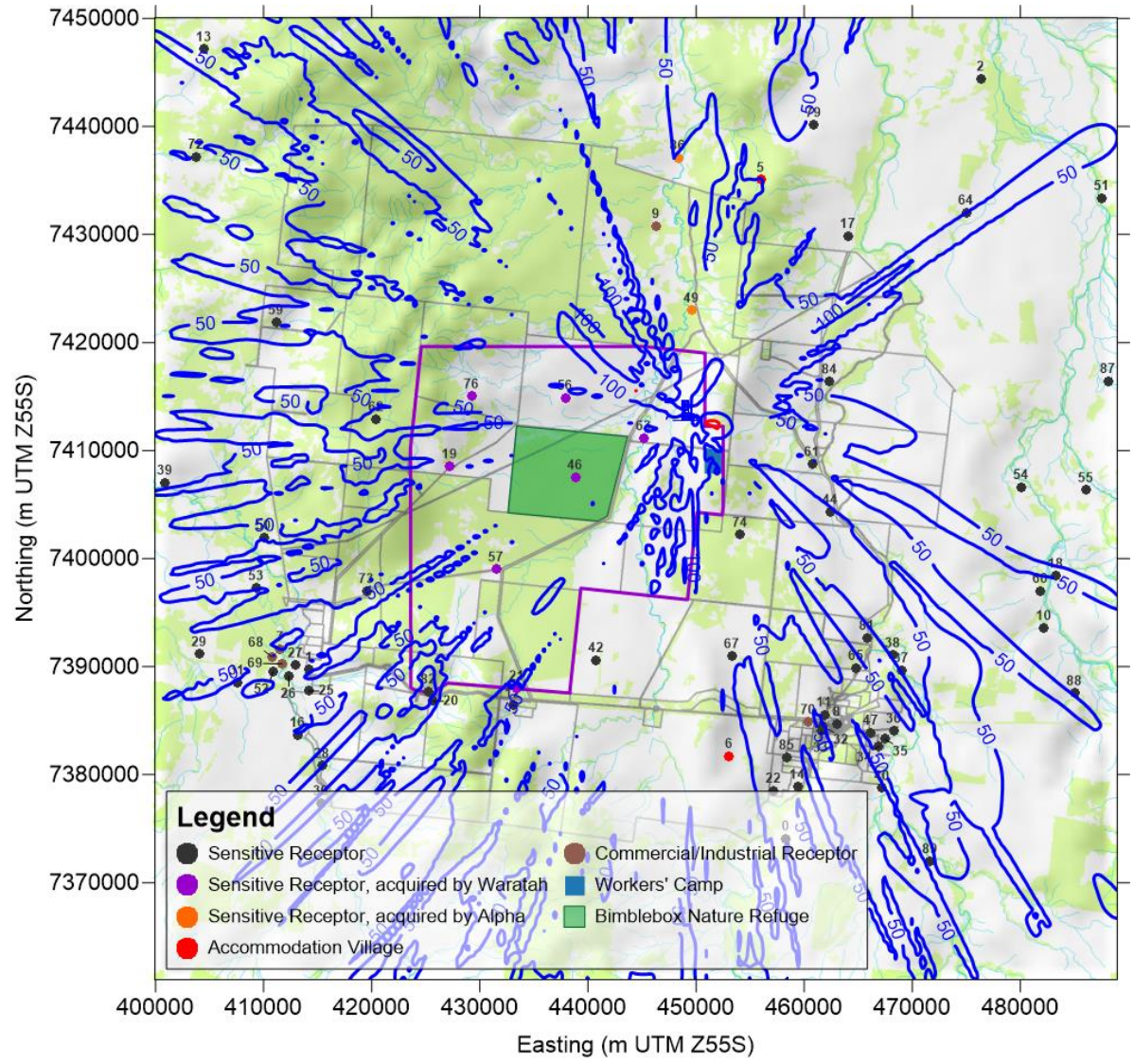

Plate 5 **1,400 MW – 60% load – Predicted maximum 1-hour average ground-level concentrations of NO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	1-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	250 µg/m^3	Natalie Shaw	August 2019

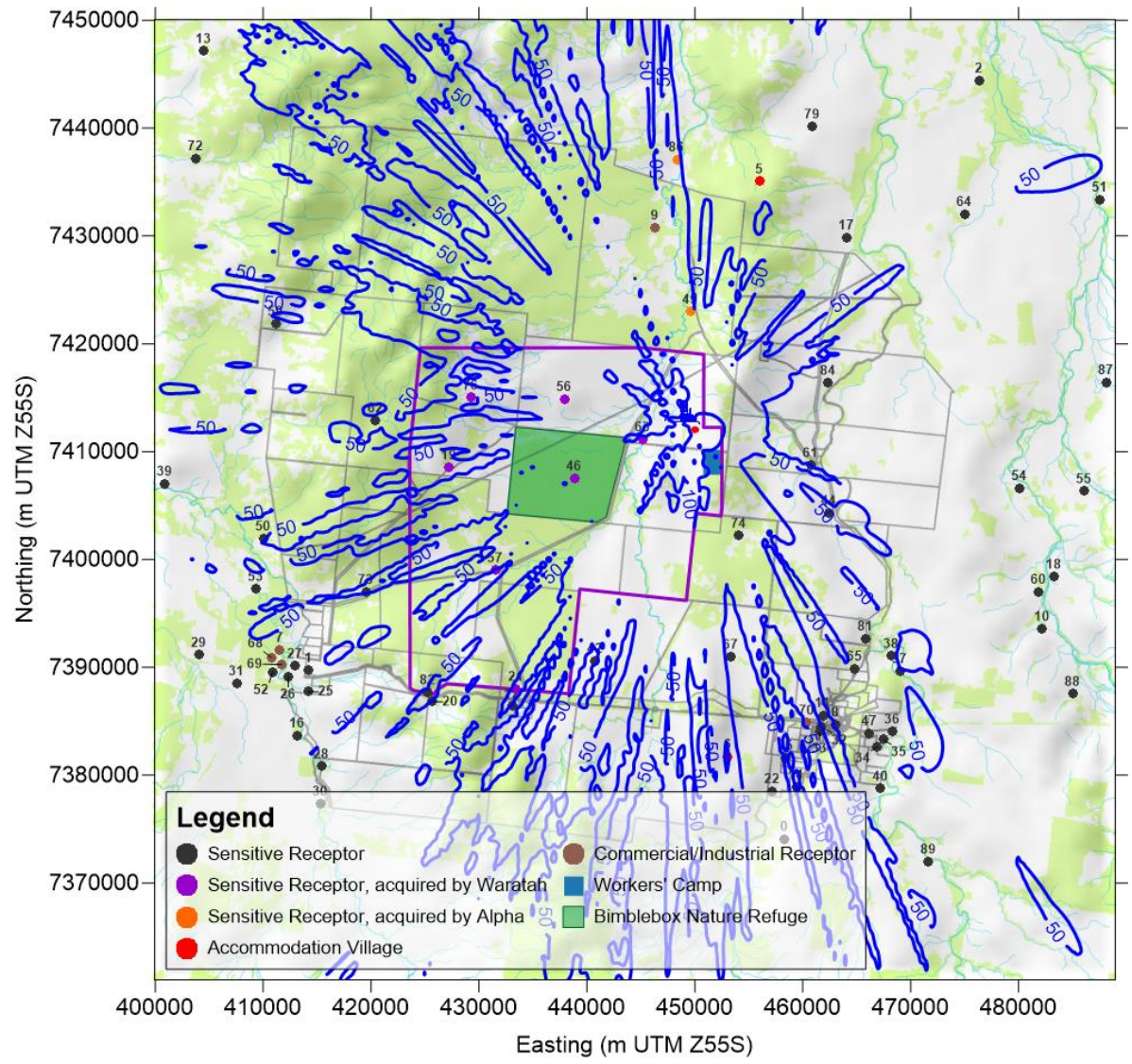

Plate 6 **1,400 MW – 25% – load - Predicted maximum 1-hour average ground-level concentrations of NO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	1-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	250 µg/m^3	Natalie Shaw	August 2019

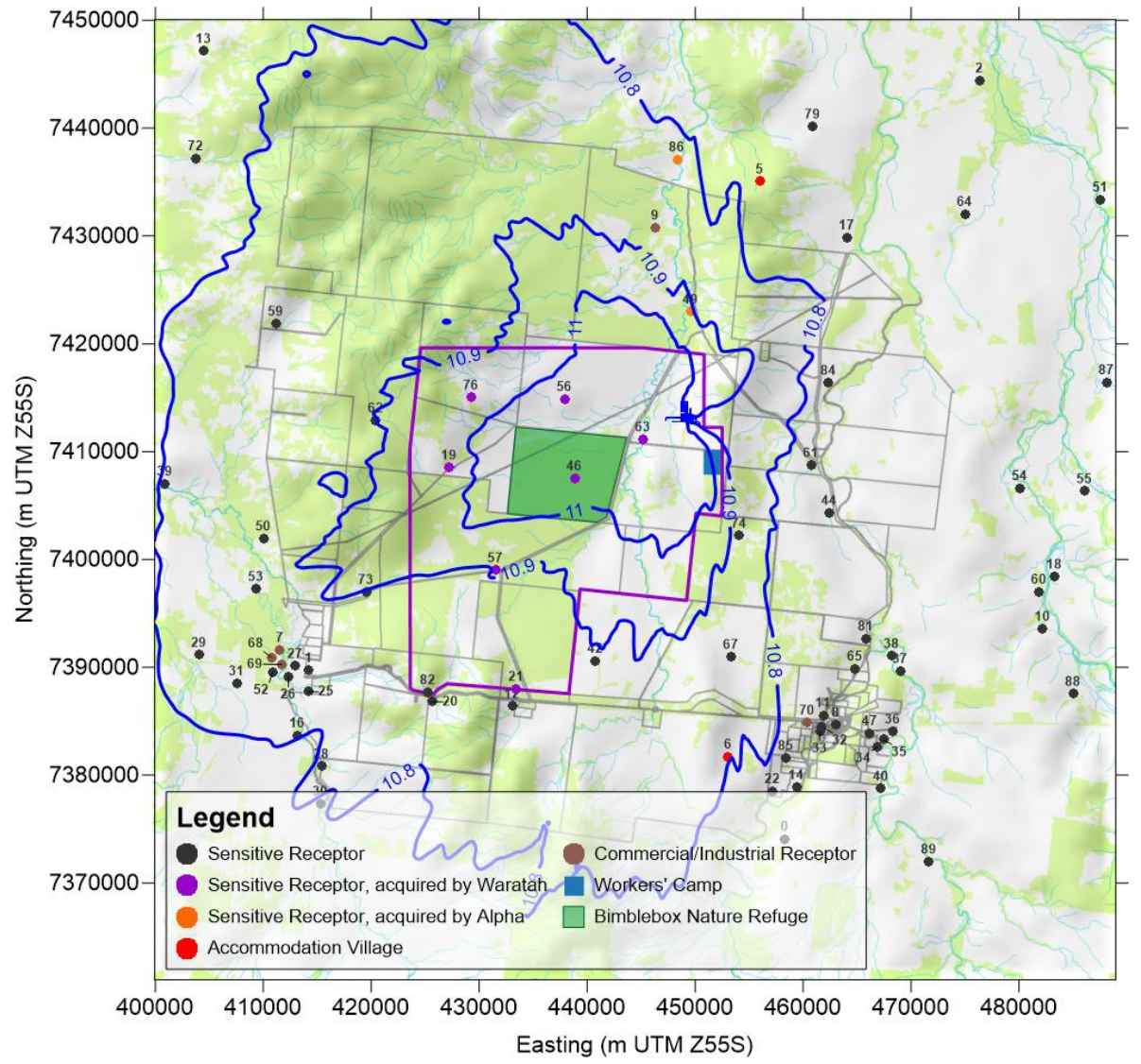

Plate 7 **1,400 MW – Overload – Predicted annual average ground-level concentrations of NO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	62 µg/m^3	Natalie Shaw	August 2019

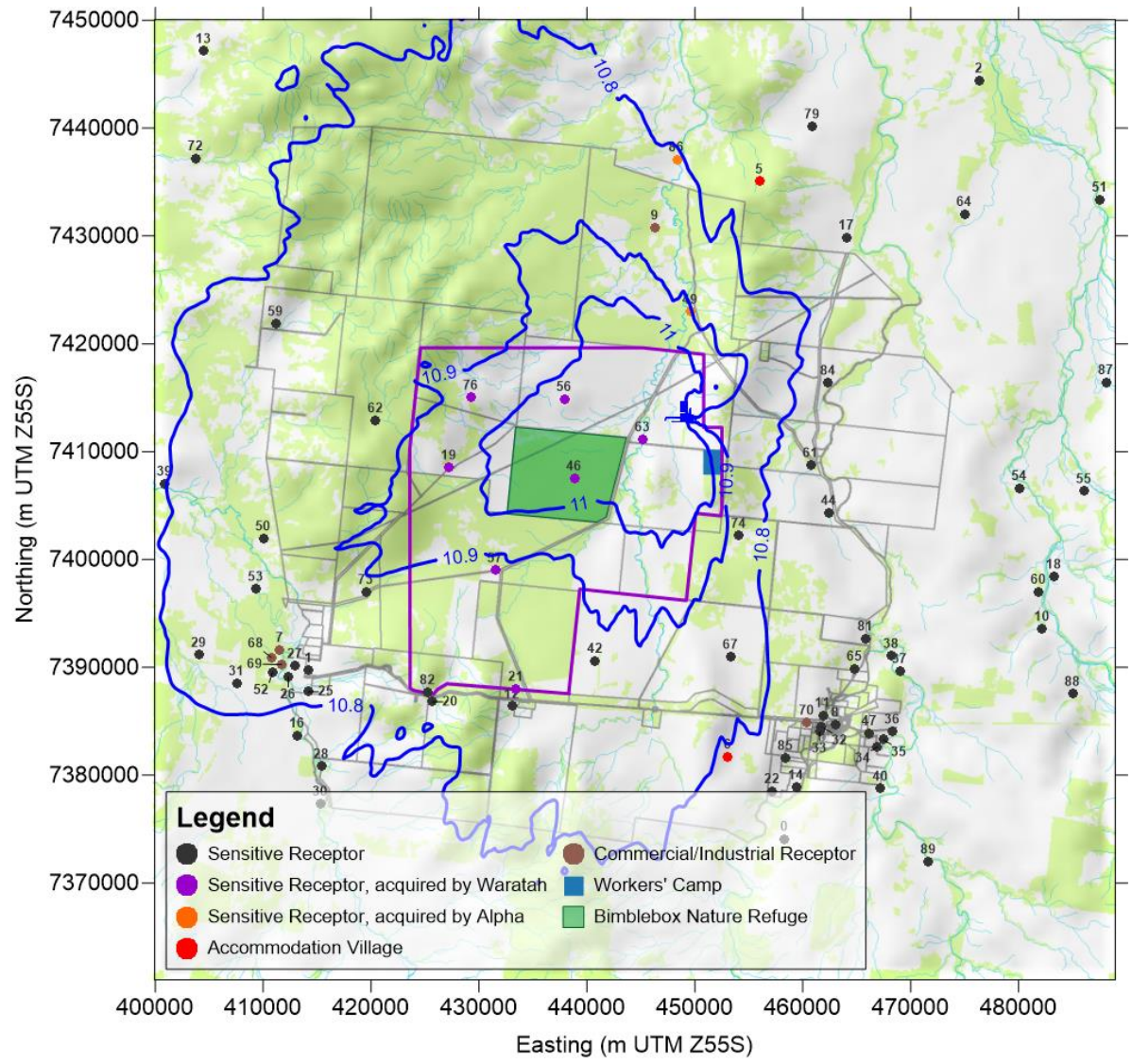

Plate 8 **1,400 MW – 100% load – Predicted annual average ground-level concentrations of NO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	62 µg/m^3	Natalie Shaw	August 2019

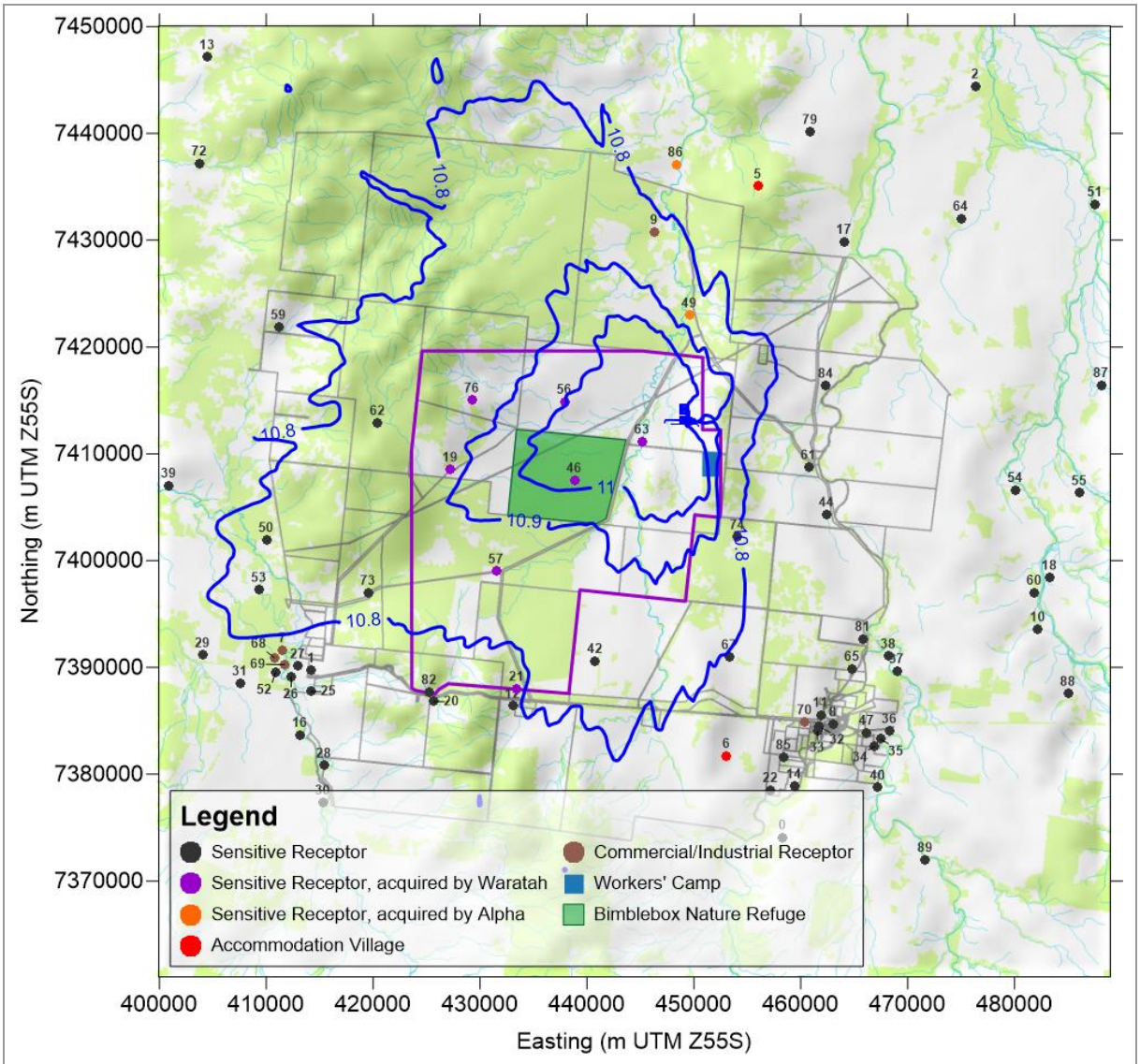

Plate 9 **1,400 MW – 60% load – Predicted annual average ground-level concentrations of NO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	62 µg/m^3	Natalie Shaw	August 2019

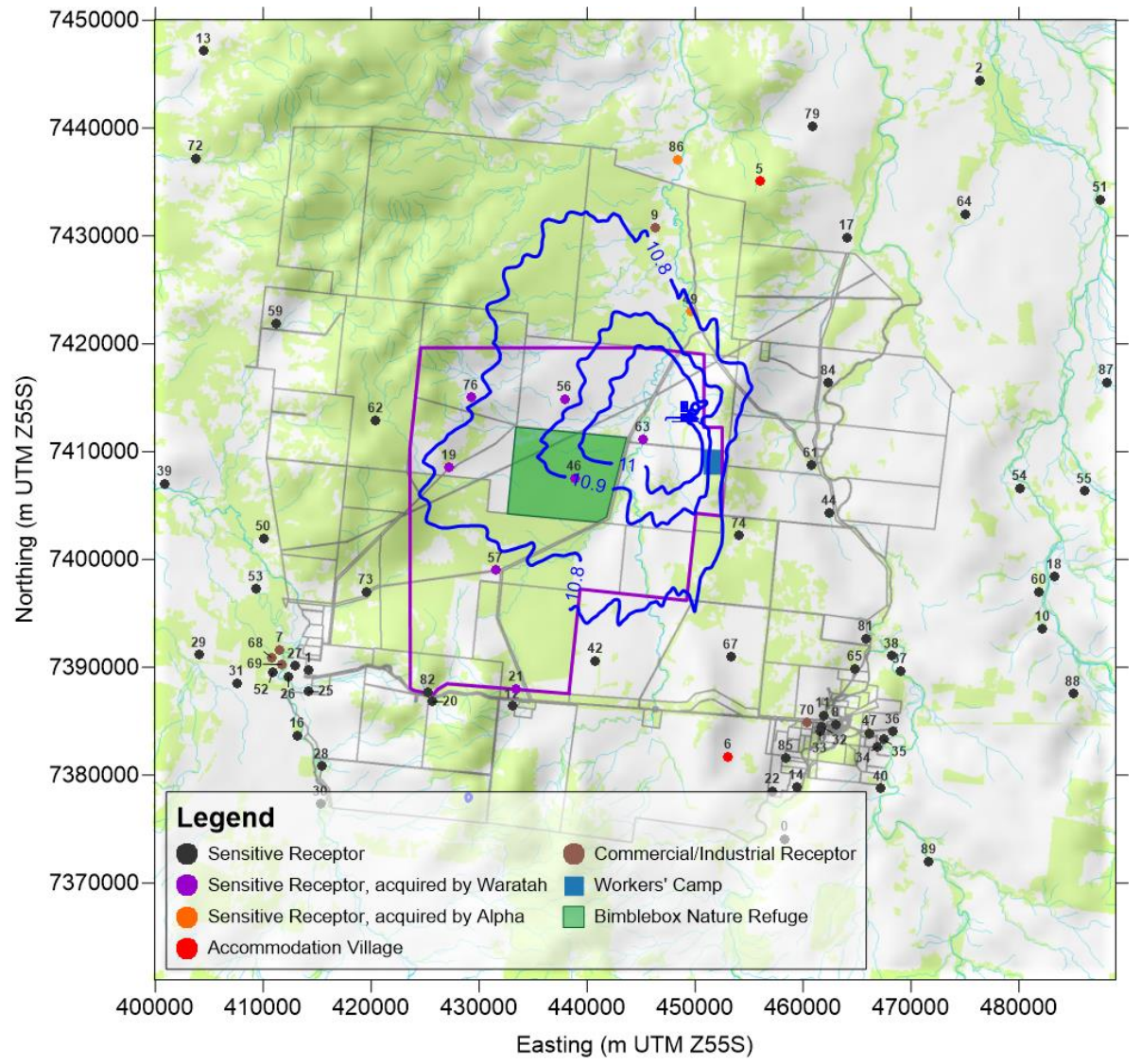

Plate 10 **1,400 MW – 25% load – Predicted annual average ground-level concentrations of NO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	62 µg/m^3	Natalie Shaw	August 2019

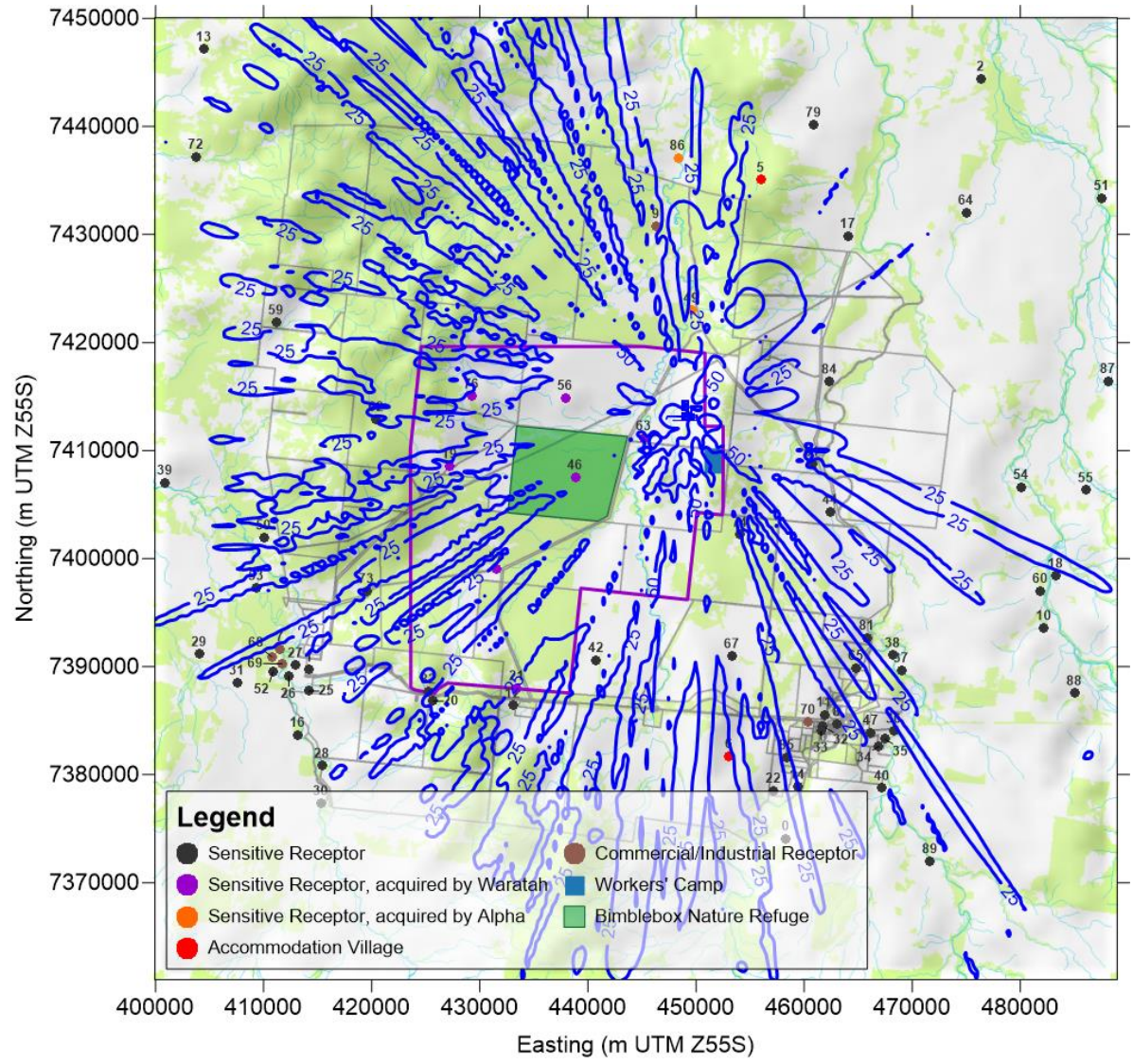

Plate 11 **1,400 MW – Overload – Predicted maximum 1-hour average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	1-hour	CALPUFF	µg/m³
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	570 µg/m³	Natalie Shaw	August 2019

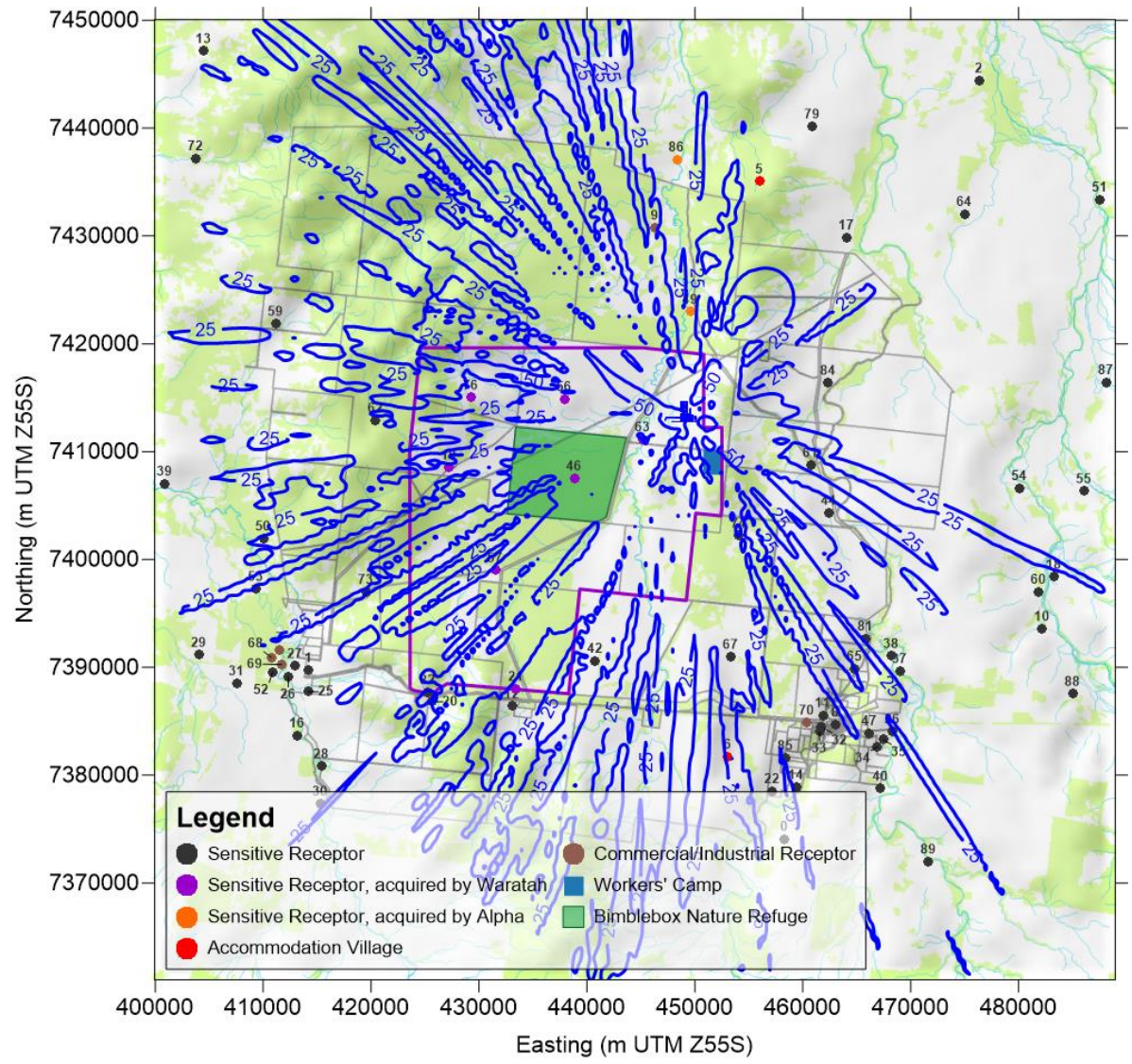

Plate 12 **1,400 MW – 100% load – Predicted maximum 1-hour average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	1-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	570 µg/m^3	Natalie Shaw	August 2019

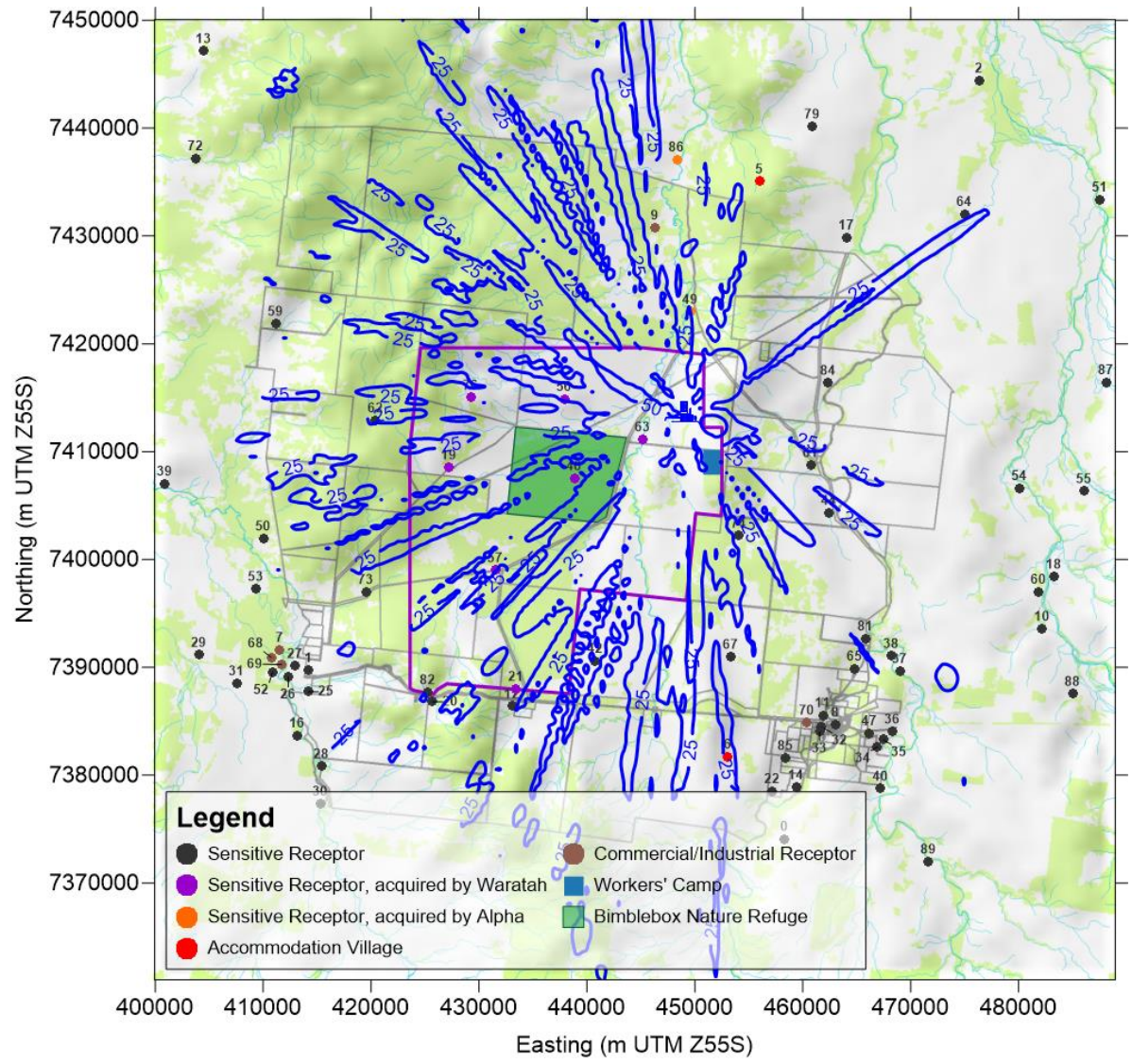

Plate 13 **1,400 MW – 60% load – Predicted maximum 1-hour average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	1-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	570 µg/m^3	Natalie Shaw	August 2019

