

Intended For

Alinta Energy (Cataby) Pty Ltd

Document type

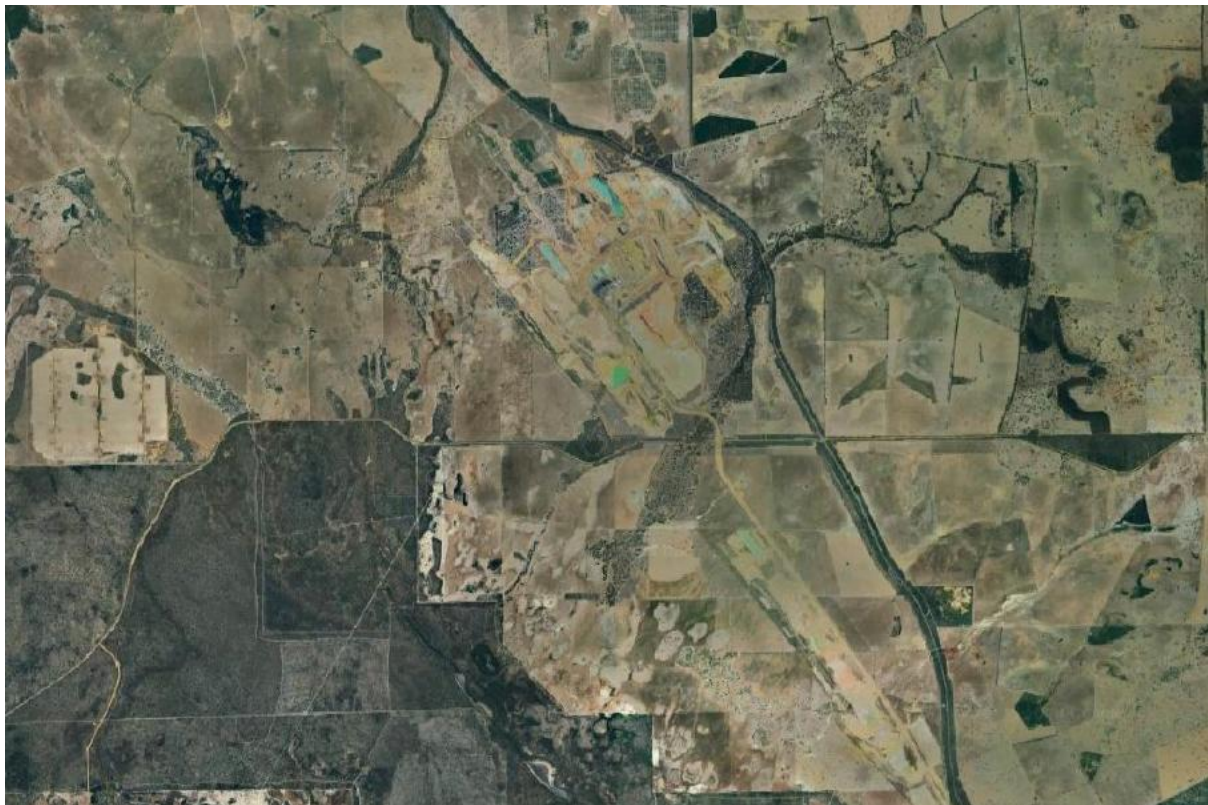
Draft Report

Date

8th June 2026

Cataby Power Station Air Quality Assessment

Alinta Energy (Cataby) Pty Ltd



Project Name **Cataby Power Station Air Quality Assessment**
Project No. **01-0004**
Document Type **Draft**
Version **E**
Date **08/06/2026**
Prepared By **Caelan Whiting**
Approved By **Martin Parsons**

Revision	Date	Made by	Approved by	Description
A	6 th December 2024	Martin Parsons	Martin Parsons	Initial issue
B	13 th February 2025	Martin Parsons	Martin Parsons	Updated Draft
C	24 th July 2025	Martin Parsons	Martin Parsons	Updated Draft
D	2 nd June 2026	Caelan Whiting	Martin Parsons	Additional pollutants added
E	8 th June 2026	Martin Parsons	Martin Parsons	Updated draft based on comments

This report has been prepared by MRP Technical Consulting Pty Ltd in accordance with the agreed scope of work and for the sole purpose described therein. It must not be used for any other purpose without MRP's prior written consent.

The conclusions presented represent MRP's professional judgement based on the information available at the time of assessment. MRP does not warrant or guarantee any particular outcome, including regulatory approval or operational performance.

MRP has relied on information provided by the Client and third parties and has not independently verified all such information. MRP accepts no responsibility for any errors, omissions or consequences arising from inaccurate or incomplete information.

This report does not constitute legal advice.

To the fullest extent permitted by law, MRP does not accept or assume any duty of care or liability to any person other than the Client in respect of this report. The Client remains solely responsible for any decisions made based on this report.

This report is provided for general information within the agreed scope and should not be relied upon as the sole basis for decision-making.

To the extent permitted by law, MRP shall not be liable for any indirect or consequential loss, including loss of profit, revenue or opportunity, arising from use of this report.

MRP Technical Consulting Pty Ltd
ACN: 679 732 453
ABN: 15679732453

Table of Contents

1	Introduction	1
1.1	Background	1
1.2	Purpose of this report	1
1.3	Project information	1
2	Existing environment	2
2.1	Regional climate	2
2.2	Existing air quality	5
3	Assessment criteria	6
4	Air dispersion modelling methodology	7
4.1	Air dispersion model	7
4.2	Meteorological data	7
4.3	Model parameterisation	8
4.3.1	AERMOD	8
4.4	Modelled scenarios	10
4.4.1	Normal operations in isolation (S1)	10
4.4.2	Normal operations – cumulative (S2)	10
4.4.3	Start-up operations (S3)	10
4.4.4	Shutdown operations (S4)	10
4.5	Treatment of exhaust gases	11
4.6	Emission estimates and stack parameters	11
4.7	Treatment of oxides of nitrogen	14
5	Modelling results	14
5.1	Nitrogen dioxide	14
5.2	Carbon monoxide	24
5.3	Particulate matter (PM ₁₀)	34
5.4	Particulate matter (PM _{2.5})	44
5.5	Formaldehyde	54
6	Summary	64
7	References	65

Tables

Table 2-1: CAMS derived background concentrations 2022	6
Table 3-1: Ambient air quality criteria	7
Table 4-1: AERMOD grid receptor parameters	8
Table 4-2: Sensitive receptor locations	8
Table 4-3: Control system efficiency of reciprocating engines under normal operations	11
Table 4-4: Stack locations	11
Table 4-5: Stack parameters used in the modelling	13

Table 4-6: Emission rates used in the modelling.....	13
Table 5-1: Summary of predicted maximum 1-hour average and annual average GLCs of NO ₂ ..	15
Table 5-2: Summary of predicted maximum 1-hour and 8-hour average GLCs of CO	25
Table 5-3: Summary of predicted maximum 24-hour average and annual average GLCs of PM ₁₀	35
Table 5-4: Summary of predicted maximum 24-hour average and annual average GLCs of PM _{2.5}	45
Table 5-5: Summary of predicted maximum 99.9 th percentile 1-hour average and maximum 24- hour average GLCs of CH ₂ O	55

Figures

Figure 1-1 Regional location of project.....	2
Figure 2-1: Mean rainfall at BoM monitoring station – Gingin Aero (1996- 2024)	3
Figure 2-2: Mean minimum and maximum temperature recorded at BoM monitoring site – Gingin Aero (1996 - 2024)	4
Figure 2-3: Gingin Aero 2022 - Annual average wind rose	5
Figure 4-1: Locations of sensitive receptors	9
Figure 4-2: Proposed stack locations	12
Figure 5-1: Predicted maximum 1-hour average GLCs of NO ₂ (µg/m ³) for normal operations in isolation (Scenario 1)	16
Figure 5-2: Predicted annual average GLCs of NO ₂ (µg/m ³) for normal operations in isolation (Scenario 1)	17
Figure 5-3: Predicted cumulative maximum 1-hour average GLCs of NO ₂ (µg/m ³) for normal operations (Scenario 2)	18
Figure 5-4: Predicted cumulative annual average GLCs of NO ₂ (µg/m ³) for normal operations (Scenario 2)	19
Figure 5-5: Predicted cumulative maximum 1-hour average GLCs of NO ₂ (µg/m ³) for start-up operations (Scenario 3)	20
Figure 5-6: Predicted cumulative annual average GLCs of NO ₂ (µg/m ³) for start-up operations (Scenario 3)	21
Figure 5-7: Predicted cumulative maximum 1-hour average GLCs of NO ₂ (µg/m ³) for shutdown operations (Scenario 4)	22
Figure 5-8: Predicted cumulative annual average GLCs of NO ₂ (µg/m ³) for shutdown operations (Scenario 4)	23
Figure 5-9: Predicted maximum 1-hour average GLCs of CO (µg/m ³) for normal operations in isolation (Scenario 1)	26
Figure 5-10: Predicted maximum 8-hour average GLCs of CO (µg/m ³) for normal operations in isolation (Scenario 1)	27

Figure 5-11: Predicted cumulative maximum 1-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)	28
Figure 5-12: Predicted cumulative maximum 8-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)	29
Figure 5-13: Predicted cumulative maximum 1-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)	30
Figure 5-14: Predicted cumulative maximum 8-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)	31
Figure 5-15: Predicted cumulative maximum 1-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)	32
Figure 5-16: Predicted cumulative maximum 8-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)	33
Figure 5-17: Predicted maximum 24-hour average GLCs of PM ₁₀ ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)	36
Figure 5-18: Predicted annual average GLCs of PM ₁₀ ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)	37
Figure 5-19: Predicted cumulative maximum 24-hour average GLCs of PM ₁₀ ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)	38
Figure 5-20: Predicted cumulative annual average GLCs of PM ₁₀ ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)	39
Figure 5-21: Predicted cumulative maximum 24-hour average GLCs of PM ₁₀ ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)	40
Figure 5-22: Predicted cumulative annual average GLCs of PM ₁₀ ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)	41
Figure 5-23: Predicted cumulative maximum 24-hour average GLCs of PM ₁₀ ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)	42
Figure 5-24: Predicted cumulative annual average GLCs of PM ₁₀ ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)	43
Figure 5-25: Predicted maximum 24-hour average GLCs of PM _{2.5} ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)	46
Figure 5-26: Predicted annual average GLCs of PM _{2.5} ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)	47
Figure 5-27: Predicted cumulative maximum 24-hour average GLCs of PM _{2.5} ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)	48
Figure 5-28: Predicted cumulative annual average GLCs of PM _{2.5} ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)	49
Figure 5-29: Predicted cumulative maximum 24-hour average GLCs of PM _{2.5} ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)	50
Figure 5-30: Predicted cumulative annual average GLCs of PM _{2.5} ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)	51

Figure 5-31: Predicted cumulative maximum 24-hour average GLCs of PM _{2.5} (µg/m ³) for shutdown operations (Scenario 4)	52
Figure 5-32: Predicted cumulative annual average GLCs of PM _{2.5} (µg/m ³) for shutdown operations (Scenario 4)	53
Figure 5-33: Predicted maximum 99.9 th percentile 1-hour average GLCs of CH ₂ O (µg/m ³) for normal operations in isolation (Scenario 1)	56
Figure 5-34: Predicted maximum 24-hour average GLCs of CH ₂ O (µg/m ³) for normal operations in isolation (Scenario 1)	57
Figure 5-35: Predicted cumulative maximum 99.9 th percentile 1-hour average GLCs of CH ₂ O (µg/m ³) for normal operations (Scenario 2)	58
Figure 5-36: Predicted cumulative maximum 24-hour average GLCs of CH ₂ O (µg/m ³) for normal operations (Scenario 2)	59
Figure 5-37: Predicted cumulative maximum 99.9 th percentile 1-hour average GLCs of CH ₂ O (µg/m ³) for start-up operations (Scenario 3)	60
Figure 5-38: Predicted cumulative maximum 24-hour average GLCs of CH ₂ O (µg/m ³) for start-up operations (Scenario 3)	61
Figure 5-39: Predicted cumulative maximum 99.9 th percentile 1-hour average GLCs of CH ₂ O (µg/m ³) for shutdown operations (Scenario 4)	62
Figure 5-40: Predicted cumulative maximum 24-hour average GLCs of CH ₂ O (µg/m ³) for shutdown operations (Scenario 4)	63

1 Introduction

1.1 Background

As part of Alinta Energy's commitment to securing an energy mix that delivers reliability, affordability and sustainability, Alinta Energy (Cataby) Pty Ltd (Alinta) is developing approximately 400 megawatts (MW) of supply known as the Cataby Power Station (The Project or the Proposal). The Project is proposed to be based on a combination of natural gas fired turbine and reciprocating engine technology, and will be connected to the South West Interconnected System (SWIS).

The Project will connect to the 330 kilovolt (KV) Yandin substation. Gas supply will be provided by gas pipeline proponents via a purpose-built lateral pipeline from Dampier Bunbury Natural Gas Pipeline (DBNGP). The lateral pipeline will be conducted separately by others and does not form part of this assessment.

Alinta plan to seek approval under Part IV of the *Environmental Protection Act 1986* to enable the development of the Project. Alinta requested that MRP Technical Consulting Pty Ltd (MRP) undertake an air quality assessment as part of the Environmental Impact Assessment (EIA) Process.

1.2 Purpose of this report

This report presents the assessment of the potential impact to the ambient air quality associated with emissions from the proposed Project. The assessment focuses on key pollutants of concern, including nitrogen dioxide (NO₂), particulates (including PM₁₀ and PM_{2.5}), formaldehyde (CH₂O) and carbon monoxide (CO). The approach, methodology and results of air dispersion modelling that was undertaken as part of this assessment are detailed as well as the predicted impacts.

1.3 Project information

The Project will be located approximately 150 kilometres (km) north of Perth on cleared agricultural land (Figure 1-1). The Project will consist of 400 MW of generation capacity, utilising a combination of a single gas turbine and ten reciprocating engines. The turbine and engines are expected to be initially run using natural gas, however they are being implemented to be able to run on blended hydrogen gas in the future if required. The Project will be located on an estimated 28 hectare (ha) lot.

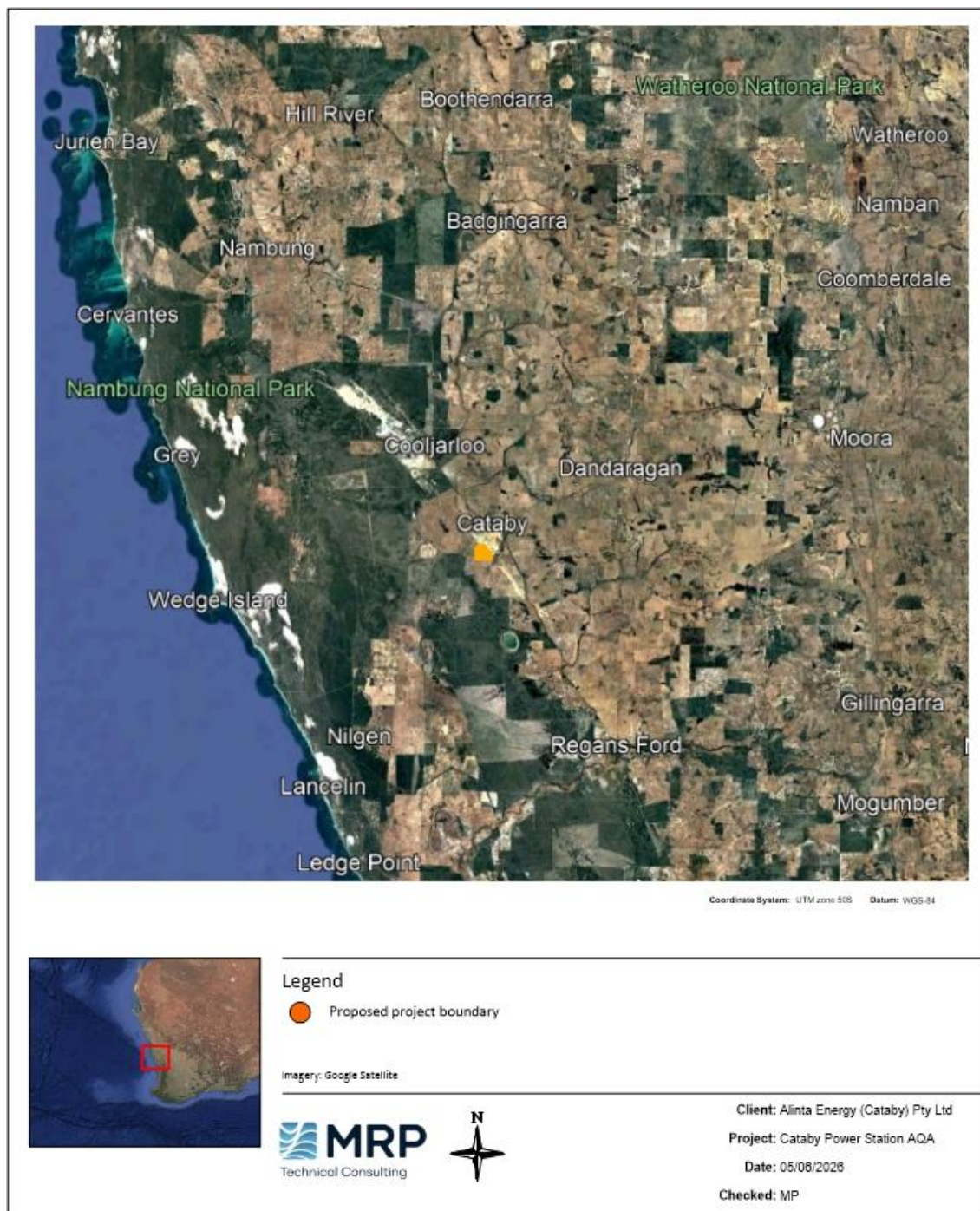


Figure 1-1 Regional location of project

2 Existing environment

2.1 Regional climate

The climate of the region is classed as Mediterranean, with hot, dry summers and mild winters. For the regional climate information, data is taken from the nearest Bureau of Meteorology (BoM) monitoring station to the project (Gingin Aero), with a complete dataset available for analysis from 2022. The data shows that during the summer months (December to February)

the maximum average temperatures can go as high as 34°C and during the winter months (June to August) the minimum average temperatures can go as low as 6°C. The average maximum and minimum temperature plots can be seen below in Figure 2-2 (BoM, 2024). The annual average wind rose derived from the Gingin Aero meteorological dataset (2022) is presented as Figure 2-3.