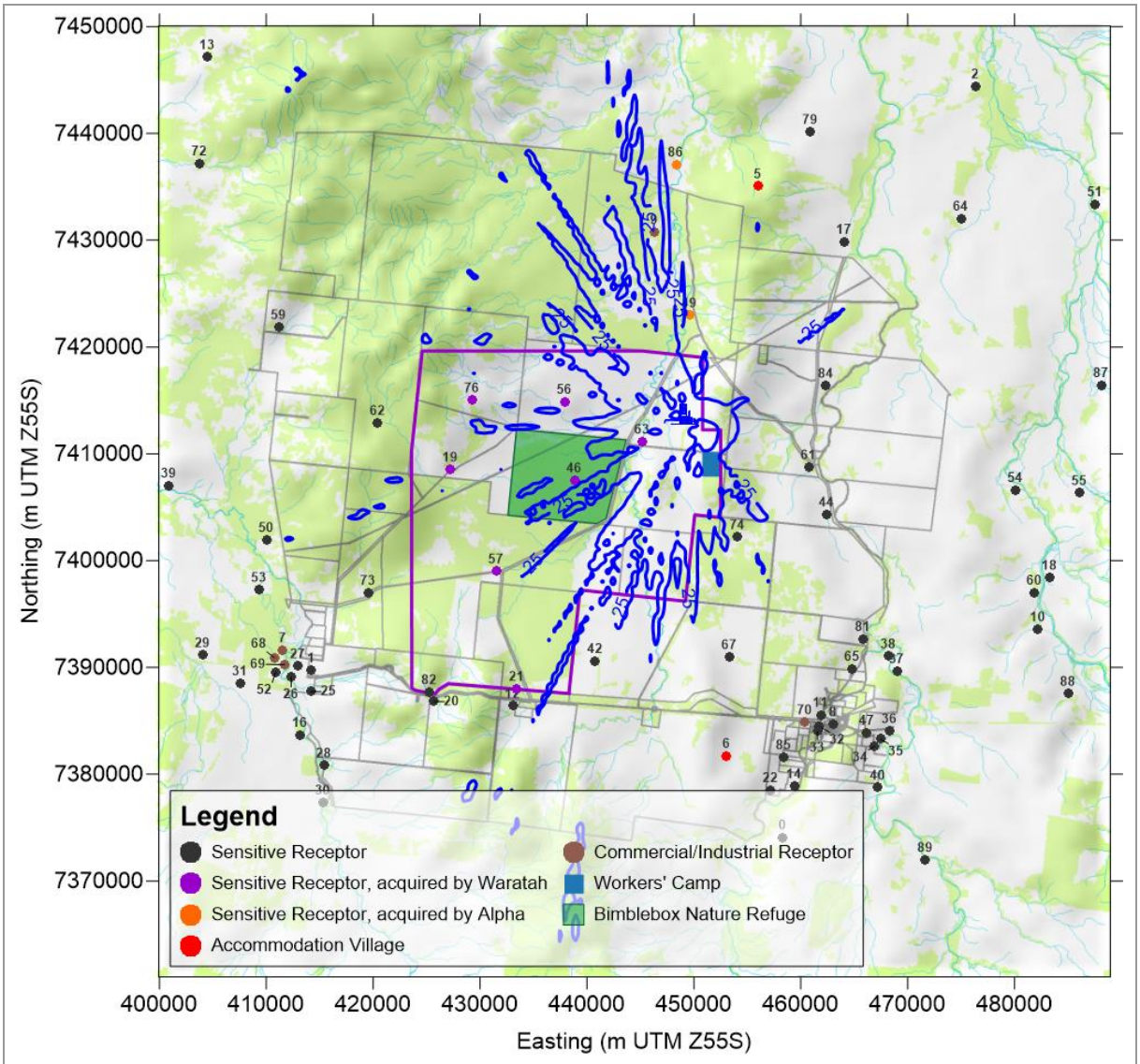

Plate 14 **1,400 MW – 25% load – Predicted maximum 1-hour average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	1-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	570 µg/m^3	Natalie Shaw	August 2019

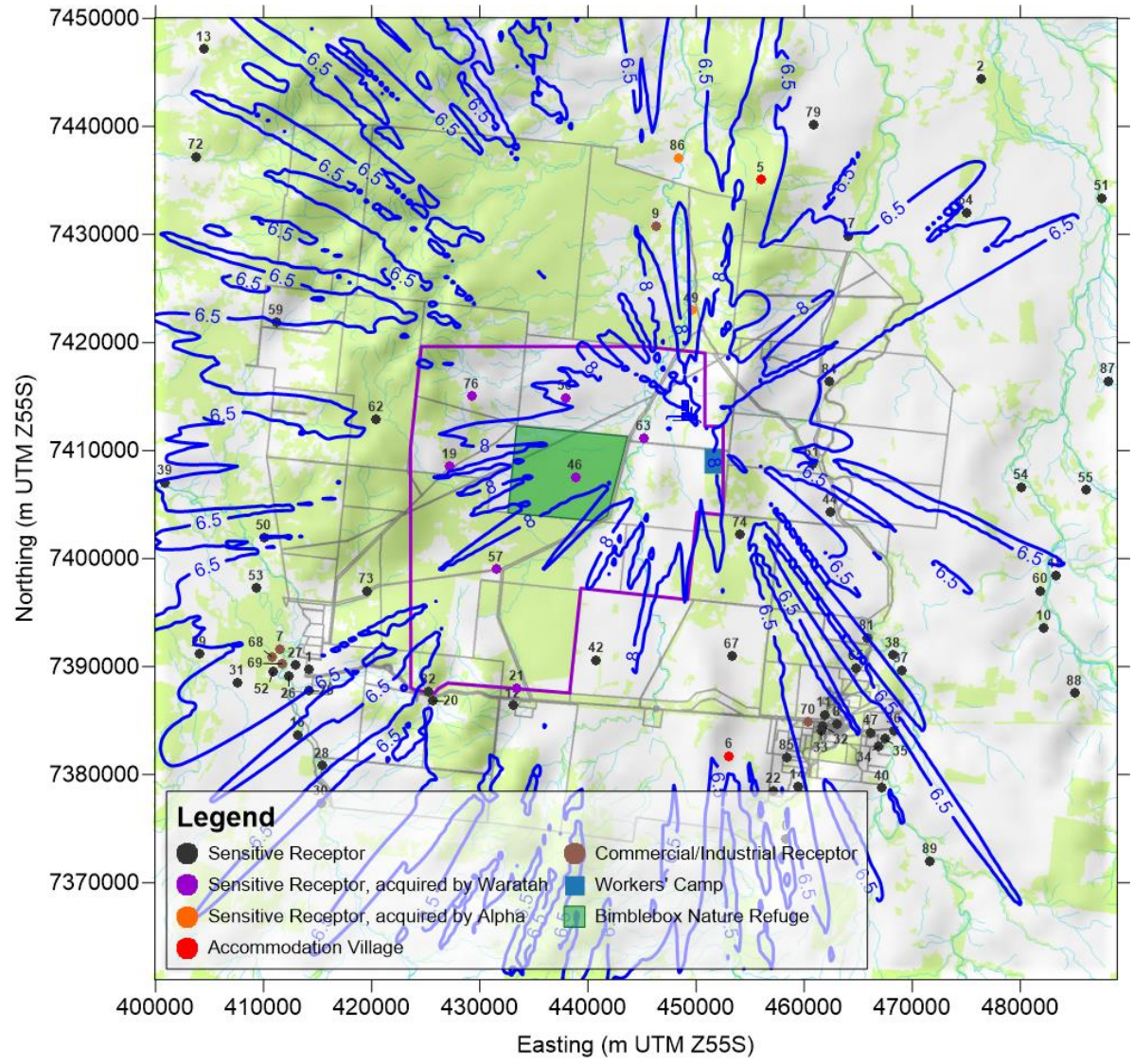

Plate 15 **1,400 MW – Overload – Predicted maximum 24-hour average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	230 µg/m^3	Natalie Shaw	August 2019

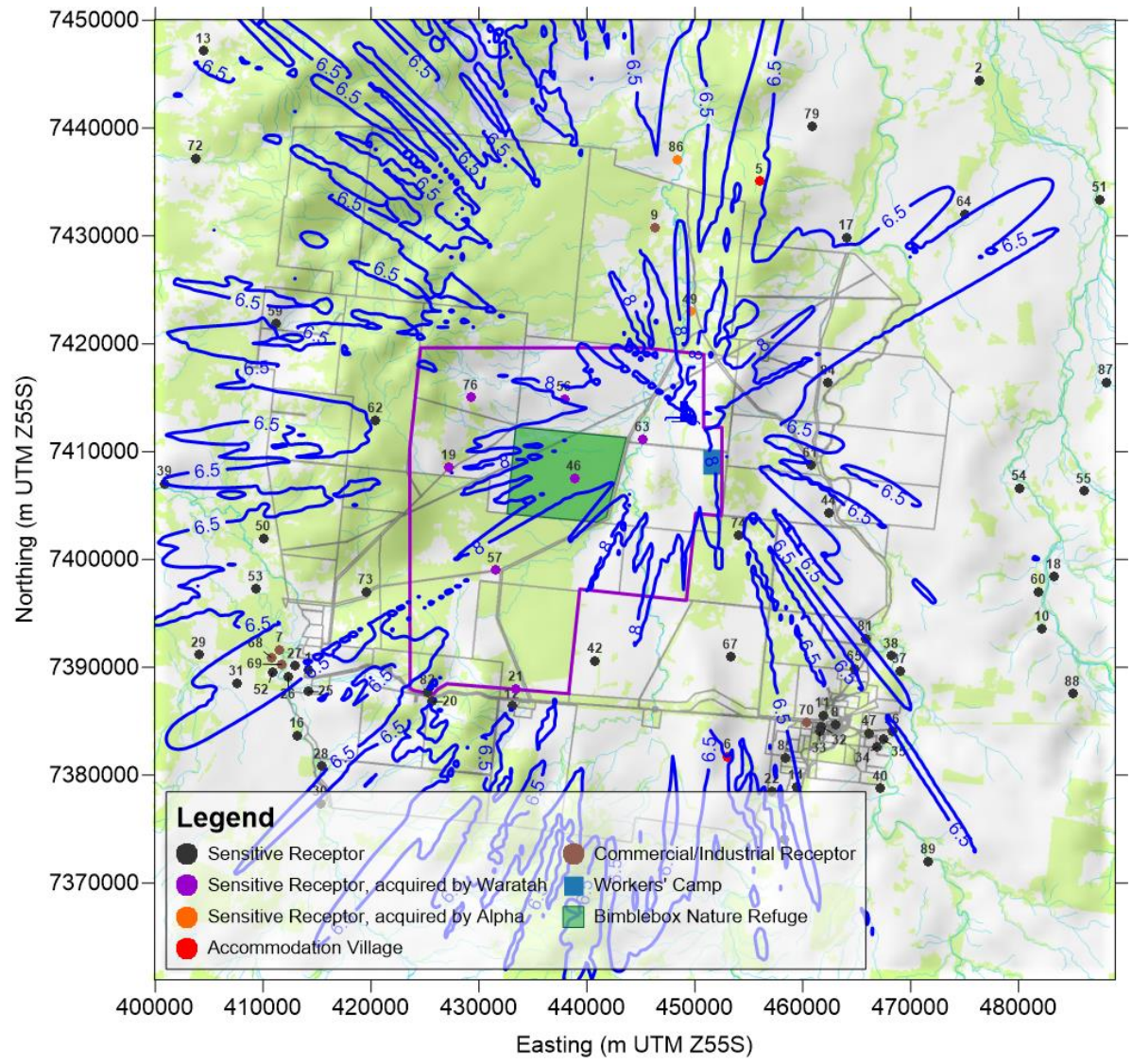

Plate 16 **1,400 MW – 100% load – Predicted maximum 24-hour average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	230 µg/m^3	Natalie Shaw	August 2019

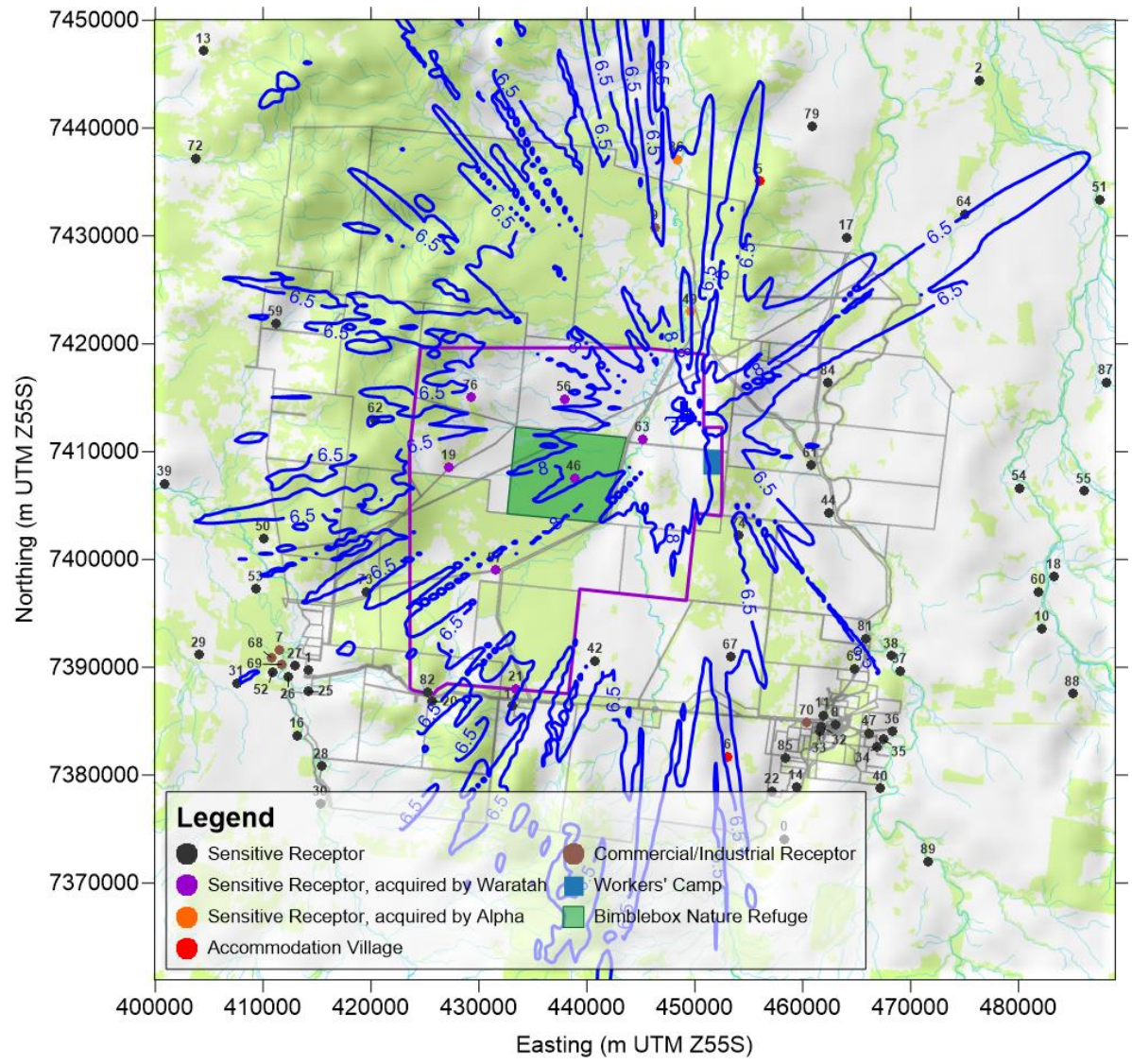

Plate 17 **1,400 MW – 60% load – Predicted maximum 24-hour average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	230 µg/m^3	Natalie Shaw	August 2019

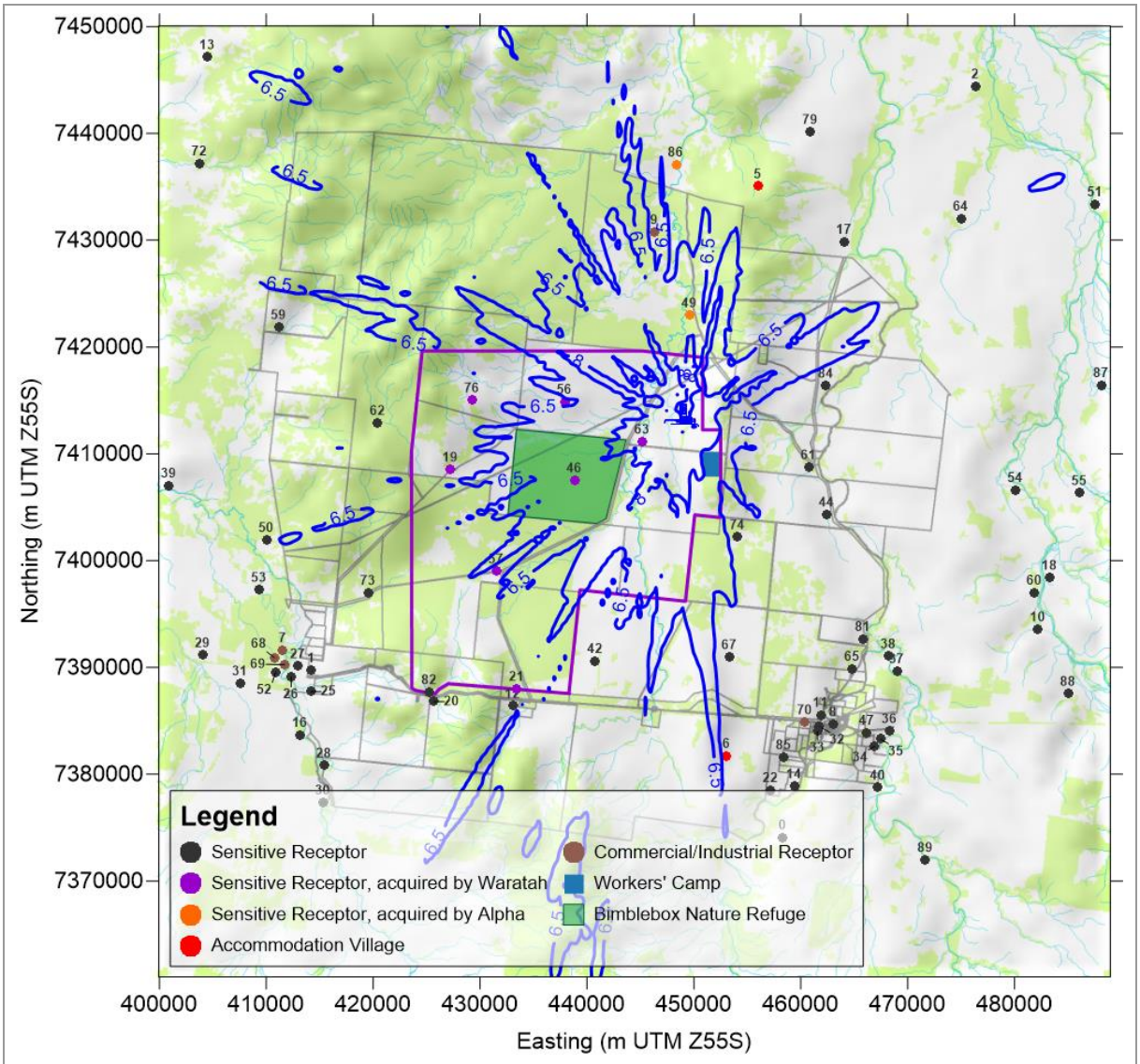

Plate 18 **1,400 MW – 25% load – Predicted maximum 24-hour average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	230 µg/m^3	Natalie Shaw	August 2019

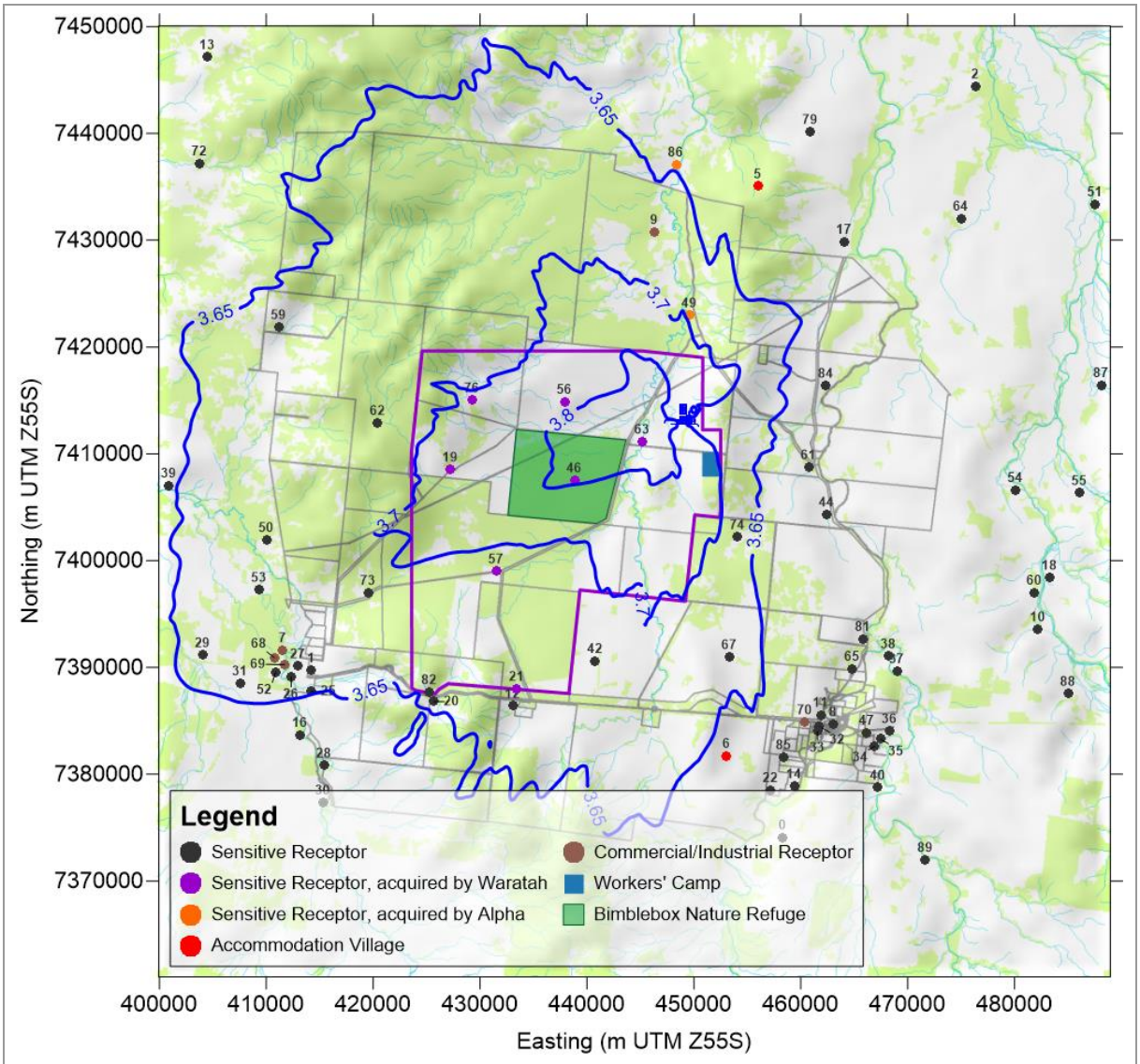

Plate 19 **1,400 MW – Overload – Predicted annual average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	57 µg/m^3	Natalie Shaw	August 2019

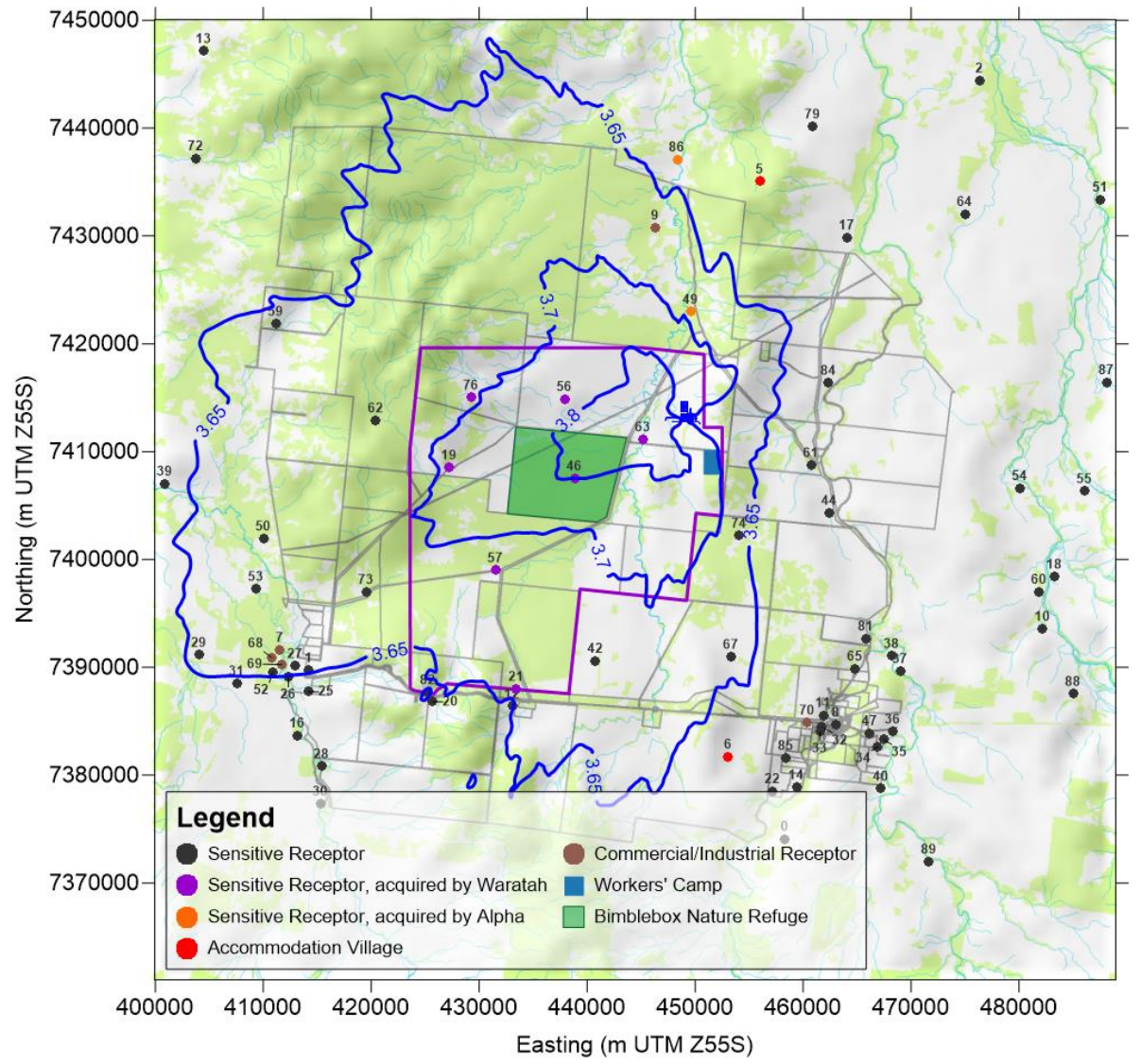

Plate 20 **1,400 MW – 100% load – Predicted annual average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	57 µg/m^3	Natalie Shaw	August 2019

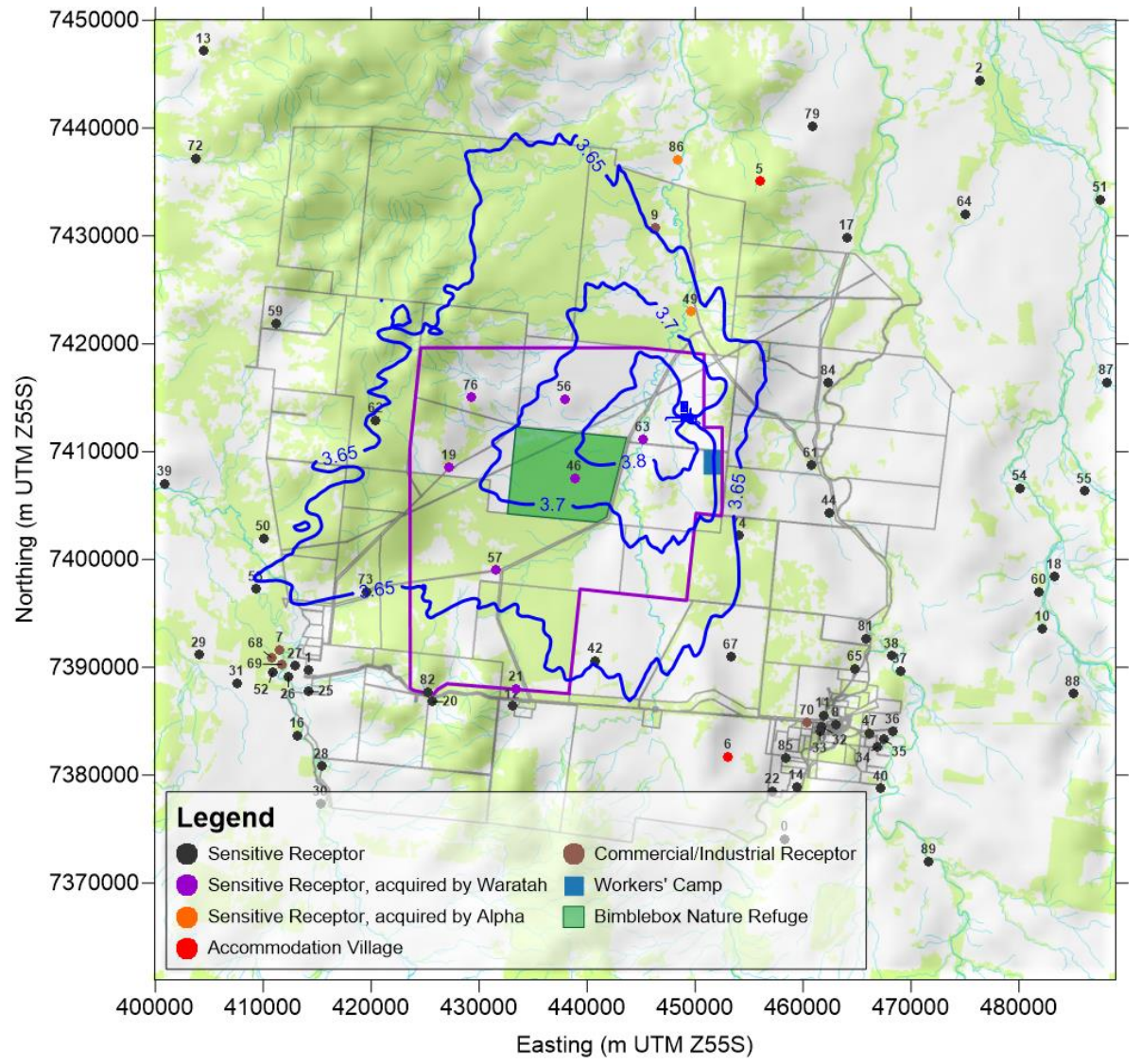

Plate 21 **1,400 MW – 60% load – Predicted annual average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	57 µg/m^3	Natalie Shaw	August 2019

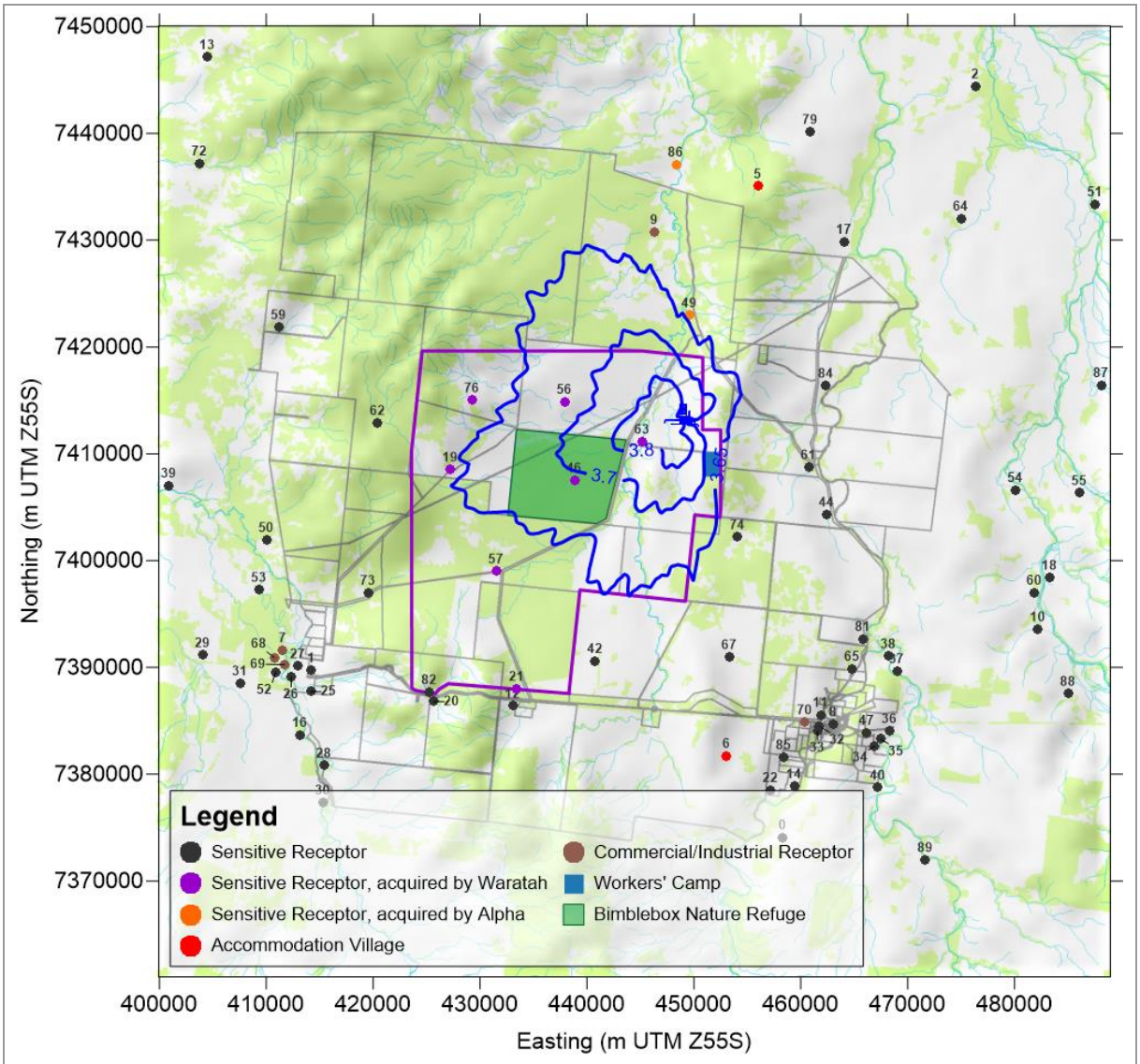

Plate 22 **1,400 MW – 25% load – Predicted annual average ground-level concentrations of SO_2 due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	57 µg/m^3	Natalie Shaw	August 2019

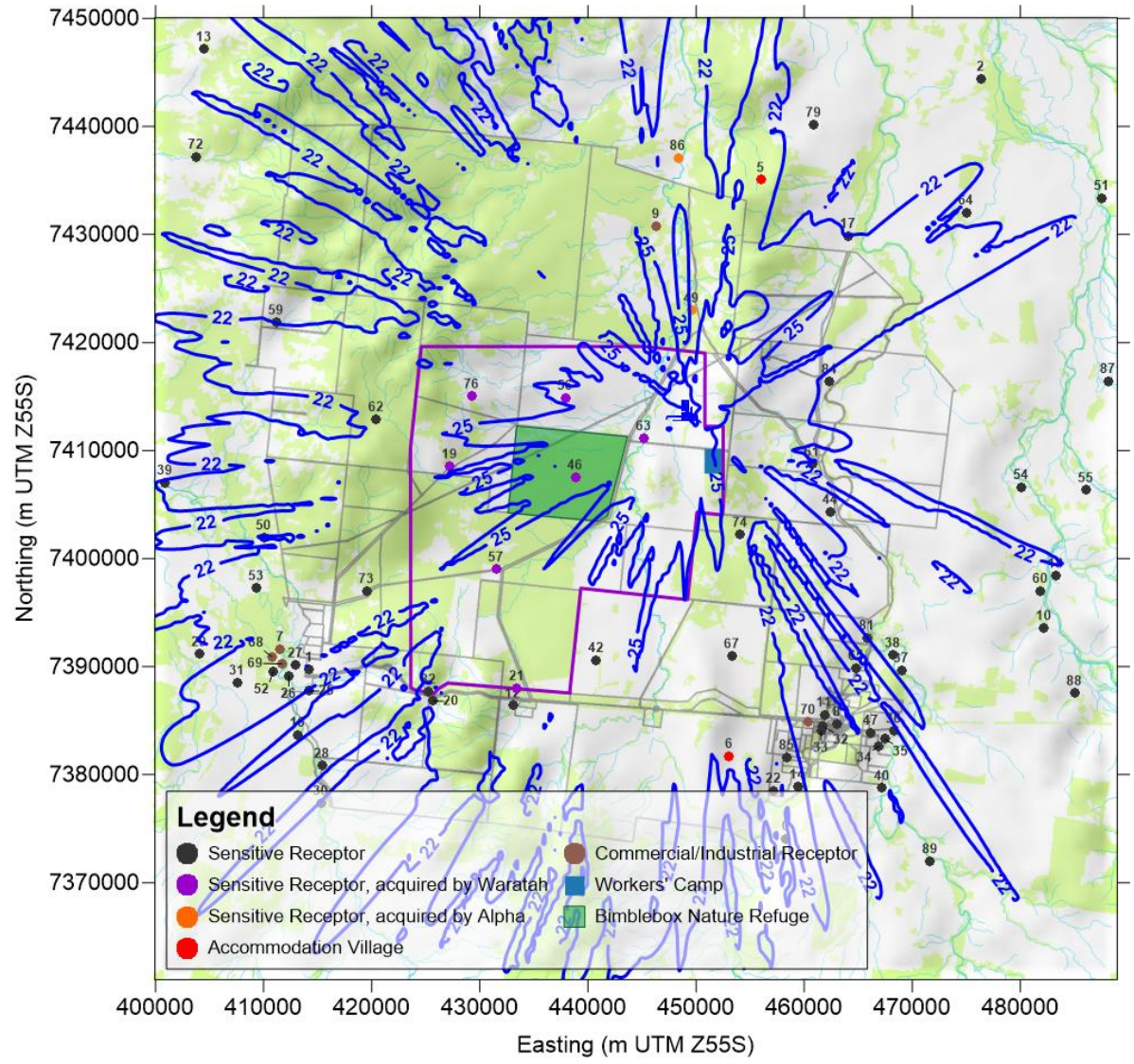

Plate 23 **1,400 MW – Overload – Predicted maximum 24-hour average ground-level concentrations of PM_{10} due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	50 µg/m^3	Natalie Shaw	August 2019

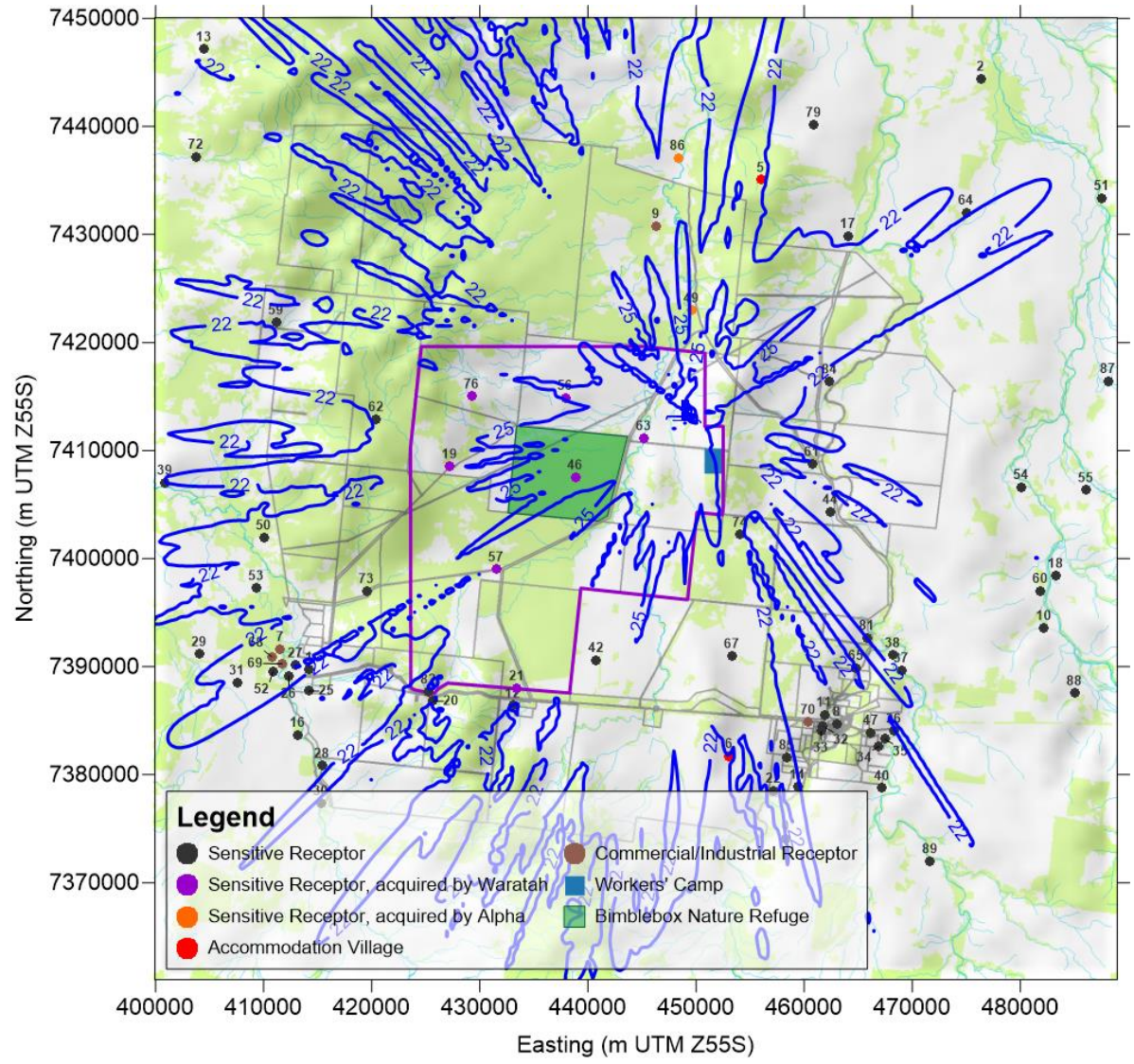

Plate 24 **1,400 MW – 100% load – Predicted maximum 24-hour average ground-level concentrations of PM_{10} due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	50 µg/m^3	Natalie Shaw	August 2019

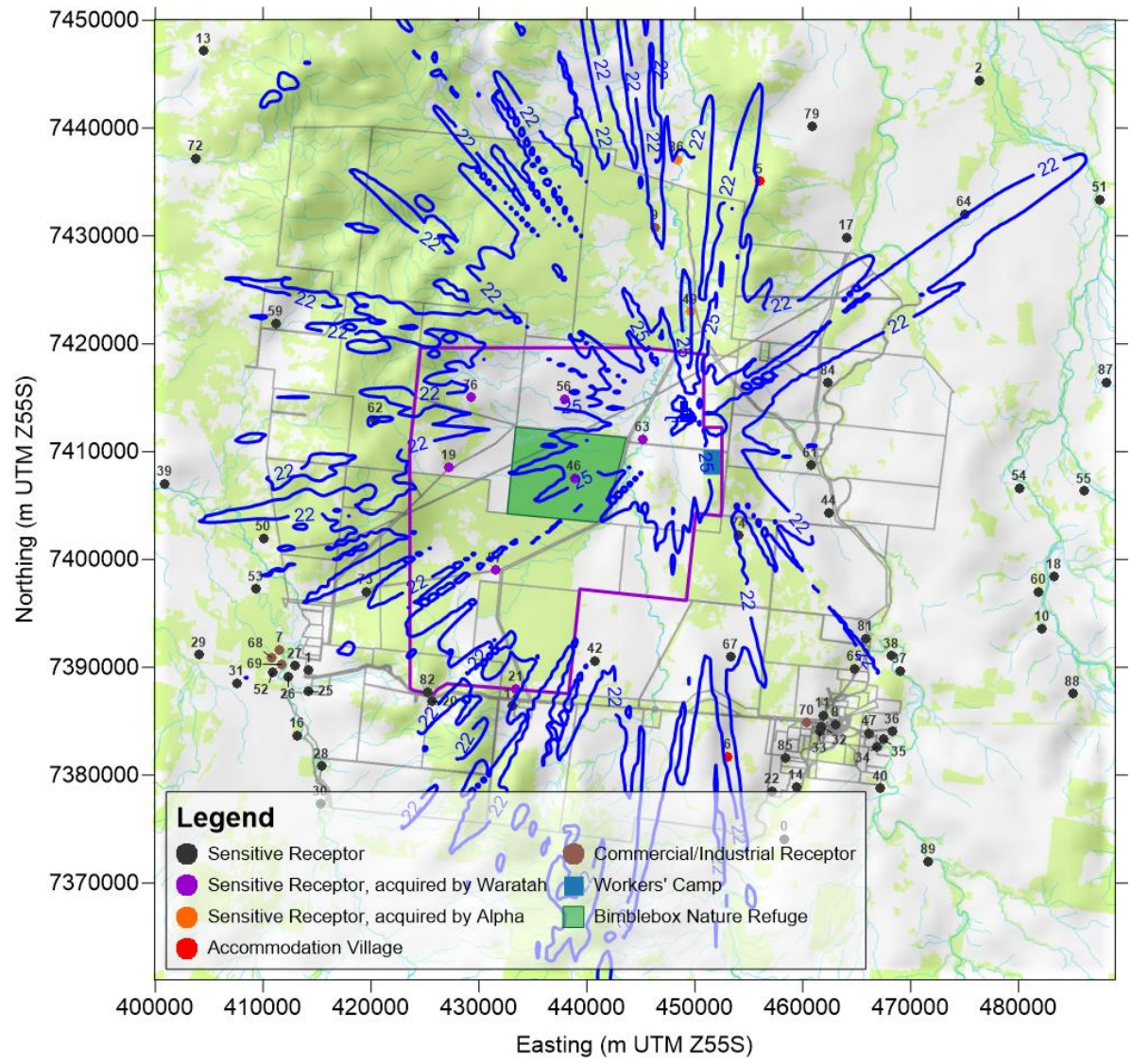

Plate 25 **1,400 MW – 60% load – Predicted maximum 24-hour average ground-level concentrations of PM_{10} due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	50 µg/m^3	Natalie Shaw	August 2019

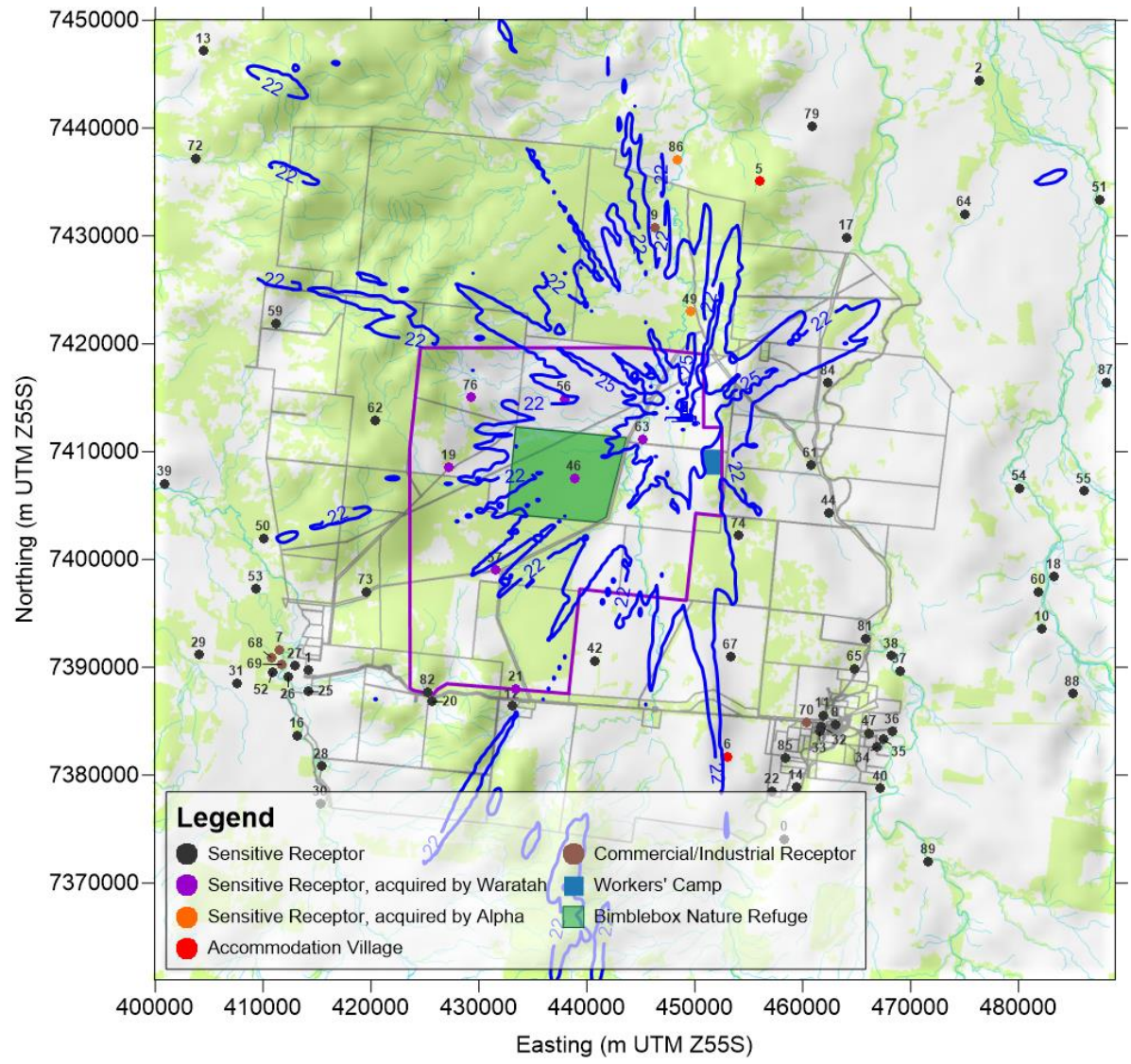

Plate 26 **1,400 MW – 25% load – Predicted maximum 24-hour average ground-level concentrations of PM_{10} due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	50 µg/m^3	Natalie Shaw	August 2019

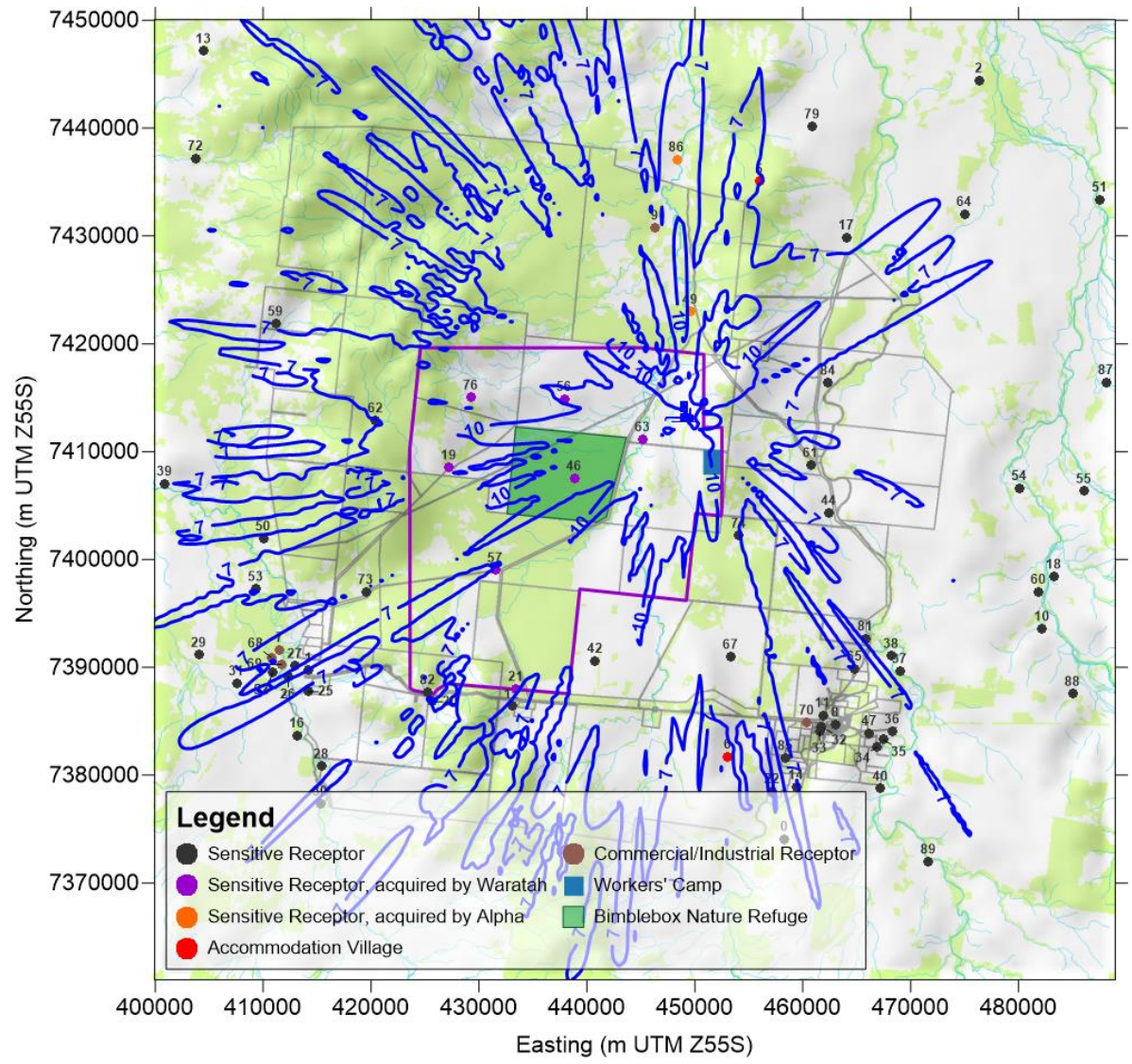

Plate 27 **1,400 MW – Overload – Predicted maximum 24-hour average ground-level concentrations of $PM_{2.5}$ due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	25 µg/m^3	Natalie Shaw	August 2019

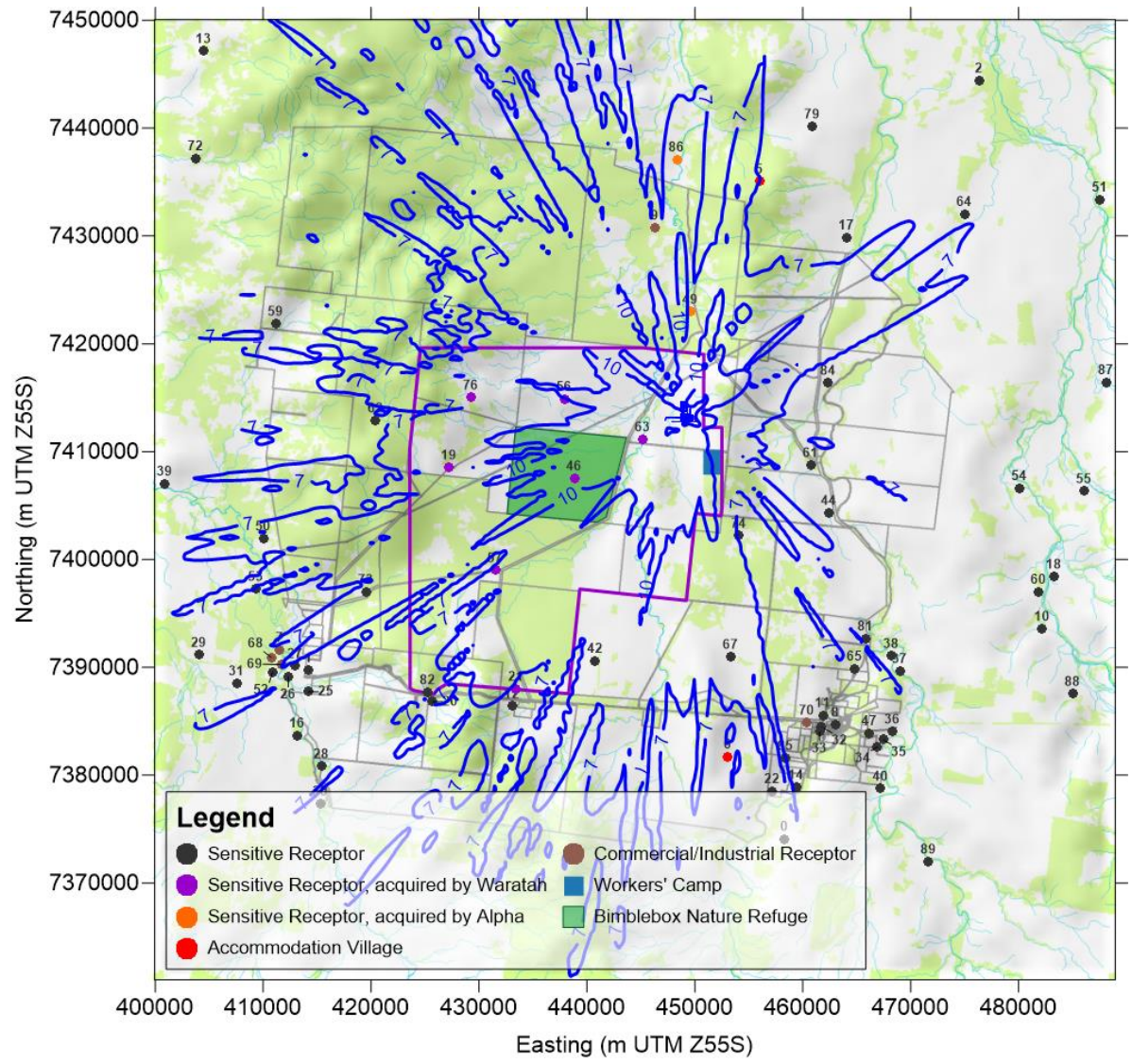

Plate 28 **1,400 MW – 100% load – Predicted maximum 24-hour average ground-level concentrations of $PM_{2.5}$ due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	25 µg/m^3	Natalie Shaw	August 2019

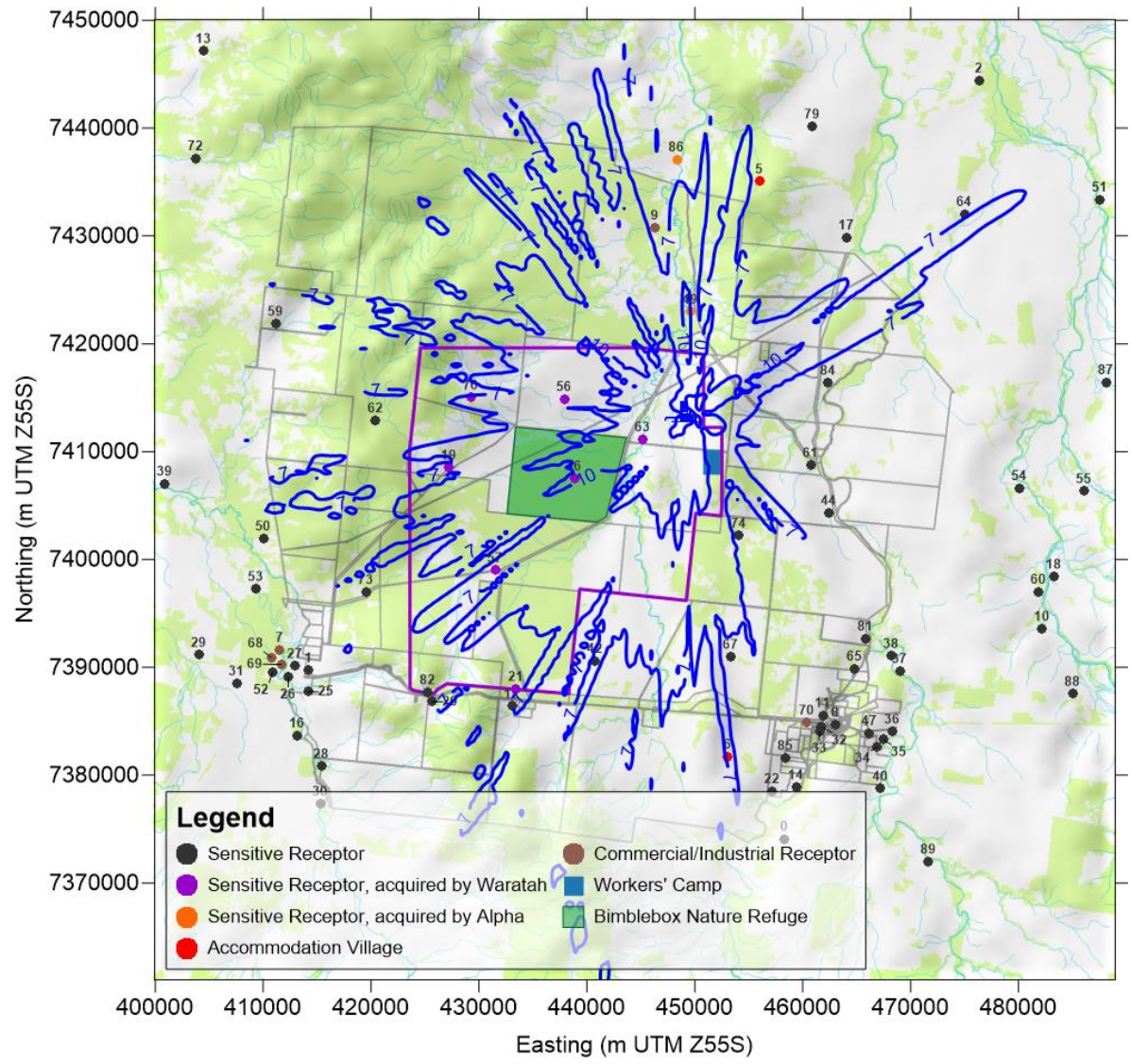

Plate 29 **1,400 MW – 60% load – Predicted maximum 24-hour average ground-level concentrations of $PM_{2.5}$ due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	25 µg/m^3	Natalie Shaw	August 2019

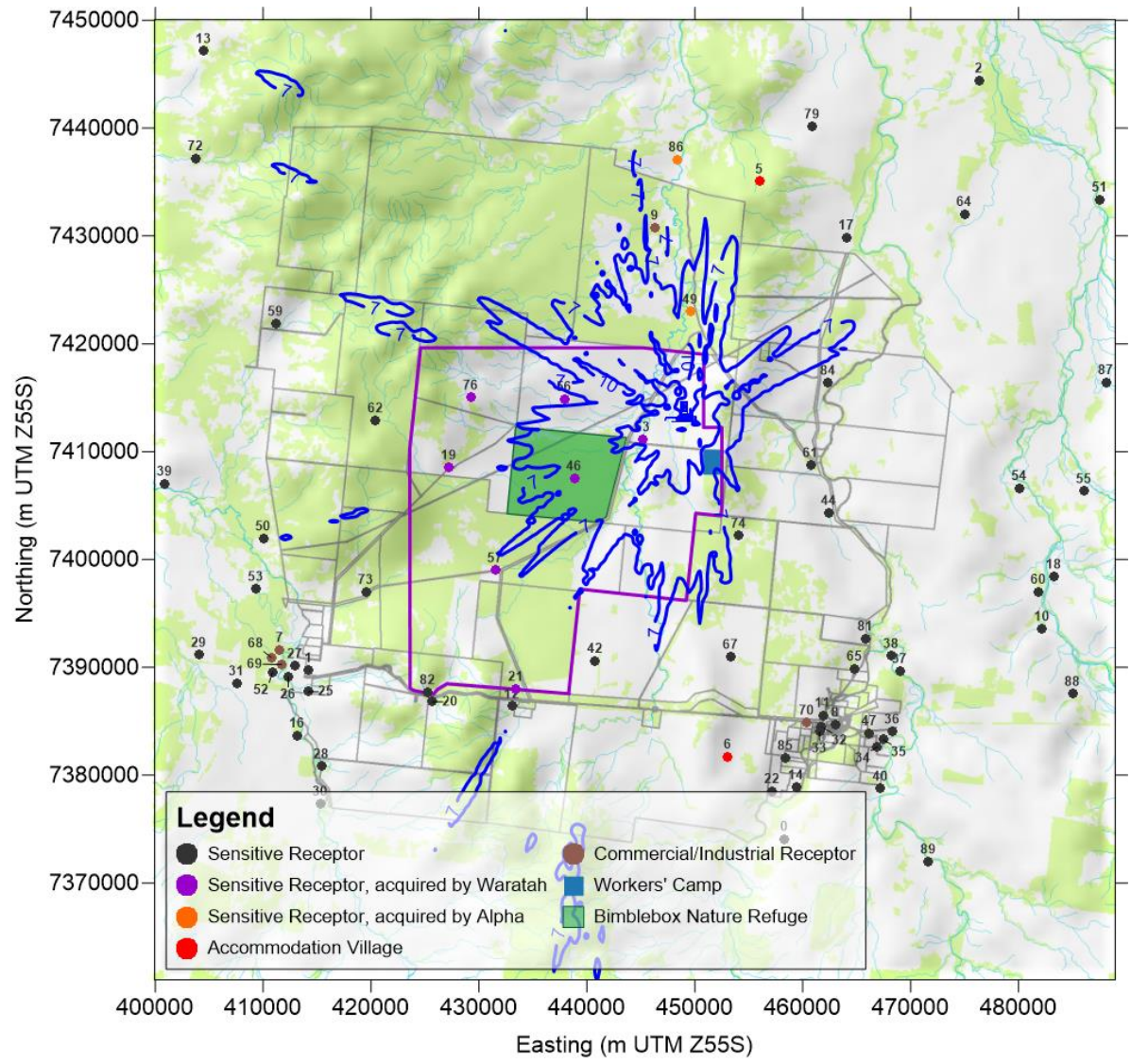

Plate 30 **1,400 MW – 25% load – Predicted maximum 24-hour average ground-level concentrations of $PM_{2.5}$ due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	24-hour	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	25 µg/m^3	Natalie Shaw	August 2019