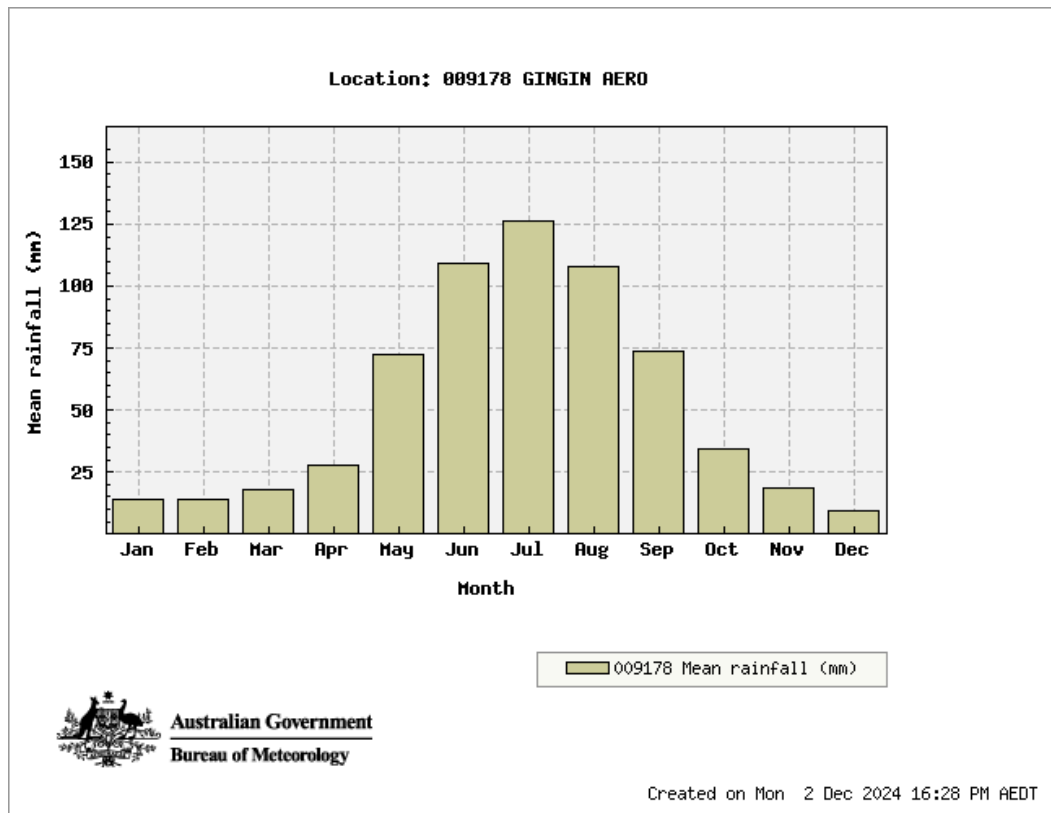


Figure 2-1: Mean rainfall at BoM monitoring station – Gingin Aero (1996- 2024)

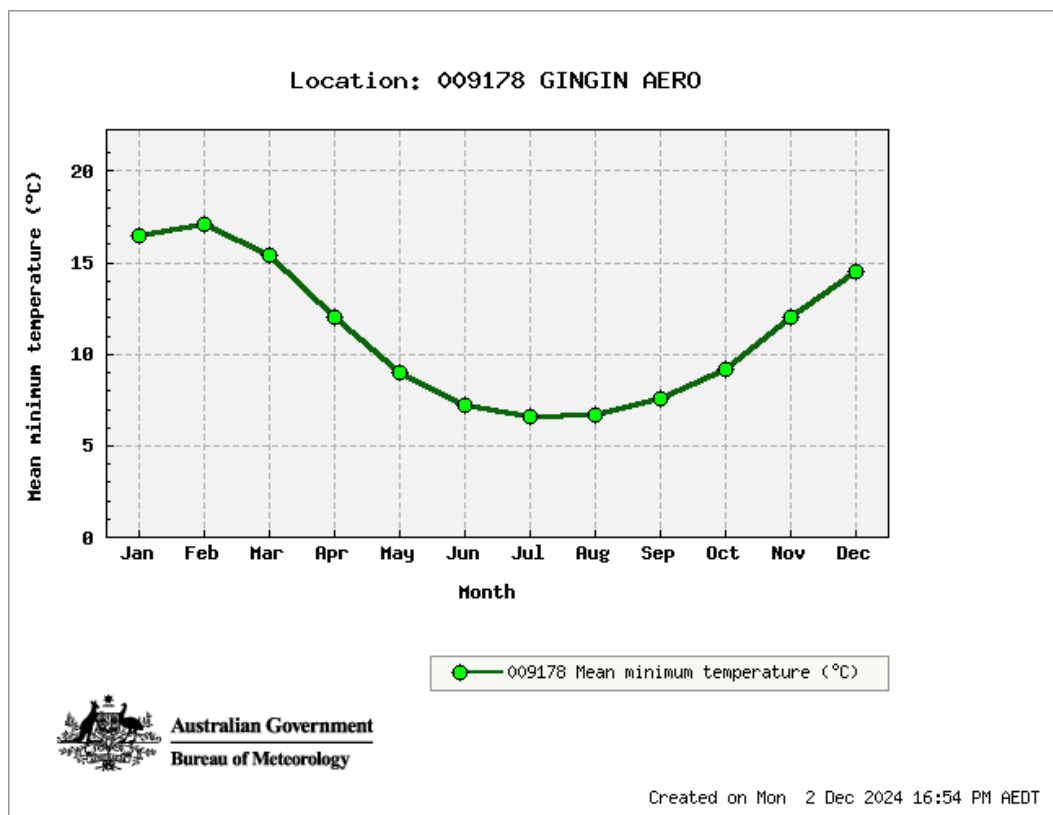
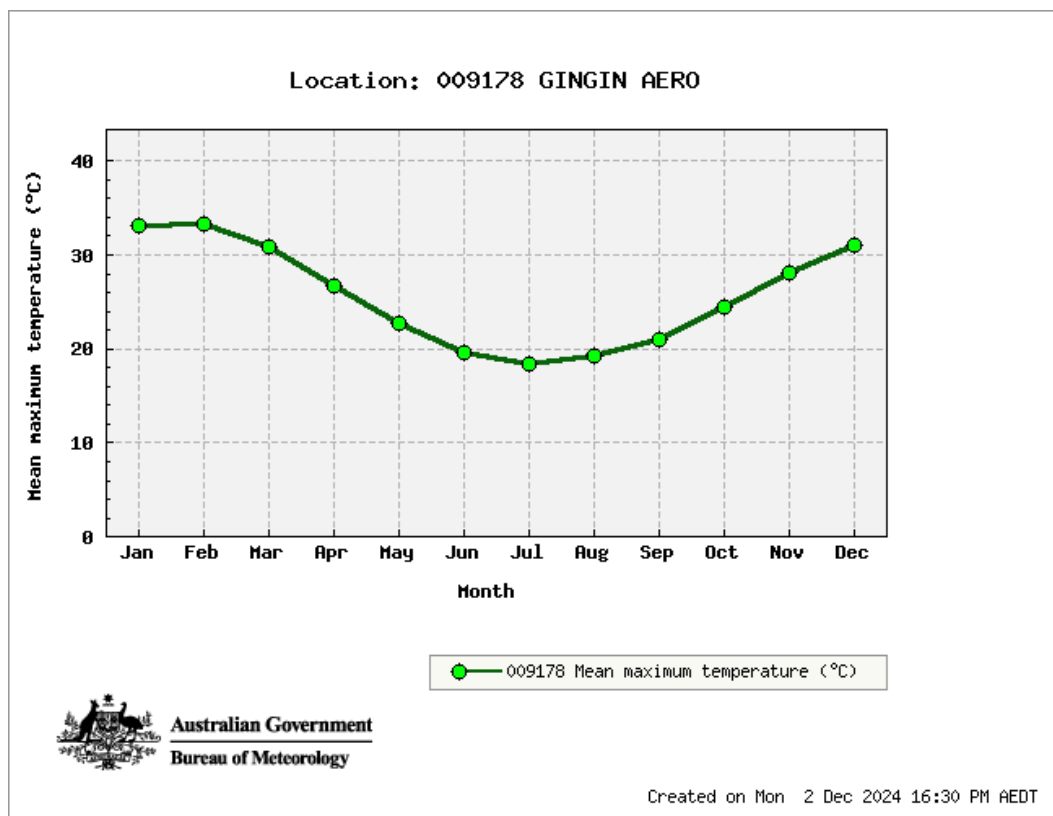
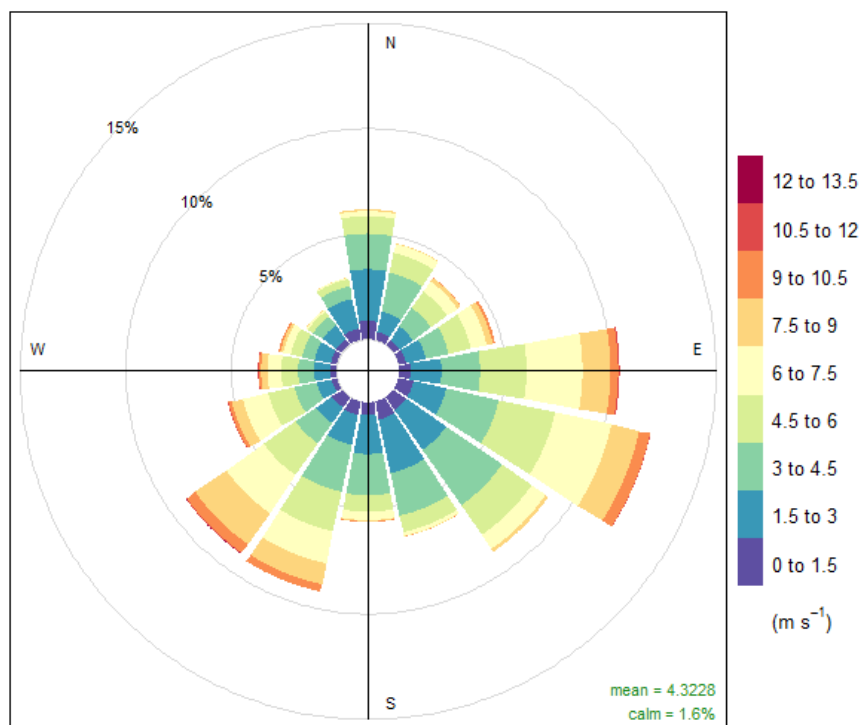


Figure 2-2: Mean minimum and maximum temperature recorded at BoM monitoring site – Gingin Aero (1996 - 2024)



Frequency of counts by wind direction (%)

Figure 2-3: Gingin Aero 2022 - Annual average wind rose

2.2 Existing air quality

In order to assess the potential impact of the proposed operations in the region, predicted emissions from the modelling were considered in conjunction with existing regional concentrations (cumulative impacts). In the absence of site-specific monitoring data, background concentrations for pollutants of concern were derived from the Copernicus Atmosphere Monitoring Service (CAMS) global reanalysis (Copernicus, 2024) dataset for the 2022 year. The CAMS reanalysis combines model data with observations from across the world into a globally complete and consistent dataset.

A review of potential emission sources within the surrounding region was undertaken. Nearby operations include the Iluka Cataby Mineral Sands project and Tronox's Cooljarloo Mine. Emissions from these operations are primarily associated with mobile equipment, including light and heavy vehicles. Emissions from these sources would be transient and only likely to impact on a very localised basis. On this basis, these sources were not explicitly included in the cumulative modelling, with regional background concentrations considered to provide a conservative representation of existing conditions.

A summary of the background concentration values as adapted from the CAMS dataset for the region for the cumulative assessment are presented in Table 2-1. No specific guidance for selection of an appropriate background level for the purposes of an air quality assessment is provided in Western Australia. However, in Victoria, the State Environment Protection Policy

Ambient Air Quality SEPP (AQM) (EPA VIC, 2001) states that the 70th percentile concentration (concentration which is exceeded by 30% of concentrations for that averaging period) should be adopted as the background level for short term averaging periods. The average values from the CAMS dataset were used for the annual averages.

Table 2-1: CAMS derived background concentrations 2022

Pollutant	Averaging period	Concentration (µg/m ³)
NO ₂	70 th percentile 1-hour	2.06
	Annual	1.86
PM ₁₀	70 th percentile 24-hour	9.46
	Annual	8.81
PM _{2.5}	70 th percentile 24-hour	5.77
	Annual	5.64
CH ₂ O	70 th percentile 1-hour	1.95
	70 th percentile 24-hour	2.08
CO	70 th percentile 1-hour	91.05
	70 th percentile 8-hour	91.47

Notes:

1. Referenced to 25°C, and 101.3 kPa.

3 Assessment criteria

The Department of Water and Environmental Regulation (DWER) and the federal government have published a number of documents relevant to this assessment including the following:

- Guidance Statement for Risk Assessments in February 2017 (DWER, 2017);
- the draft Guideline: Air Emissions in October 2019 (DWER, 2019), which refers to air quality criteria that may be considered in determining public health and environment impacts;
- DWER Air Quality Modelling Guidance Notes (2006);
- National Environment Protection (Ambient Air Quality) Measure (NEPM) (NEPC, 2021), noting that a proposed variation to the PM_{2.5} and SO₂ standards have recently come into effect as of January 2025; and
- NEPM (Air Toxics) (NEPC, 2011).

Results of the modelling were assessed with reference to criteria and guidance stipulated in the above documentation. Table 3-1 displays standards for pollutants relevant to this assessment. Where criteria or guidelines for pollutants were outlined in both the NEPM and DWER, the NEPM criteria was selected.

Table 3-1: Ambient air quality criteria

Compound	Averaging period	Concentration ($\mu\text{g}/\text{m}^3$) ¹	Reference
NO ₂	1-hr	151	NEPC (2021)
	Annual	28	
PM ₁₀	24-hour	46	NEPC (2021) & DWER (2019)
	Annual	23	
PM _{2.5}	24-hour	18	NEPC (2021) ²
	Annual	6.4	
CH ₂ O	1-hour	20	DWER (2019)
	24-hour ³	49	NEPC (2011)
CO	1-hour	30,000	DWER (2019)
	8-hour	10,000	NEPC (2021) & DWER (2019)

Notes:

1. Referenced to 25°C, and 101.3 kPa.
2. The PM_{2.5} values are based on the AAQ NEPM standards proposed in the 2021 variation for implementation in 2025 but yet to formally ratified.
3. This is a monitoring investigation level. As defined in the NEPM (Air Toxics) (NEPC, 2011), monitoring investigation levels are established for use in assessing the significance of the monitored levels of air toxics with respect to protection of human health. If the monitoring investigation level is exceeded, then some form of further investigation by the relevant jurisdiction of the cause of the exceedance is appropriate.

4 Air dispersion modelling methodology

4.1 Air dispersion model

The air dispersion modelling was conducted using AERMOD (version 24142) which is a steady-state Gaussian (plume) model and is the recommended regulatory model for short range (<50 km) dispersion in the United States. AERMOD is used widely in Australia for regulatory approvals applications and is accepted for use by DWER. AERMOD is a current-generation air dispersion model that incorporates concepts such as planetary boundary layer theory and advanced methods for handling complex terrain. The utilisation of AERMOD is consistent with the considerations of EIA outlined in the EPAs Environmental Factor Guideline for Air Quality (EPA, 2020).

4.2 Meteorological data

Processing of meteorological data for AERMOD for the dispersion modelling was completed using the AERMET meteorological pre-processor. Meteorological modelling was completed with consideration to the EPA Victoria guidance publication (1550) (EPA Victoria, 2013). A site-specific meteorological file was developed for input to the model using representative meteorological monitoring data collected at the Gingin Aero (BoM) monitoring station, located approximately 80 km away from the site, augmented with data generated by The Air Pollution Model (TAPM) where required. TAPM was developed by the Australian Commonwealth Scientific

and Industrial Research Organisation (CSIRO) and consists of coupled prognostic meteorological and air pollution dispersion model components. The annual average wind rose derived from the Gingin Aero meteorological dataset (2022) is presented in Figure 2-3.

4.3 Model parameterisation

4.3.1 AERMOD

A summary of the receptor grid(s) for the air dispersion modelling is presented in Table 4-1.