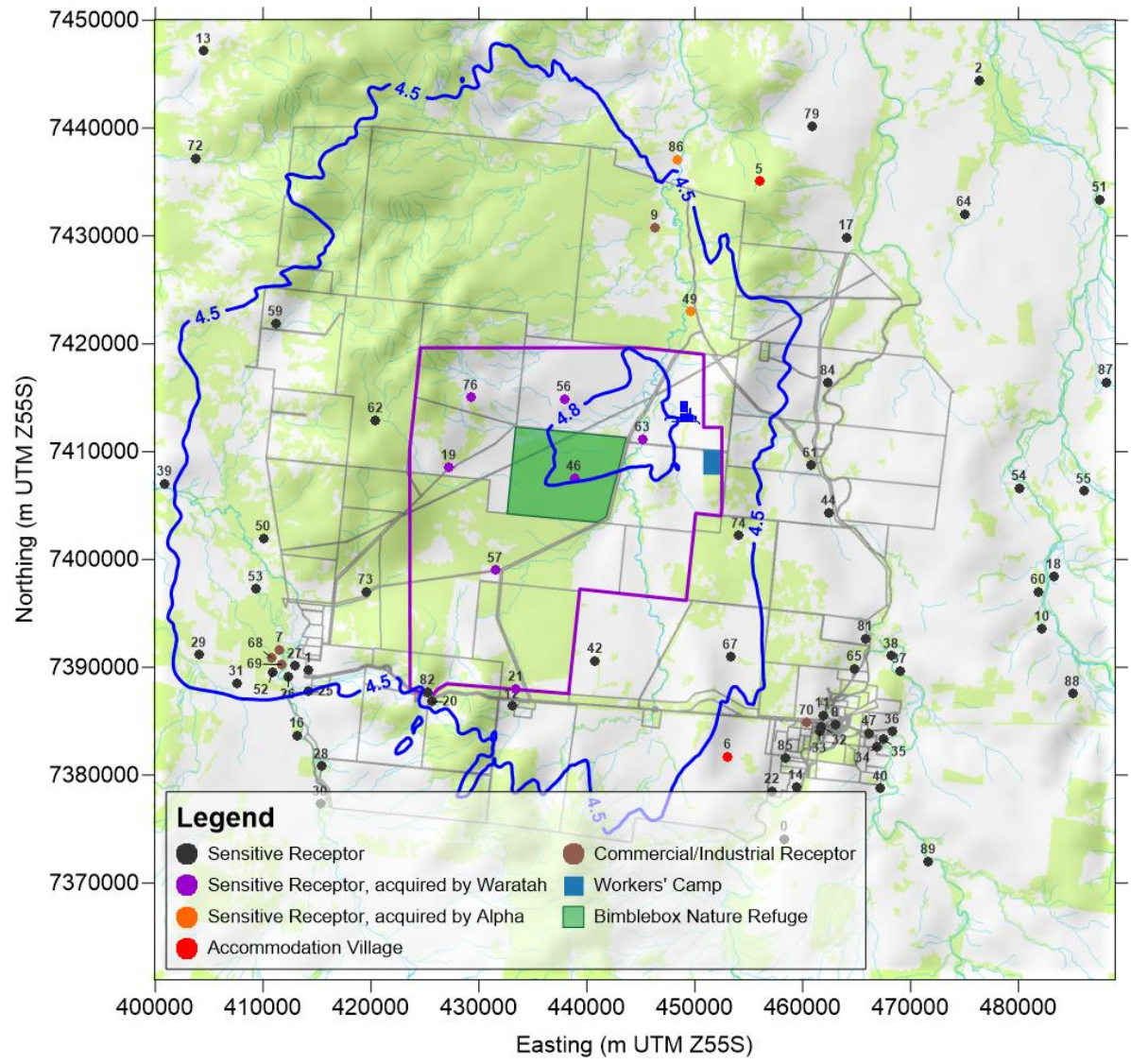

Plate 31 **1,400 MW – Overload – Predicted annual average ground-level concentrations of $PM_{2.5}$ due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	Annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	8 µg/m^3	Natalie Shaw	August 2019

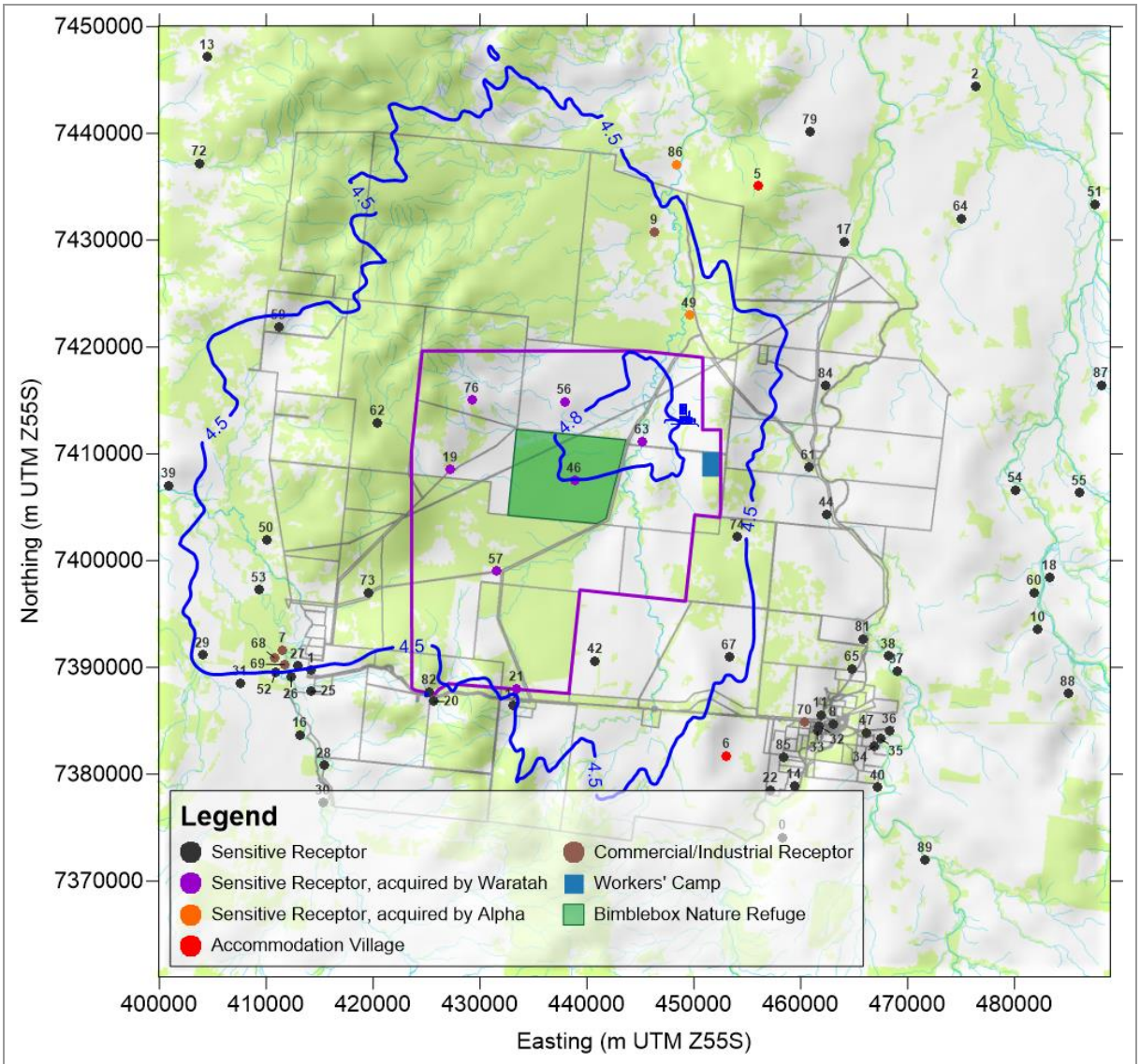

Plate 32 **1,400 MW – 100% load – Predicted annual average ground-level concentrations of $PM_{2.5}$ due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	Annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	8 µg/m^3	Natalie Shaw	August 2019

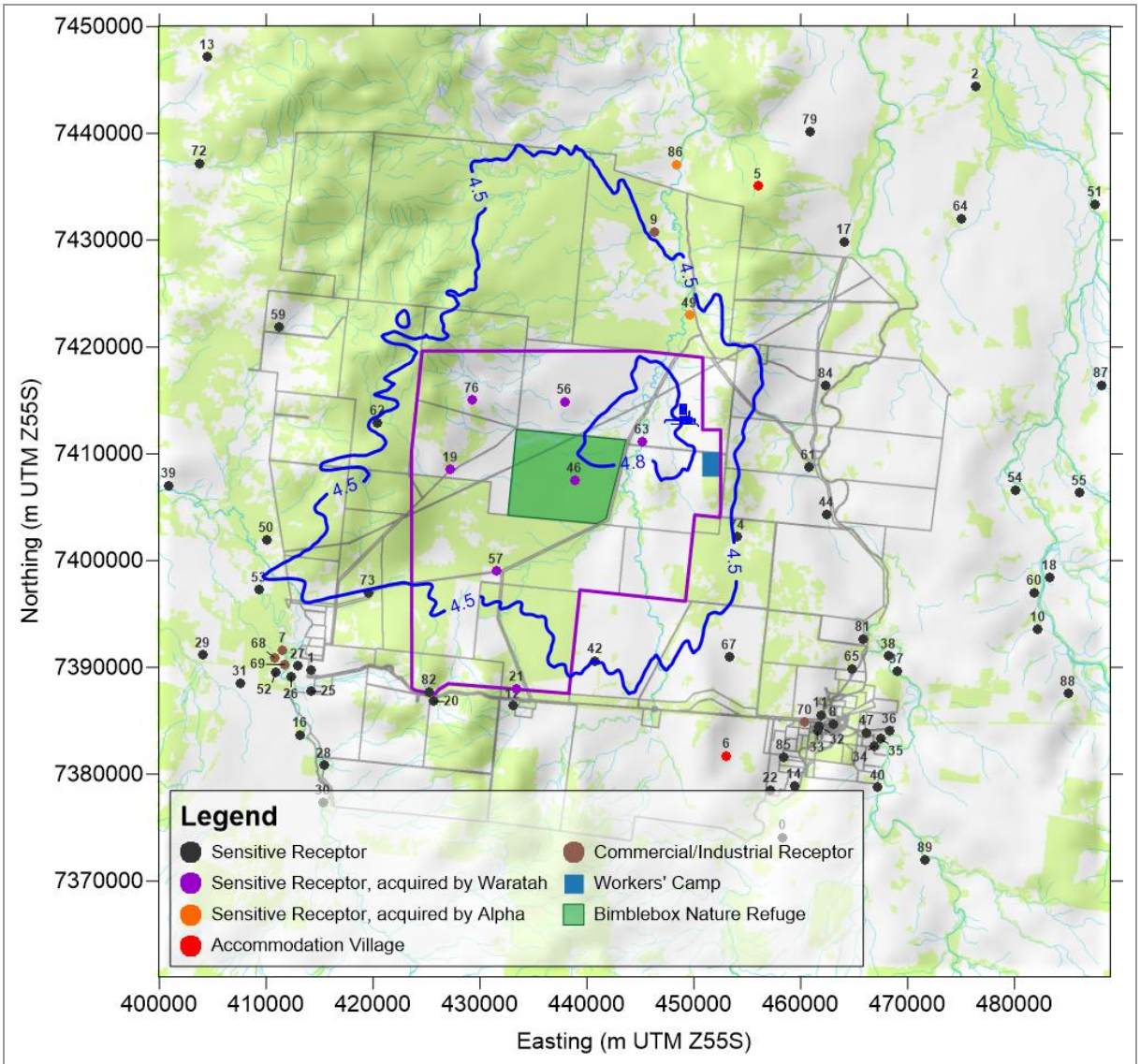

Plate 33 **1,400 MW – 60% load – Predicted annual average ground-level concentrations of $PM_{2.5}$ due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	Annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	8 µg/m^3	Natalie Shaw	August 2019

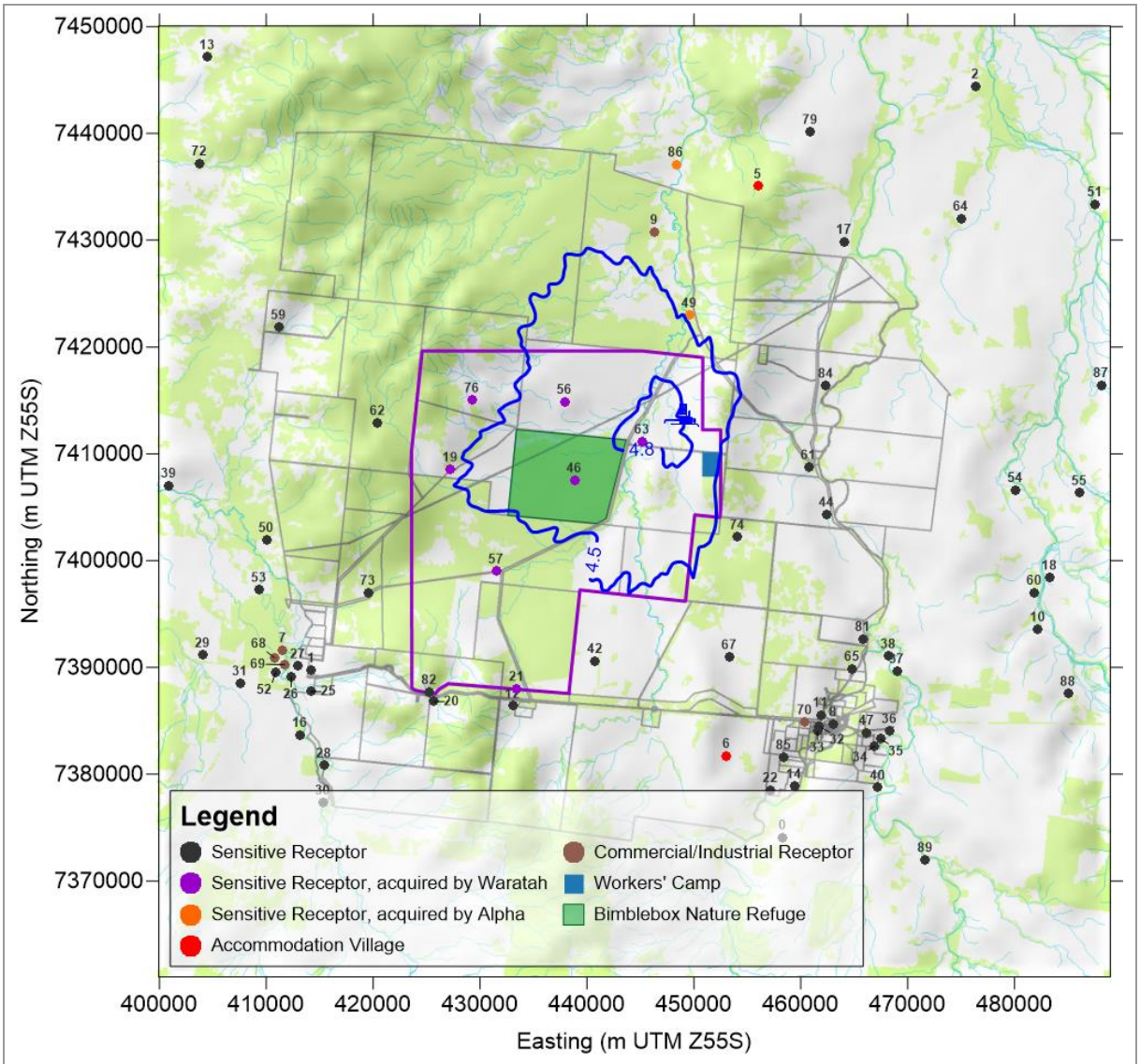

Plate 34 **1,400 MW – 25% load – Predicted annual average ground-level concentrations of $PM_{2.5}$ due to the Project including ambient background**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	Annual	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Annual	8 µg/m^3	Natalie Shaw	August 2019

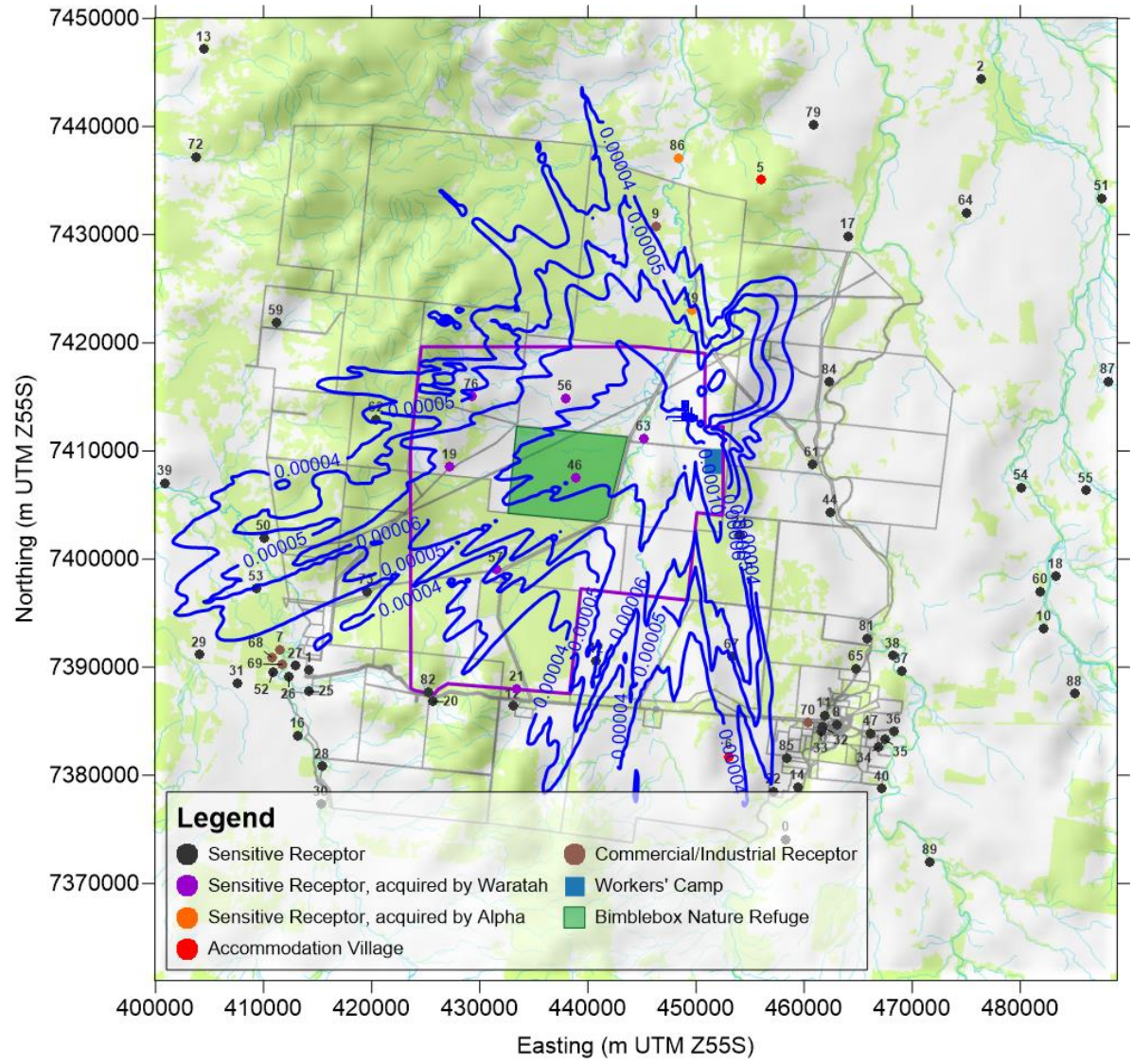

Plate 35 **1,400 MW – Overload – Predicted maximum 30-day average ground-level concentrations of fluoride due to the Project**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	30-day	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	0.84 µg/m^3	Natalie Shaw	August 2019

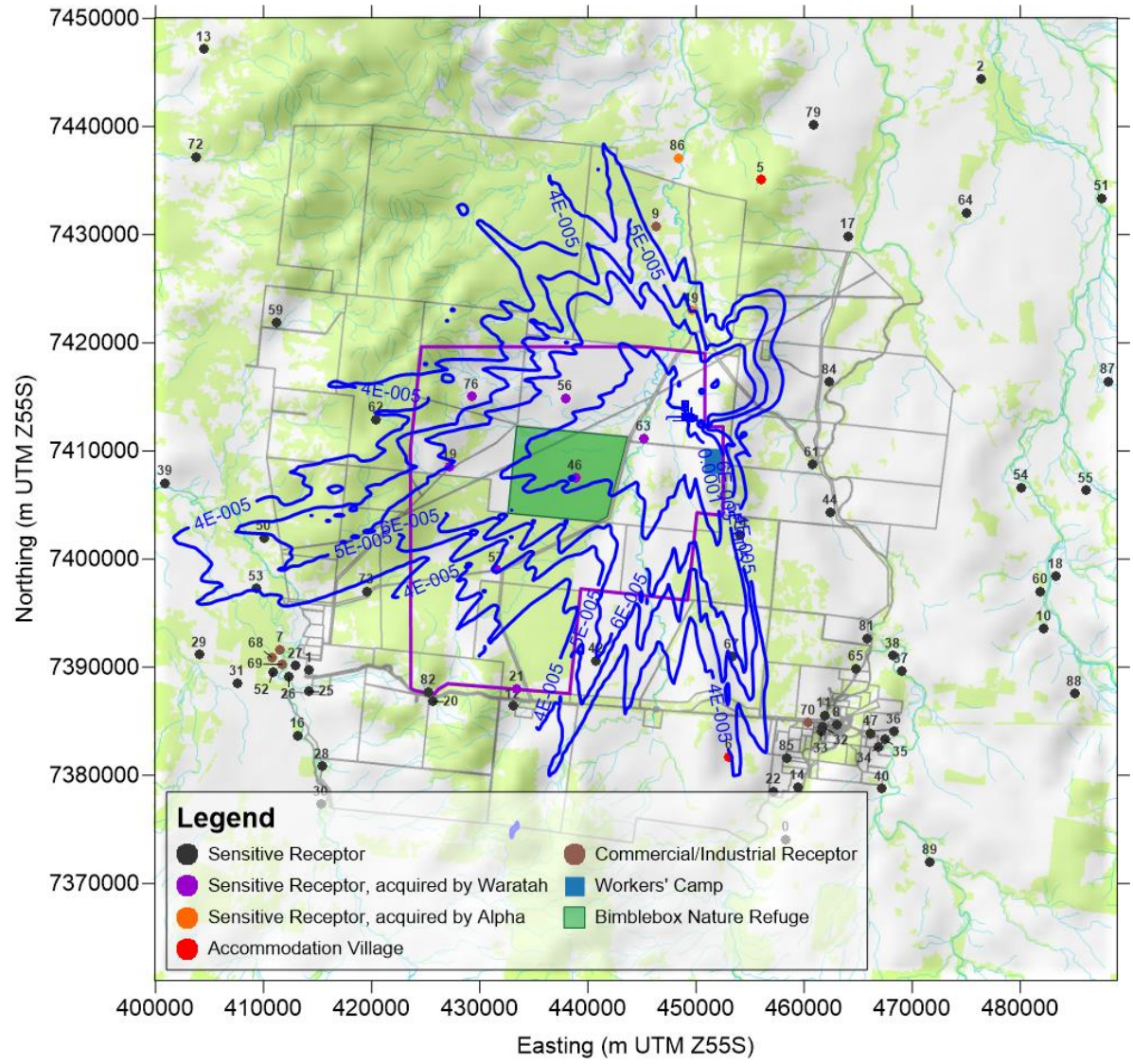

Plate 36 **1,400 MW – 100% load – Predicted maximum 30-day average ground-level concentrations of fluoride due to the Project**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	30-day	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	0.84 µg/m^3	Natalie Shaw	August 2019

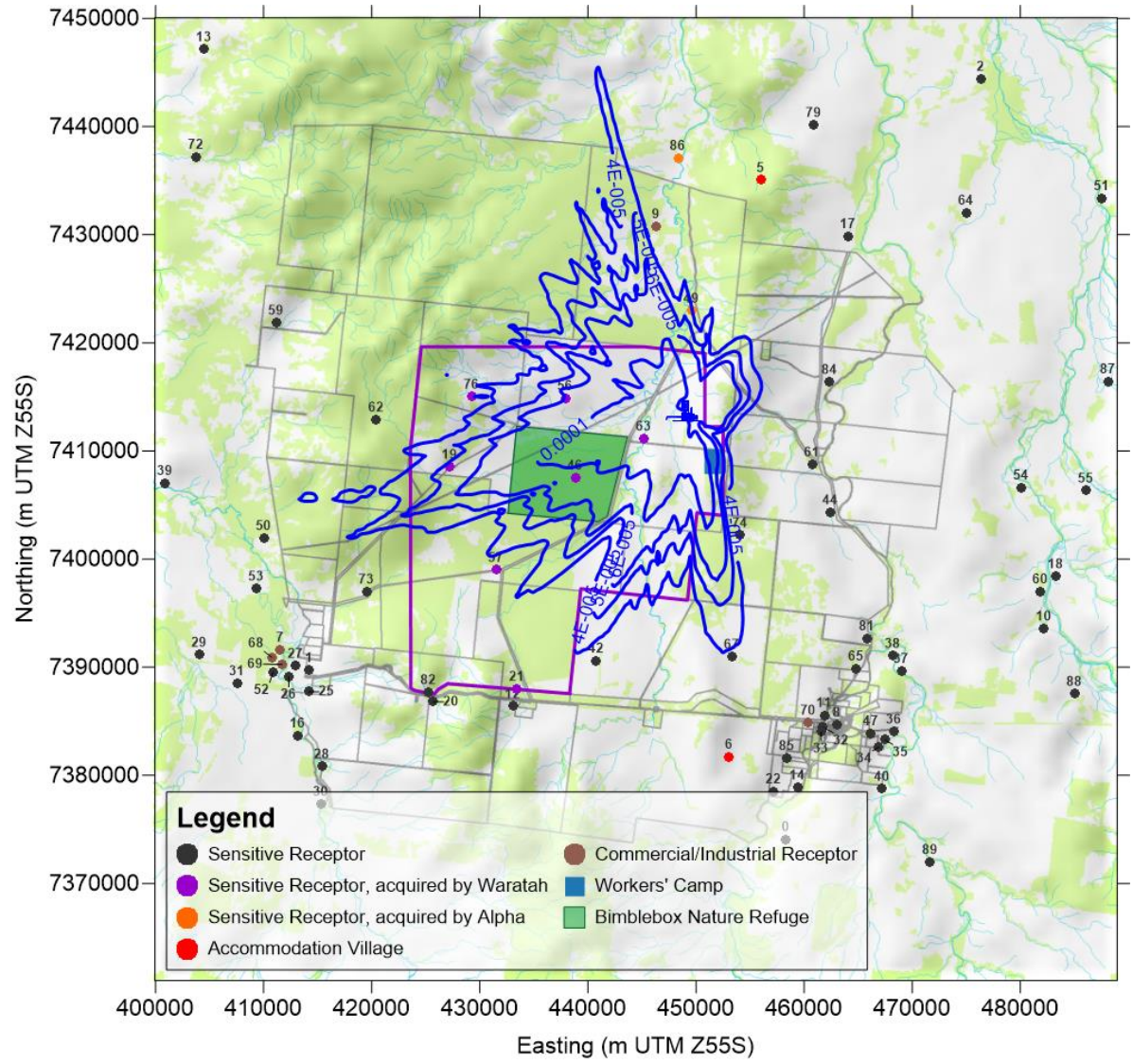

Plate 37 **1,400 MW – 60% load – Predicted maximum 30-day average ground-level concentrations of fluoride due to the Project**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	30-day	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	0.84 µg/m^3	Natalie Shaw	August 2019

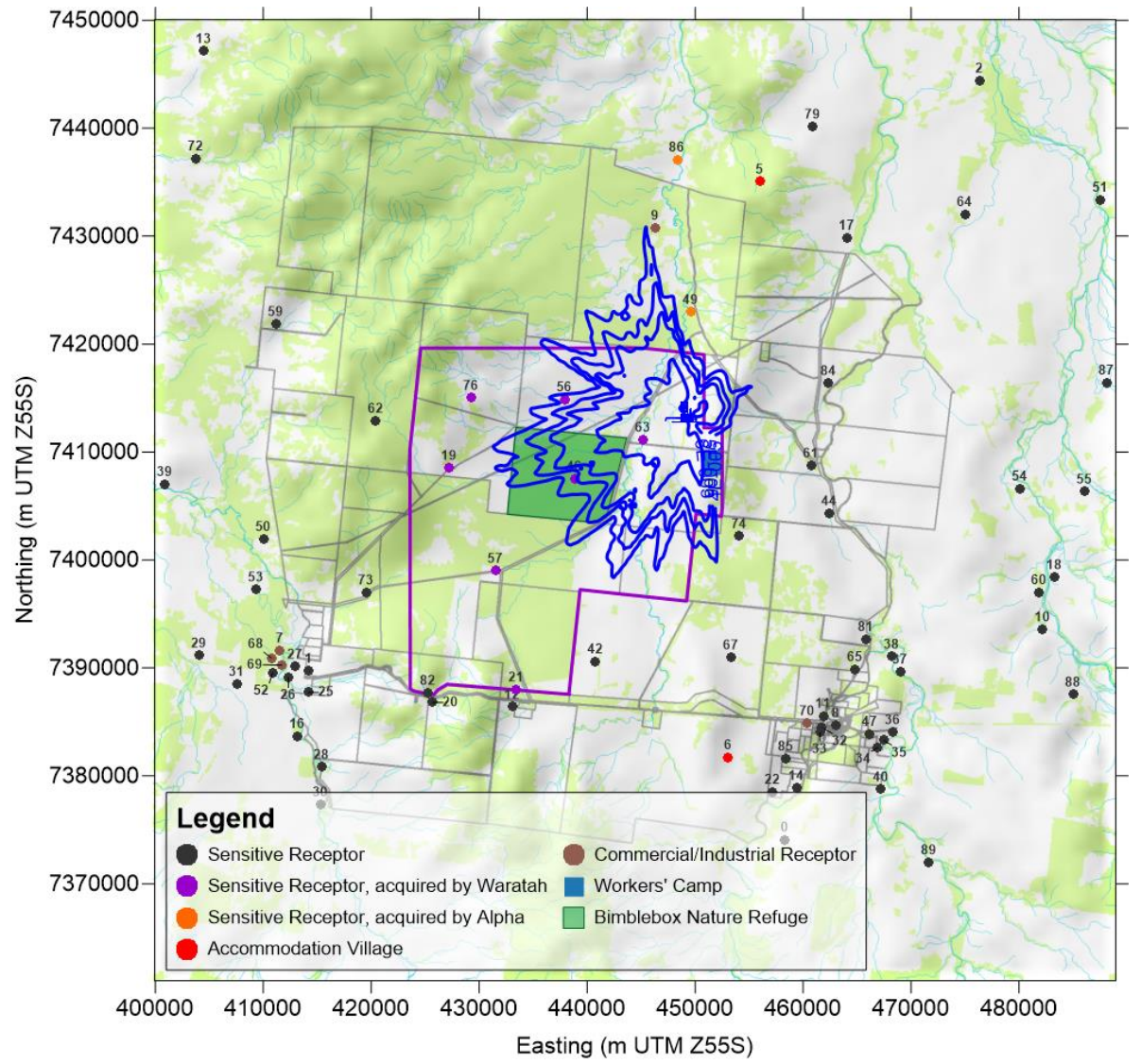

Plate 38 **1,400 MW – 25% load – Predicted maximum 30-day average ground-level concentrations of fluoride due to the Project**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	30-day	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	0.84 µg/m^3	Natalie Shaw	August 2019

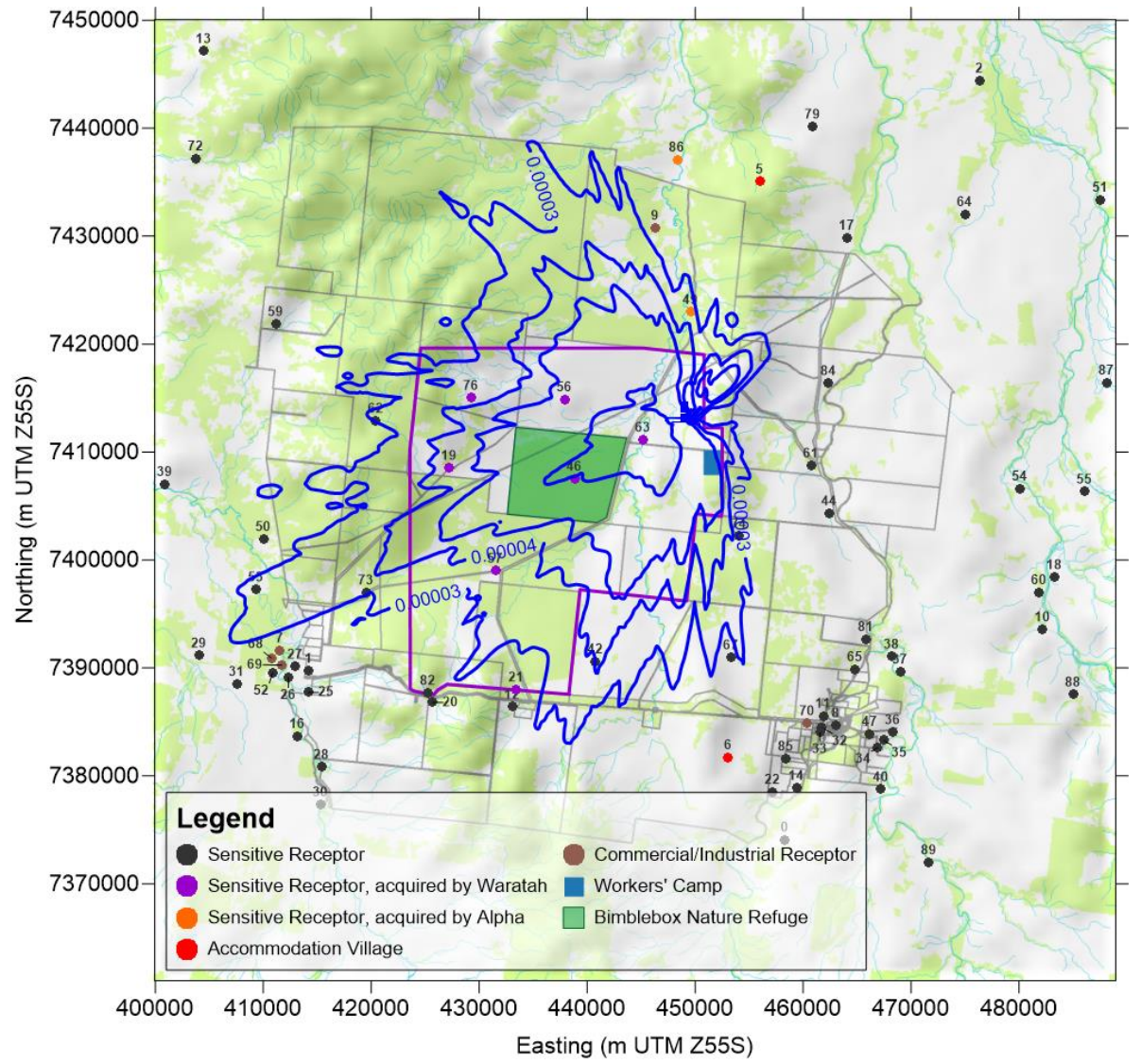

Plate 39 **1,400 MW – Overload – Predicted maximum 90-day average ground-level concentrations of fluoride due to the Project**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	90-day	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	0.1 µg/m^3	Natalie Shaw	August 2019

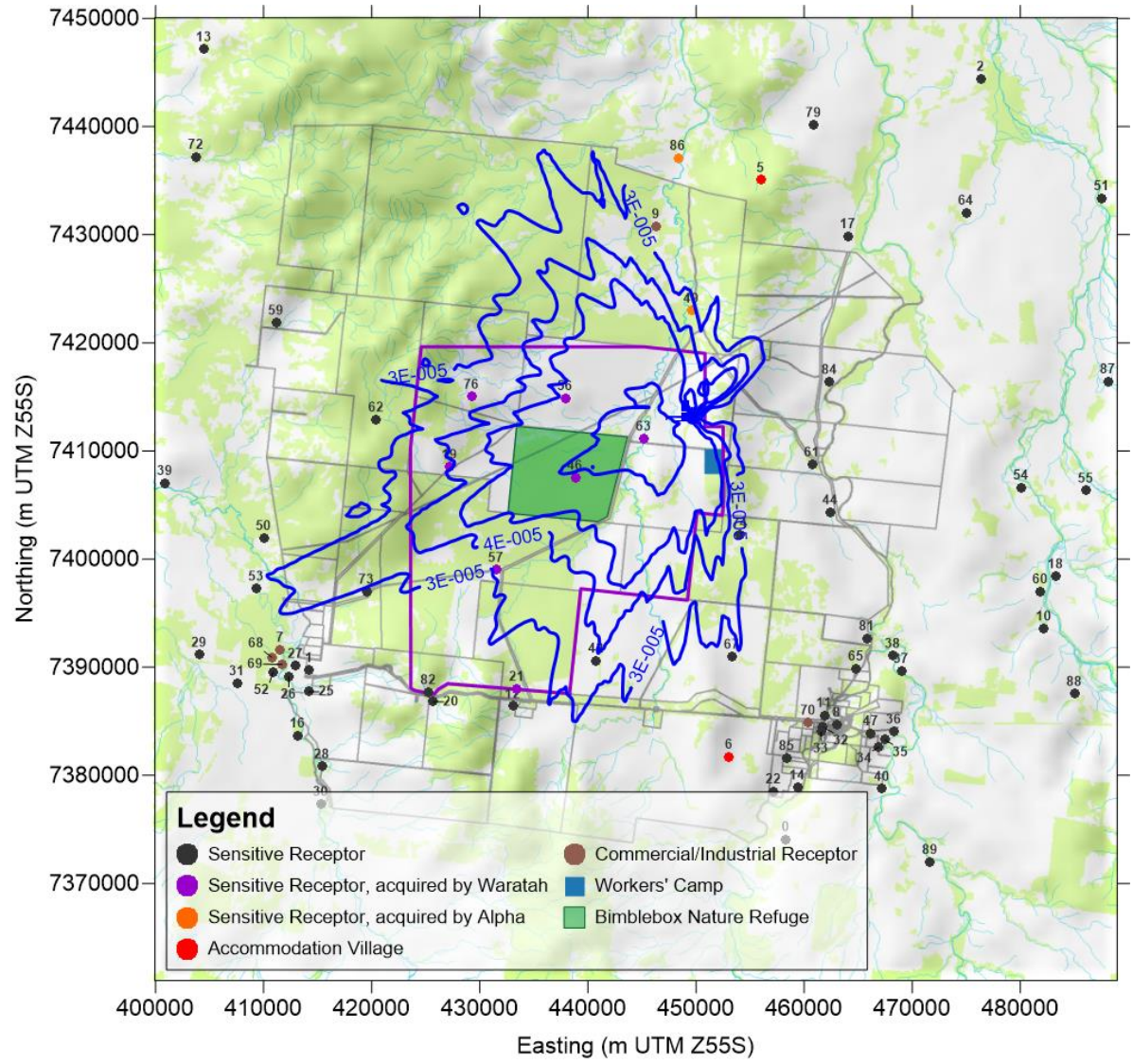

Plate 40 **1,400 MW – 100% load – Predicted maximum 90-day average ground-level concentrations of fluoride due to the Project**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	90-day	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	0.1 µg/m^3	Natalie Shaw	August 2019

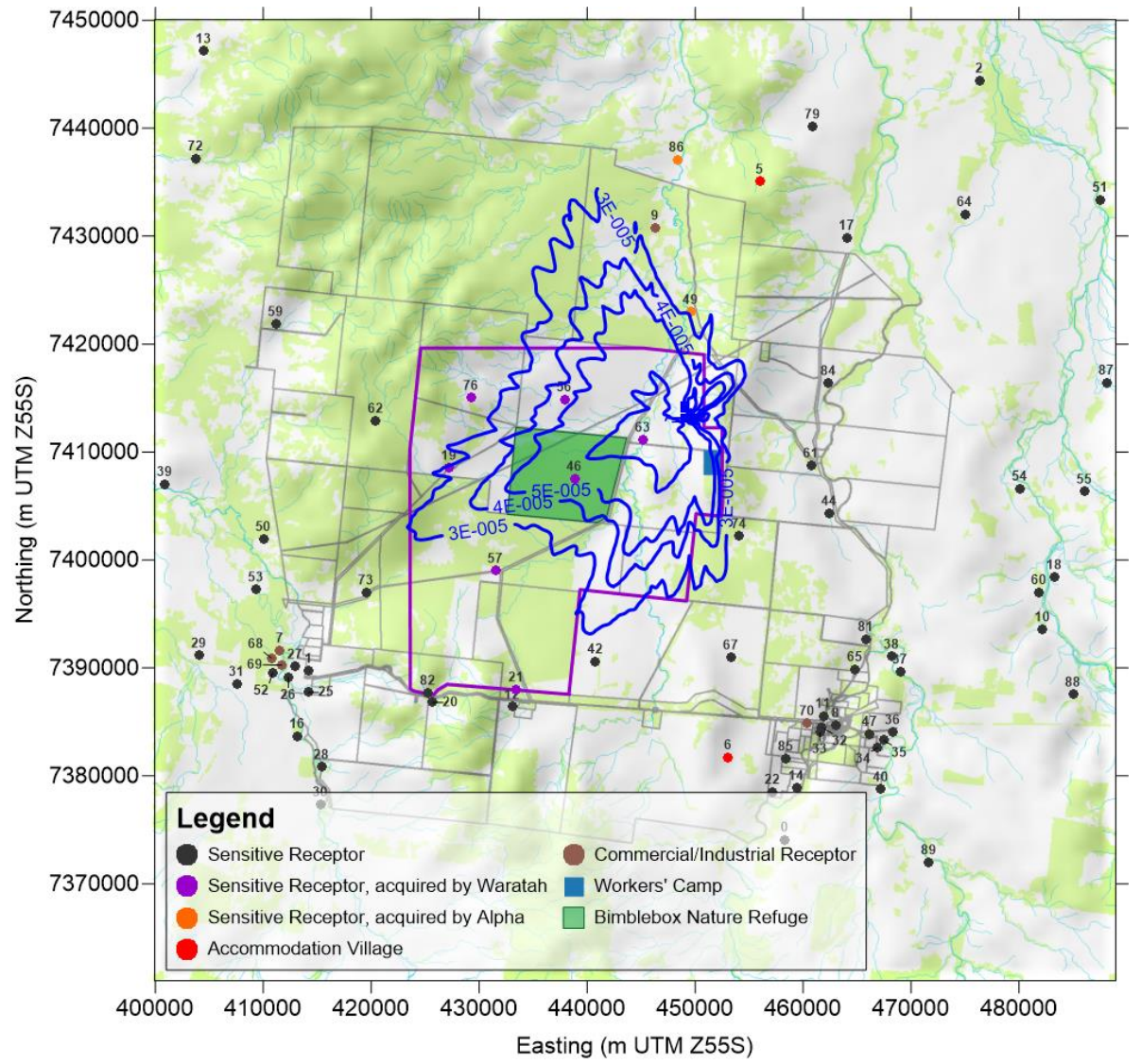

Plate 41 **1,400 MW – 60% load – Predicted maximum 90-day average ground-level concentrations of fluoride due to the Project**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	90-day	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	0.1 µg/m^3	Natalie Shaw	August 2019

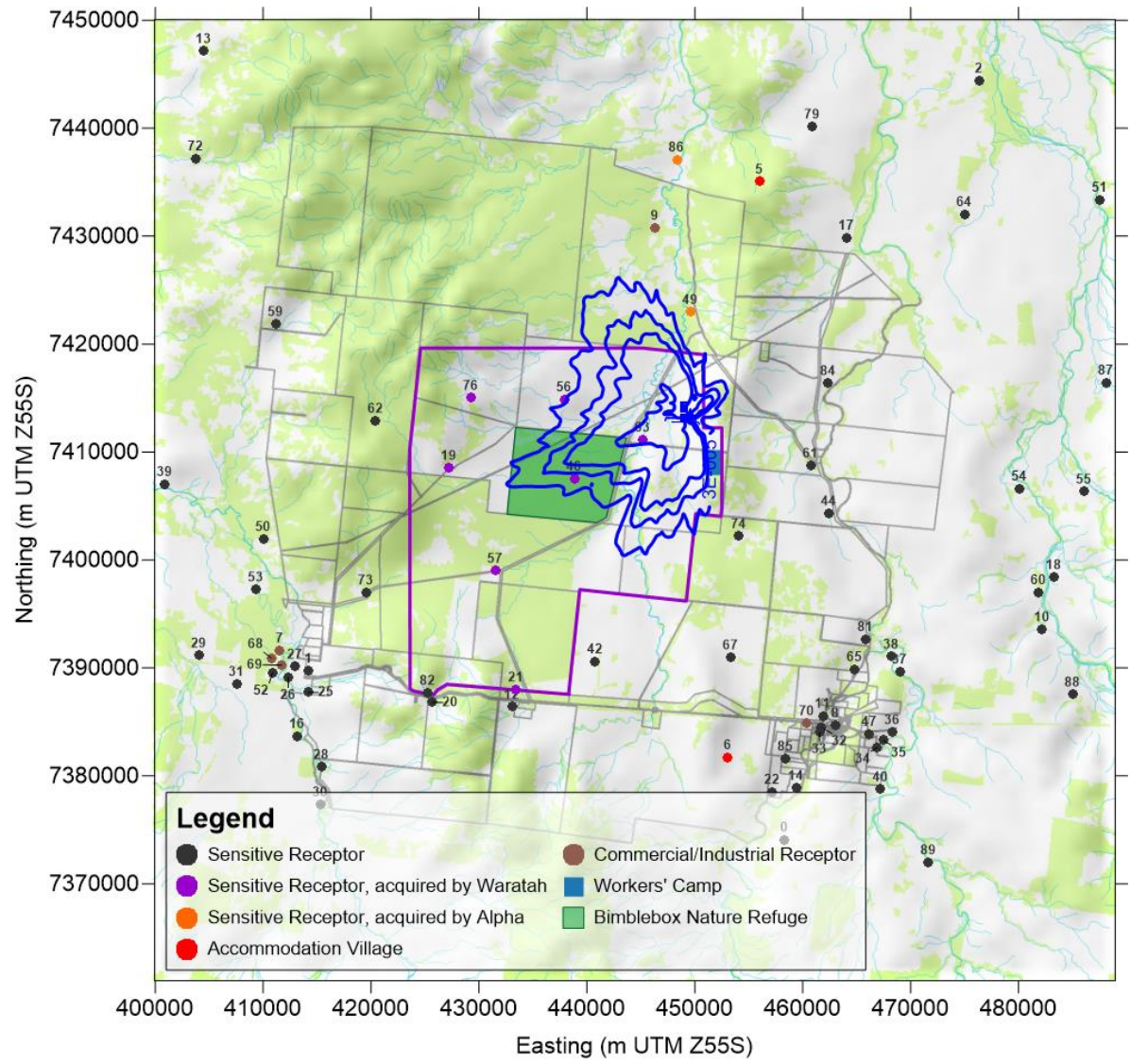

Plate 42 **1,400 MW – 25% load – Predicted maximum 90-day average ground-level concentrations of fluoride due to the Project**

Location:	**Averaging period:**	**Data source:**	**Units:**
Central Queensland	90-day	CALPUFF	µg/m^3
Type:	**Objective:**	**Prepared by:**	**Date:**
Maximum	0.1 µg/m^3	Natalie Shaw	August 2019

APPENDIX A METEOROLOGICAL AND DISPERSION MODELLING METHODOLOGY

The meteorological data for this study was generated by TAPM and CALMET, for use in the CALPUFF dispersion model. Details of the model configurations are supplied in the following sections.

A1 TAPM METEOROLOGY

The meteorological model, TAPM (The Air Pollution Model) Version 4.0.5, was developed by the CSIRO and has been validated by the CSIRO, Katestone and others for many locations in Australia, in southeast Asia and in North America (see www.cmar.csiro.au/research/tapm for more details on the model and validation results from the CSIRO). Katestone has used the TAPM model throughout Australia and has performed well for simulating regional winds patterns. TAPM has proven to be a useful model for simulating meteorology in locations where monitoring data is unavailable.

TAPM requires synoptic meteorological information for the region surrounding the Project. This information is generated by a global model similar to the large-scale models used to forecast the weather. The data are supplied on a grid resolution of approximately 75 km, and at elevations of 100 metres to five kilometres above the ground. TAPM uses this synoptic information, along with specific details of the location such as surrounding terrain, land use, soil moisture content and soil type to simulate the meteorology of a region as well as at a specific location.

TAPM resolves local terrain and land use features that may influence local meteorology and generates a meteorological dataset that is representative of site-specific geographic conditions. A year of synoptic data must be selected as input for TAPM. The selection of this year should be such that the year is representative of typical meteorological conditions (and therefore is not necessarily the most recent year of available data) and whether monitoring data is available for the time period to validate the output dataset. In addition, Katestone's experience elsewhere in Central Queensland suggests that variability of dispersion meteorological conditions from year to year are unlikely to change the outcome of the air quality assessment. For this study, the period January to December 2012 was modelled as meteorological data for the site was installed for a time during this period.

TAPM was configured as follows:

- 70 x 70 grid point domain with an outer grid of 20 kilometres and nesting grids of 10 kilometres, 3 kilometres
- Grid centred near the site of the Project at latitude -23°30’ and longitude 146°30’
- Geoscience Australia 9-second digital elevation model terrain data
- 25 vertical grid levels.

A1.1 CALMET meteorological modelling

CALMET is an advanced non-steady-state diagnostic 3D meteorological model with micro-meteorological modules for overwater and overland boundary layers. The model is the meteorological pre-processor for the CALPUFF modelling system. CALMET is capable of reading hourly meteorological data as data assimilation from multiple sites within the modelling domain; it can also be initialised with the gridded three-dimensional prognostic output from other meteorological models such as TAPM. This can improve dispersion model output, particularly over complex terrain as the near surface meteorological conditions are calculated for each grid point.

CALMET (version 6.5.0) was used to simulate meteorological conditions in the study region. The CALMET simulation was initialised with the gridded TAPM three-dimensional wind field data from the innermost grid (3 km resolution). CALMET treats the prognostic model output as the initial guess field for the CALMET diagnostic model

wind fields. CALMET then adjusts the initial guess field for the kinematic effects of terrain, slope flows, blocking effects and 3-dimensional divergence minimisation.

Key features of CALMET used to generate the wind fields are as follows:

- Domain area of 90 by 108 at 1 km spacing
- 366 days modelled (1 January to 31 December 2012)
- Prognostic wind fields input as MM5/3D.dat for "initial guess" field only (as generated from TAPM)
- Gridded cloud cover from prognostic relative humidity at all levels
- No Froude number adjustment or kinematic effects
- No extrapolation of surface wind observations to upper layers
- Terrain radius of influence set to 15 km
- All other parameters set to default.

The geophysical data (land use and terrain heights) were generated to be consistent with the geophysical dataset for TAPM.

A2 CALPUFF DISPERSION MODELLING

CALPUFF simulates the dispersion of air pollutants to predict ground-level concentration and deposition rates across a network of receptors spaced at regular intervals, and at identified discrete locations. CALPUFF is a non-steady-state Lagrangian Gaussian puff model containing parameterisations for complex terrain effects, overwater transport, coastal interaction effects, building downwash, wet and dry removal, and simple chemical transformation. CALPUFF employs the 3D meteorological fields generated from the CALMET model by simulating the effects of time and space varying meteorological conditions on pollutant transport, transformation and removal. CALPUFF takes into account the geophysical features of the study area that affects dispersion of pollutants and ground-level concentrations of those pollutants in identified regions of interest. CALPUFF contains algorithms that can resolve near-source effects such as building downwash, transitional plume rise, partial plume penetration, sub-grid scale terrain interactions, as well as the long-range effects of removal, transformation, vertical wind shear, overwater transport and coastal interactions. Emission sources can be characterised as arbitrarily-varying point, area, volume and lines or any combination of those sources within the modelling domain.

Key features of CALPUFF used to simulate dispersion:

- Domain area of 90 by 100 grids at 1 km spacing, equivalent to the domain defined in CALMET, with a nesting factor of 2
- 365 days modelled (1 January 2012 to 31 December 2012)
- Gridded 3D hourly-varying meteorological conditions generated by CALMET
- Partial plume path adjustment for terrain modelled
- Dispersion coefficients calculated internally from sigma v and sigma w using micrometeorological variables
- Building wakes were incorporated using the PRIME algorithm
- Stack tip downwash, transitional plume rise and PDF used for dispersion under convective conditions.

All other options set to default.

APPENDIX B DISCRETE RECEPTOR RESULTS

Table B1 1,400 MW – Predicted maximum 1-hour concentrations of NO_2 due to Project in isolation and with background

ID	Name	Maximum 1-hour NO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
0	Dwelling	16.5	13.9	14.2	6.0	51.4	48.8	49.1	40.9
1	Dwelling	17.1	16.7	12.9	7.7	52.0	51.6	47.8	42.6
2	Dwelling	9.8	8.7	5.1	2.7	44.7	43.6	40.0	37.6
5	Accommodation Village - Alpha Coal Project	24.7	23.9	16.9	9.6	59.6	58.8	51.8	44.5
6	Accommodation Village - South Galilee Coal Project	20.0	44.8	55.9	14.5	54.9	79.7	90.8	49.4
7	Airfield	24.1	21.7	14.4	6.4	59.0	56.6	49.3	41.3
8	Alpha	15.3	13.8	9.9	12.8	50.2	48.7	44.8	47.7
9	Alpha Coal Bulk Sample	28.5	30.4	28.7	27.4	63.4	65.3	63.6	62.3
10	Beaufort Homestead	13.1	9.9	8.1	3.6	48.0	44.8	43.0	38.5
11	Bedford Homestead	12.3	13.2	10.0	27.4	47.2	48.1	44.9	62.3
12	Betanga Homestead	16.9	14.0	17.5	11.8	51.8	48.9	52.4	46.7
13	Blairgowrie	15.6	14.9	11.6	8.1	50.5	49.8	46.5	43.0
14	Bonanza Homestead	33.3	24.3	11.1	14.8	68.2	59.2	46.0	49.7
16	Burgoyne Homestead	13.2	11.4	14.6	4.0	48.1	46.3	49.5	38.9
17	Burtle Homestead	18.9	17.0	9.1	4.8	53.8	51.9	44.0	39.7
18	Carinya Homestead	17.3	17.5	17.4	4.2	52.2	52.4	52.3	39.1
19	Cavendish Homestead[a]	20.5	19.4	24.3	9.7	55.4	54.3	59.2	44.6
20	Colorado Homestead	34.8	24.3	13.9	12.2	69.7	59.2	48.8	47.1
21	Corn Top Homestead[a]	24.5	16.3	9.0	23.8	59.4	51.2	43.9	58.7
22	Creek Farm Homestead	23.0	17.6	11.3	5.3	57.9	52.5	46.2	40.2
25	Dwelling	16.8	12.2	10.2	5.7	51.7	47.1	45.1	40.6
26	Dwelling	14.0	16.3	11.5	10.3	48.9	51.2	46.4	45.2
27	Dwelling	17.3	16.5	13.0	8.3	52.2	51.4	47.9	43.2
28	Dwelling	16.2	14.6	13.0	5.2	51.1	49.5	47.9	40.1
29	Dwelling	20.9	16.1	9.9	10.9	55.8	51.0	44.8	45.8
30	Dwelling	13.7	18.3	22.7	8.9	48.6	53.2	57.6	43.8
31	Dwelling	18.6	14.1	13.4	6.5	53.5	49.0	48.3	41.4
32	Dwelling	12.6	12.9	16.3	14.0	47.5	47.8	51.2	48.9
33	Dwelling	12.6	12.7	16.4	9.5	47.5	47.6	51.3	44.4
34	Dwelling	18.7	16.1	7.8	10.9	53.6	51.0	42.7	45.8
35	Dwelling	19.1	13.4	8.9	11.8	54.0	48.3	43.8	46.7
36	Dwelling	24.4	30.7	7.8	6.5	59.3	65.6	42.7	41.4
37	Dwelling	14.3	15.6	14.0	14.7	49.2	50.5	48.9	49.6
38	Dwelling?	14.6	14.5	12.1	10.0	49.5	49.4	47.0	44.9

ID	Name	Maximum 1-hour NO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
39	Edwinstowe Homestead	27.6	21.6	11.7	8.1	62.5	56.5	46.6	43.0
40	Elphin Homestead	17.4	32.1	13.2	9.7	52.3	67.0	48.1	44.6
41	Eulimbie Homestead	19.6	16.1	11.3	5.9	54.5	51.0	46.2	40.8
42	Eureka Homestead	69.4	52.0	45.7	14.5	104.3	86.9	80.6	49.4
44	Gadwell Homestead	30.4	26.1	8.8	16.6	65.3	61.0	43.7	51.5
46	Glen Innes Homestead[a]	44.0	41.3	29.5	16.4	78.9	76.2	64.4	51.3
47	Hazelbrook Homestead	19.7	14.6	7.5	8.3	54.6	49.5	42.4	43.2
49	Hobartville Homestead[b]	26.3	28.4	34.1	20.0	61.2	63.3	69.0	54.9
50	Inverurie Homestead	23.8	36.4	13.9	14.4	58.7	71.3	48.8	49.3
51	Islay Plains Homestead	5.3	5.1	3.8	4.6	40.2	40.0	38.7	39.5
52	Jericho	19.6	15.1	13.4	6.2	54.5	50.0	48.3	41.1
53	Jordan Avon Homestead	27.6	25.9	16.3	10.8	62.5	60.8	51.2	45.7
54	Kalbar Homestead	8.3	7.0	4.3	2.5	43.2	41.9	39.2	37.4
55	Kerand Homestead	7.5	6.5	3.9	1.9	42.4	41.4	38.8	36.8
56	Kia Ora Homestead[a]	43.4	35.6	24.8	24.1	78.3	70.5	59.7	59.0
57	Lambton Meadows Homestead[a]	51.1	37.0	25.7	14.6	86.0	71.9	60.6	49.5
59	Locharnoch	31.0	27.9	16.8	7.2	65.9	62.8	51.7	42.1
60	Melton Homestead	13.7	9.3	5.6	4.4	48.6	44.2	40.5	39.3
61	Mentmore Homestead	30.6	27.6	19.5	13.8	65.5	62.5	54.4	48.7
62	Milangavla	20.7	23.0	40.1	10.8	55.6	57.9	75.0	45.7
63	Monklands[a]	98.9	87.0	57.1	32.9	133.8	121.9	92.0	67.8
64	Moonstone Homestead	12.7	19.1	14.5	5.9	47.6	54.0	49.4	40.8
65	Mossvale Homestead	41.3	32.3	8.5	12.7	76.2	67.2	43.4	47.6
67	Oakleigh Homestead	38.1	41.9	18.3	6.7	73.0	76.8	53.2	41.6
68	Quarry?	21.6	21.6	15.2	6.9	56.5	56.5	50.1	41.8
69	Racecourse	21.1	17.7	13.1	6.1	56.0	52.6	48.0	41.0
70	Racecourse	12.0	11.4	11.1	13.0	46.9	46.3	46.0	47.9
72	Rosedale Homestead	25.0	13.4	11.7	9.1	59.9	48.3	46.6	44.0
73	Rosefield Homestead	31.3	34.1	24.4	17.0	66.2	69.0	59.3	51.9
74	Salt Bush Homestead	28.4	23.0	22.4	21.4	63.3	57.9	57.3	56.3
75	Speculation Homestead	13.9	25.3	14.1	11.0	48.8	60.2	49.0	45.9
76	Spring Creek[a]	25.0	25.8	24.9	13.5	59.9	60.7	59.8	48.4
79	Surbiton Homestead	10.0	10.8	12.1	5.5	44.9	45.7	47.0	40.4
80	Surbiton Station	18.6	15.0	9.7	10.3	53.5	49.9	44.6	45.2
81	The Grove Homestead	23.4	21.6	22.9	5.1	58.3	56.5	57.8	40.0
82	Toarbee	26.2	35.9	25.2	19.6	61.1	70.8	60.1	54.5
84	Tressillian Homestead	17.8	16.3	11.3	7.2	52.7	51.2	46.2	42.1
85	Villafield Homestead	39.1	30.3	12.2	16.6	74.0	65.2	47.1	51.5
86	Wendouree Homestead[b]	19.8	18.1	15.8	23.2	54.7	53.0	50.7	58.1
87	Woodbrook Homestead	6.3	5.5	2.6	1.4	41.2	40.4	37.5	36.3
88	Wycheproof Homestead	17.4	20.3	13.9	3.0	52.3	55.2	48.8	37.9

ID	Name	Maximum 1-hour NO_2 ($\mu g/m^3$)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
89	Zeta Homestead	12.3	17.0	13.6	10.5	47.2	51.9	48.5	45.4
-	Workers' Camp	179.8	174.0	111.4	73.4	214.7	208.9	146.3	108.3
Background included		-	-	-	-	35	35	35	35
Objective		**-**	**-**	**-**	**-**	**250**	**250**	**250**	**250**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table B2 1,400 MW – Predicted annual average ground-level concentrations of NO_2 due to Project in isolation and with background

ID	Name	Annual NO_2 ($\mu g/m^3$)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
0	Dwelling	0.08	0.08	0.05	0.03	10.8	10.8	10.8	10.7
1	Dwelling	0.13	0.12	0.08	0.05	10.8	10.8	10.8	10.7
2	Dwelling	0.04	0.03	0.02	0.01	10.7	10.7	10.7	10.7
5	Accommodation Village - Alpha Coal Project	0.08	0.07	0.05	0.03	10.8	10.8	10.8	10.7
6	Accommodation Village - South Galilee Coal Project	0.10	0.10	0.08	0.05	10.8	10.8	10.8	10.7
7	Airfield	0.15	0.13	0.09	0.05	10.8	10.8	10.8	10.7
8	Alpha	0.06	0.05	0.04	0.02	10.8	10.8	10.7	10.7
9	Alpha Coal Bulk Sample	0.15	0.15	0.11	0.08	10.9	10.8	10.8	10.8
10	Beaufort Homestead	0.03	0.02	0.02	0.01	10.7	10.7	10.7	10.7
11	Bedford Homestead	0.06	0.06	0.04	0.03	10.8	10.8	10.7	10.7
12	Betanga Homestead	0.13	0.12	0.09	0.07	10.8	10.8	10.8	10.8
13	Blairgowrie	0.07	0.07	0.05	0.03	10.8	10.8	10.7	10.7
14	Bonanza Homestead	0.09	0.08	0.05	0.03	10.8	10.8	10.8	10.7
16	Burgoyne Homestead	0.10	0.09	0.07	0.04	10.8	10.8	10.8	10.7
17	Burtle Homestead	0.07	0.06	0.04	0.02	10.8	10.8	10.7	10.7
18	Carinya Homestead	0.03	0.02	0.02	0.01	10.7	10.7	10.7	10.7
19	Cavendish Homestead[a]	0.26	0.25	0.19	0.11	11.0	10.9	10.9	10.8
20	Colorado Homestead	0.12	0.11	0.07	0.04	10.8	10.8	10.8	10.7
21	Corn Top Homestead[a]	0.14	0.12	0.09	0.07	10.8	10.8	10.8	10.8
22	Creek Farm Homestead	0.09	0.09	0.06	0.03	10.8	10.8	10.8	10.7
25	Dwelling	0.12	0.11	0.07	0.04	10.8	10.8	10.8	10.7
26	Dwelling	0.13	0.12	0.08	0.05	10.8	10.8	10.8	10.7
27	Dwelling	0.14	0.12	0.08	0.05	10.8	10.8	10.8	10.7
28	Dwelling	0.10	0.09	0.07	0.04	10.8	10.8	10.8	10.7
29	Dwelling	0.14	0.13	0.09	0.05	10.8	10.8	10.8	10.7

ID	Name	Annual NO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
30	Dwelling	0.10	0.09	0.06	0.03	10.8	10.8	10.8	10.7
31	Dwelling	0.13	0.11	0.08	0.04	10.8	10.8	10.8	10.7
32	Dwelling	0.06	0.06	0.04	0.03	10.8	10.8	10.7	10.7
33	Dwelling	0.07	0.06	0.04	0.02	10.8	10.8	10.7	10.7
34	Dwelling	0.05	0.04	0.03	0.02	10.7	10.7	10.7	10.7
35	Dwelling	0.05	0.04	0.03	0.02	10.7	10.7	10.7	10.7
36	Dwelling	0.05	0.04	0.03	0.02	10.7	10.7	10.7	10.7
37	Dwelling	0.04	0.04	0.03	0.02	10.7	10.7	10.7	10.7
38	Dwelling?	0.04	0.04	0.03	0.02	10.7	10.7	10.7	10.7
39	Edwinstowe Homestead	0.11	0.10	0.07	0.04	10.8	10.8	10.8	10.7
40	Elphin Homestead	0.05	0.04	0.03	0.02	10.7	10.7	10.7	10.7
41	Eulimbie Homestead	0.03	0.03	0.02	0.01	10.7	10.7	10.7	10.7
42	Eureka Homestead	0.19	0.18	0.12	0.08	10.9	10.9	10.8	10.8
44	Gadwell Homestead	0.06	0.05	0.04	0.02	10.8	10.8	10.7	10.7
46	Glen Innes Homestead[a]	0.51	0.47	0.36	0.20	11.2	11.2	11.1	10.9
47	Hazelbrook Homestead	0.05	0.05	0.03	0.02	10.8	10.7	10.7	10.7
49	Hobartville Homestead[b]	0.22	0.21	0.17	0.11	10.9	10.9	10.9	10.8
50	Inverurie Homestead	0.17	0.16	0.11	0.07	10.9	10.9	10.8	10.8
51	Islay Plains Homestead	0.02	0.02	0.01	0.01	10.7	10.7	10.7	10.7
52	Jericho	0.13	0.12	0.08	0.05	10.8	10.8	10.8	10.7
53	Jordan Avon Homestead	0.18	0.16	0.11	0.06	10.9	10.9	10.8	10.8
54	Kalbar Homestead	0.03	0.03	0.02	0.01	10.7	10.7	10.7	10.7
55	Kerand Homestead	0.02	0.02	0.01	0.01	10.7	10.7	10.7	10.7
56	Kia Ora Homestead[a]	0.40	0.38	0.29	0.17	11.1	11.1	11.0	10.9
57	Lambton Meadows Homestead[a]	0.21	0.19	0.15	0.08	10.9	10.9	10.8	10.8
59	Locharnoch	0.14	0.13	0.10	0.05	10.8	10.8	10.8	10.7
60	Melton Homestead	0.03	0.02	0.02	0.01	10.7	10.7	10.7	10.7
61	Mentmore Homestead	0.08	0.07	0.05	0.03	10.8	10.8	10.8	10.7
62	Milangavla	0.20	0.18	0.13	0.07	10.9	10.9	10.8	10.8
63	Monklands[a]	0.87	0.88	0.88	0.69	11.6	11.6	11.6	11.4
64	Moonstone Homestead	0.04	0.04	0.03	0.02	10.7	10.7	10.7	10.7
65	Mossvale Homestead	0.06	0.05	0.03	0.02	10.8	10.7	10.7	10.7
67	Oakleigh Homestead	0.14	0.13	0.10	0.06	10.8	10.8	10.8	10.8
68	Quarry?	0.14	0.13	0.09	0.05	10.8	10.8	10.8	10.7
69	Racecourse	0.14	0.12	0.09	0.05	10.8	10.8	10.8	10.7
70	Racecourse	0.07	0.07	0.05	0.03	10.8	10.8	10.7	10.7
72	Rosedale Homestead	0.08	0.07	0.05	0.03	10.8	10.8	10.7	10.7
73	Rosefield Homestead	0.19	0.17	0.12	0.07	10.9	10.9	10.8	10.8
74	Salt Bush Homestead	0.15	0.14	0.10	0.06	10.9	10.8	10.8	10.8
75	Speculation Homestead	0.07	0.07	0.06	0.04	10.8	10.8	10.8	10.7
76	Spring Creek[a]	0.25	0.23	0.16	0.09	10.9	10.9	10.9	10.8

ID	Name	Annual NO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
79	Surbiton Homestead	0.05	0.04	0.03	0.02	10.7	10.7	10.7	10.7
80	Surbiton Station	0.04	0.03	0.02	0.01	10.7	10.7	10.7	10.7
81	The Grove Homestead	0.05	0.05	0.03	0.02	10.8	10.7	10.7	10.7
82	Toarbee	0.13	0.12	0.08	0.05	10.8	10.8	10.8	10.7
84	Tressillian Homestead	0.08	0.07	0.05	0.03	10.8	10.8	10.8	10.7
85	Villafield Homestead	0.09	0.08	0.06	0.03	10.8	10.8	10.8	10.7
86	Wendouree Homestead[b]	0.11	0.11	0.08	0.05	10.8	10.8	10.8	10.8
87	Woodbrook Homestead	0.02	0.02	0.01	0.01	10.7	10.7	10.7	10.7
88	Wycheproof Homestead	0.02	0.02	0.01	0.01	10.7	10.7	10.7	10.7
89	Zeta Homestead	0.03	0.03	0.03	0.01	10.7	10.7	10.7	10.7
-	Workers' Camp	0.41	0.41	0.39	0.24	11.1	11.1	11.1	10.9
Background included		-	-	-	-	11	11	11	11
Objective		**-**	**-**	**-**	**-**	**62**	**62**	**62**	**62**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table B3 1,400 MW – Predicted maximum 1-hour average ground-level concentrations of SO_2 due to Project in isolation and with background