Table 4-1: AERMOD grid receptor parameters

Parameter	Value
Dimensions	40kmx40km
Spacing	1000m
Grid Origin X Coordinate [m]	339000
Grid Origin Y Coordinate [m]	6575500
No of Points	40x40

Notes:

1. Universal Transverse Mercator (UTM) Zone 50

Table 4-2: Sensitive receptor locations

Description	(mE) ¹	(mN) ¹	Approx distance from power station
Residence 1	355568	6596274	3.8 km
Residence 2	361007	6591739	3.9 km
Residence 3	356046	6597669	4.0 km
Residence 4	356532	6598078	4.0 km
Residence 5	356552	6598549	4.2 km
Residence 6	358792	6600602	5.3 km
Residence 7	360741	6599600	4.5km
Iluka Offices	359896	6597016	1.9 km
Iluka Operations	359422	6595699	0.3 km
Iluka Owned Premises	360265	6594009	1.7 km
Ampol Cataby	362047	6596868	3.2 km
Cataby Townsite	360135	6598782	3.6 km
PWR Hybrid Solar Farm	357939	6600048	4.9 km

Notes:

1. UTM Zone 50

In addition to the modelled grid, predicted concentrations were assessed at three of the discrete receptor locations from Table 4-2 including the offices of the mining operations as well as at Residence 1 and 2 for informative purposes.

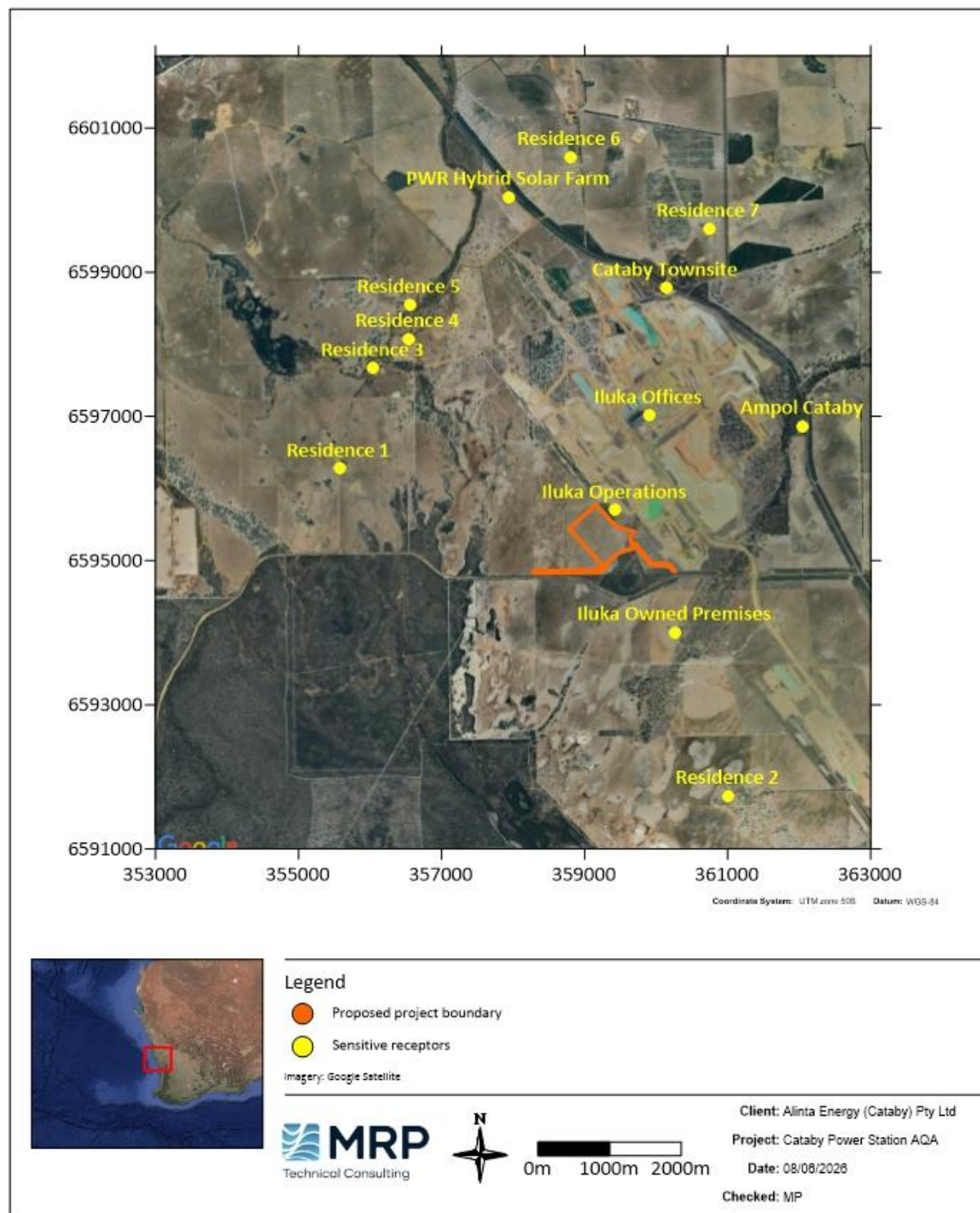


Figure 4-1: Locations of sensitive receptors

Terrain elevation data for the model domain were obtained from the US National Aeronautics and Space Administration's (NASA) Shuttle Radar Topography Mission (SRTM3/SRTM1) and incorporated into AERMOD using the AERMAP terrain processor.

4.4 Modelled scenarios

The air dispersion modelling assessment considered emissions from the proposed power station under a range of operating scenarios representing normal, start-up, and shutdown operating conditions. The assessment adopted a conservative approach, with emissions based on worst-case operating conditions and assuming all sources operate simultaneously and continuously. A summary of each of the scenarios considered as part of this assessment is provided below:

4.4.1 Normal operations in isolation (S1)

The normal operations in isolation scenario included emissions estimates and stack parameters from the proposed power station without consideration of background concentrations. Emissions from all proposed sources operating on natural gas were included under the normal operations scenario.

The proposed plant consists of one open cycle gas turbine and ten reciprocating engines. The power station is expected to operate as a peaking facility and is not anticipated to run continuously. However, for the purpose of this assessment, emissions from all units were conservatively assumed to occur simultaneously and continuously all year round.

4.4.2 Normal operations – cumulative (S2)

The normal operations - cumulative scenario included emissions from the proposed sources as described in Section 4.4.1 with the addition of background concentrations as described in Section 2.2.

4.4.3 Start-up operations (S3)

Emissions from the proposed sources under a start-up scenario were assessed using the emissions provided by the vendors. The emissions under this scenario were considered cumulatively. Startup emissions for the turbine were expected to occur over a 23-minute period. Startup emissions associated with the reciprocating engines were expected to occur over a period of 3.6 minutes. As some of the short-term criteria for the pollutants of concern are based on 1-hour averages, it was conservatively assumed that normal operations were occurring for the remaining 37 minutes and 56.4 minutes in the hour, respectively.

4.4.4 Shutdown operations (S4)

Emissions from the proposed sources under a shutdown scenario were assessed using the emissions provided by the vendors. Like the startup emissions, shutdown emissions from the turbine were expected to occur over a 23-minute period. Emissions associated with the shutdown of the reciprocating engines were expected to occur over a 5-minute period. It was conservatively assumed that normal operations were occurring for the remaining 37 minutes or 55 minutes in the hour, respectively.

4.5 Treatment of exhaust gases

The proposed reciprocating engines could employ an air pollution control system, potentially incorporating both selective catalytic reduction and oxidation catalysts to reduce emissions of NO_x, CO and CH₂O from the exhaust stream. The control equipment is designed to achieve a removal efficiency of pollutants under normal operations as described in Table 4-3. Emission rates used in the dispersion modelling have been based on the post-control concentrations provided by Alinta. The use of selective catalytic reduction has been included in this assessment however, sensitivity testing indicated that selective catalytic reduction is not required to comply with relevant ambient air quality criteria for NO₂ and will be revisited as part of detailed design.

Table 4-3: Control system efficiency of reciprocating engines under normal operations

Pollutant	Emission rate (pre-controls) ¹	Emission rate (post-controls) ¹	Removal efficiency (%)
NO ₂	180	50	72%
CO	235	30	87%
CH ₂ O	30	2	94%

Notes:

1. mg/Nm³, dry at 15% O₂

4.6 Emission estimates and stack parameters

A summary of the stack parameters, emissions data and stack locations for the proposed sources that were used in the assessment are provided in Figure 4-2, and Table 4-4 to Table 4-6 below:

Table 4-4: Stack locations

Source	(mE) ¹	(mN) ¹
Gas turbine	359406	6595184
Reciprocating engine 1	359194	6595363
Reciprocating engine 2	359200	6595368
Reciprocating engine 3	359206	6595373
Reciprocating engine 4	359212	6595379
Reciprocating engine 5	359218	6595384
Reciprocating engine 6	359229	6595395
Reciprocating engine 7	359235	6595400
Reciprocating engine 8	359241	6595406
Reciprocating engine 9	359247	6595411
Reciprocating engine 10	359253	6595417

Notes:

1. UTM Zone 50

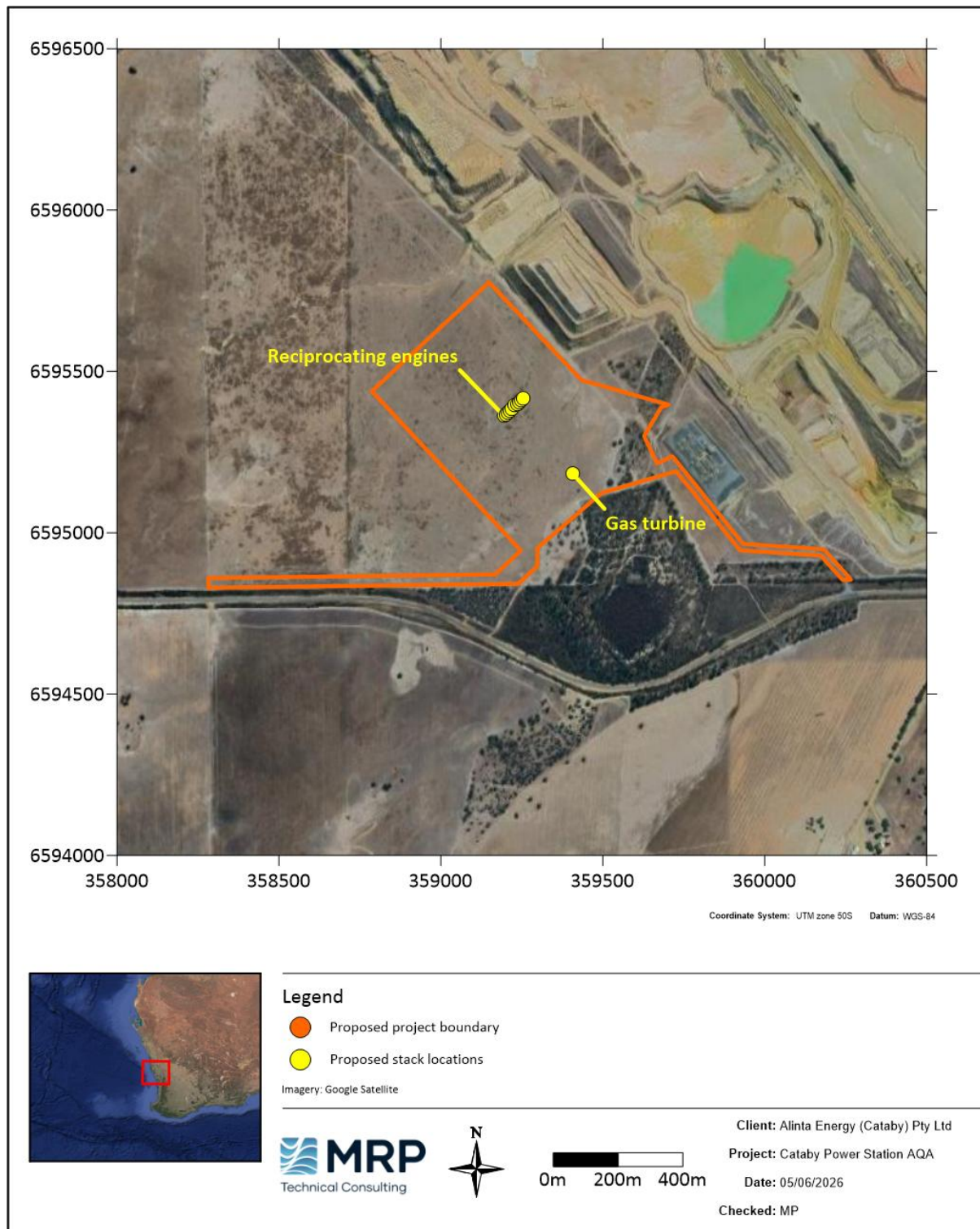


Figure 4-2: Proposed stack locations

Table 4-5: Stack parameters used in the modelling

Parameter	Unit	Gas turbine	Reciprocating engines
Height	m	35	25
Diameter	m	6.5	1.704
Exit velocity	m/s	30.8	25.6
Exit temperature	°K	806.35	615.15

Table 4-6: Emission rates used in the modelling

Pollutant	Unit	Gas turbine			Reciprocating engines		
		Normal (S1 & S2)	Start-up (S3)	Shutdown (S4)	Normal (S1 & S2)	Start-up (S3)	Shutdown (S4)
NO _x	g/s	21.54	22.48	22.48	1.90	1.91	1.88
CO		12.92	845.94	845.94	1.14	1.54	1.54
PM ₁₀		1.73	1.73	1.73	0.08	0.15	0.07
PM _{2.5}		1.73	1.73	1.73	0.08	0.15	0.07
CH ₂ O		0.05	0.46	0.46	0.07	0.11	0.12

4.7 Treatment of oxides of nitrogen

The Ozone Limiting Method (OLM) was utilised to predict ground level concentrations (GLCs) of NO_2 as specified by the USEPA (see Cole and Summerhays 1979) and NSW Environment Protection Authority (NSW EPA, 2022). This method assumes that all the available ozone in the atmosphere will react with nitrogen oxide (NO) in the plume until either all the available ozone or all the NO is used up. This approach is conservative in that it assumes that the atmospheric reaction is instant when in reality, the reaction typically takes place over a number of hours.

Similar to the attainment of the background concentration data for each pollutant, in the absence of ozone monitoring data, regional ozone concentrations were adapted from the CAMS global reanalysis dataset in accordance with the methodology used to obtain the background concentrations of all the pollutants of concern (Copernicus, 2024).

5 Modelling results

5.1 Nitrogen dioxide

Contour plots showing predicted concentrations of NO_2 can be found in Figure 5-1 to Figure 5-8 below, with relevant air quality criteria displayed as a red contour line. Table 5-1 presents the predicted GLCs across the entire modelled domain, offsite, and at a selection of nearby sensitive receptors in the region.

Results of the modelling indicated that there were no exceedances of the relevant 1-hour maximum or annual average ambient guideline values (AGVs) for NO_2 predicted across the entire modelled domain.

Table 5-1: Summary of predicted maximum 1-hour average and annual average GLCs of NO₂

Maximum 1-hour average NO ₂ GLCs											
Receptor	Criteria	Background		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
				Normal operations - isolation		Normal operations - cumulative		Start-up operations		Shutdown operations	
	(µg/m ³) ¹	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline
Max GLC across modelling domain	150	2.1	1.4%	61.0	41%	63.0	42%	63.3	42%	62.6	42%
Max GLC offsite				61.0	41%	63.0	42%	63.3	42%	62.6	42%
Residence 1				13.1	8.7%	15.1	10%	15.2	10%	15.1	10%
Residence 2				18.3	12%	20.4	14%	20.4	14%	20.2	13%
Cataby Mineral Sands onsite receptor				29.9	20%	32.0	21%	32.1	21%	31.7	21%

Annual average NO ₂ GLCs											
Receptor	Criteria	Background		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
				Normal operations - isolation		Normal operations - cumulative		Start-up operations		Shutdown operations	
	(µg/m ³) ¹	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline
Max GLC across modelling domain	28	1.9	6.7%	1.4	5.1%	3.3	12%	3.3	12%	3.3	12%
Max GLC offsite				1.0	3.6%	2.9	10%	2.9	10%	2.9	10%
Residence 1				0.25	<1%	2.1	7.6%	2.1	7.6%	2.1	7.6%
Residence 2				0.07	<1%	1.9	6.9%	1.9	6.9%	1.9	6.9%
Cataby Mineral Sands onsite receptor				0.47	1.7%	2.3	8.3%	2.3	8.4%	2.3	8.3%

Notes
1. Referenced to 25°C, and 101.3 kPa.

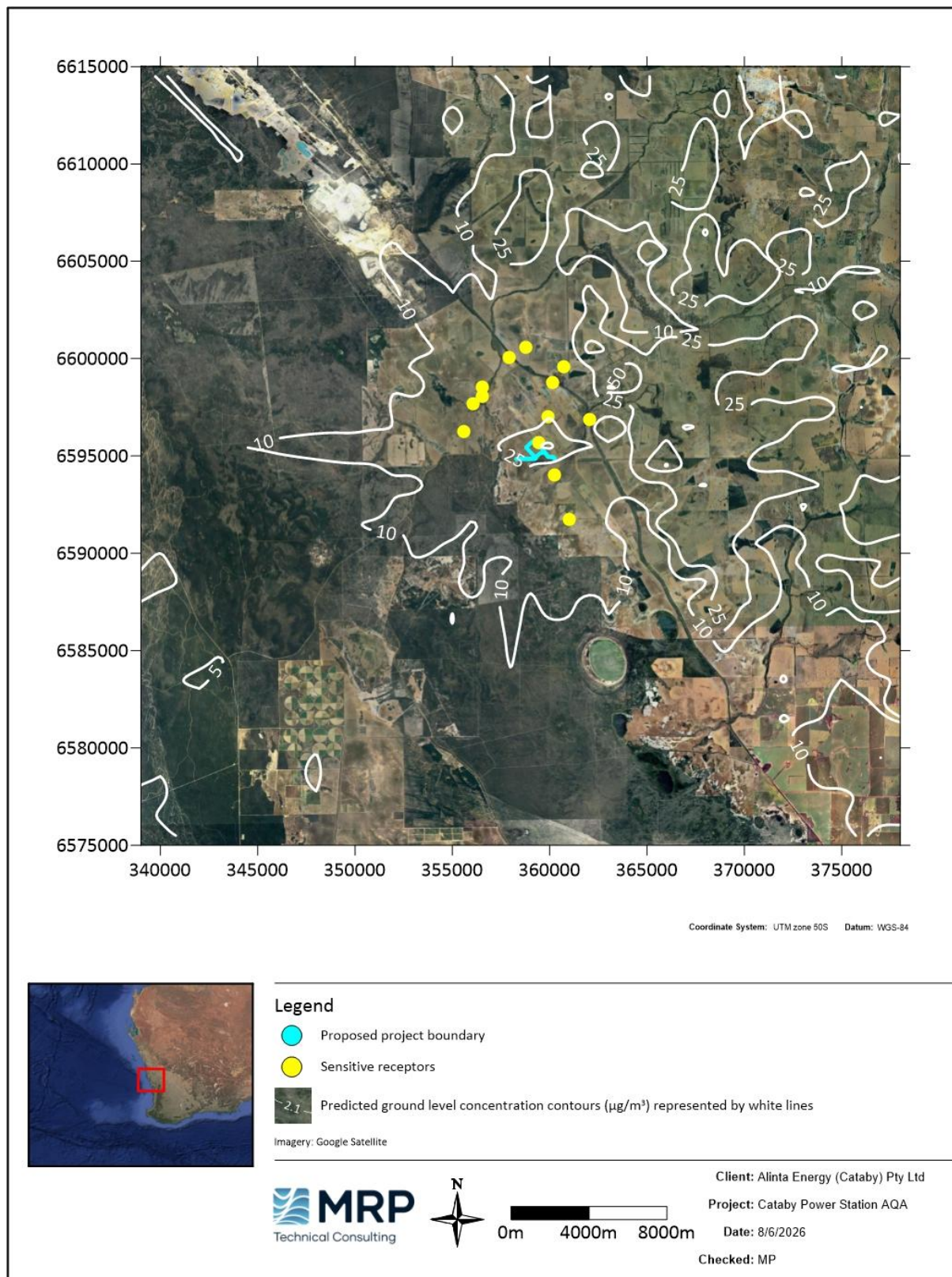


Figure 5-1: Predicted maximum 1-hour average GLCs of NO_2 ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)

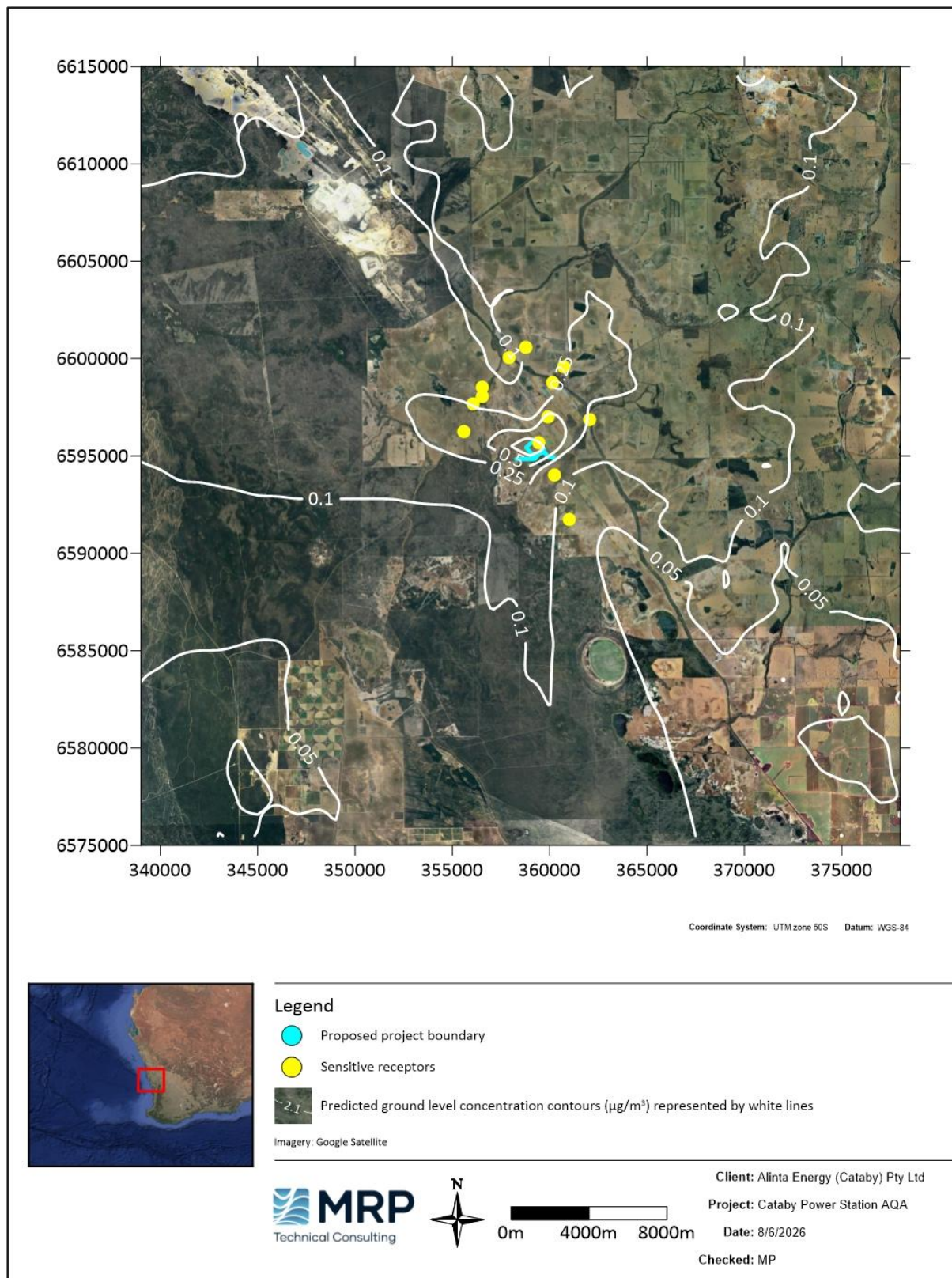


Figure 5-2: Predicted annual average GLCs of NO_2 ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)

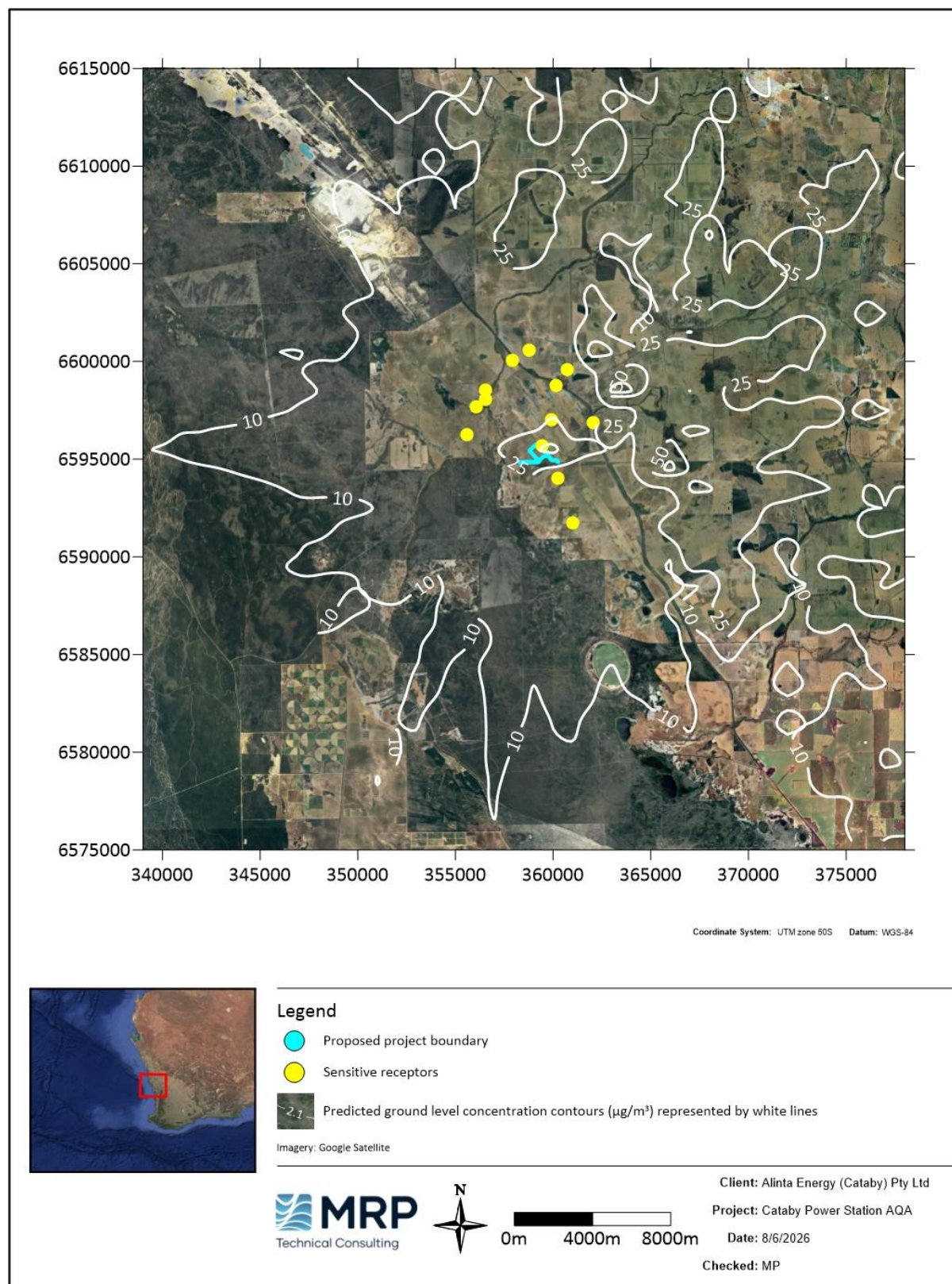


Figure 5-3: Predicted cumulative maximum 1-hour average GLCs of NO_2 ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)

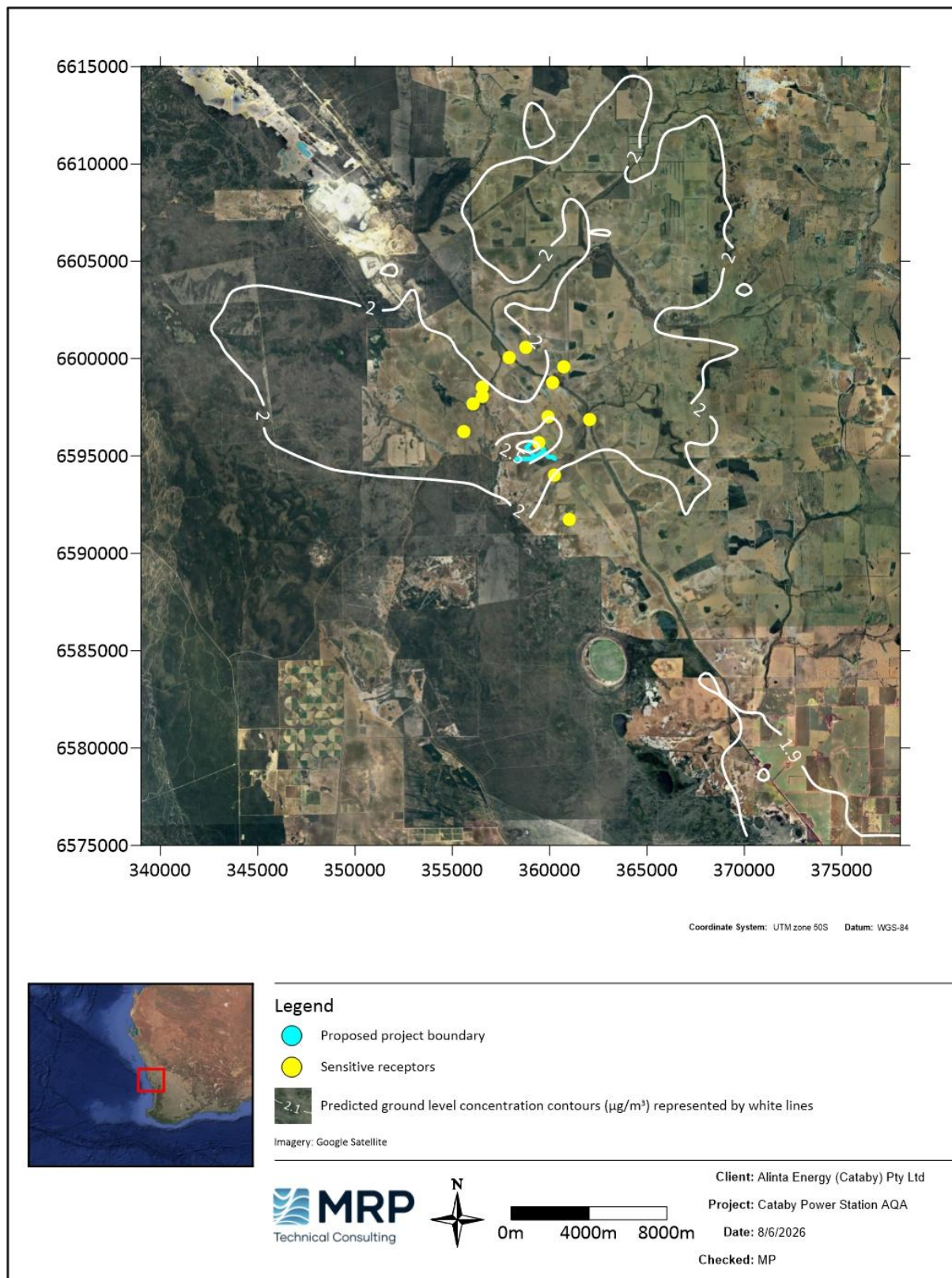


Figure 5-4: Predicted cumulative annual average GLCs of NO_2 ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)

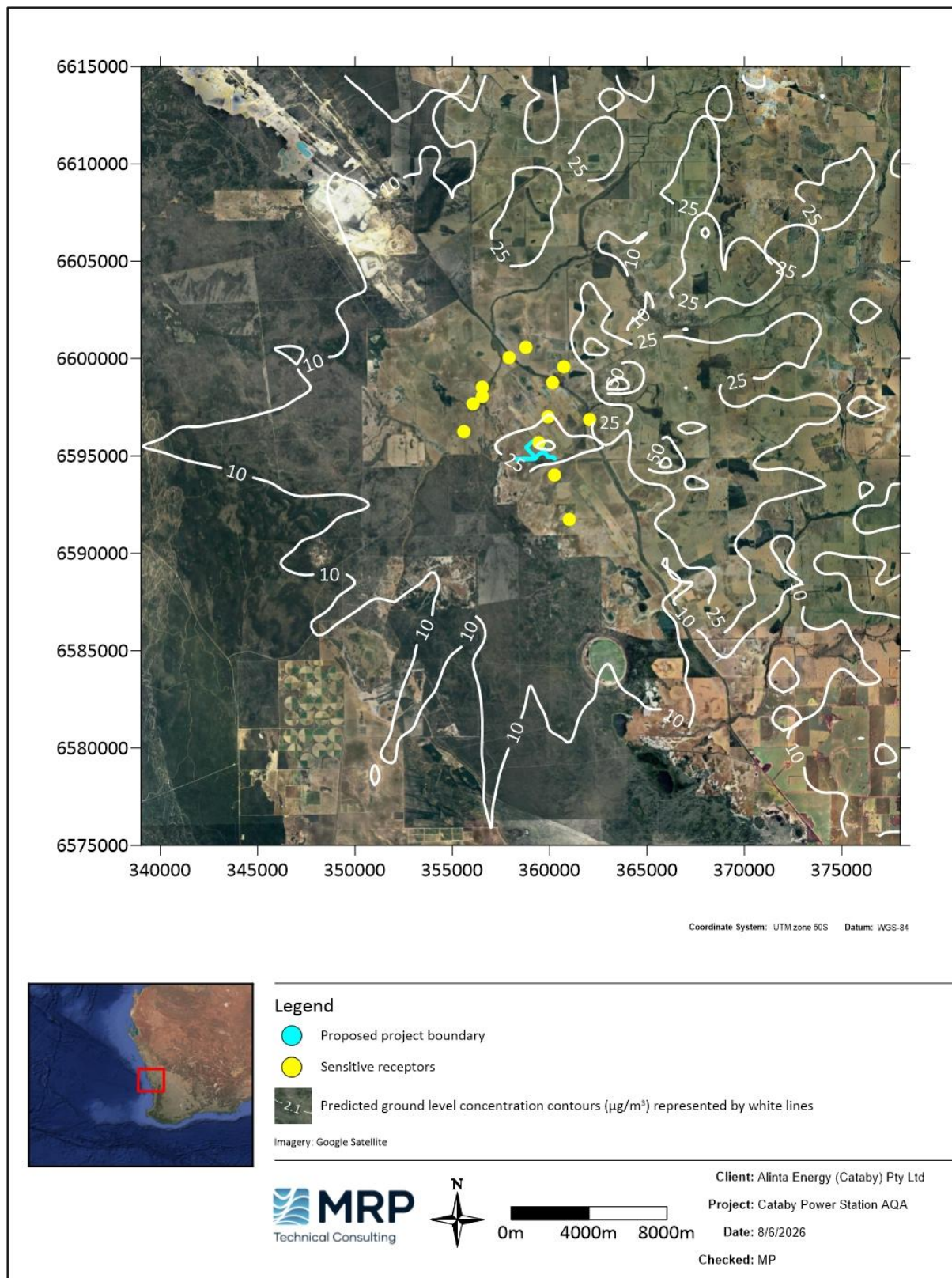


Figure 5-5: Predicted cumulative maximum 1-hour average GLCs of NO_2 ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)