ID	Name	1-hour SO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
0	Dwelling	7.0	5.9	6.0	2.5	18.4	17.3	17.4	13.9
1	Dwelling	7.2	7.1	5.5	3.3	18.6	18.5	16.9	14.7
2	Dwelling	4.1	3.7	2.2	1.1	15.5	15.1	13.6	12.5
5	Accommodation Village - Alpha Coal Project	10.5	10.1	7.2	4.1	21.9	21.5	18.6	15.5
6	Accommodation Village - South Galilee Coal Project	8.5	19.0	23.7	6.1	19.9	30.4	35.1	17.5
7	Airfield	10.2	9.2	6.1	2.7	21.6	20.6	17.5	14.1
8	Alpha	6.5	5.9	4.2	5.4	17.9	17.3	15.6	16.8
9	Alpha Coal Bulk Sample	12.1	12.9	12.2	11.6	23.5	24.3	23.6	23.0
10	Beaufort Homestead	5.5	4.2	3.4	1.5	16.9	15.6	14.8	12.9
11	Bedford Homestead	5.2	5.6	4.2	11.6	16.6	17.0	15.6	23.0
12	Betanga Homestead	7.2	5.9	7.4	5.0	18.6	17.3	18.8	16.4
13	Blairgowrie	6.6	6.3	4.9	3.4	18.0	17.7	16.3	14.8
14	Bonanza Homestead	14.1	10.3	4.7	6.3	25.5	21.7	16.1	17.7
16	Burgoyne Homestead	5.6	4.9	6.2	1.7	17.0	16.3	17.6	13.1
17	Burtle Homestead	8.0	7.2	3.9	2.0	19.4	18.6	15.3	13.4
18	Carinya Homestead	7.3	7.4	7.4	1.8	18.7	18.8	18.8	13.2

ID	Name	1-hour SO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
19	Cavendish Homestead[a]	8.7	8.2	10.3	4.1	20.1	19.6	21.7	15.5
20	Colorado Homestead	14.8	10.3	5.9	5.2	26.2	21.7	17.3	16.6
21	Corn Top Homestead[a]	10.4	6.9	3.8	10.1	21.8	18.3	15.2	21.5
22	Creek Farm Homestead	9.7	7.5	4.8	2.2	21.1	18.9	16.2	13.6
25	Dwelling	7.1	5.2	4.3	2.4	18.5	16.6	15.7	13.8
26	Dwelling	5.9	6.9	4.9	4.4	17.3	18.3	16.3	15.8
27	Dwelling	7.3	7.0	5.5	3.5	18.7	18.4	16.9	14.9
28	Dwelling	6.9	6.2	5.5	2.2	18.3	17.6	16.9	13.6
29	Dwelling	8.9	6.8	4.2	4.6	20.3	18.2	15.6	16.0
30	Dwelling	5.8	7.8	9.6	3.8	17.2	19.2	21.0	15.2
31	Dwelling	7.9	6.0	5.7	2.8	19.3	17.4	17.1	14.2
32	Dwelling	5.4	5.5	6.9	5.9	16.8	16.9	18.3	17.3
33	Dwelling	5.4	5.4	7.0	4.0	16.8	16.8	18.4	15.4
34	Dwelling	7.9	6.8	3.3	4.6	19.3	18.2	14.7	16.0
35	Dwelling	8.1	5.7	3.8	5.0	19.5	17.1	15.2	16.4
36	Dwelling	10.3	13.0	3.3	2.7	21.7	24.4	14.7	14.1
37	Dwelling	6.0	6.6	5.9	6.2	17.4	18.0	17.3	17.6
38	Dwelling?	6.2	6.1	5.1	4.2	17.6	17.5	16.5	15.6
39	Edwinstowe Homestead	11.7	9.1	4.9	3.4	23.1	20.5	16.3	14.8
40	Elphin Homestead	7.4	13.6	5.6	4.1	18.8	25.0	17.0	15.5
41	Eulimbie Homestead	8.3	6.8	4.8	2.5	19.7	18.2	16.2	13.9
42	Eureka Homestead	29.4	22.0	19.4	6.2	40.8	33.4	30.8	17.6
44	Gadwell Homestead	12.9	11.1	3.7	7.0	24.3	22.5	15.1	18.4
46	Glen Innes Homestead[a]	18.6	17.5	12.5	6.9	30.0	28.9	23.9	18.3
47	Hazelbrook Homestead	8.3	6.2	3.2	3.5	19.7	17.6	14.6	14.9
49	Hobartville Homestead[b]	11.1	12.1	14.5	8.4	22.5	23.5	25.9	19.8
50	Inverurie Homestead	10.1	15.4	5.9	6.1	21.5	26.8	17.3	17.5
51	Islay Plains Homestead	2.2	2.2	1.6	2.0	13.6	13.6	13.0	13.4
52	Jericho	8.3	6.4	5.7	2.6	19.7	17.8	17.1	14.0
53	Jordan Avon Homestead	11.7	11.0	6.9	4.6	23.1	22.4	18.3	16.0
54	Kalbar Homestead	3.5	3.0	1.8	1.0	14.9	14.4	13.2	12.4
55	Kerand Homestead	3.2	2.8	1.7	0.8	14.6	14.2	13.1	12.2
56	Kia Ora Homestead[a]	18.4	15.1	10.5	10.2	29.8	26.5	21.9	21.6
57	Lambton Meadows Homestead[a]	21.6	15.7	10.9	6.2	33.0	27.1	22.3	17.6
59	Locharnoch	13.2	11.8	7.1	3.0	24.6	23.2	18.5	14.4
60	Melton Homestead	5.8	4.0	2.4	1.9	17.2	15.4	13.8	13.3
61	Mentmore Homestead	13.0	11.7	8.3	5.8	24.4	23.1	19.7	17.2
62	Milangavla	8.8	9.8	17.0	4.6	20.2	21.2	28.4	16.0
63	Monklands[a]	41.9	36.9	24.2	13.9	53.3	48.3	35.6	25.3
64	Moonstone Homestead	5.4	8.1	6.2	2.5	16.8	19.5	17.6	13.9
65	Mossvale Homestead	17.5	13.7	3.6	5.4	28.9	25.1	15.0	16.8

ID	Name	1-hour SO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
67	Oakleigh Homestead	16.1	17.8	7.8	2.8	27.5	29.2	19.2	14.2
68	Quarry?	9.2	9.2	6.4	2.9	20.6	20.6	17.8	14.3
69	Racecourse	8.9	7.5	5.5	2.6	20.3	18.9	16.9	14.0
70	Racecourse	5.1	4.8	4.7	5.5	16.5	16.2	16.1	16.9
72	Rosedale Homestead	10.6	5.7	5.0	3.8	22.0	17.1	16.4	15.2
73	Rosefield Homestead	13.3	14.4	10.3	7.2	24.7	25.8	21.7	18.6
74	Salt Bush Homestead	12.0	9.8	9.5	9.1	23.4	21.2	20.9	20.5
75	Speculation Homestead	5.9	10.7	6.0	4.7	17.3	22.1	17.4	16.1
76	Spring Creek[a]	10.6	10.9	10.5	5.7	22.0	22.3	21.9	17.1
79	Surbiton Homestead	4.3	4.6	5.1	2.3	15.7	16.0	16.5	13.7
80	Surbiton Station	7.9	6.3	4.1	4.3	19.3	17.7	15.5	15.7
81	The Grove Homestead	9.9	9.1	9.7	2.1	21.3	20.5	21.1	13.5
82	Toarbee	11.1	15.2	10.7	8.3	22.5	26.6	22.1	19.7
84	Tressillian Homestead	7.5	6.9	4.8	3.0	18.9	18.3	16.2	14.4
85	Villafield Homestead	16.6	12.9	5.2	7.0	28.0	24.3	16.6	18.4
86	Wendouree Homestead[b]	8.4	7.7	6.7	9.8	19.8	19.1	18.1	21.2
87	Woodbrook Homestead	2.7	2.3	1.1	0.6	14.1	13.7	12.5	12.0
88	Wycheproof Homestead	7.4	8.6	5.9	1.3	18.8	20.0	17.3	12.7
89	Zeta Homestead	5.2	7.2	5.8	4.4	16.6	18.6	17.2	15.8
-	Workers' Camp	76.2	73.7	47.3	31.1	87.6	85.1	58.7	42.5
Background included		-	-	-	-	11	11	11	11
Objective		**-**	**-**	**-**	**-**	**570**	**570**	**570**	**570**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table B4 1,400 MW – Predicted maximum 24-hour average ground-level concentrations of SO_2 due to Project in isolation and with background

ID	Name	Maximum 24-hour SO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
0	Dwelling	0.9	0.8	0.5	0.0	6.6	6.5	6.2	5.7
1	Dwelling	1.1	0.9	0.4	0.3	6.8	6.6	6.1	6.0
2	Dwelling	0.4	0.4	0.2	0.3	6.1	6.1	5.9	6.0
5	Accommodation Village - Alpha Coal Project	1.1	1.0	0.8	0.2	6.8	6.7	6.5	5.9
6	Accommodation Village - South Galilee Coal Project	0.9	0.9	1.5	0.4	6.6	6.6	7.2	6.1
7	Airfield	1.1	0.9	0.6	0.5	6.8	6.6	6.3	6.2
8	Alpha	0.6	0.6	0.3	0.2	6.3	6.3	6.0	5.9

ID	Name	Maximum 24-hour SO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
9	Alpha Coal Bulk Sample	1.0	1.1	0.8	0.3	6.7	6.8	6.5	6.0
10	Beaufort Homestead	0.4	0.3	0.2	0.8	6.1	6.0	5.9	6.5
11	Bedford Homestead	0.6	0.6	0.3	0.1	6.3	6.3	6.0	5.8
12	Betanga Homestead	0.9	0.8	0.8	0.5	6.6	6.5	6.5	6.2
13	Blairgowrie	0.5	0.5	0.3	0.4	6.2	6.2	6.0	6.1
14	Bonanza Homestead	1.1	0.9	0.4	0.3	6.8	6.6	6.1	6.0
16	Burgoyne Homestead	0.9	0.7	0.5	0.3	6.6	6.4	6.2	6.0
17	Burtle Homestead	0.8	0.7	0.5	0.2	6.5	6.4	6.2	5.9
18	Carinya Homestead	0.4	0.4	0.3	0.3	6.1	6.1	6.0	6.0
19	Cavendish Homestead[a]	1.4	1.6	1.3	0.1	7.1	7.3	7.0	5.8
20	Colorado Homestead	0.9	0.8	0.6	0.5	6.6	6.5	6.3	6.2
21	Corn Top Homestead[a]	1.1	0.9	0.7	0.3	6.8	6.6	6.4	6.0
22	Creek Farm Homestead	1.1	1.0	0.5	0.7	6.8	6.7	6.2	6.4
25	Dwelling	0.8	0.5	0.4	0.3	6.5	6.2	6.1	6.0
26	Dwelling	0.9	0.9	0.5	0.2	6.6	6.6	6.2	5.9
27	Dwelling	1.1	0.8	0.5	0.3	6.8	6.5	6.2	6.0
28	Dwelling	0.7	0.6	0.5	0.3	6.4	6.3	6.2	6.0
29	Dwelling	0.8	0.7	0.5	0.3	6.5	6.4	6.2	6.0
30	Dwelling	0.7	0.7	0.5	0.5	6.4	6.4	6.2	6.2
31	Dwelling	0.9	0.9	0.8	0.3	6.6	6.6	6.5	6.0
32	Dwelling	0.6	0.6	0.4	0.2	6.3	6.3	6.1	5.9
33	Dwelling	0.6	0.6	0.4	0.4	6.3	6.3	6.1	6.1
34	Dwelling	0.5	0.4	0.3	0.3	6.2	6.1	6.0	6.0
35	Dwelling	0.5	0.4	0.3	0.3	6.2	6.1	6.0	6.0
36	Dwelling	0.7	0.8	0.3	0.3	6.4	6.5	6.0	6.0
37	Dwelling	0.5	0.4	0.3	0.2	6.2	6.1	6.0	5.9
38	Dwelling?	0.5	0.4	0.3	0.3	6.2	6.1	6.0	6.0
39	Edwinstowe Homestead	1.0	0.8	0.4	0.3	6.7	6.5	6.1	6.0
40	Elphin Homestead	0.5	0.8	0.4	0.3	6.2	6.5	6.1	6.0
41	Eulimbie Homestead	0.5	0.4	0.3	0.2	6.2	6.1	6.0	5.9
42	Eureka Homestead	1.7	1.6	1.3	0.2	7.4	7.3	7.0	5.9
44	Gadwell Homestead	0.6	0.5	0.3	0.5	6.3	6.2	6.0	6.2
46	Glen Innes Homestead[a]	3.1	3.2	3.3	0.3	8.8	8.9	9.0	6.0
47	Hazelbrook Homestead	0.6	0.5	0.3	1.1	6.3	6.2	6.0	6.8
49	Hobartville Homestead[b]	1.8	1.7	2.6	0.2	7.5	7.4	8.3	5.9
50	Inverurie Homestead	0.8	1.4	0.5	1.9	6.5	7.1	6.2	7.6
51	Islay Plains Homestead	0.6	0.6	0.4	0.5	6.3	6.3	6.1	6.2
52	Jericho	1.2	1.0	0.7	0.3	6.9	6.7	6.4	6.0
53	Jordan Avon Homestead	1.0	0.9	0.5	0.3	6.7	6.6	6.2	6.0
54	Kalbar Homestead	0.3	0.2	0.2	0.3	6.0	5.9	5.9	6.0
55	Kerand Homestead	0.2	0.1	0.1	0.1	5.9	5.8	5.8	5.8

ID	Name	Maximum 24-hour SO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
56	Kia Ora Homestead[a]	2.8	2.5	1.4	0.1	8.5	8.2	7.1	5.8
57	Lambton Meadows Homestead[a]	1.1	1.4	2.2	0.8	6.8	7.1	7.9	6.5
59	Locharnoch	0.8	0.8	0.7	0.5	6.5	6.5	6.4	6.2
60	Melton Homestead	0.3	0.2	0.2	0.3	6.0	5.9	5.9	6.0
61	Mentmore Homestead	0.8	0.7	0.7	0.1	6.5	6.4	6.4	5.8
62	Milangavla	1.0	0.9	1.1	0.4	6.7	6.6	6.8	6.1
63	Monklands[a]	4.8	4.7	4.1	0.3	10.5	10.4	9.8	6.0
64	Moonstone Homestead	0.6	0.7	0.7	3.1	6.3	6.4	6.4	8.8
65	Mossvale Homestead	1.0	0.8	0.4	0.3	6.7	6.5	6.1	6.0
67	Oakleigh Homestead	1.6	1.5	0.9	0.3	7.3	7.2	6.6	6.0
68	Quarry?	1.1	0.9	0.7	0.4	6.8	6.6	6.4	6.1
69	Racecourse	1.2	1.0	0.7	0.2	6.9	6.7	6.4	5.9
70	Racecourse	0.6	0.6	0.3	0.3	6.3	6.3	6.0	6.0
72	Rosedale Homestead	0.7	0.4	0.3	0.3	6.4	6.1	6.0	6.0
73	Rosefield Homestead	1.2	1.2	0.8	0.2	6.9	6.9	6.5	5.9
74	Salt Bush Homestead	1.0	0.9	0.6	0.4	6.7	6.6	6.3	6.1
75	Speculation Homestead	0.4	0.6	0.5	0.6	6.1	6.3	6.2	6.3
76	Spring Creek[a]	1.2	1.3	1.1	0.3	6.9	7.0	6.8	6.0
79	Surbiton Homestead	0.5	0.4	0.5	0.4	6.2	6.1	6.2	6.1
80	Surbiton Station	0.5	0.5	0.5	0.2	6.2	6.2	6.2	5.9
81	The Grove Homestead	0.8	0.8	0.5	0.3	6.5	6.5	6.2	6.0
82	Toarbee	0.8	0.9	0.7	0.1	6.5	6.6	6.4	5.8
84	Tressillian Homestead	0.7	0.6	0.5	0.4	6.4	6.3	6.2	6.1
85	Villafield Homestead	1.2	1.0	0.5	0.3	6.9	6.7	6.2	6.0
86	Wendouree Homestead[b]	1.7	1.4	0.9	0.4	7.4	7.1	6.6	6.1
87	Woodbrook Homestead	0.2	0.2	0.1	0.7	5.9	5.9	5.8	6.4
88	Wycheproof Homestead	0.4	0.5	0.3	0.0	6.1	6.2	6.0	5.7
89	Zeta Homestead	0.4	0.4	0.4	0.1	6.1	6.1	6.1	5.8
-	Workers' Camp	5.9	5.8	3.9	2.3	11.6	11.5	9.6	8.0
Background included		-	-	-	-	5.7	5.7	5.7	5.7
Objective		**-**	**-**	**-**	**-**	**230**	**230**	**230**	**230**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table B5 1,400 MW – Predicted annual average ground-level concentrations of SO_2 due to Project in isolation and with background

ID	Name	Annual SO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
0	Dwelling	0.03	0.03	0.02	0.01	3.6	3.6	3.6	3.6
1	Dwelling	0.06	0.05	0.03	0.02	3.7	3.7	3.6	3.6
2	Dwelling	0.02	0.01	0.01	0.01	3.6	3.6	3.6	3.6
5	Accommodation Village - Alpha Coal Project	0.03	0.03	0.02	0.01	3.6	3.6	3.6	3.6
6	Accommodation Village - South Galilee Coal Project	0.04	0.04	0.03	0.02	3.6	3.6	3.6	3.6
7	Airfield	0.06	0.06	0.04	0.02	3.7	3.7	3.6	3.6
8	Alpha	0.02	0.02	0.02	0.01	3.6	3.6	3.6	3.6
9	Alpha Coal Bulk Sample	0.06	0.06	0.05	0.04	3.7	3.7	3.6	3.6
10	Beaufort Homestead	0.01	0.01	0.01	0.00	3.6	3.6	3.6	3.6
11	Bedford Homestead	0.03	0.02	0.02	0.01	3.6	3.6	3.6	3.6
12	Betanga Homestead	0.05	0.05	0.04	0.03	3.7	3.6	3.6	3.6
13	Blairgowrie	0.03	0.03	0.02	0.01	3.6	3.6	3.6	3.6
14	Bonanza Homestead	0.04	0.03	0.02	0.01	3.6	3.6	3.6	3.6
16	Burgoyne Homestead	0.04	0.04	0.03	0.02	3.6	3.6	3.6	3.6
17	Burtle Homestead	0.03	0.03	0.02	0.01	3.6	3.6	3.6	3.6
18	Carinya Homestead	0.01	0.01	0.01	0.00	3.6	3.6	3.6	3.6
19	Cavendish Homestead[a]	0.11	0.10	0.08	0.05	3.7	3.7	3.7	3.6
20	Colorado Homestead	0.05	0.05	0.03	0.02	3.7	3.6	3.6	3.6
21	Corn Top Homestead[a]	0.06	0.05	0.04	0.03	3.7	3.7	3.6	3.6
22	Creek Farm Homestead	0.04	0.04	0.02	0.01	3.6	3.6	3.6	3.6
25	Dwelling	0.05	0.04	0.03	0.02	3.7	3.6	3.6	3.6
26	Dwelling	0.06	0.05	0.03	0.02	3.7	3.6	3.6	3.6
27	Dwelling	0.06	0.05	0.04	0.02	3.7	3.7	3.6	3.6
28	Dwelling	0.04	0.04	0.03	0.01	3.6	3.6	3.6	3.6
29	Dwelling	0.06	0.05	0.04	0.02	3.7	3.7	3.6	3.6
30	Dwelling	0.04	0.04	0.02	0.01	3.6	3.6	3.6	3.6
31	Dwelling	0.05	0.05	0.03	0.02	3.7	3.6	3.6	3.6
32	Dwelling	0.03	0.02	0.02	0.01	3.6	3.6	3.6	3.6
33	Dwelling	0.03	0.02	0.02	0.01	3.6	3.6	3.6	3.6
34	Dwelling	0.02	0.02	0.01	0.01	3.6	3.6	3.6	3.6
35	Dwelling	0.02	0.02	0.01	0.01	3.6	3.6	3.6	3.6
36	Dwelling	0.02	0.02	0.01	0.01	3.6	3.6	3.6	3.6
37	Dwelling	0.02	0.02	0.01	0.01	3.6	3.6	3.6	3.6
38	Dwelling?	0.02	0.02	0.01	0.01	3.6	3.6	3.6	3.6
39	Edwinstowe Homestead	0.05	0.04	0.03	0.02	3.6	3.6	3.6	3.6
40	Elphin Homestead	0.02	0.02	0.01	0.01	3.6	3.6	3.6	3.6
41	Eulimbie Homestead	0.01	0.01	0.01	0.01	3.6	3.6	3.6	3.6
42	Eureka Homestead	0.08	0.08	0.05	0.03	3.7	3.7	3.7	3.6
44	Gadwell Homestead	0.02	0.02	0.02	0.01	3.6	3.6	3.6	3.6
46	Glen Innes Homestead[a]	0.22	0.20	0.15	0.09	3.8	3.8	3.8	3.7

ID	Name	Annual SO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
47	Hazelbrook Homestead	0.02	0.02	0.01	0.01	3.6	3.6	3.6	3.6
49	Hobartville Homestead[b]	0.09	0.09	0.07	0.05	3.7	3.7	3.7	3.6
50	Inverurie Homestead	0.07	0.07	0.05	0.03	3.7	3.7	3.6	3.6
51	Islay Plains Homestead	0.01	0.01	0.01	0.00	3.6	3.6	3.6	3.6
52	Jericho	0.06	0.05	0.04	0.02	3.7	3.7	3.6	3.6
53	Jordan Avon Homestead	0.07	0.07	0.05	0.03	3.7	3.7	3.6	3.6
54	Kalbar Homestead	0.01	0.01	0.01	0.00	3.6	3.6	3.6	3.6
55	Kerand Homestead	0.01	0.01	0.01	0.00	3.6	3.6	3.6	3.6
56	Kia Ora Homestead[a]	0.17	0.16	0.12	0.07	3.8	3.8	3.7	3.7
57	Lambton Meadows Homestead[a]	0.09	0.08	0.06	0.03	3.7	3.7	3.7	3.6
59	Locharnoch	0.06	0.06	0.04	0.02	3.7	3.7	3.6	3.6
60	Melton Homestead	0.01	0.01	0.01	0.00	3.6	3.6	3.6	3.6
61	Mentmore Homestead	0.03	0.03	0.02	0.01	3.6	3.6	3.6	3.6
62	Milangavla	0.08	0.08	0.06	0.03	3.7	3.7	3.7	3.6
63	Monklands[a]	0.37	0.37	0.38	0.29	4.0	4.0	4.0	3.9
64	Moonstone Homestead	0.02	0.02	0.01	0.01	3.6	3.6	3.6	3.6
65	Mossvale Homestead	0.02	0.02	0.01	0.01	3.6	3.6	3.6	3.6
67	Oakleigh Homestead	0.06	0.06	0.04	0.02	3.7	3.7	3.6	3.6
68	Quarry?	0.06	0.05	0.04	0.02	3.7	3.7	3.6	3.6
69	Racecourse	0.06	0.05	0.04	0.02	3.7	3.7	3.6	3.6
70	Racecourse	0.03	0.03	0.02	0.01	3.6	3.6	3.6	3.6
72	Rosedale Homestead	0.04	0.03	0.02	0.01	3.6	3.6	3.6	3.6
73	Rosefield Homestead	0.08	0.07	0.05	0.03	3.7	3.7	3.6	3.6
74	Salt Bush Homestead	0.07	0.06	0.04	0.02	3.7	3.7	3.6	3.6
75	Speculation Homestead	0.03	0.03	0.03	0.02	3.6	3.6	3.6	3.6
76	Spring Creek[a]	0.10	0.10	0.07	0.04	3.7	3.7	3.7	3.6
79	Surbiton Homestead	0.02	0.02	0.01	0.01	3.6	3.6	3.6	3.6
80	Surbiton Station	0.02	0.01	0.01	0.01	3.6	3.6	3.6	3.6
81	The Grove Homestead	0.02	0.02	0.01	0.01	3.6	3.6	3.6	3.6
82	Toarbee	0.05	0.05	0.03	0.02	3.7	3.7	3.6	3.6
84	Tressillian Homestead	0.03	0.03	0.02	0.01	3.6	3.6	3.6	3.6
85	Villafield Homestead	0.04	0.04	0.02	0.01	3.6	3.6	3.6	3.6
86	Wendouree Homestead[b]	0.05	0.04	0.03	0.02	3.6	3.6	3.6	3.6
87	Woodbrook Homestead	0.01	0.01	0.00	0.00	3.6	3.6	3.6	3.6
88	Wycheproof Homestead	0.01	0.01	0.01	0.00	3.6	3.6	3.6	3.6
89	Zeta Homestead	0.01	0.01	0.01	0.01	3.6	3.6	3.6	3.6
-	Workers' Camp	0.17	0.17	0.16	0.10	3.8	3.8	3.8	3.7
Background included		-	-	-	-	3.6	3.6	3.6	3.6
Objective		**-**	**-**	**-**	**-**	**57**	**57**	**57**	**57**

Table note:
[a] These receptors will be acquired by Waratah

ID	Name	Annual SO_2 (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
[b] These receptors will be acquired by Alpha Coal									

Table B6 1,400 MW – Predicted maximum 24-hour average ground-level concentrations of PM_{10} due to Project in isolation and with background

ID	Name	Maximum 24-hour PM_{10} (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
0	Dwelling	1.8	1.6	0.9	0.6	22.2	22.0	21.3	21.0
1	Dwelling	2.1	1.7	0.8	0.6	22.5	22.1	21.2	21.0
2	Dwelling	0.8	0.7	0.5	0.3	21.2	21.1	20.9	20.7
5	Accommodation Village - Alpha Coal Project	2.1	2.0	1.5	0.7	22.5	22.4	21.9	21.1
6	Accommodation Village - South Galilee Coal Project	1.7	1.8	2.9	1.1	22.1	22.2	23.3	21.5
7	Airfield	2.2	1.9	1.2	0.5	22.6	22.3	21.6	20.9
8	Alpha	1.2	1.1	0.6	0.5	21.6	21.5	21.0	20.9
9	Alpha Coal Bulk Sample	2.0	2.2	1.5	1.5	22.4	22.6	21.9	21.9
10	Beaufort Homestead	0.7	0.6	0.5	0.2	21.1	21.0	20.9	20.6
11	Bedford Homestead	1.2	1.1	0.6	1.0	21.6	21.5	21.0	21.4
12	Betanga Homestead	1.8	1.6	1.6	0.8	22.2	22.0	22.0	21.2
13	Blairgowrie	1.0	0.9	0.6	0.6	21.4	21.3	21.0	21.0
14	Bonanza Homestead	2.2	1.7	0.9	0.7	22.6	22.1	21.3	21.1
16	Burgoyne Homestead	1.7	1.3	1.1	0.4	22.1	21.7	21.5	20.8
17	Burtle Homestead	1.6	1.4	0.9	0.7	22.0	21.8	21.3	21.1
18	Carinya Homestead	0.7	0.7	0.7	0.2	21.1	21.1	21.1	20.6
19	Cavendish Homestead[a]	2.8	3.1	2.6	1.0	23.2	23.5	23.0	21.4
20	Colorado Homestead	1.8	1.6	1.3	0.6	22.2	22.0	21.7	21.0
21	Corn Top Homestead[a]	2.1	1.8	1.4	1.4	22.5	22.2	21.8	21.8
22	Creek Farm Homestead	2.1	1.9	0.9	0.6	22.5	22.3	21.3	21.0
25	Dwelling	1.5	1.0	0.8	0.5	21.9	21.4	21.2	20.9
26	Dwelling	1.8	1.8	1.0	0.6	22.2	22.2	21.4	21.0
27	Dwelling	2.2	1.6	1.0	0.6	22.6	22.0	21.4	21.0
28	Dwelling	1.3	1.2	1.0	0.5	21.7	21.6	21.4	20.9
29	Dwelling	1.5	1.3	1.0	1.0	21.9	21.7	21.4	21.4
30	Dwelling	1.4	1.3	1.0	0.6	21.8	21.7	21.4	21.0
31	Dwelling	1.8	1.7	1.6	0.4	22.2	22.1	22.0	20.8
32	Dwelling	1.2	1.1	0.8	0.8	21.6	21.5	21.2	21.2
33	Dwelling	1.2	1.1	0.8	0.6	21.6	21.5	21.2	21.0
34	Dwelling	1.0	0.8	0.5	0.5	21.4	21.2	20.9	20.9
35	Dwelling	1.0	0.9	0.6	0.6	21.4	21.3	21.0	21.0

ID	Name	Maximum 24-hour PM_{10} (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
36	Dwelling	1.4	1.5	0.6	0.4	21.8	21.9	21.0	20.8
37	Dwelling	1.0	0.9	0.7	0.6	21.4	21.3	21.1	21.0
38	Dwelling?	0.9	0.8	0.6	0.5	21.3	21.2	21.0	20.9
39	Edwinstowe Homestead	1.9	1.6	0.8	0.7	22.3	22.0	21.2	21.1
40	Elphin Homestead	1.0	1.5	0.8	0.3	21.4	21.9	21.2	20.7
41	Eulimbie Homestead	1.0	0.9	0.6	0.3	21.4	21.3	21.0	20.7
42	Eureka Homestead	3.3	3.2	2.5	1.0	23.7	23.6	22.9	21.4
44	Gadwell Homestead	1.2	1.0	0.6	0.6	21.6	21.4	21.0	21.0
46	Glen Innes Homestead[a]	6.1	6.2	6.5	2.2	26.5	26.6	26.9	22.6
47	Hazelbrook Homestead	1.2	1.0	0.5	0.4	21.6	21.4	20.9	20.8
49	Hobartville Homestead[b]	3.6	3.4	5.1	3.7	24.0	23.8	25.5	24.1
50	Inverurie Homestead	1.5	2.7	1.0	0.9	21.9	23.1	21.4	21.3
51	Islay Plains Homestead	1.3	1.1	0.8	0.6	21.7	21.5	21.2	21.0
52	Jericho	2.3	1.9	1.3	0.5	22.7	22.3	21.7	20.9
53	Jordan Avon Homestead	2.0	1.7	1.1	0.7	22.4	22.1	21.5	21.1
54	Kalbar Homestead	0.5	0.5	0.3	0.2	20.9	20.9	20.7	20.6
55	Kerand Homestead	0.3	0.3	0.2	0.1	20.7	20.7	20.6	20.5
56	Kia Ora Homestead[a]	5.5	5.0	2.8	1.5	25.9	25.4	23.2	21.9
57	Lambton Meadows Homestead[a]	2.2	2.8	4.3	1.0	22.6	23.2	24.7	21.4
59	Locharnoch	1.6	1.5	1.4	0.6	22.0	21.9	21.8	21.0
60	Melton Homestead	0.5	0.5	0.4	0.3	20.9	20.9	20.8	20.7
61	Mentmore Homestead	1.5	1.5	1.4	0.7	21.9	21.9	21.8	21.1
62	Milangavla	2.0	1.7	2.1	0.6	22.4	22.1	22.5	21.0
63	Monklands[a]	9.4	9.2	8.0	6.1	29.8	29.6	28.4	26.5
64	Moonstone Homestead	1.2	1.3	1.3	0.7	21.6	21.7	21.7	21.1
65	Mossvale Homestead	1.9	1.6	0.7	0.7	22.3	22.0	21.1	21.1
67	Oakleigh Homestead	3.1	2.9	1.7	0.8	23.5	23.3	22.1	21.2
68	Quarry?	2.1	1.8	1.4	0.4	22.5	22.2	21.8	20.8
69	Racecourse	2.3	2.0	1.4	0.5	22.7	22.4	21.8	20.9
70	Racecourse	1.2	1.1	0.7	0.7	21.6	21.5	21.1	21.1
72	Rosedale Homestead	1.3	0.8	0.6	0.5	21.7	21.2	21.0	20.9
73	Rosefield Homestead	2.3	2.3	1.5	0.8	22.7	22.7	21.9	21.2
74	Salt Bush Homestead	2.0	1.8	1.3	1.3	22.4	22.2	21.7	21.7
75	Speculation Homestead	0.8	1.2	0.9	0.5	21.2	21.6	21.3	20.9
76	Spring Creek[a]	2.3	2.6	2.2	0.9	22.7	23.0	22.6	21.3
79	Surbiton Homestead	0.9	0.8	0.9	0.4	21.3	21.2	21.3	20.8
80	Surbiton Station	1.0	1.0	1.1	0.5	21.4	21.4	21.5	20.9
81	The Grove Homestead	1.6	1.5	0.9	0.3	22.0	21.9	21.3	20.7
82	Toarbee	1.6	1.8	1.4	0.8	22.0	22.2	21.8	21.2
84	Tressillian Homestead	1.4	1.2	1.0	0.6	21.8	21.6	21.4	21.0
85	Villafield Homestead	2.4	2.0	1.0	0.7	22.8	22.4	21.4	21.1

ID	Name	Maximum 24-hour PM_{10} (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
86	Wendouree Homestead[b]	3.3	2.8	1.7	1.3	23.7	23.2	22.1	21.7
87	Woodbrook Homestead	0.4	0.3	0.2	0.1	20.8	20.7	20.6	20.5
88	Wycheproof Homestead	0.9	1.0	0.6	0.2	21.3	21.4	21.0	20.6
89	Zeta Homestead	0.9	0.9	0.7	0.4	21.3	21.3	21.1	20.8
-	Workers' Camp	11.7	11.3	7.7	4.6	32.1	31.7	28.1	25.0
Background included		-	-	-	-	20	20	20	20
Objective		**-**	**-**	**-**	**-**	**50**	**50**	**50**	**50**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table B7 1,400 MW – Predicted maximum 24-hour average ground-level concentrations of $PM_{2.5}$ due to Project in isolation and with background

ID	Name	Maximum 24-hour $PM_{2.5}$ (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
0	Dwelling	1.8	1.6	0.9	0.6	6.8	6.6	5.9	5.6
1	Dwelling	2.1	1.7	0.8	0.6	7.1	6.7	5.8	5.6
2	Dwelling	0.8	0.7	0.5	0.3	5.8	5.7	5.5	5.3
5	Accommodation Village - Alpha Coal Project	2.1	2.0	1.5	0.7	7.1	7.0	6.5	5.7
6	Accommodation Village - South Galilee Coal Project	1.7	1.8	2.9	1.1	6.7	6.8	7.9	6.1
7	Airfield	2.2	1.9	1.2	0.5	7.2	6.9	6.2	5.5
8	Alpha	1.2	1.1	0.6	0.5	6.2	6.1	5.6	5.5
9	Alpha Coal Bulk Sample	2.0	2.2	1.5	1.5	7.0	7.2	6.5	6.5
10	Beaufort Homestead	0.7	0.6	0.5	0.2	5.7	5.6	5.5	5.2
11	Bedford Homestead	1.2	1.1	0.6	1.0	6.2	6.1	5.6	6.0
12	Betanga Homestead	1.8	1.6	1.6	0.8	6.8	6.6	6.6	5.8
13	Blairgowrie	1.0	0.9	0.6	0.6	6.0	5.9	5.6	5.6
14	Bonanza Homestead	2.2	1.7	0.9	0.7	7.2	6.7	5.9	5.7
16	Burgoyne Homestead	1.7	1.3	1.1	0.4	6.7	6.3	6.1	5.4
17	Burtle Homestead	1.6	1.4	0.9	0.7	6.6	6.4	5.9	5.7
18	Carinya Homestead	0.7	0.7	0.7	0.2	5.7	5.7	5.7	5.2
19	Cavendish Homestead[a]	2.8	3.1	2.6	1.0	7.8	8.1	7.6	6.0
20	Colorado Homestead	1.8	1.6	1.3	0.6	6.8	6.6	6.3	5.6
21	Corn Top Homestead[a]	2.1	1.8	1.4	1.4	7.1	6.8	6.4	6.4
22	Creek Farm Homestead	2.1	1.9	0.9	0.6	7.1	6.9	5.9	5.6
25	Dwelling	1.5	1.0	0.8	0.5	6.5	6.0	5.8	5.5
26	Dwelling	1.8	1.8	1.0	0.6	6.8	6.8	6.0	5.6