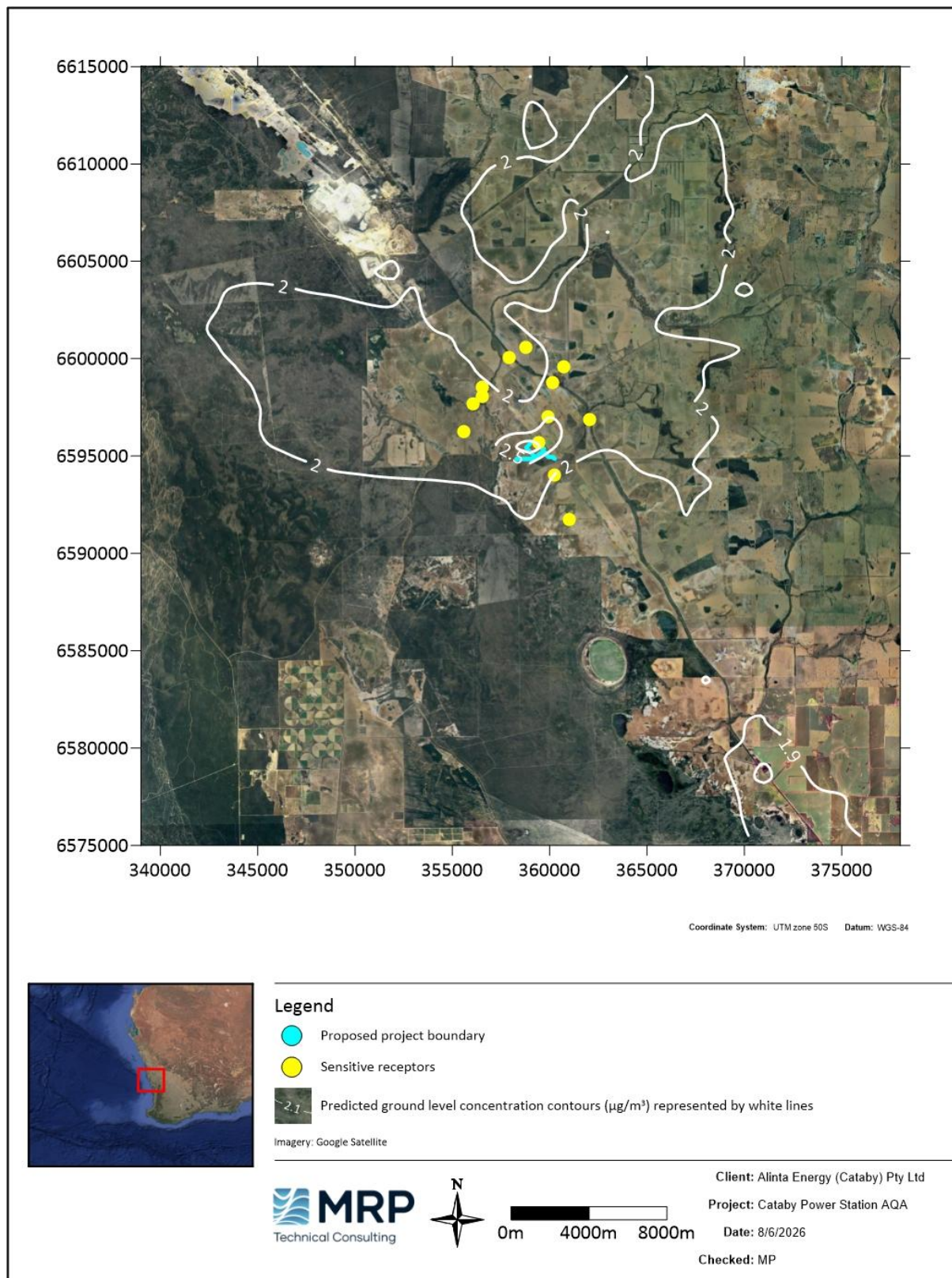


Figure 5-6: Predicted cumulative annual average GLCs of NO_2 ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)

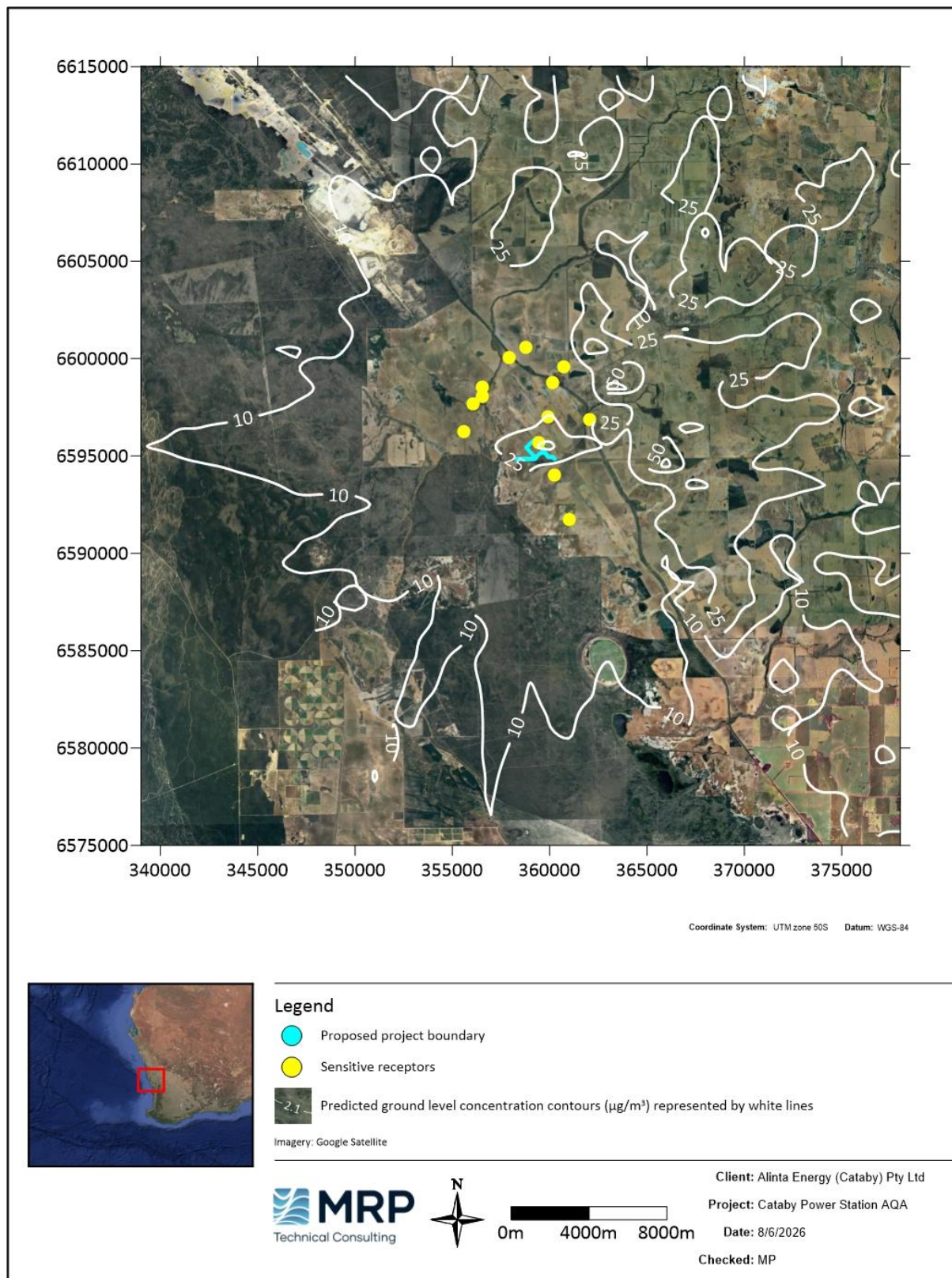


Figure 5-7: Predicted cumulative maximum 1-hour average GLCs of NO_2 ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)

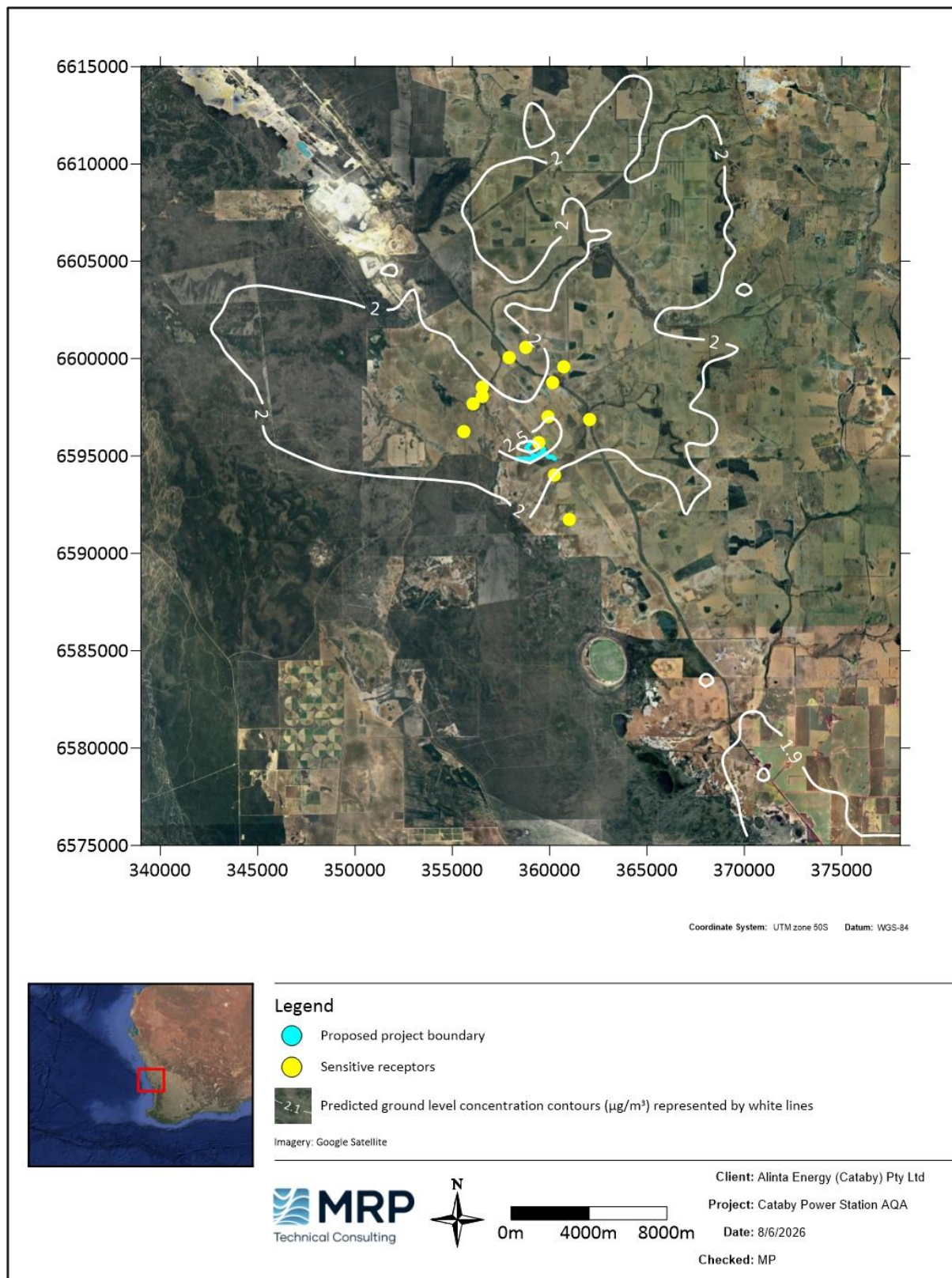


Figure 5-8: Predicted cumulative annual average GLCs of NO_2 ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)

5.2 Carbon monoxide

Contour plots showing predicted concentrations of CO can be found in Figure 5-9 to Figure 5-16 below, with relevant air quality criteria displayed as a red contour line. Table 5-2 presents the predicted GLCs across the entire modelled domain, offsite, and at nearby sensitive receptors in the region.

Results of the modelling indicated that there were no exceedances of the relevant 1-hour or 8-hour maximum ambient guideline values (AGVs) for CO predicted across the entire modelled domain.

Table 5-2: Summary of predicted maximum 1-hour and 8-hour average GLCs of CO

Maximum 1-hour average CO GLCs											
Receptor	Criteria	Background		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
				Normal operations - isolation		Normal operations - cumulative		Start-up operations		Shutdown operations	
	(µg/m³) ¹	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline
Max GLC across modelling domain	30,000	91	<1%	44	<1%	135	<1%	532	1.8%	532	1.8%
Max GLC offsite				44	<1%	135	<1%	532	1.8%	532	1.8%
Residence 1				8.7	<1%	100	<1%	201	<1%	201	<1%
Residence 2				12.2	<1%	103	<1%	216	<1%	216	<1%
Cataby Mineral Sands onsite receptor				19.9	<1%	111	<1%	217	<1%	217	<1%

Maximum 8-hour average CO GLCs											
Receptor	Criteria	Background		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
				Normal operations - isolation		Normal operations - cumulative		Start-up operations		Shutdown operations	
	(µg/m³) ¹	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline
Max GLC across modelling domain	10,000	91	<1%	19	<1%	110	1.1%	233	2.3%	233	2.3%
Max GLC offsite				19	<1%	110	1.1%	233	2.3%	233	2.3%
Residence 1				4.0	<1%	96	<1%	123	1.2%	123	1.2%
Residence 2				1.5	<1%	93	<1%	111	1.1%	111	1.1%
Cataby Mineral Sands onsite receptor				5.4	<1%	97	<1%	129	1.3%	129	1.3%

Notes
1. Referenced to 25°C, and 101.3 kPa.

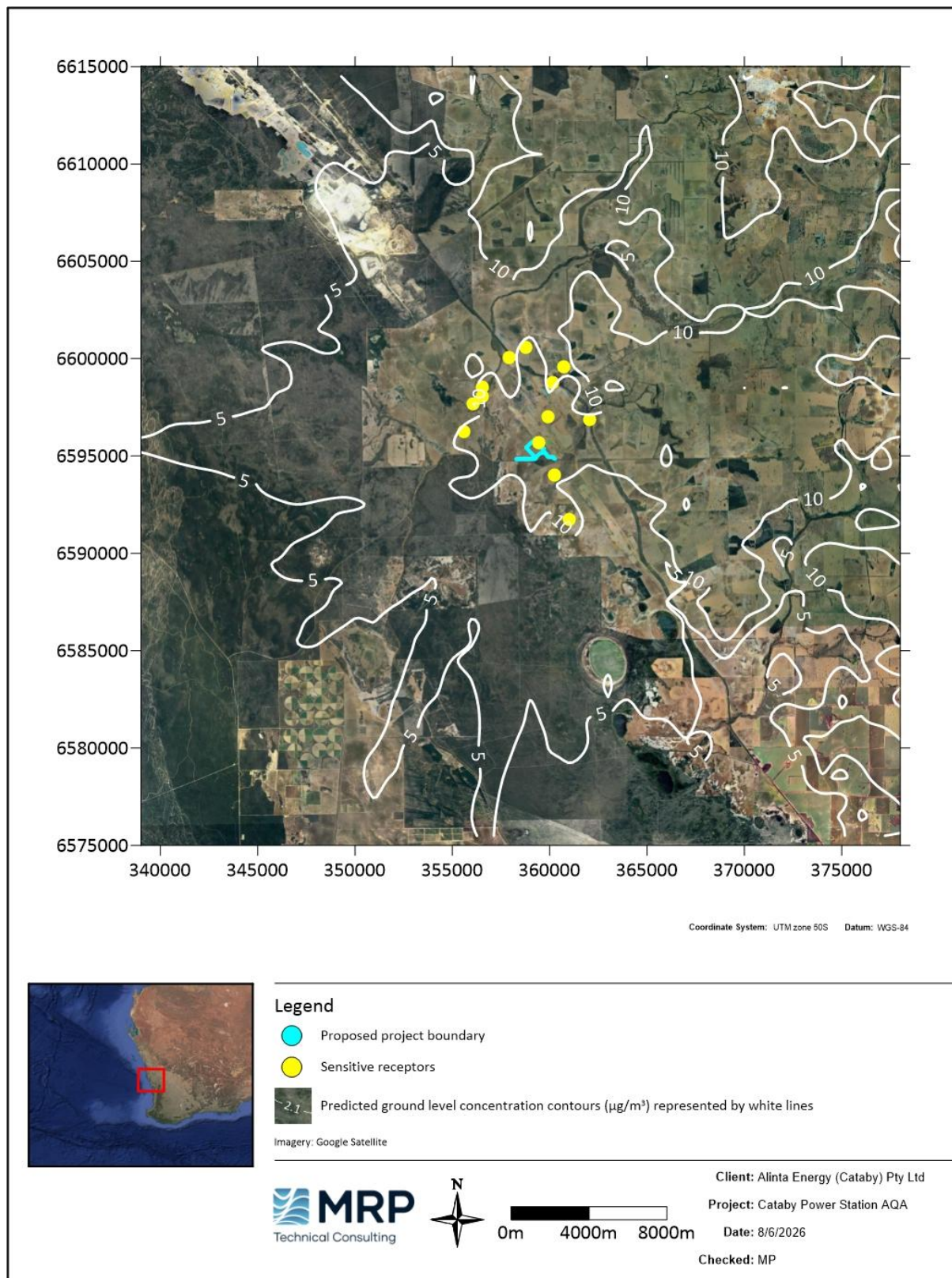


Figure 5-9: Predicted maximum 1-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)

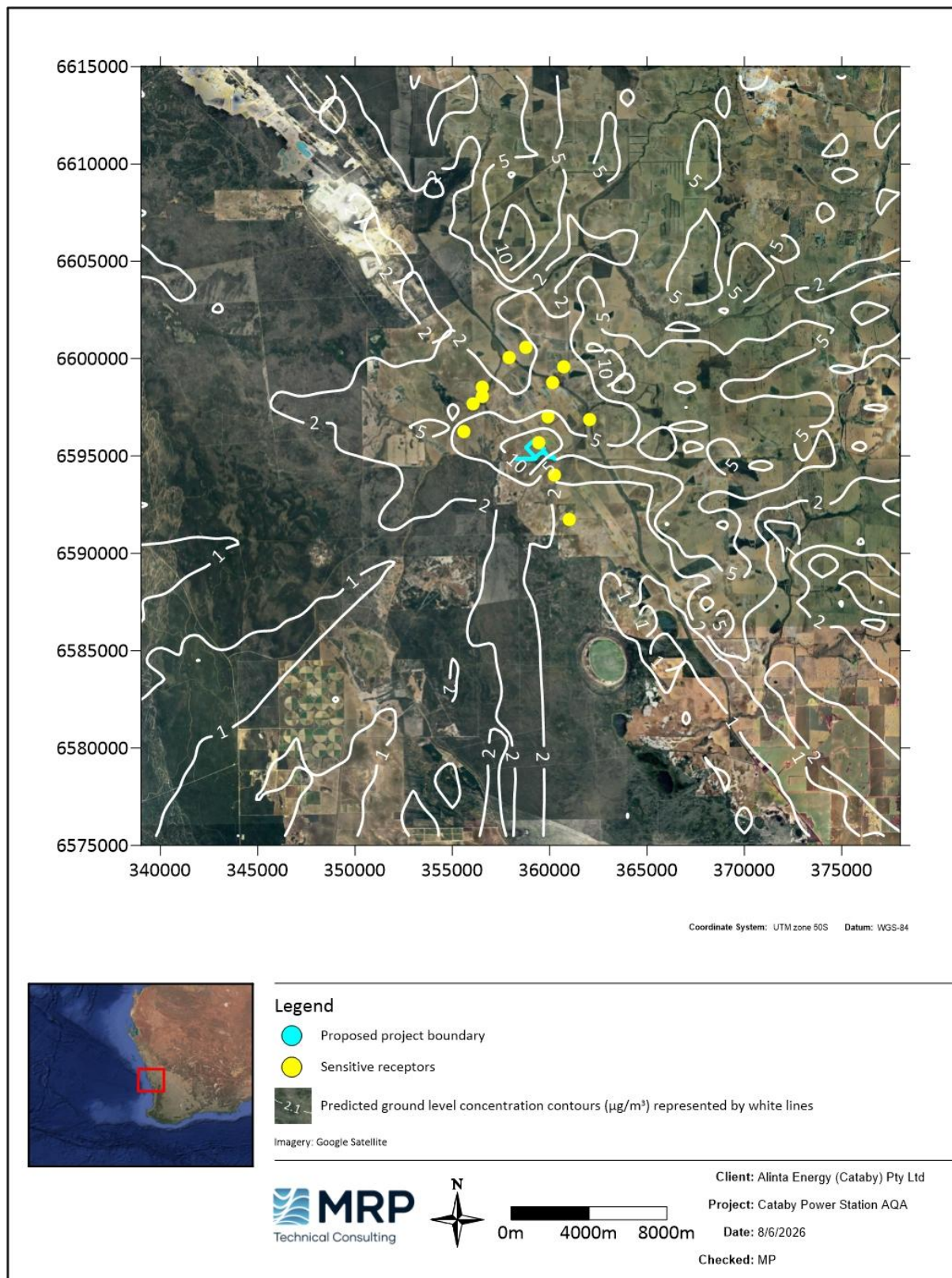


Figure 5-10: Predicted maximum 8-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)

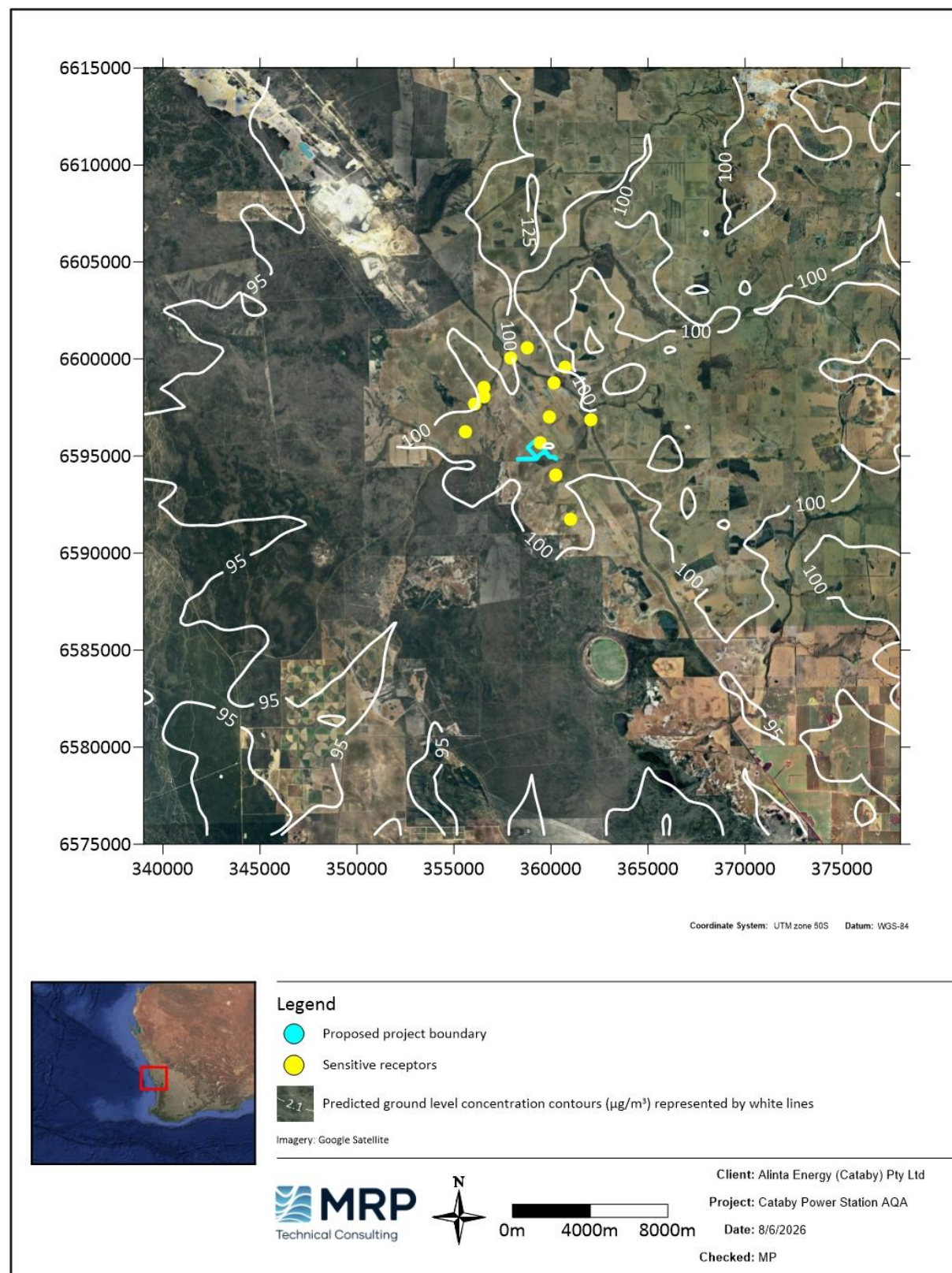


Figure 5-11: Predicted cumulative maximum 1-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)

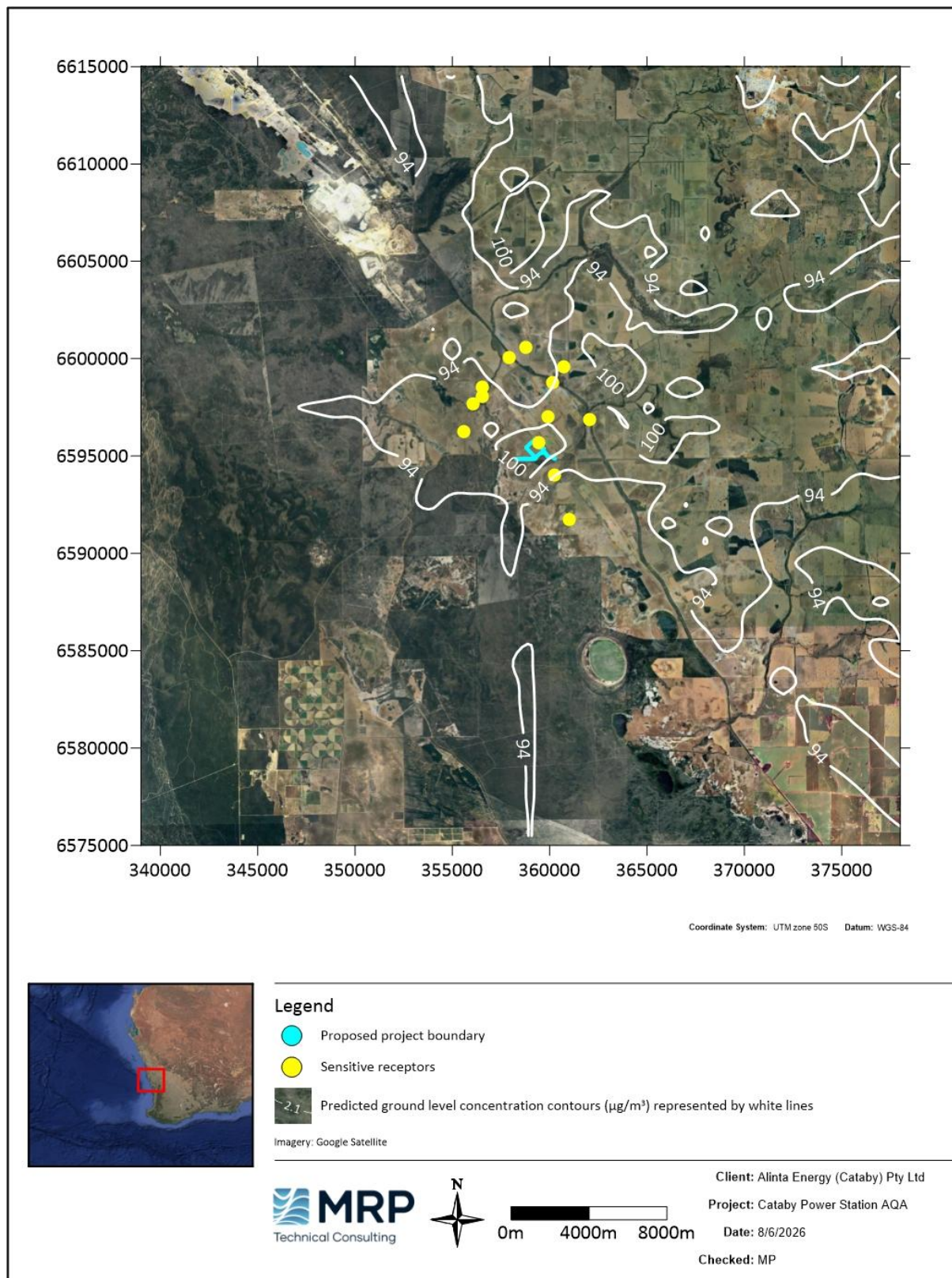


Figure 5-12: Predicted cumulative maximum 8-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)

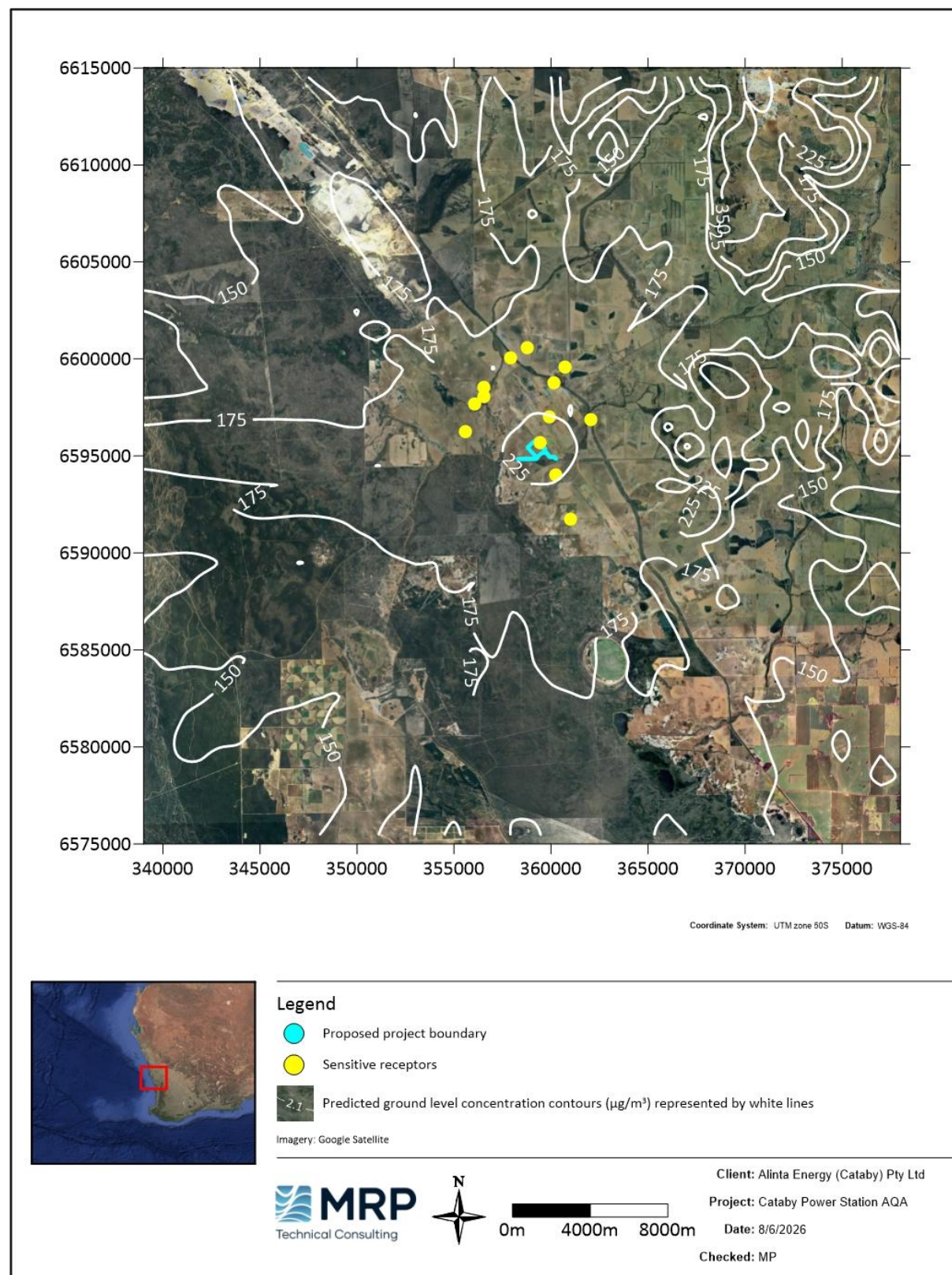


Figure 5-13: Predicted cumulative maximum 1-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)