ID	Name	Maximum 24-hour $PM_{2.5}$ (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
27	Dwelling	2.2	1.6	1.0	0.6	7.2	6.6	6.0	5.6
28	Dwelling	1.3	1.2	1.0	0.5	6.3	6.2	6.0	5.5
29	Dwelling	1.5	1.3	1.0	1.0	6.5	6.3	6.0	6.0
30	Dwelling	1.4	1.3	1.0	0.6	6.4	6.3	6.0	5.6
31	Dwelling	1.8	1.7	1.6	0.4	6.8	6.7	6.6	5.4
32	Dwelling	1.2	1.1	0.8	0.8	6.2	6.1	5.8	5.8
33	Dwelling	1.2	1.1	0.8	0.6	6.2	6.1	5.8	5.6
34	Dwelling	1.0	0.8	0.5	0.5	6.0	5.8	5.5	5.5
35	Dwelling	1.0	0.9	0.6	0.6	6.0	5.9	5.6	5.6
36	Dwelling	1.4	1.5	0.6	0.4	6.4	6.5	5.6	5.4
37	Dwelling	1.0	0.9	0.7	0.6	6.0	5.9	5.7	5.6
38	Dwelling?	0.9	0.8	0.6	0.5	5.9	5.8	5.6	5.5
39	Edwinstowe Homestead	1.9	1.6	0.8	0.7	6.9	6.6	5.8	5.7
40	Elphin Homestead	1.0	1.5	0.8	0.3	6.0	6.5	5.8	5.3
41	Eulimbie Homestead	1.0	0.9	0.6	0.3	6.0	5.9	5.6	5.3
42	Eureka Homestead	3.3	3.2	2.5	1.0	8.3	8.2	7.5	6.0
44	Gadwell Homestead	1.2	1.0	0.6	0.6	6.2	6.0	5.6	5.6
46	Glen Innes Homestead[a]	6.1	6.2	6.5	2.2	11.1	11.2	11.5	7.2
47	Hazelbrook Homestead	1.2	1.0	0.5	0.4	6.2	6.0	5.5	5.4
49	Hobartville Homestead[b]	3.6	3.4	5.1	3.7	8.6	8.4	10.1	8.7
50	Inverurie Homestead	1.5	2.7	1.0	0.9	6.5	7.7	6.0	5.9
51	Islay Plains Homestead	1.3	1.1	0.8	0.6	6.3	6.1	5.8	5.6
52	Jericho	2.3	1.9	1.3	0.5	7.3	6.9	6.3	5.5
53	Jordan Avon Homestead	2.0	1.7	1.1	0.7	7.0	6.7	6.1	5.7
54	Kalbar Homestead	0.5	0.5	0.3	0.2	5.5	5.5	5.3	5.2
55	Kerand Homestead	0.3	0.3	0.2	0.1	5.3	5.3	5.2	5.1
56	Kia Ora Homestead[a]	5.5	5.0	2.8	1.5	10.5	10.0	7.8	6.5
57	Lambton Meadows Homestead[a]	2.2	2.8	4.3	1.0	7.2	7.8	9.3	6.0
59	Locharnoch	1.6	1.5	1.4	0.6	6.6	6.5	6.4	5.6
60	Melton Homestead	0.5	0.5	0.4	0.3	5.5	5.5	5.4	5.3
61	Mentmore Homestead	1.5	1.5	1.4	0.7	6.5	6.5	6.4	5.7
62	Milangavla	2.0	1.7	2.1	0.6	7.0	6.7	7.1	5.6
63	Monklands[a]	9.4	9.2	8.0	6.1	14.4	14.2	13.0	11.1
64	Moonstone Homestead	1.2	1.3	1.3	0.7	6.2	6.3	6.3	5.7
65	Mossvale Homestead	1.9	1.6	0.7	0.7	6.9	6.6	5.7	5.7
67	Oakleigh Homestead	3.1	2.9	1.7	0.8	8.1	7.9	6.7	5.8
68	Quarry?	2.1	1.8	1.4	0.4	7.1	6.8	6.4	5.4
69	Racecourse	2.3	2.0	1.4	0.5	7.3	7.0	6.4	5.5
70	Racecourse	1.2	1.1	0.7	0.7	6.2	6.1	5.7	5.7
72	Rosedale Homestead	1.3	0.8	0.6	0.5	6.3	5.8	5.6	5.5
73	Rosefield Homestead	2.3	2.3	1.5	0.8	7.3	7.3	6.5	5.8

ID	Name	Maximum 24-hour $PM_{2.5}$ (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
74	Salt Bush Homestead	2.0	1.8	1.3	1.3	7.0	6.8	6.3	6.3
75	Speculation Homestead	0.8	1.2	0.9	0.5	5.8	6.2	5.9	5.5
76	Spring Creek[a]	2.3	2.6	2.2	0.9	7.3	7.6	7.2	5.9
79	Surbiton Homestead	0.9	0.8	0.9	0.4	5.9	5.8	5.9	5.4
80	Surbiton Station	1.0	1.0	1.1	0.5	6.0	6.0	6.1	5.5
81	The Grove Homestead	1.6	1.5	0.9	0.3	6.6	6.5	5.9	5.3
82	Toarbee	1.6	1.8	1.4	0.8	6.6	6.8	6.4	5.8
84	Tressillian Homestead	1.4	1.2	1.0	0.6	6.4	6.2	6.0	5.6
85	Villafield Homestead	2.4	2.0	1.0	0.7	7.4	7.0	6.0	5.7
86	Wendouree Homestead[b]	3.3	2.8	1.7	1.3	8.3	7.8	6.7	6.3
87	Woodbrook Homestead	0.4	0.3	0.2	0.1	5.4	5.3	5.2	5.1
88	Wycheproof Homestead	0.9	1.0	0.6	0.2	5.9	6.0	5.6	5.2
89	Zeta Homestead	0.9	0.9	0.7	0.4	5.9	5.9	5.7	5.4
-	Workers' Camp	11.7	11.3	7.7	4.6	16.7	16.3	12.7	9.6
Background included		-	-	-	-	5.0	5.0	5.0	5.0
Objective		**-**	**-**	**-**	**-**	**25**	**25**	**25**	**25**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table B8 1,400 MW – Predicted annual average ground-level concentrations of $PM_{2.5}$ due to Project in isolation and with background

ID	Name	Annual $PM_{2.5}$ (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
0	Dwelling	0.07	0.06	0.04	0.02	4.5	4.5	4.4	4.4
1	Dwelling	0.11	0.10	0.07	0.04	4.5	4.5	4.5	4.4
2	Dwelling	0.03	0.03	0.02	0.01	4.4	4.4	4.4	4.4
5	Accommodation Village - Alpha Coal Project	0.07	0.06	0.04	0.03	4.5	4.5	4.4	4.4
6	Accommodation Village - South Galilee Coal Project	0.08	0.08	0.06	0.04	4.5	4.5	4.5	4.4
7	Airfield	0.12	0.11	0.08	0.04	4.5	4.5	4.5	4.4
8	Alpha	0.05	0.04	0.03	0.02	4.4	4.4	4.4	4.4
9	Alpha Coal Bulk Sample	0.13	0.12	0.10	0.07	4.5	4.5	4.5	4.5
10	Beaufort Homestead	0.02	0.02	0.01	0.01	4.4	4.4	4.4	4.4
11	Bedford Homestead	0.05	0.05	0.03	0.02	4.5	4.4	4.4	4.4
12	Betanga Homestead	0.11	0.10	0.08	0.06	4.5	4.5	4.5	4.5
13	Blairgowrie	0.06	0.05	0.04	0.03	4.5	4.5	4.4	4.4
14	Bonanza Homestead	0.07	0.06	0.04	0.03	4.5	4.5	4.4	4.4

ID	Name	Annual $PM_{2.5}$ (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
16	Burgoyne Homestead	0.08	0.07	0.06	0.03	4.5	4.5	4.5	4.4
17	Burtle Homestead	0.06	0.05	0.04	0.02	4.5	4.5	4.4	4.4
18	Carinya Homestead	0.02	0.02	0.02	0.01	4.4	4.4	4.4	4.4
19	Cavendish Homestead[a]	0.22	0.20	0.16	0.09	4.6	4.6	4.6	4.5
20	Colorado Homestead	0.10	0.09	0.06	0.03	4.5	4.5	4.5	4.4
21	Corn Top Homestead[a]	0.11	0.10	0.08	0.06	4.5	4.5	4.5	4.5
22	Creek Farm Homestead	0.08	0.07	0.05	0.03	4.5	4.5	4.4	4.4
25	Dwelling	0.10	0.09	0.06	0.04	4.5	4.5	4.5	4.4
26	Dwelling	0.11	0.10	0.07	0.04	4.5	4.5	4.5	4.4
27	Dwelling	0.11	0.10	0.07	0.04	4.5	4.5	4.5	4.4
28	Dwelling	0.09	0.08	0.05	0.03	4.5	4.5	4.5	4.4
29	Dwelling	0.12	0.11	0.07	0.04	4.5	4.5	4.5	4.4
30	Dwelling	0.08	0.07	0.05	0.03	4.5	4.5	4.4	4.4
31	Dwelling	0.11	0.09	0.07	0.04	4.5	4.5	4.5	4.4
32	Dwelling	0.05	0.05	0.03	0.02	4.5	4.4	4.4	4.4
33	Dwelling	0.05	0.05	0.04	0.02	4.5	4.4	4.4	4.4
34	Dwelling	0.04	0.04	0.02	0.01	4.4	4.4	4.4	4.4
35	Dwelling	0.04	0.03	0.02	0.01	4.4	4.4	4.4	4.4
36	Dwelling	0.04	0.04	0.02	0.01	4.4	4.4	4.4	4.4
37	Dwelling	0.04	0.03	0.02	0.01	4.4	4.4	4.4	4.4
38	Dwelling?	0.04	0.03	0.02	0.01	4.4	4.4	4.4	4.4
39	Edwinstowe Homestead	0.09	0.08	0.06	0.03	4.5	4.5	4.5	4.4
40	Elphin Homestead	0.04	0.04	0.03	0.01	4.4	4.4	4.4	4.4
41	Eulimbie Homestead	0.03	0.03	0.02	0.01	4.4	4.4	4.4	4.4
42	Eureka Homestead	0.16	0.15	0.10	0.06	4.6	4.5	4.5	4.5
44	Gadwell Homestead	0.05	0.04	0.03	0.02	4.4	4.4	4.4	4.4
46	Glen Innes Homestead[a]	0.43	0.39	0.30	0.17	4.8	4.8	4.7	4.6
47	Hazelbrook Homestead	0.04	0.04	0.03	0.01	4.4	4.4	4.4	4.4
49	Hobartville Homestead[b]	0.18	0.17	0.14	0.09	4.6	4.6	4.5	4.5
50	Inverurie Homestead	0.14	0.13	0.09	0.05	4.5	4.5	4.5	4.5
51	Islay Plains Homestead	0.02	0.02	0.01	0.01	4.4	4.4	4.4	4.4
52	Jericho	0.11	0.10	0.07	0.04	4.5	4.5	4.5	4.4
53	Jordan Avon Homestead	0.15	0.13	0.09	0.05	4.5	4.5	4.5	4.5
54	Kalbar Homestead	0.02	0.02	0.01	0.01	4.4	4.4	4.4	4.4
55	Kerand Homestead	0.02	0.01	0.01	0.01	4.4	4.4	4.4	4.4
56	Kia Ora Homestead[a]	0.34	0.31	0.25	0.14	4.7	4.7	4.6	4.5
57	Lambton Meadows Homestead[a]	0.17	0.16	0.12	0.07	4.6	4.6	4.5	4.5
59	Locharnoch	0.12	0.11	0.08	0.04	4.5	4.5	4.5	4.4
60	Melton Homestead	0.02	0.02	0.01	0.01	4.4	4.4	4.4	4.4
61	Mentmore Homestead	0.06	0.06	0.04	0.03	4.5	4.5	4.4	4.4
62	Milangavla	0.17	0.15	0.11	0.06	4.6	4.5	4.5	4.5

ID	Name	Annual $PM_{2.5}$ (µg/m^3)							
		Project				Project plus background			
		Overload	100%	60%	25%	Overload	100%	60%	25%
63	Monklands[a]	0.73	0.74	0.74	0.58	5.1	5.1	5.1	5.0
64	Moonstone Homestead	0.04	0.03	0.02	0.01	4.4	4.4	4.4	4.4
65	Mossvale Homestead	0.05	0.04	0.03	0.02	4.4	4.4	4.4	4.4
67	Oakleigh Homestead	0.11	0.11	0.08	0.05	4.5	4.5	4.5	4.4
68	Quarry?	0.12	0.11	0.07	0.04	4.5	4.5	4.5	4.4
69	Racecourse	0.11	0.10	0.07	0.04	4.5	4.5	4.5	4.4
70	Racecourse	0.06	0.06	0.04	0.02	4.5	4.5	4.4	4.4
72	Rosedale Homestead	0.07	0.06	0.04	0.03	4.5	4.5	4.4	4.4
73	Rosefield Homestead	0.16	0.14	0.10	0.06	4.6	4.5	4.5	4.5
74	Salt Bush Homestead	0.13	0.12	0.09	0.05	4.5	4.5	4.5	4.4
75	Speculation Homestead	0.06	0.06	0.05	0.03	4.5	4.5	4.5	4.4
76	Spring Creek[a]	0.21	0.19	0.14	0.08	4.6	4.6	4.5	4.5
79	Surbiton Homestead	0.04	0.04	0.02	0.01	4.4	4.4	4.4	4.4
80	Surbiton Station	0.03	0.03	0.02	0.01	4.4	4.4	4.4	4.4
81	The Grove Homestead	0.04	0.04	0.03	0.01	4.4	4.4	4.4	4.4
82	Toarbee	0.10	0.10	0.07	0.04	4.5	4.5	4.5	4.4
84	Tressillian Homestead	0.07	0.06	0.04	0.02	4.5	4.5	4.4	4.4
85	Villafield Homestead	0.08	0.07	0.05	0.03	4.5	4.5	4.4	4.4
86	Wendouree Homestead[b]	0.10	0.09	0.06	0.04	4.5	4.5	4.5	4.4
87	Woodbrook Homestead	0.01	0.01	0.01	0.00	4.4	4.4	4.4	4.4
88	Wycheproof Homestead	0.02	0.02	0.01	0.01	4.4	4.4	4.4	4.4
89	Zeta Homestead	0.03	0.03	0.02	0.01	4.4	4.4	4.4	4.4
-	Workers' Camp	0.34	0.34	0.32	0.20	4.7	4.7	4.7	4.6
Background included		-	-	-	-	4.4	4.4	4.4	4.4
Objective		**-**	**-**	**-**	**-**	**8.0**	**8.0**	**8.0**	**8.0**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table B9 1,400 MW – Predicted annual average ground-level concentrations of arsenic due to Project in isolation

ID	Name	Annual arsenic (µg/m^3)			
		Overload	100%	60%	25%
0	Dwelling	2.8E-07	2.6E-07	1.8E-07	9.4E-08
1	Dwelling	4.5E-07	4.1E-07	2.8E-07	1.6E-07
2	Dwelling	1.2E-07	1.1E-07	7.5E-08	4.1E-08
5	Accommodation Village - Alpha Coal Project	2.7E-07	2.5E-07	1.7E-07	1.0E-07
6	Accommodation Village - South Galilee Coal Project	3.5E-07	3.3E-07	2.6E-07	1.6E-07
7	Airfield	5.1E-07	4.6E-07	3.2E-07	1.7E-07
8	Alpha	2.0E-07	1.8E-07	1.3E-07	8.0E-08

ID	Name	Annual arsenic (µg/m^3)			
		Overload	100%	60%	25%
9	Alpha Coal Bulk Sample	5.2E-07	5.0E-07	4.0E-07	2.9E-07
10	Beaufort Homestead	8.6E-08	7.8E-08	5.4E-08	3.1E-08
11	Bedford Homestead	2.1E-07	1.9E-07	1.4E-07	9.8E-08
12	Betanga Homestead	4.4E-07	4.0E-07	3.1E-07	2.3E-07
13	Blairgowrie	2.5E-07	2.3E-07	1.7E-07	1.1E-07
14	Bonanza Homestead	3.0E-07	2.7E-07	1.8E-07	1.1E-07
16	Burgoyne Homestead	3.5E-07	3.0E-07	2.3E-07	1.2E-07
17	Burtle Homestead	2.5E-07	2.2E-07	1.5E-07	8.1E-08
18	Carinya Homestead	9.0E-08	8.1E-08	6.3E-08	3.0E-08
19	Cavendish Homestead[a]	9.1E-07	8.4E-07	6.5E-07	3.7E-07
20	Colorado Homestead	4.2E-07	3.7E-07	2.4E-07	1.4E-07
21	Corn Top Homestead[a]	4.6E-07	4.2E-07	3.2E-07	2.5E-07
22	Creek Farm Homestead	3.2E-07	3.0E-07	2.0E-07	1.1E-07
25	Dwelling	4.1E-07	3.6E-07	2.5E-07	1.5E-07
26	Dwelling	4.4E-07	4.0E-07	2.7E-07	1.6E-07
27	Dwelling	4.7E-07	4.2E-07	2.8E-07	1.6E-07
28	Dwelling	3.6E-07	3.2E-07	2.3E-07	1.2E-07
29	Dwelling	4.9E-07	4.4E-07	3.0E-07	1.7E-07
30	Dwelling	3.3E-07	3.0E-07	2.0E-07	1.2E-07
31	Dwelling	4.3E-07	3.9E-07	2.8E-07	1.5E-07
32	Dwelling	2.2E-07	2.0E-07	1.4E-07	8.8E-08
33	Dwelling	2.3E-07	2.0E-07	1.5E-07	8.4E-08
34	Dwelling	1.7E-07	1.5E-07	1.0E-07	5.9E-08
35	Dwelling	1.6E-07	1.4E-07	1.0E-07	5.7E-08
36	Dwelling	1.6E-07	1.5E-07	9.5E-08	5.2E-08
37	Dwelling	1.5E-07	1.3E-07	9.3E-08	5.4E-08
38	Dwelling?	1.5E-07	1.4E-07	9.5E-08	5.6E-08
39	Edwinstowe Homestead	3.7E-07	3.4E-07	2.3E-07	1.3E-07
40	Elphin Homestead	1.6E-07	1.5E-07	1.1E-07	5.9E-08
41	Eulimbie Homestead	1.2E-07	1.0E-07	7.6E-08	4.8E-08
42	Eureka Homestead	6.6E-07	6.1E-07	4.1E-07	2.6E-07
44	Gadwell Homestead	2.0E-07	1.8E-07	1.3E-07	8.3E-08
46	Glen Innes Homestead[a]	1.8E-06	1.6E-06	1.2E-06	6.9E-07
47	Hazelbrook Homestead	1.8E-07	1.6E-07	1.1E-07	5.9E-08
49	Hobartville Homestead[b]	7.4E-07	7.1E-07	5.9E-07	3.7E-07
50	Inverurie Homestead	5.8E-07	5.4E-07	3.7E-07	2.2E-07
51	Islay Plains Homestead	7.8E-08	6.9E-08	5.1E-08	2.9E-08
52	Jericho	4.6E-07	4.1E-07	2.9E-07	1.6E-07
53	Jordan Avon Homestead	6.0E-07	5.4E-07	3.8E-07	2.1E-07
54	Kalbar Homestead	9.7E-08	8.9E-08	6.2E-08	3.3E-08
55	Kerand Homestead	6.6E-08	6.0E-08	4.2E-08	2.2E-08
56	Kia Ora Homestead[a]	1.4E-06	1.3E-06	1.0E-06	5.8E-07
57	Lambton Meadows Homestead[a]	7.0E-07	6.6E-07	5.1E-07	2.8E-07

ID	Name	Annual arsenic (µg/m^3)			
		Overload	100%	60%	25%
59	Locharnoch	4.8E-07	4.5E-07	3.3E-07	1.6E-07
60	Melton Homestead	8.7E-08	7.7E-08	5.7E-08	3.5E-08
61	Mentmore Homestead	2.7E-07	2.4E-07	1.8E-07	1.1E-07
62	Milangavla	6.8E-07	6.1E-07	4.5E-07	2.4E-07
63	Monklands[a]	3.0E-06	3.0E-06	3.1E-06	2.4E-06
64	Moonstone Homestead	1.5E-07	1.4E-07	1.0E-07	5.5E-08
65	Mossvale Homestead	1.9E-07	1.7E-07	1.1E-07	6.4E-08
67	Oakleigh Homestead	4.6E-07	4.5E-07	3.4E-07	1.9E-07
68	Quarry?	4.9E-07	4.4E-07	3.1E-07	1.6E-07
69	Racecourse	4.7E-07	4.2E-07	3.0E-07	1.6E-07
70	Racecourse	2.6E-07	2.3E-07	1.6E-07	9.6E-08
72	Rosedale Homestead	2.8E-07	2.5E-07	1.6E-07	1.0E-07
73	Rosefield Homestead	6.6E-07	5.9E-07	4.0E-07	2.3E-07
74	Salt Bush Homestead	5.3E-07	4.9E-07	3.6E-07	1.9E-07
75	Speculation Homestead	2.4E-07	2.3E-07	2.2E-07	1.4E-07
76	Spring Creek[a]	8.5E-07	7.7E-07	5.7E-07	3.2E-07
79	Surbiton Homestead	1.6E-07	1.4E-07	1.0E-07	5.9E-08
80	Surbiton Station	1.2E-07	1.1E-07	8.4E-08	5.0E-08
81	The Grove Homestead	1.8E-07	1.6E-07	1.2E-07	5.8E-08
82	Toarbee	4.3E-07	4.1E-07	2.8E-07	1.7E-07
84	Tressillian Homestead	2.8E-07	2.5E-07	1.8E-07	9.5E-08
85	Villafield Homestead	3.2E-07	2.9E-07	2.0E-07	1.1E-07
86	Wendouree Homestead[b]	3.9E-07	3.6E-07	2.7E-07	1.7E-07
87	Woodbrook Homestead	5.7E-08	5.2E-08	3.5E-08	1.8E-08
88	Wycheproof Homestead	8.0E-08	7.5E-08	4.8E-08	2.3E-08
89	Zeta Homestead	1.2E-07	1.1E-07	8.8E-08	5.1E-08
-	Workers' Camp	1.4E-06	1.4E-06	1.3E-06	8.2E-07
Objective		**6E-03**	**6E-03**	**6E-03**	**6E-03**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table B10 1,400 MW – Predicted 1-hour and annual average ground-level concentrations of boron due to Project in isolation

ID	Name	1-hour boron (µg/m^3)				Annual boron (µg/m^3)			
		Overload	100%	60%	25%	Overload	100%	60%	25%
0	Dwelling	2.6E-03	2.2E-03	2.2E-03	9.4E-04	1.3E-05	1.2E-05	8.2E-06	4.3E-06
1	Dwelling	2.7E-03	2.6E-03	2.0E-03	1.2E-03	2.1E-05	1.9E-05	1.3E-05	7.3E-06
2	Dwelling	1.5E-03	1.4E-03	7.9E-04	4.2E-04	5.6E-06	4.9E-06	3.4E-06	1.9E-06
5	Accommodation Village -	3.9E-03	3.7E-03	2.6E-03	1.5E-03	1.2E-05	1.1E-05	7.8E-06	4.7E-06

ID	Name	1-hour boron (µg/m^3)				Annual boron (µg/m^3)			
		Overload	100%	60%	25%	Overload	100%	60%	25%
	Alpha Coal Project								
6	Accommodation Village - South Galilee Coal Project	3.1E-03	7.0E-03	8.7E-03	2.3E-03	1.6E-05	1.5E-05	1.2E-05	7.4E-06
7	Airfield	3.8E-03	3.4E-03	2.3E-03	1.0E-03	2.3E-05	2.1E-05	1.4E-05	7.6E-06
8	Alpha	2.4E-03	2.2E-03	1.5E-03	2.0E-03	9.1E-06	8.1E-06	5.7E-06	3.6E-06
9	Alpha Coal Bulk Sample	4.4E-03	4.7E-03	4.5E-03	4.3E-03	2.3E-05	2.3E-05	1.8E-05	1.3E-05
10	Beaufort Homestead	2.0E-03	1.6E-03	1.3E-03	5.7E-04	3.9E-06	3.5E-06	2.4E-06	1.4E-06
11	Bedford Homestead	1.9E-03	2.1E-03	1.6E-03	4.3E-03	9.7E-06	8.7E-06	6.3E-06	4.5E-06
12	Betanga Homestead	2.6E-03	2.2E-03	2.7E-03	1.9E-03	2.0E-05	1.8E-05	1.4E-05	1.0E-05
13	Blairgowrie	2.4E-03	2.3E-03	1.8E-03	1.3E-03	1.2E-05	1.0E-05	7.5E-06	5.0E-06
14	Bonanza Homestead	5.2E-03	3.8E-03	1.7E-03	2.3E-03	1.4E-05	1.2E-05	8.2E-06	4.8E-06
16	Burgoyne Homestead	2.1E-03	1.8E-03	2.3E-03	6.3E-04	1.6E-05	1.4E-05	1.1E-05	5.6E-06
17	Burtle Homestead	2.9E-03	2.7E-03	1.4E-03	7.5E-04	1.1E-05	1.0E-05	6.7E-06	3.7E-06
18	Carinya Homestead	2.7E-03	2.7E-03	2.7E-03	6.6E-04	4.1E-06	3.7E-06	2.8E-06	1.4E-06
19	Cavendish Homestead[a]	3.2E-03	3.0E-03	3.8E-03	1.5E-03	4.1E-05	3.8E-05	2.9E-05	1.7E-05
20	Colorado Homestead	5.4E-03	3.8E-03	2.2E-03	1.9E-03	1.9E-05	1.7E-05	1.1E-05	6.5E-06
21	Corn Top Homestead[a]	3.8E-03	2.6E-03	1.4E-03	3.7E-03	2.1E-05	1.9E-05	1.4E-05	1.1E-05
22	Creek Farm Homestead	3.6E-03	2.8E-03	1.8E-03	8.3E-04	1.5E-05	1.3E-05	9.1E-06	5.0E-06
25	Dwelling	2.6E-03	1.9E-03	1.6E-03	9.0E-04	1.9E-05	1.6E-05	1.1E-05	6.7E-06
26	Dwelling	2.2E-03	2.5E-03	1.8E-03	1.6E-03	2.0E-05	1.8E-05	1.2E-05	7.2E-06
27	Dwelling	2.7E-03	2.6E-03	2.0E-03	1.3E-03	2.1E-05	1.9E-05	1.3E-05	7.4E-06
28	Dwelling	2.5E-03	2.3E-03	2.0E-03	8.1E-04	1.6E-05	1.5E-05	1.0E-05	5.5E-06
29	Dwelling	3.3E-03	2.5E-03	1.5E-03	1.7E-03	2.2E-05	2.0E-05	1.4E-05	7.5E-06
30	Dwelling	2.1E-03	2.9E-03	3.5E-03	1.4E-03	1.5E-05	1.4E-05	9.0E-06	5.4E-06
31	Dwelling	2.9E-03	2.2E-03	2.1E-03	1.0E-03	2.0E-05	1.8E-05	1.3E-05	6.6E-06
32	Dwelling	2.0E-03	2.0E-03	2.5E-03	2.2E-03	1.0E-05	8.9E-06	6.5E-06	4.0E-06
33	Dwelling	2.0E-03	2.0E-03	2.6E-03	1.5E-03	1.0E-05	9.1E-06	6.6E-06	3.8E-06
34	Dwelling	2.9E-03	2.5E-03	1.2E-03	1.7E-03	7.7E-06	6.8E-06	4.7E-06	2.7E-06
35	Dwelling	3.0E-03	2.1E-03	1.4E-03	1.9E-03	7.5E-06	6.5E-06	4.6E-06	2.6E-06
36	Dwelling	3.8E-03	4.8E-03	1.2E-03	1.0E-03	7.2E-06	6.7E-06	4.3E-06	2.4E-06
37	Dwelling	2.2E-03	2.4E-03	2.2E-03	2.3E-03	6.7E-06	6.0E-06	4.2E-06	2.5E-06
38	Dwelling?	2.3E-03	2.3E-03	1.9E-03	1.6E-03	6.9E-06	6.2E-06	4.3E-06	2.5E-06

ID	Name	1-hour boron (µg/m^3)				Annual boron (µg/m^3)			
		Overload	100%	60%	25%	Overload	100%	60%	25%
39	Edwinstowe Homestead	4.3E-03	3.4E-03	1.8E-03	1.3E-03	1.7E-05	1.5E-05	1.0E-05	5.8E-06
40	Elphin Homestead	2.7E-03	5.0E-03	2.1E-03	1.5E-03	7.3E-06	6.8E-06	4.8E-06	2.7E-06
41	Eulimbie Homestead	3.1E-03	2.5E-03	1.8E-03	9.3E-04	5.3E-06	4.7E-06	3.4E-06	2.2E-06
42	Eureka Homestead	1.1E-02	8.1E-03	7.1E-03	2.3E-03	3.0E-05	2.8E-05	1.9E-05	1.2E-05
44	Gadwell Homestead	4.7E-03	4.1E-03	1.4E-03	2.6E-03	9.2E-06	8.3E-06	5.8E-06	3.8E-06
46	Glen Innes Homestead[a]	6.9E-03	6.5E-03	4.6E-03	2.6E-03	8.0E-05	7.4E-05	5.6E-05	3.2E-05
47	Hazelbrook Homestead	3.1E-03	2.3E-03	1.2E-03	1.3E-03	8.1E-06	7.1E-06	4.9E-06	2.7E-06
49	Hobartville Homestead[b]	4.1E-03	4.4E-03	5.3E-03	3.1E-03	3.4E-05	3.2E-05	2.7E-05	1.7E-05
50	Inverurie Homestead	3.7E-03	5.7E-03	2.2E-03	2.3E-03	2.6E-05	2.5E-05	1.7E-05	1.0E-05
51	Islay Plains Homestead	8.2E-04	8.0E-04	5.9E-04	7.3E-04	3.5E-06	3.1E-06	2.3E-06	1.3E-06
52	Jericho	3.1E-03	2.4E-03	2.1E-03	9.7E-04	2.1E-05	1.9E-05	1.3E-05	7.2E-06
53	Jordan Avon Homestead	4.3E-03	4.0E-03	2.5E-03	1.7E-03	2.8E-05	2.5E-05	1.7E-05	9.8E-06
54	Kalbar Homestead	1.3E-03	1.1E-03	6.6E-04	3.9E-04	4.4E-06	4.1E-06	2.8E-06	1.5E-06
55	Kerand Homestead	1.2E-03	1.0E-03	6.1E-04	2.9E-04	3.0E-06	2.8E-06	1.9E-06	1.0E-06
56	Kia Ora Homestead[a]	6.8E-03	5.6E-03	3.9E-03	3.8E-03	6.3E-05	5.9E-05	4.6E-05	2.6E-05
57	Lambton Meadows Homestead[a]	8.0E-03	5.8E-03	4.0E-03	2.3E-03	3.2E-05	3.0E-05	2.3E-05	1.3E-05
59	Locharnoch	4.8E-03	4.4E-03	2.6E-03	1.1E-03	2.2E-05	2.0E-05	1.5E-05	7.2E-06
60	Melton Homestead	2.1E-03	1.5E-03	8.7E-04	6.9E-04	4.0E-06	3.5E-06	2.6E-06	1.6E-06
61	Mentmore Homestead	4.8E-03	4.3E-03	3.0E-03	2.2E-03	1.2E-05	1.1E-05	8.2E-06	5.0E-06
62	Milangavla	3.2E-03	3.6E-03	6.3E-03	1.7E-03	3.1E-05	2.8E-05	2.0E-05	1.1E-05
63	Monklands[a]	1.5E-02	1.4E-02	8.9E-03	5.2E-03	1.4E-04	1.4E-04	1.4E-04	1.1E-04
64	Moonstone Homestead	2.0E-03	3.0E-03	2.3E-03	9.3E-04	6.9E-06	6.5E-06	4.5E-06	2.5E-06
65	Mossvale Homestead	6.4E-03	5.1E-03	1.3E-03	2.0E-03	8.7E-06	7.8E-06	5.2E-06	2.9E-06
67	Oakleigh Homestead	5.9E-03	6.6E-03	2.9E-03	1.1E-03	2.1E-05	2.1E-05	1.5E-05	8.7E-06
68	Quarry?	3.4E-03	3.4E-03	2.4E-03	1.1E-03	2.3E-05	2.0E-05	1.4E-05	7.4E-06
69	Racecourse	3.3E-03	2.8E-03	2.0E-03	9.6E-04	2.1E-05	1.9E-05	1.3E-05	7.5E-06
70	Racecourse	1.9E-03	1.8E-03	1.7E-03	2.0E-03	1.2E-05	1.0E-05	7.4E-06	4.4E-06

ID	Name	1-hour boron (µg/m^3)				Annual boron (µg/m^3)			
		Overload	100%	60%	25%	Overload	100%	60%	25%
72	Rosedale Homestead	3.9E-03	2.1E-03	1.8E-03	1.4E-03	1.3E-05	1.1E-05	7.4E-06	4.7E-06
73	Rosefield Homestead	4.9E-03	5.3E-03	3.8E-03	2.7E-03	3.0E-05	2.7E-05	1.8E-05	1.0E-05
74	Salt Bush Homestead	4.4E-03	3.6E-03	3.5E-03	3.4E-03	2.4E-05	2.2E-05	1.6E-05	8.8E-06
75	Speculation Homestead	2.2E-03	4.0E-03	2.2E-03	1.7E-03	1.1E-05	1.1E-05	1.0E-05	6.4E-06
76	Spring Creek[a]	3.9E-03	4.0E-03	3.9E-03	2.1E-03	3.9E-05	3.5E-05	2.6E-05	1.5E-05
79	Surbiton Homestead	1.6E-03	1.7E-03	1.9E-03	8.6E-04	7.4E-06	6.6E-06	4.6E-06	2.7E-06
80	Surbiton Station	2.9E-03	2.3E-03	1.5E-03	1.6E-03	5.6E-06	5.1E-06	3.8E-06	2.3E-06
81	The Grove Homestead	3.7E-03	3.4E-03	3.6E-03	8.0E-04	8.0E-06	7.2E-06	5.2E-06	2.6E-06
82	Toarbee	4.1E-03	5.6E-03	3.9E-03	3.1E-03	2.0E-05	1.9E-05	1.3E-05	7.8E-06
84	Tressillian Homestead	2.8E-03	2.5E-03	1.8E-03	1.1E-03	1.3E-05	1.2E-05	8.1E-06	4.3E-06
85	Villafield Homestead	6.1E-03	4.7E-03	1.9E-03	2.6E-03	1.5E-05	1.3E-05	9.0E-06	5.2E-06
86	Wendouree Homestead[b]	3.1E-03	2.8E-03	2.5E-03	3.6E-03	1.8E-05	1.6E-05	1.2E-05	7.9E-06
87	Woodbrook Homestead	9.8E-04	8.6E-04	4.0E-04	2.1E-04	2.6E-06	2.4E-06	1.6E-06	8.3E-07
88	Wycheproof Homestead	2.7E-03	3.2E-03	2.2E-03	4.7E-04	3.6E-06	3.4E-06	2.2E-06	1.0E-06
89	Zeta Homestead	1.9E-03	2.7E-03	2.1E-03	1.6E-03	5.3E-06	4.9E-06	4.0E-06	2.3E-06
-	Workers' Camp	2.8E-02	2.7E-02	1.7E-02	1.2E-02	6.4E-05	6.4E-05	6.0E-05	3.7E-05
Objective		**5E+01**	**5E+01**	**5E+01**	**5E+01**	**5E+00**	**5E+00**	**5E+00**	**5E+00**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table B11 1,400 MW – Predicted annual average ground-level concentrations of cadmium due to Project in isolation

ID	Name	Annual cadmium (µg/m^3)			
		Overload	100%	60%	25%
0	Dwelling	7.8E-09	7.1E-09	5.0E-09	2.6E-09
1	Dwelling	1.3E-08	1.1E-08	7.7E-09	4.4E-09
2	Dwelling	3.4E-09	3.0E-09	2.1E-09	1.1E-09
5	Accommodation Village - Alpha Coal Project	7.5E-09	6.8E-09	4.8E-09	2.9E-09
6	Accommodation Village - South Galilee Coal Project	9.6E-09	9.1E-09	7.2E-09	4.5E-09
7	Airfield	1.4E-08	1.3E-08	8.8E-09	4.7E-09

ID	Name	Annual cadmium (µg/m^3)			
		Overload	100%	60%	25%
8	Alpha	5.6E-09	4.9E-09	3.5E-09	2.2E-09
9	Alpha Coal Bulk Sample	1.4E-08	1.4E-08	1.1E-08	8.1E-09
10	Beaufort Homestead	2.4E-09	2.1E-09	1.5E-09	8.5E-10
11	Bedford Homestead	5.9E-09	5.3E-09	3.8E-09	2.7E-09
12	Betanga Homestead	1.2E-08	1.1E-08	8.6E-09	6.4E-09
13	Blairgowrie	7.1E-09	6.3E-09	4.6E-09	3.0E-09
14	Bonanza Homestead	8.3E-09	7.4E-09	5.0E-09	2.9E-09
16	Burgoyne Homestead	9.7E-09	8.5E-09	6.4E-09	3.4E-09
17	Burtle Homestead	6.8E-09	6.1E-09	4.1E-09	2.3E-09
18	Carinya Homestead	2.5E-09	2.2E-09	1.7E-09	8.4E-10
19	Cavendish Homestead[a]	2.5E-08	2.3E-08	1.8E-08	1.0E-08
20	Colorado Homestead	1.2E-08	1.0E-08	6.7E-09	4.0E-09
21	Corn Top Homestead[a]	1.3E-08	1.2E-08	8.8E-09	7.0E-09
22	Creek Farm Homestead	9.0E-09	8.2E-09	5.6E-09	3.0E-09
25	Dwelling	1.1E-08	1.0E-08	6.8E-09	4.1E-09
26	Dwelling	1.2E-08	1.1E-08	7.5E-09	4.4E-09
27	Dwelling	1.3E-08	1.2E-08	7.8E-09	4.5E-09
28	Dwelling	9.9E-09	9.0E-09	6.2E-09	3.4E-09
29	Dwelling	1.4E-08	1.2E-08	8.3E-09	4.6E-09
30	Dwelling	9.2E-09	8.4E-09	5.5E-09	3.3E-09
31	Dwelling	1.2E-08	1.1E-08	7.6E-09	4.0E-09
32	Dwelling	6.1E-09	5.4E-09	4.0E-09	2.5E-09
33	Dwelling	6.3E-09	5.6E-09	4.0E-09	2.3E-09
34	Dwelling	4.7E-09	4.1E-09	2.8E-09	1.6E-09
35	Dwelling	4.6E-09	4.0E-09	2.8E-09	1.6E-09
36	Dwelling	4.4E-09	4.0E-09	2.6E-09	1.4E-09
37	Dwelling	4.1E-09	3.7E-09	2.5E-09	1.5E-09
38	Dwelling?	4.2E-09	3.7E-09	2.6E-09	1.5E-09
39	Edwinstowe Homestead	1.0E-08	9.3E-09	6.3E-09	3.6E-09
40	Elphin Homestead	4.4E-09	4.1E-09	2.9E-09	1.6E-09
41	Eulimbie Homestead	3.2E-09	2.9E-09	2.1E-09	1.3E-09
42	Eureka Homestead	1.8E-08	1.7E-08	1.1E-08	7.2E-09
44	Gadwell Homestead	5.6E-09	5.0E-09	3.5E-09	2.3E-09
46	Glen Innes Homestead[a]	4.9E-08	4.5E-08	3.4E-08	1.9E-08
47	Hazelbrook Homestead	4.9E-09	4.3E-09	3.0E-09	1.6E-09
49	Hobartville Homestead[b]	2.1E-08	2.0E-08	1.6E-08	1.0E-08
50	Inverurie Homestead	1.6E-08	1.5E-08	1.0E-08	6.2E-09
51	Islay Plains Homestead	2.2E-09	1.9E-09	1.4E-09	8.1E-10
52	Jericho	1.3E-08	1.1E-08	7.9E-09	4.4E-09
53	Jordan Avon Homestead	1.7E-08	1.5E-08	1.1E-08	6.0E-09
54	Kalbar Homestead	2.7E-09	2.5E-09	1.7E-09	9.2E-10
55	Kerand Homestead	1.8E-09	1.7E-09	1.1E-09	6.2E-10
56	Kia Ora Homestead[a]	3.8E-08	3.6E-08	2.8E-08	1.6E-08

ID	Name	Annual cadmium (µg/m³)			
		Overload	100%	60%	25%
57	Lambton Meadows Homestead[a]	2.0E-08	1.8E-08	1.4E-08	7.7E-09
59	Locharnoch	1.3E-08	1.2E-08	9.0E-09	4.4E-09
60	Melton Homestead	2.4E-09	2.1E-09	1.6E-09	9.7E-10
61	Mentmore Homestead	7.4E-09	6.7E-09	5.0E-09	3.1E-09
62	Milangavla	1.9E-08	1.7E-08	1.2E-08	6.6E-09
63	Monklands[a]	8.3E-08	8.4E-08	8.4E-08	6.6E-08
64	Moonstone Homestead	4.2E-09	3.9E-09	2.7E-09	1.5E-09
65	Mossvale Homestead	5.3E-09	4.7E-09	3.2E-09	1.8E-09
67	Oakleigh Homestead	1.3E-08	1.3E-08	9.3E-09	5.3E-09
68	Quarry?	1.4E-08	1.2E-08	8.5E-09	4.5E-09
69	Racecourse	1.3E-08	1.2E-08	8.2E-09	4.6E-09
70	Racecourse	7.1E-09	6.4E-09	4.5E-09	2.7E-09
72	Rosedale Homestead	7.9E-09	6.9E-09	4.5E-09	2.9E-09
73	Rosefield Homestead	1.8E-08	1.6E-08	1.1E-08	6.4E-09
74	Salt Bush Homestead	1.5E-08	1.3E-08	9.8E-09	5.4E-09
75	Speculation Homestead	6.8E-09	6.5E-09	6.1E-09	3.9E-09
76	Spring Creek[a]	2.3E-08	2.1E-08	1.6E-08	8.9E-09
79	Surbiton Homestead	4.5E-09	4.0E-09	2.8E-09	1.6E-09
80	Surbiton Station	3.4E-09	3.1E-09	2.3E-09	1.4E-09
81	The Grove Homestead	4.9E-09	4.4E-09	3.2E-09	1.6E-09
82	Toarbee	1.2E-08	1.1E-08	7.6E-09	4.8E-09
84	Tressillian Homestead	7.8E-09	7.0E-09	4.9E-09	2.6E-09
85	Villafield Homestead	9.0E-09	7.9E-09	5.5E-09	3.2E-09
86	Wendouree Homestead[b]	1.1E-08	1.0E-08	7.4E-09	4.8E-09
87	Woodbrook Homestead	1.6E-09	1.4E-09	9.6E-10	5.1E-10
88	Wycheproof Homestead	2.2E-09	2.1E-09	1.3E-09	6.3E-10
89	Zeta Homestead	3.2E-09	3.0E-09	2.4E-09	1.4E-09
-	Workers' Camp	3.9E-08	3.9E-08	3.7E-08	2.3E-08
Objective		**5E-03**	**5E-03**	**5E-03**	**5E-03**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table B12 1,400 MW – Predicted annual average ground-level concentrations of lead due to Project in isolation

ID	Name	Annual lead (µg/m³)			
		Overload	100%	60%	25%
0	Dwelling	2.4E-06	2.2E-06	1.5E-06	7.9E-07
1	Dwelling	3.8E-06	3.4E-06	2.3E-06	1.3E-06
2	Dwelling	1.0E-06	9.1E-07	6.3E-07	3.4E-07
5	Accommodation Village - Alpha Coal Project	2.3E-06	2.1E-06	1.4E-06	8.7E-07

ID	Name	Annual lead (µg/m^3)			
		Overload	100%	60%	25%
6	Accommodation Village - South Galilee Coal Project	2.9E-06	2.8E-06	2.2E-06	1.4E-06
7	Airfield	4.3E-06	3.9E-06	2.7E-06	1.4E-06
8	Alpha	1.7E-06	1.5E-06	1.1E-06	6.7E-07
9	Alpha Coal Bulk Sample	4.4E-06	4.2E-06	3.3E-06	2.4E-06
10	Beaufort Homestead	7.2E-07	6.5E-07	4.5E-07	2.6E-07
11	Bedford Homestead	1.8E-06	1.6E-06	1.2E-06	8.2E-07
12	Betanga Homestead	3.7E-06	3.4E-06	2.6E-06	1.9E-06
13	Blairgowrie	2.2E-06	1.9E-06	1.4E-06	9.1E-07
14	Bonanza Homestead	2.5E-06	2.2E-06	1.5E-06	8.8E-07
16	Burgoyne Homestead	2.9E-06	2.6E-06	2.0E-06	1.0E-06
17	Burtle Homestead	2.1E-06	1.9E-06	1.2E-06	6.8E-07
18	Carinya Homestead	7.6E-07	6.8E-07	5.2E-07	2.5E-07
19	Cavendish Homestead[a]	7.7E-06	7.1E-06	5.4E-06	3.1E-06
20	Colorado Homestead	3.6E-06	3.1E-06	2.0E-06	1.2E-06
21	Corn Top Homestead[a]	3.9E-06	3.5E-06	2.7E-06	2.1E-06
22	Creek Farm Homestead	2.7E-06	2.5E-06	1.7E-06	9.2E-07
25	Dwelling	3.5E-06	3.1E-06	2.1E-06	1.2E-06
26	Dwelling	3.8E-06	3.4E-06	2.3E-06	1.3E-06
27	Dwelling	3.9E-06	3.5E-06	2.4E-06	1.4E-06
28	Dwelling	3.0E-06	2.7E-06	1.9E-06	1.0E-06
29	Dwelling	4.1E-06	3.7E-06	2.5E-06	1.4E-06
30	Dwelling	2.8E-06	2.6E-06	1.7E-06	9.9E-07
31	Dwelling	3.7E-06	3.3E-06	2.3E-06	1.2E-06
32	Dwelling	1.9E-06	1.6E-06	1.2E-06	7.4E-07
33	Dwelling	1.9E-06	1.7E-06	1.2E-06	7.0E-07
34	Dwelling	1.4E-06	1.3E-06	8.7E-07	4.9E-07
35	Dwelling	1.4E-06	1.2E-06	8.5E-07	4.8E-07
36	Dwelling	1.3E-06	1.2E-06	7.9E-07	4.3E-07
37	Dwelling	1.2E-06	1.1E-06	7.8E-07	4.5E-07
38	Dwelling?	1.3E-06	1.1E-06	8.0E-07	4.7E-07
39	Edwinstowe Homestead	3.1E-06	2.8E-06	1.9E-06	1.1E-06
40	Elphin Homestead	1.4E-06	1.3E-06	8.9E-07	4.9E-07
41	Eulimbie Homestead	9.8E-07	8.7E-07	6.4E-07	4.0E-07
42	Eureka Homestead	5.5E-06	5.2E-06	3.5E-06	2.2E-06
44	Gadwell Homestead	1.7E-06	1.5E-06	1.1E-06	6.9E-07
46	Glen Innes Homestead[a]	1.5E-05	1.4E-05	1.0E-05	5.8E-06
47	Hazelbrook Homestead	1.5E-06	1.3E-06	9.1E-07	5.0E-07
49	Hobartville Homestead[b]	6.3E-06	6.0E-06	4.9E-06	3.1E-06
50	Inverurie Homestead	4.9E-06	4.6E-06	3.1E-06	1.9E-06
51	Islay Plains Homestead	6.6E-07	5.8E-07	4.2E-07	2.4E-07
52	Jericho	3.9E-06	3.5E-06	2.4E-06	1.3E-06
53	Jordan Avon Homestead	5.1E-06	4.6E-06	3.2E-06	1.8E-06

ID	Name	Annual lead (µg/m³)			
		Overload	100%	60%	25%
54	Kalbar Homestead	8.2E-07	7.5E-07	5.2E-07	2.8E-07
55	Kerand Homestead	5.6E-07	5.1E-07	3.5E-07	1.9E-07
56	Kia Ora Homestead[a]	1.2E-05	1.1E-05	8.5E-06	4.8E-06
57	Lambton Meadows Homestead[a]	5.9E-06	5.5E-06	4.3E-06	2.3E-06
59	Locharnoch	4.1E-06	3.8E-06	2.8E-06	1.3E-06
60	Melton Homestead	7.3E-07	6.5E-07	4.7E-07	2.9E-07
61	Mentmore Homestead	2.2E-06	2.0E-06	1.5E-06	9.2E-07
62	Milangavla	5.8E-06	5.1E-06	3.8E-06	2.0E-06
63	Monklands[a]	2.5E-05	2.6E-05	2.6E-05	2.0E-05
64	Moonstone Homestead	1.3E-06	1.2E-06	8.4E-07	4.6E-07
65	Mossvale Homestead	1.6E-06	1.4E-06	9.6E-07	5.4E-07
67	Oakleigh Homestead	3.9E-06	3.8E-06	2.8E-06	1.6E-06
68	Quarry?	4.2E-06	3.7E-06	2.6E-06	1.4E-06
69	Racecourse	4.0E-06	3.6E-06	2.5E-06	1.4E-06
70	Racecourse	2.2E-06	1.9E-06	1.4E-06	8.0E-07
72	Rosedale Homestead	2.4E-06	2.1E-06	1.4E-06	8.7E-07
73	Rosefield Homestead	5.6E-06	5.0E-06	3.4E-06	1.9E-06
74	Salt Bush Homestead	4.4E-06	4.1E-06	3.0E-06	1.6E-06
75	Speculation Homestead	2.1E-06	2.0E-06	1.9E-06	1.2E-06
76	Spring Creek[a]	7.1E-06	6.5E-06	4.7E-06	2.7E-06
79	Surbiton Homestead	1.4E-06	1.2E-06	8.6E-07	4.9E-07
80	Surbiton Station	1.0E-06	9.4E-07	7.1E-07	4.1E-07
81	The Grove Homestead	1.5E-06	1.3E-06	9.7E-07	4.8E-07
82	Toarbee	3.6E-06	3.5E-06	2.3E-06	1.4E-06
84	Tressillian Homestead	2.4E-06	2.1E-06	1.5E-06	7.9E-07
85	Villafield Homestead	2.7E-06	2.4E-06	1.7E-06	9.6E-07
86	Wendouree Homestead[b]	3.3E-06	3.0E-06	2.3E-06	1.5E-06
87	Woodbrook Homestead	4.8E-07	4.4E-07	2.9E-07	1.5E-07
88	Wycheproof Homestead	6.7E-07	6.3E-07	4.0E-07	1.9E-07
89	Zeta Homestead	9.8E-07	9.1E-07	7.4E-07	4.3E-07
-	Workers' Camp	1.2E-05	1.2E-05	1.1E-05	6.9E-06
Objective		**5E-01**	**5E-01**	**5E-01**	**5E-01**

Table note:
[a] These receptors will be acquired by Waratah
[b] These receptors will be acquired by Alpha Coal

Table B13 1,400 MW – Predicted 1-hour and annual average ground-level concentrations of mercury due to Project in isolation

ID	Name	1-hour mercury (µg/m³)				Annual mercury (µg/m³)			
		Overload	100%	60%	25%	Overload	100%	60%	25%
0	Dwelling	1.2E-06	9.9E-07	1.0E-06	4.2E-07	5.8E-09	5.3E-09	3.7E-09	1.9E-09

ID	Name	1-hour mercury (µg/m^3)				Annual mercury (µg/m^3)			
		Overload	100%	60%	25%	Overload	100%	60%	25%
1	Dwelling	1.2E-06	1.2E-06	9.2E-07	5.5E-07	9.4E-09	8.5E-09	5.8E-09	3.3E-09
2	Dwelling	6.9E-07	6.2E-07	3.6E-07	1.9E-07	2.6E-09	2.2E-09	1.5E-09	8.4E-10
5	Accommodation Village - Alpha Coal Project	1.8E-06	1.7E-06	1.2E-06	6.8E-07	5.6E-09	5.1E-09	3.6E-09	2.1E-09
6	Accommodation Village - South Galilee Coal Project	1.4E-06	3.2E-06	4.0E-06	1.0E-06	7.2E-09	6.8E-09	5.4E-09	3.3E-09
7	Airfield	1.7E-06	1.5E-06	1.0E-06	4.5E-07	1.1E-08	9.5E-09	6.6E-09	3.4E-09
8	Alpha	1.1E-06	9.8E-07	7.1E-07	9.0E-07	4.1E-09	3.7E-09	2.6E-09	1.6E-09
9	Alpha Coal Bulk Sample	2.0E-06	2.2E-06	2.0E-06	1.9E-06	1.1E-08	1.0E-08	8.2E-09	6.0E-09
10	Beaufort Homestead	9.3E-07	7.0E-07	5.8E-07	2.6E-07	1.8E-09	1.6E-09	1.1E-09	6.3E-10
11	Bedford Homestead	8.8E-07	9.3E-07	7.1E-07	1.9E-06	4.4E-09	3.9E-09	2.9E-09	2.0E-09
12	Betanga Homestead	1.2E-06	9.9E-07	1.2E-06	8.3E-07	9.1E-09	8.3E-09	6.5E-09	4.7E-09
13	Blairgowrie	1.1E-06	1.1E-06	8.2E-07	5.7E-07	5.3E-09	4.7E-09	3.5E-09	2.2E-09
14	Bonanza Homestead	2.4E-06	1.7E-06	7.9E-07	1.0E-06	6.2E-09	5.5E-09	3.8E-09	2.2E-09
16	Burgoyne Homestead	9.4E-07	8.1E-07	1.0E-06	2.9E-07	7.2E-09	6.3E-09	4.8E-09	2.5E-09
17	Burtle Homestead	1.3E-06	1.2E-06	6.5E-07	3.4E-07	5.1E-09	4.6E-09	3.1E-09	1.7E-09
18	Carinya Homestead	1.2E-06	1.2E-06	1.2E-06	3.0E-07	1.9E-09	1.7E-09	1.3E-09	6.2E-10
19	Cavendish Homestead[a]	1.5E-06	1.4E-06	1.7E-06	6.8E-07	1.9E-08	1.7E-08	1.3E-08	7.5E-09
20	Colorado Homestead	2.5E-06	1.7E-06	9.9E-07	8.6E-07	8.8E-09	7.7E-09	5.0E-09	2.9E-09
21	Corn Top Homestead[a]	1.7E-06	1.2E-06	6.4E-07	1.7E-06	9.6E-09	8.7E-09	6.6E-09	5.1E-09
22	Creek Farm Homestead	1.6E-06	1.3E-06	8.0E-07	3.7E-07	6.7E-09	6.1E-09	4.2E-09	2.2E-09
25	Dwelling	1.2E-06	8.7E-07	7.3E-07	4.0E-07	8.5E-09	7.5E-09	5.1E-09	3.0E-09
26	Dwelling	1.0E-06	1.2E-06	8.2E-07	7.3E-07	9.2E-09	8.4E-09	5.6E-09	3.2E-09
27	Dwelling	1.2E-06	1.2E-06	9.2E-07	5.8E-07	9.7E-09	8.7E-09	5.9E-09	3.3E-09
28	Dwelling	1.1E-06	1.0E-06	9.3E-07	3.6E-07	7.4E-09	6.7E-09	4.7E-09	2.5E-09
29	Dwelling	1.5E-06	1.1E-06	7.1E-07	7.7E-07	1.0E-08	9.1E-09	6.2E-09	3.4E-09
30	Dwelling	9.7E-07	1.3E-06	1.6E-06	6.3E-07	6.8E-09	6.3E-09	4.1E-09	2.4E-09
31	Dwelling	1.3E-06	1.0E-06	9.6E-07	4.6E-07	9.0E-09	8.1E-09	5.7E-09	3.0E-09
32	Dwelling	9.0E-07	9.2E-07	1.2E-06	9.9E-07	4.6E-09	4.1E-09	3.0E-09	1.8E-09
33	Dwelling	9.0E-07	9.0E-07	1.2E-06	6.7E-07	4.7E-09	4.2E-09	3.0E-09	1.7E-09
34	Dwelling	1.3E-06	1.1E-06	5.6E-07	7.7E-07	3.5E-09	3.1E-09	2.1E-09	1.2E-09

ID	Name	1-hour mercury (µg/m^3)				Annual mercury (µg/m^3)			
		Overload	100%	60%	25%	Overload	100%	60%	25%
35	Dwelling	1.4E-06	9.5E-07	6.4E-07	8.3E-07	3.4E-09	3.0E-09	2.1E-09	1.2E-09
36	Dwelling	1.7E-06	2.2E-06	5.5E-07	4.6E-07	3.3E-09	3.0E-09	2.0E-09	1.1E-09
37	Dwelling	1.0E-06	1.1E-06	1.0E-06	1.0E-06	3.1E-09	2.7E-09	1.9E-09	1.1E-09
38	Dwelling?	1.0E-06	1.0E-06	8.6E-07	7.0E-07	3.1E-09	2.8E-09	2.0E-09	1.1E-09
39	Edwinstowe Homestead	2.0E-06	1.5E-06	8.3E-07	5.7E-07	7.7E-09	7.0E-09	4.8E-09	2.6E-09
40	Elphin Homestead	1.2E-06	2.3E-06	9.4E-07	6.9E-07	3.3E-09	3.1E-09	2.2E-09	1.2E-09
41	Eulimbie Homestead	1.4E-06	1.1E-06	8.1E-07	4.2E-07	2.4E-09	2.1E-09	1.6E-09	9.7E-10
42	Eureka Homestead	4.9E-06	3.7E-06	3.3E-06	1.0E-06	1.4E-08	1.3E-08	8.6E-09	5.3E-09
44	Gadwell Homestead	2.2E-06	1.9E-06	6.3E-07	1.2E-06	4.2E-09	3.8E-09	2.6E-09	1.7E-09
46	Glen Innes Homestead[a]	3.1E-06	2.9E-06	2.1E-06	1.2E-06	3.6E-08	3.3E-08	2.5E-08	1.4E-08
47	Hazelbrook Homestead	1.4E-06	1.0E-06	5.3E-07	5.9E-07	3.7E-09	3.2E-09	2.3E-09	1.2E-09
49	Hobartville Homestead[b]	1.9E-06	2.0E-06	2.4E-06	1.4E-06	1.5E-08	1.5E-08	1.2E-08	7.5E-09
50	Inverurie Homestead	1.7E-06	2.6E-06	9.9E-07	1.0E-06	1.2E-08	1.1E-08	7.7E-09	4.6E-09
51	Islay Plains Homestead	3.7E-07	3.6E-07	2.7E-07	3.3E-07	1.6E-09	1.4E-09	1.0E-09	5.9E-10
52	Jericho	1.4E-06	1.1E-06	9.6E-07	4.4E-07	9.5E-09	8.5E-09	5.9E-09	3.3E-09
53	Jordan Avon Homestead	2.0E-06	1.8E-06	1.2E-06	7.6E-07	1.3E-08	1.1E-08	8.0E-09	4.4E-09
54	Kalbar Homestead	5.9E-07	5.0E-07	3.0E-07	1.7E-07	2.0E-09	1.9E-09	1.3E-09	6.8E-10
55	Kerand Homestead	5.4E-07	4.6E-07	2.8E-07	1.3E-07	1.4E-09	1.3E-09	8.6E-10	4.5E-10
56	Kia Ora Homestead[a]	3.1E-06	2.5E-06	1.8E-06	1.7E-06	2.9E-08	2.7E-08	2.1E-08	1.2E-08
57	Lambton Meadows Homestead[a]	3.6E-06	2.6E-06	1.8E-06	1.0E-06	1.5E-08	1.4E-08	1.1E-08	5.7E-09
59	Locharnoch	2.2E-06	2.0E-06	1.2E-06	5.1E-07	1.0E-08	9.2E-09	6.8E-09	3.2E-09
60	Melton Homestead	9.7E-07	6.6E-07	4.0E-07	3.1E-07	1.8E-09	1.6E-09	1.2E-09	7.1E-10
61	Mentmore Homestead	2.2E-06	2.0E-06	1.4E-06	9.7E-07	5.5E-09	5.0E-09	3.8E-09	2.3E-09
62	Milangavla	1.5E-06	1.6E-06	2.9E-06	7.6E-07	1.4E-08	1.3E-08	9.3E-09	4.8E-09
63	Monklands[a]	7.0E-06	6.2E-06	4.1E-06	2.3E-06	6.2E-08	6.3E-08	6.3E-08	4.9E-08
64	Moonstone Homestead	9.0E-07	1.4E-06	1.0E-06	4.2E-07	3.1E-09	2.9E-09	2.1E-09	1.1E-09
65	Mossvale Homestead	2.9E-06	2.3E-06	6.0E-07	8.9E-07	4.0E-09	3.5E-09	2.4E-09	1.3E-09
67	Oakleigh Homestead	2.7E-06	3.0E-06	1.3E-06	4.7E-07	9.6E-09	9.4E-09	7.0E-09	3.9E-09

ID	Name	1-hour mercury (µg/m^3)				Annual mercury (µg/m^3)			
		Overload	100%	60%	25%	Overload	100%	60%	25%
68	Quarry?	1.5E-06	1.5E-06	1.1E-06	4.9E-07	1.0E-08	9.2E-09	6.4E-09	3.3E-09
69	Racecourse	1.5E-06	1.3E-06	9.3E-07	4.3E-07	9.8E-09	8.8E-09	6.1E-09	3.4E-09
70	Racecourse	8.5E-07	8.1E-07	7.9E-07	9.2E-07	5.3E-09	4.7E-09	3.4E-09	2.0E-09
72	Rosedale Homestead	1.8E-06	9.5E-07	8.4E-07	6.4E-07	5.9E-09	5.1E-09	3.4E-09	2.1E-09
73	Rosefield Homestead	2.2E-06	2.4E-06	1.7E-06	1.2E-06	1.4E-08	1.2E-08	8.3E-09	4.7E-09
74	Salt Bush Homestead	2.0E-06	1.6E-06	1.6E-06	1.5E-06	1.1E-08	1.0E-08	7.3E-09	4.0E-09
75	Speculation Homestead	9.9E-07	1.8E-06	1.0E-06	7.8E-07	5.1E-09	4.9E-09	4.6E-09	2.9E-09
76	Spring Creek[a]	1.8E-06	1.8E-06	1.8E-06	9.6E-07	1.8E-08	1.6E-08	1.2E-08	6.5E-09
79	Surbiton Homestead	7.1E-07	7.7E-07	8.6E-07	3.9E-07	3.4E-09	3.0E-09	2.1E-09	1.2E-09
80	Surbiton Station	1.3E-06	1.1E-06	6.9E-07	7.2E-07	2.5E-09	2.3E-09	1.7E-09	1.0E-09
81	The Grove Homestead	1.7E-06	1.5E-06	1.6E-06	3.6E-07	3.6E-09	3.3E-09	2.4E-09	1.2E-09
82	Toarbee	1.9E-06	2.6E-06	1.8E-06	1.4E-06	8.9E-09	8.5E-09	5.7E-09	3.5E-09
84	Tressillian Homestead	1.3E-06	1.2E-06	8.1E-07	5.1E-07	5.8E-09	5.3E-09	3.7E-09	1.9E-09
85	Villafield Homestead	2.8E-06	2.2E-06	8.7E-07	1.2E-06	6.7E-09	5.9E-09	4.1E-09	2.3E-09
86	Wendouree Homestead[b]	1.4E-06	1.3E-06	1.1E-06	1.6E-06	8.1E-09	7.5E-09	5.6E-09	3.6E-09
87	Woodbrook Homestead	4.4E-07	3.9E-07	1.8E-07	9.5E-08	1.2E-09	1.1E-09	7.3E-10	3.7E-10
88	Wycheproof Homestead	1.2E-06	1.4E-06	9.9E-07	2.1E-07	1.7E-09	1.6E-09	9.9E-10	4.6E-10
89	Zeta Homestead	8.7E-07	1.2E-06	9.7E-07	7.4E-07	2.4E-09	2.2E-09	1.8E-09	1.1E-09
-	Workers' Camp	1.3E-05	1.2E-05	7.9E-06	5.2E-06	2.9E-08	2.9E-08	2.8E-08	1.7E-08
Objective		**1.8E-01**	**1.8E-01**	**1.8E-01**	**1.8E-01**	**1.1E+00**	**1.1E+00**	**1.1E+00**	**1.1E+00**

Table note:

[a] These receptors will be acquired by Waratah

[b] These receptors will be acquired by Alpha Coal

APPENDIX C CUMULATIVE ASSESSMENT

Table C1 Predicted ground-level concentrations of PM_{10} and $PM_{2.5}$ at sensitive receptors (adapted from Table 2.13 Pacific Environment Limited, July 2013)

ID	Name	Galilee Coal Project			Galilee Coal Project, Alpha Coal Project and Kevin's Corner Project		
		PM_{10}	$PM_{2.5}$		PM_{10}	$PM_{2.5}$	
		24-hr	24-hour	Annual	24-hr	24-hour	Annual
8	Alpha	3	1	0	4	2	0
11	Bedford Homestead	4	2	0	5	3	0
12	Betanga Homestead	23	10	1	27	11	1
16	Burgoyne Homestead	9	3	0	10	3	0
17	Burtle Homestead	6	3	0	7	3	0
19	Cavendish Homestead	37	16	4	38	18	5
20	Colorado Homestead	15	6	1	19	7	1
21	Corn Top Homestead	25	10	1	29	12	1
22	Creek Farm Homestead	4	2	0	5	2	0
41	Eulimbie Homestead	5	2	0	7	2	0
42	Eureka Homestead	20	10	1	23	12	1
44	Gadwell Homestead	7	3	0	7	3	0
46	Glen Innes Homestead	431	118	26	466	118	27
49	Hobartville Homestead	41	14	1	43	15	1
50	Inverurie Homestead	9	4	1	10	4	1
52	Jericho	10	4	0	11	4	1
53	Jordan Avon Homestead	9	4	1	9	4	1
56	Kia Ora Homestead	804	209	36	808	213	37
57	Lambton Meadows Homestead	45	20	3	47	21	3
59	Locharnoch	12	4	1	12	4	1
61	Mentmore Homestead	11	4	0	11	4	0
62	Milangavla	20	9	2	22	9	2
63	Monklands	180	52	6	195	55	7
65	Mossvale Homestead	2	1	0	4	2	0
67	Oakleigh Homestead	12	6	0	15	8	0
73	Rosefield Homestead	20	8	1	21	9	2
74	Salt Bush Homestead	11	5	0	16	7	0
76	Spring Creek	59	22	5	61	22	6
79	Surbiton Homestead	10	4	0	12	5	0
81	The Grove Homestead	2	1	0	4	2	0
82	Toarbee	15	6	1	19	7	1
84	Tressillian Homestead	15	6	0	16	6	0
86	Wendouree Homestead	17	6	1	32	9	2

Table C2 **Predicted ground-level concentrations of PM_{10} and $PM_{2.5}$ at sensitive receptors (adapted from Table 12 and Figures 12 to 15, Noise Mapping Australia, February 2012)**

ID	Name	South Galilee Coal Project		
		PM_{10}	$PM_{2.5}$	
		24-hr	24-hour	Annual
8	Alpha	15	2	0.5
11	Bedford Homestead	15	2	0.5
12	Betanga Homestead	15	2	0.5
19	Cavendish Homestead	10	2	0.5
20	Colorado Homestead	10	2	0.5
22	Creek Farm Homestead	25	3	0.5
42	Eureka Homestead	30	4	0.5
44	Gadwell Homestead	15	2	0.5
57	Lambton Meadows Homestead	15	2	0.5
61	Mentmore Homestead	15	2	0.5
65	Mossvale Homestead	15	2	0.5
67	Oakleigh Homestead	32	4	0.5
74	Salt Bush Homestead	18	2	0.5
81	The Grove Homestead	15	4	0.5
84	Tressillian Homestead	10	2	0.5