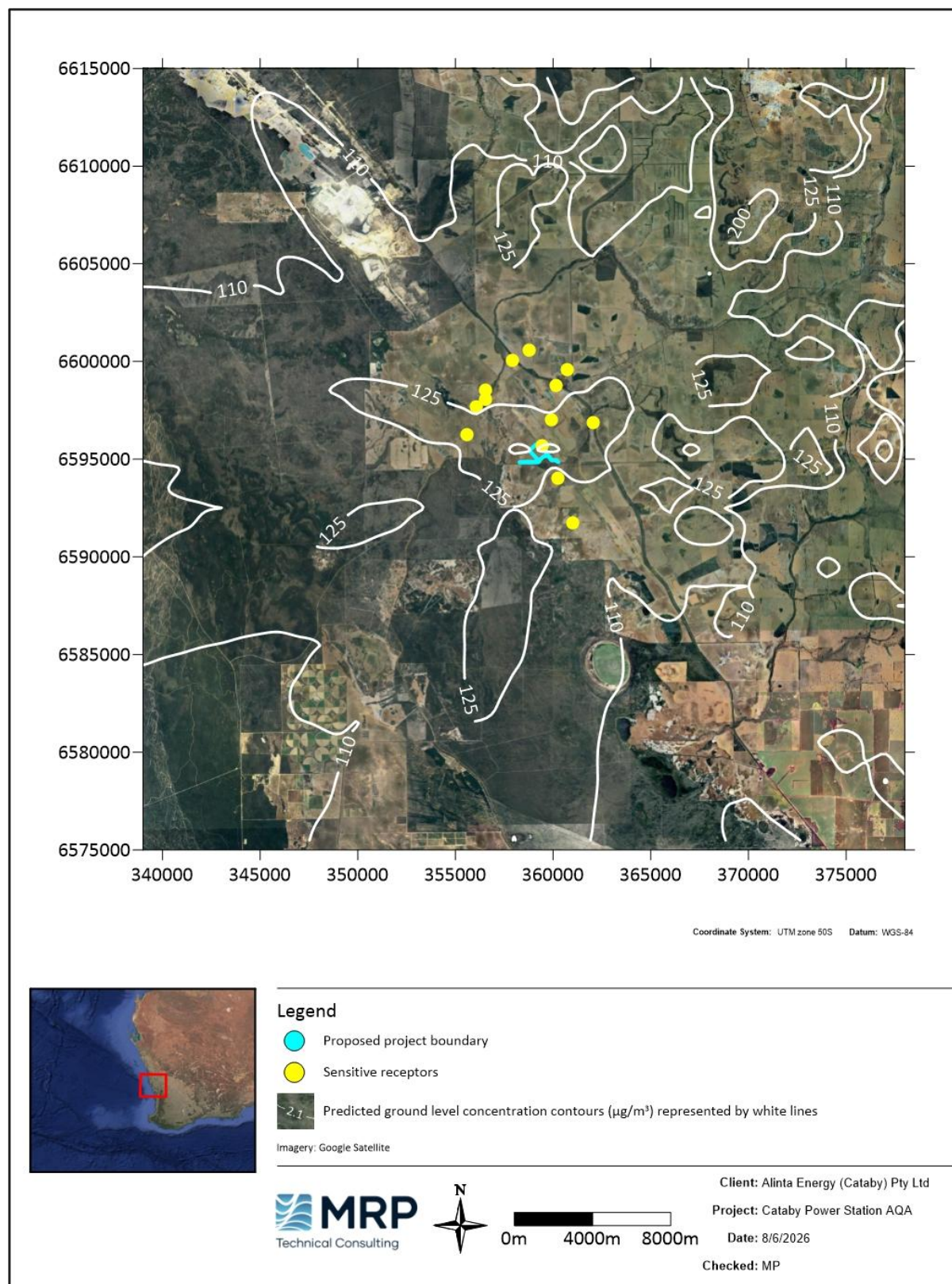


Figure 5-14: Predicted cumulative maximum 8-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)

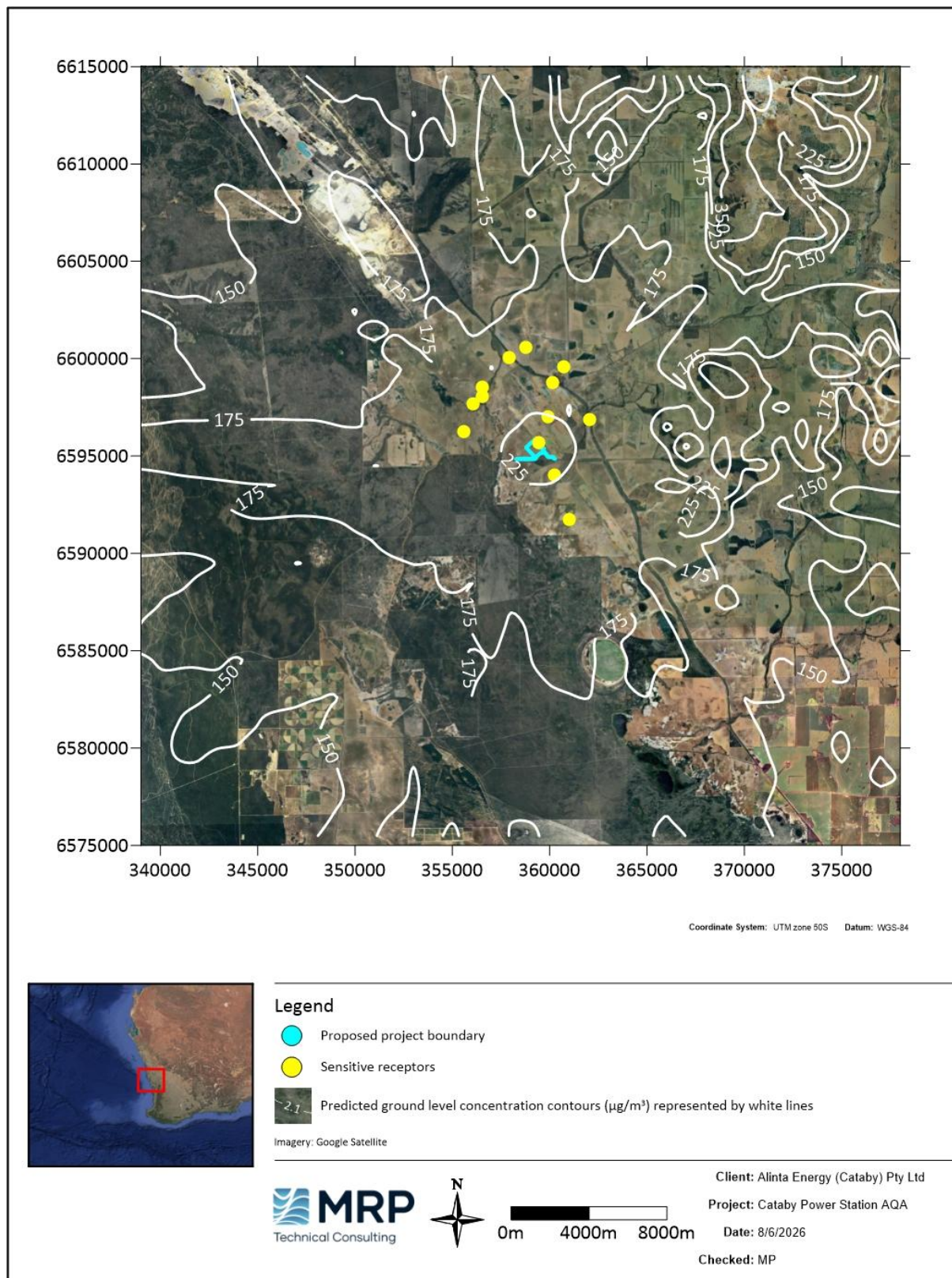


Figure 5-15: Predicted cumulative maximum 1-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)

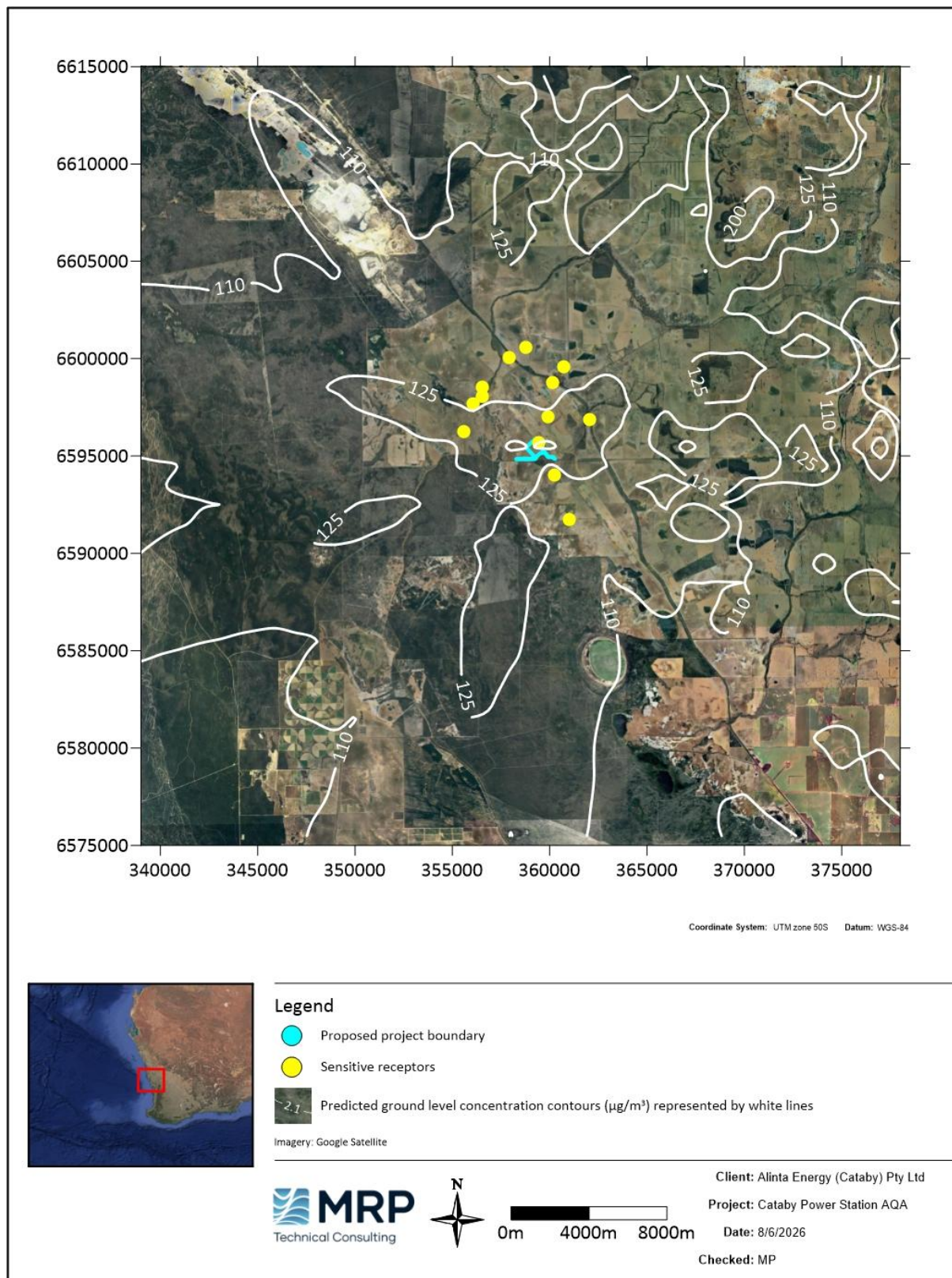


Figure 5-16: Predicted cumulative maximum 8-hour average GLCs of CO ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)

5.3 Particulate matter (PM₁₀)

Contour plots showing predicted concentrations of PM₁₀ can be found in Figure 5-17 to Figure 5-24 below, with relevant air quality criteria displayed as a red contour line. Table 5-3 presents the predicted GLCs across the entire modelled domain, offsite, and at nearby sensitive receptors in the region.

Results of the modelling indicated that there were no exceedances of the relevant 24-hour maximum or annual average ambient guideline values (AGVs) for PM₁₀ predicted across the entire modelled domain.

Table 5-3: Summary of predicted maximum 24-hour average and annual average GLCs of PM₁₀

Maximum 24-hour average PM ₁₀ GLCs											
Receptor	Criteria	Background		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
				Normal operations - isolation		Normal operations - cumulative		Start-up operations		Shutdown operations	
	(µg/m³) ¹	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline
Max GLC across modelling domain	46	9.5	21%	0.51	1.1%	10.0	22%	10.5	23%	9.9	22%
Max GLC offsite				0.51	1.1%	10.0	22%	10.5	23%	9.9	22%
Residence 1				0.13	<1%	9.6	21%	9.7	21%	9.6	21%
Residence 2				0.05	<1%	9.5	21%	9.5	21%	9.5	21%
Cataby Mineral Sands onsite receptor				0.18	<1%	9.6	21%	9.8	21%	9.6	21%

Annual average PM ₁₀ GLCs											
Receptor	Criteria	Background		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
				Normal operations - isolation		Normal operations - cumulative		Start-up operations		Shutdown operations	
	(µg/m³) ¹	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline
Max GLC across modelling domain	23	8.8	38%	0.07	<1%	8.9	39%	8.9	39%	8.9	39%
Max GLC offsite				0.05	<1%	8.9	39%	8.9	39%	8.9	38%
Residence 1				0.01	<1%	8.8	38%	8.8	38%	8.8	38%
Residence 2				0.004	<1%	8.8	38%	8.8	38%	8.8	38%
Cataby Mineral Sands onsite receptor				0.02	<1%	8.8	38%	8.8	38%	8.8	38%

Notes
1. Referenced to 25°C, and 101.3 kPa.

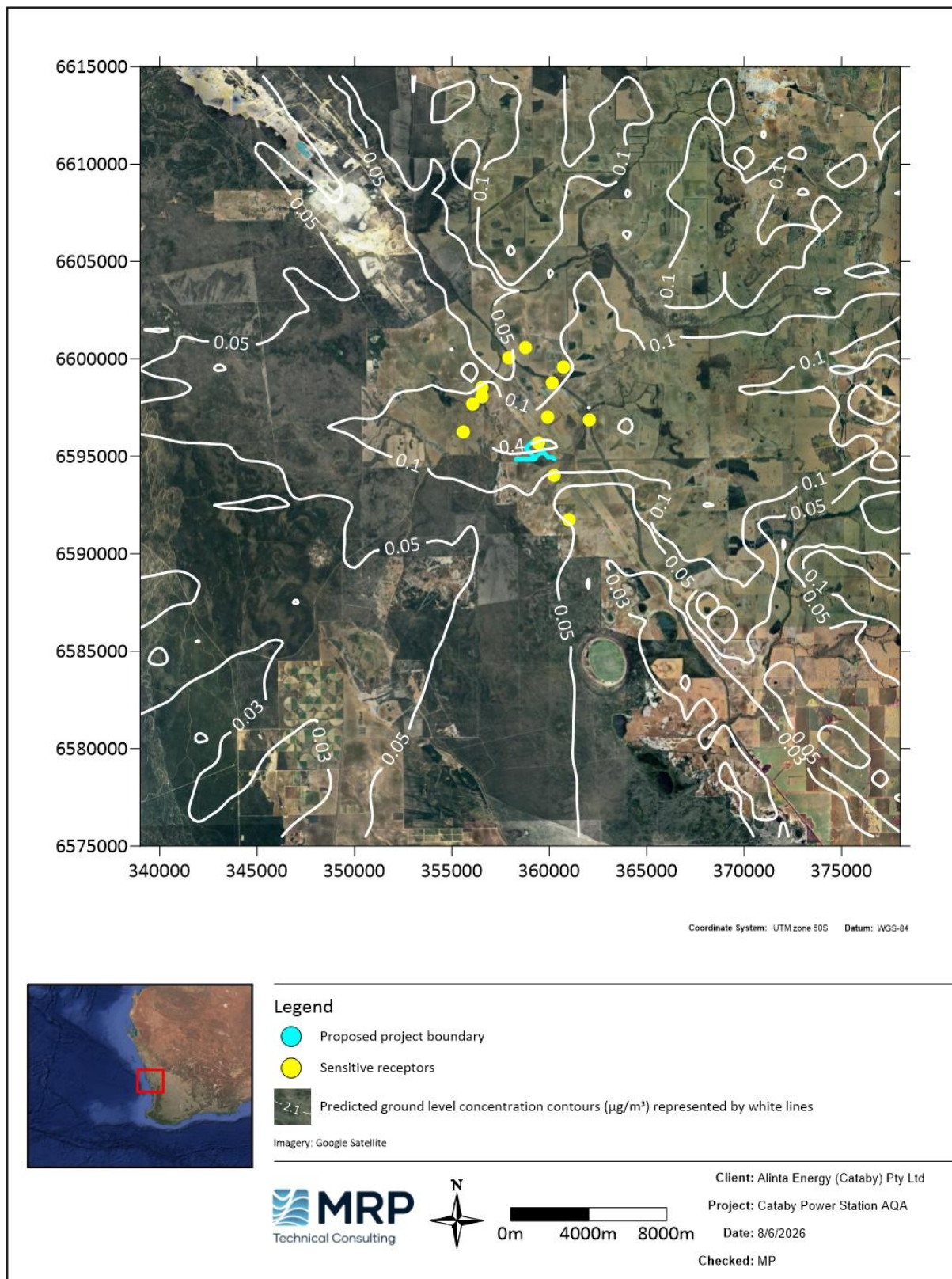


Figure 5-17: Predicted maximum 24-hour average GLCs of PM_{10} ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)

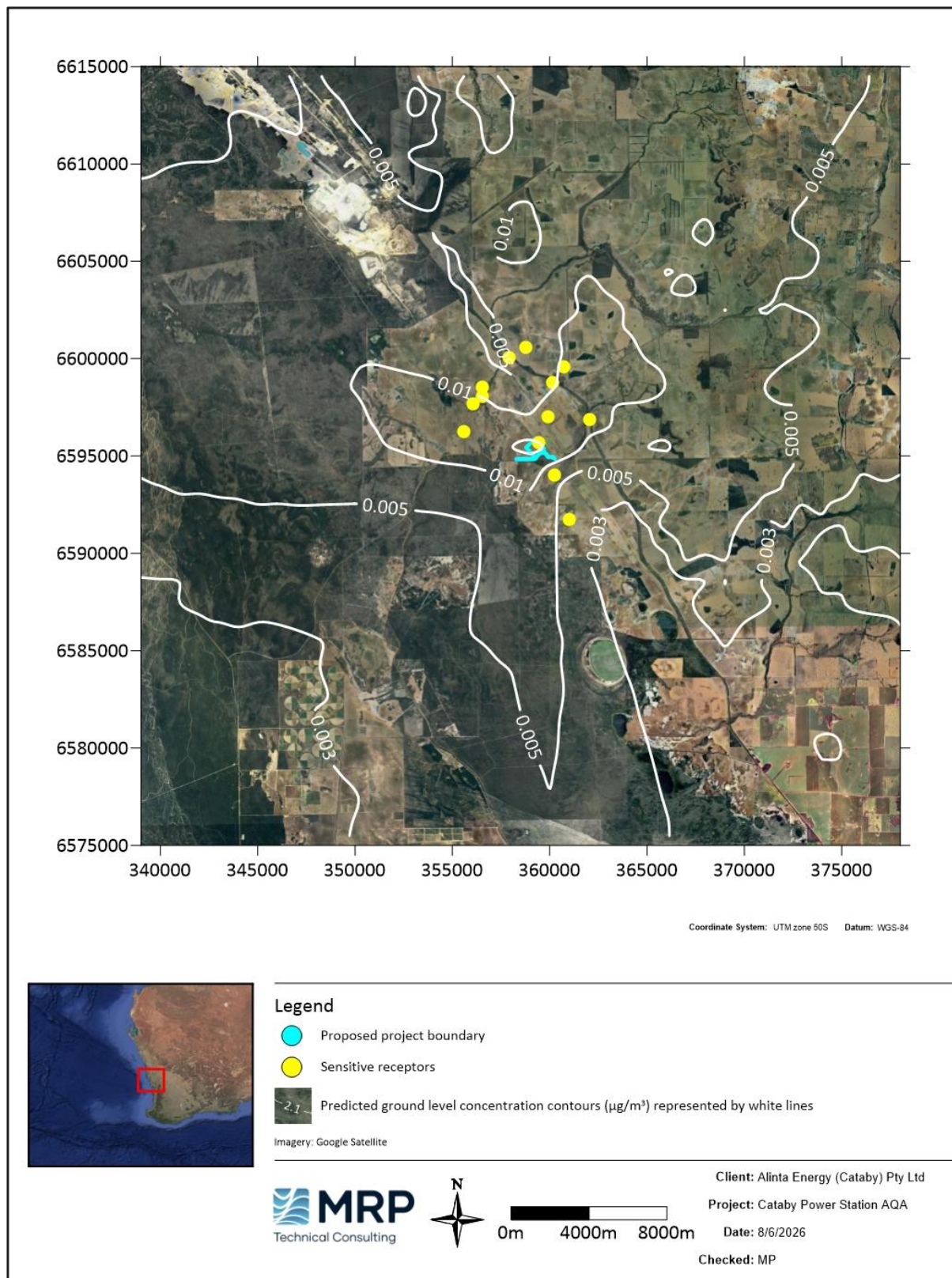


Figure 5-18: Predicted annual average GLCs of PM_{10} ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)

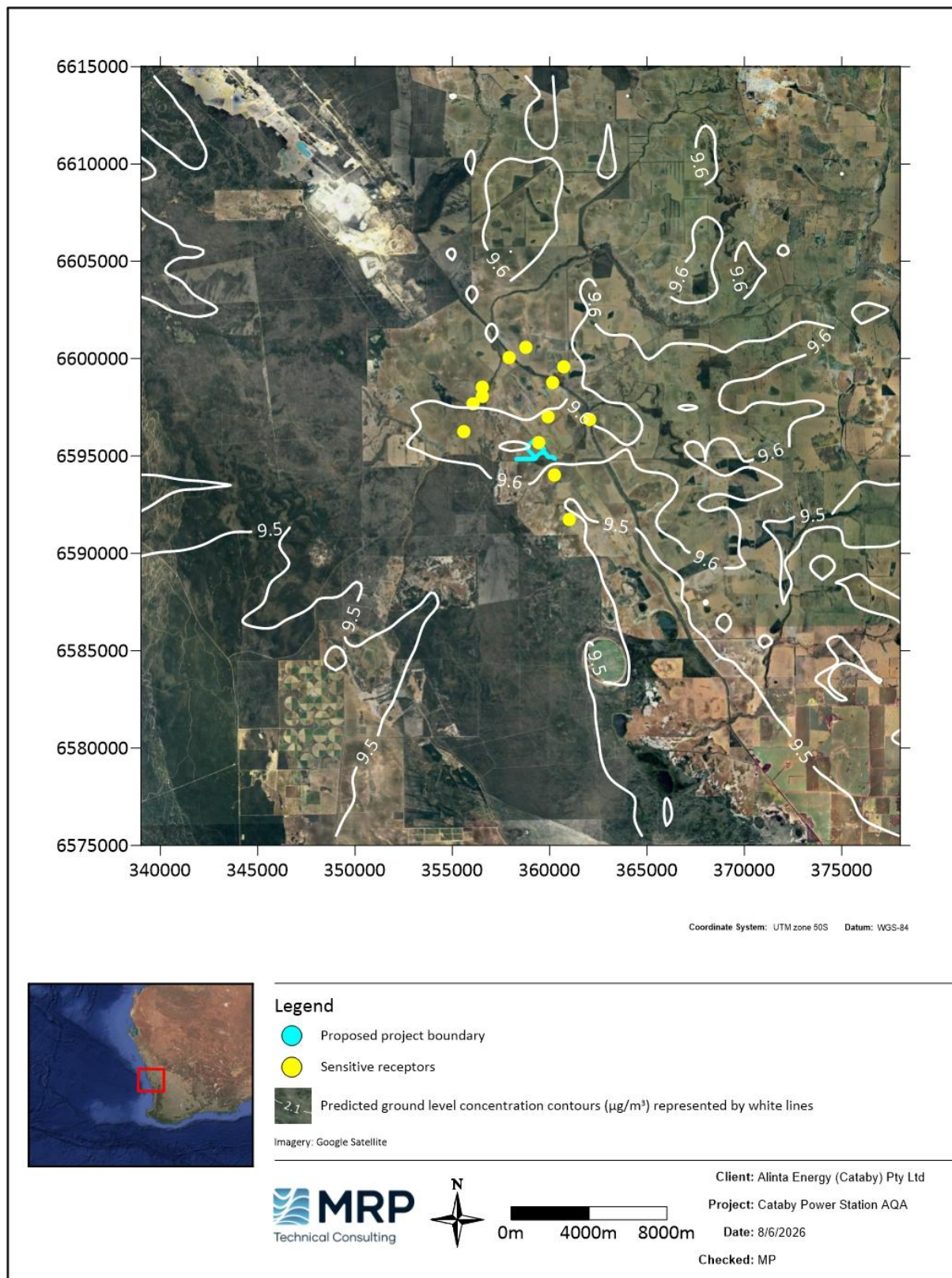


Figure 5-19: Predicted cumulative maximum 24-hour average GLCs of PM_{10} ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)

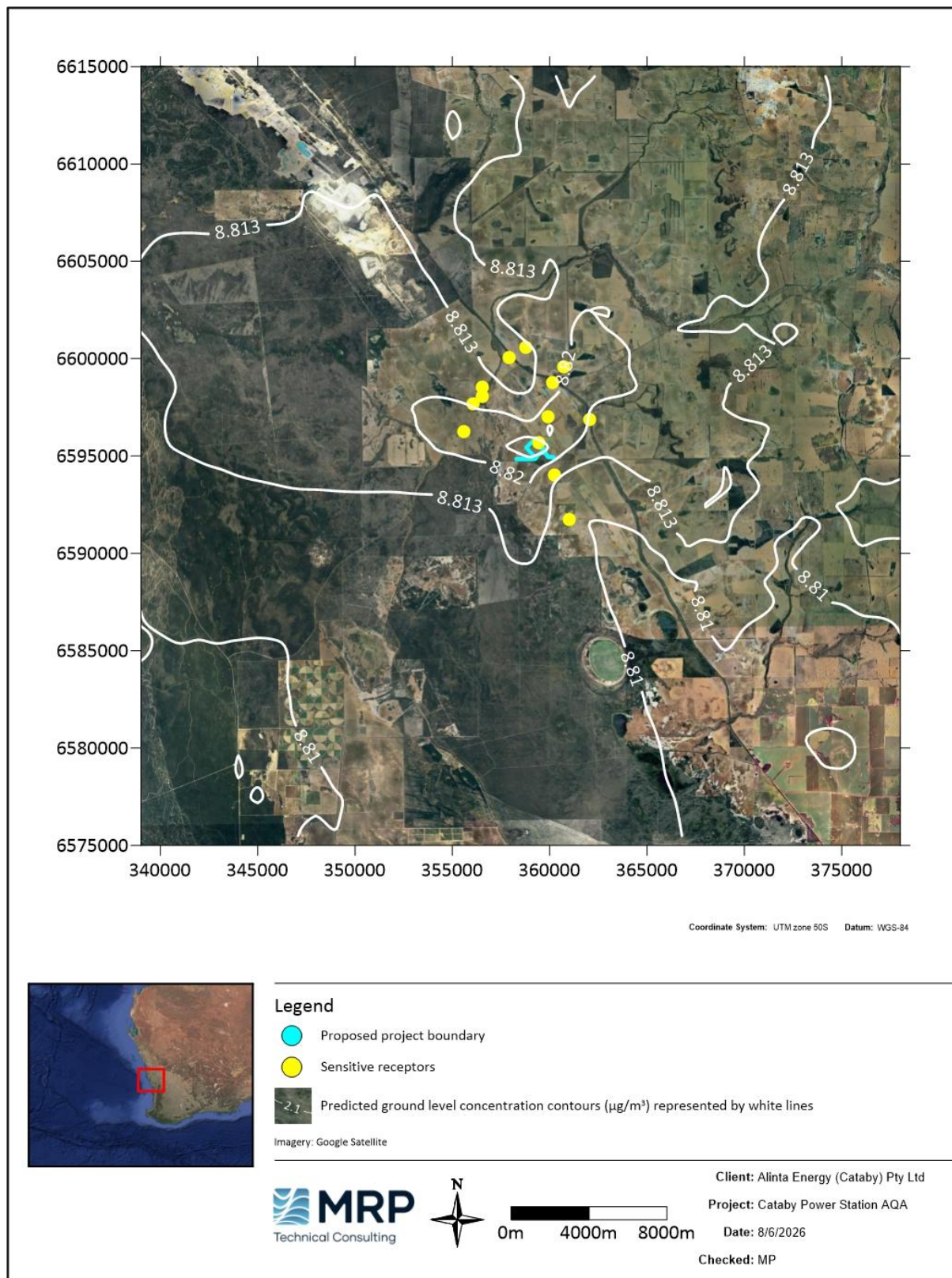


Figure 5-20: Predicted cumulative annual average GLCs of PM_{10} ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)

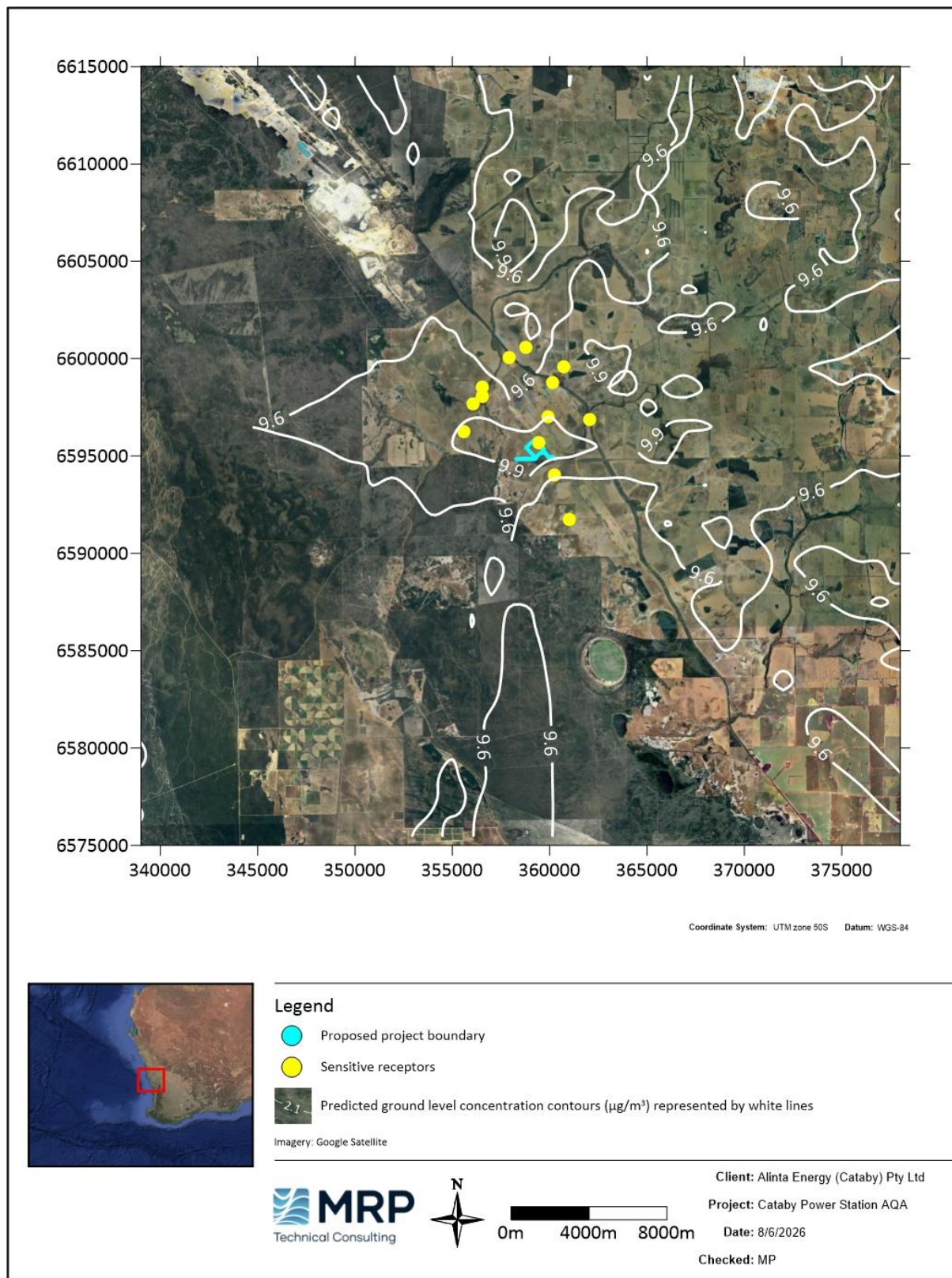


Figure 5-21: Predicted cumulative maximum 24-hour average GLCs of PM_{10} ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)

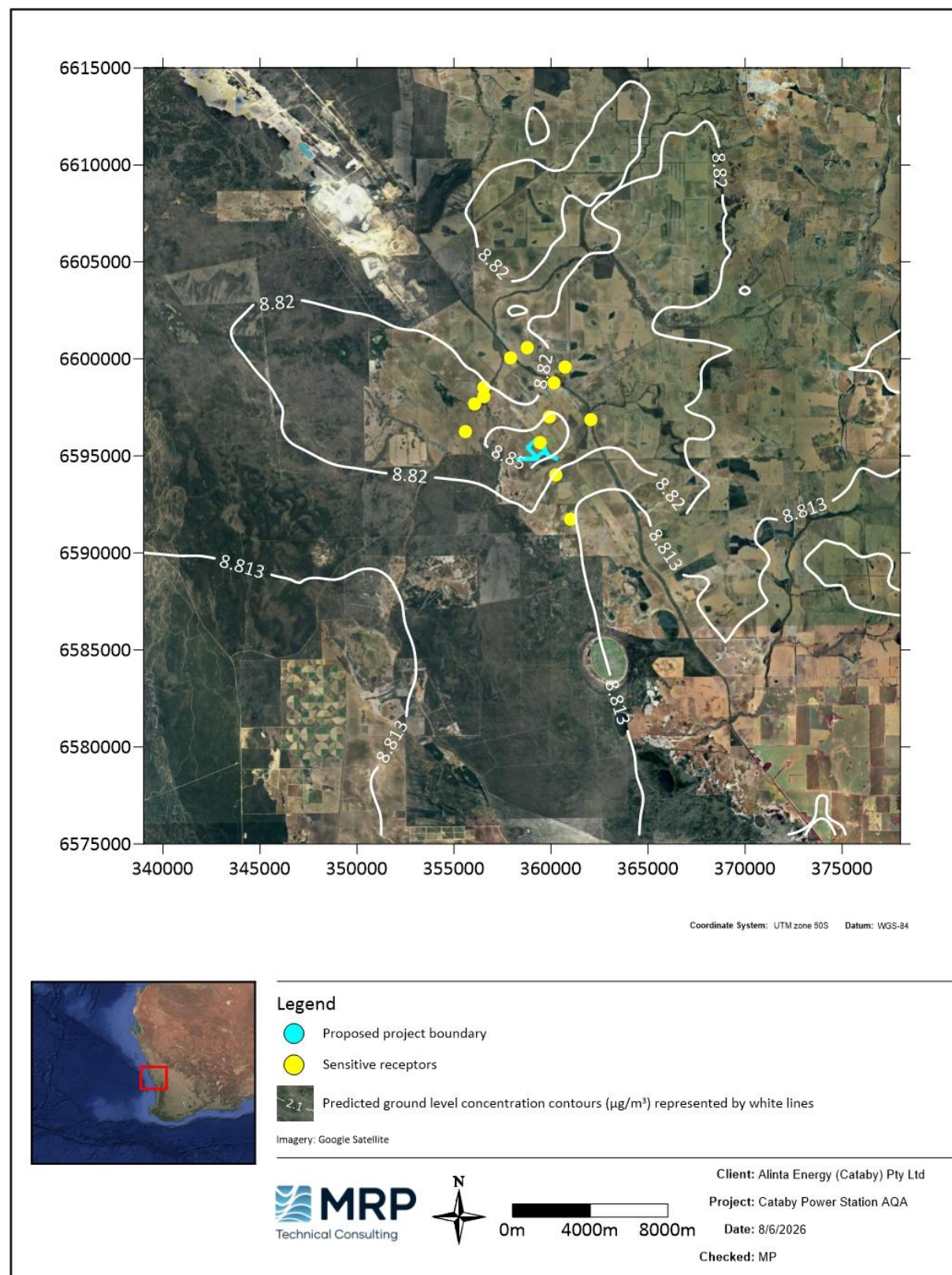


Figure 5-22: Predicted cumulative annual average GLCs of PM_{10} ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)

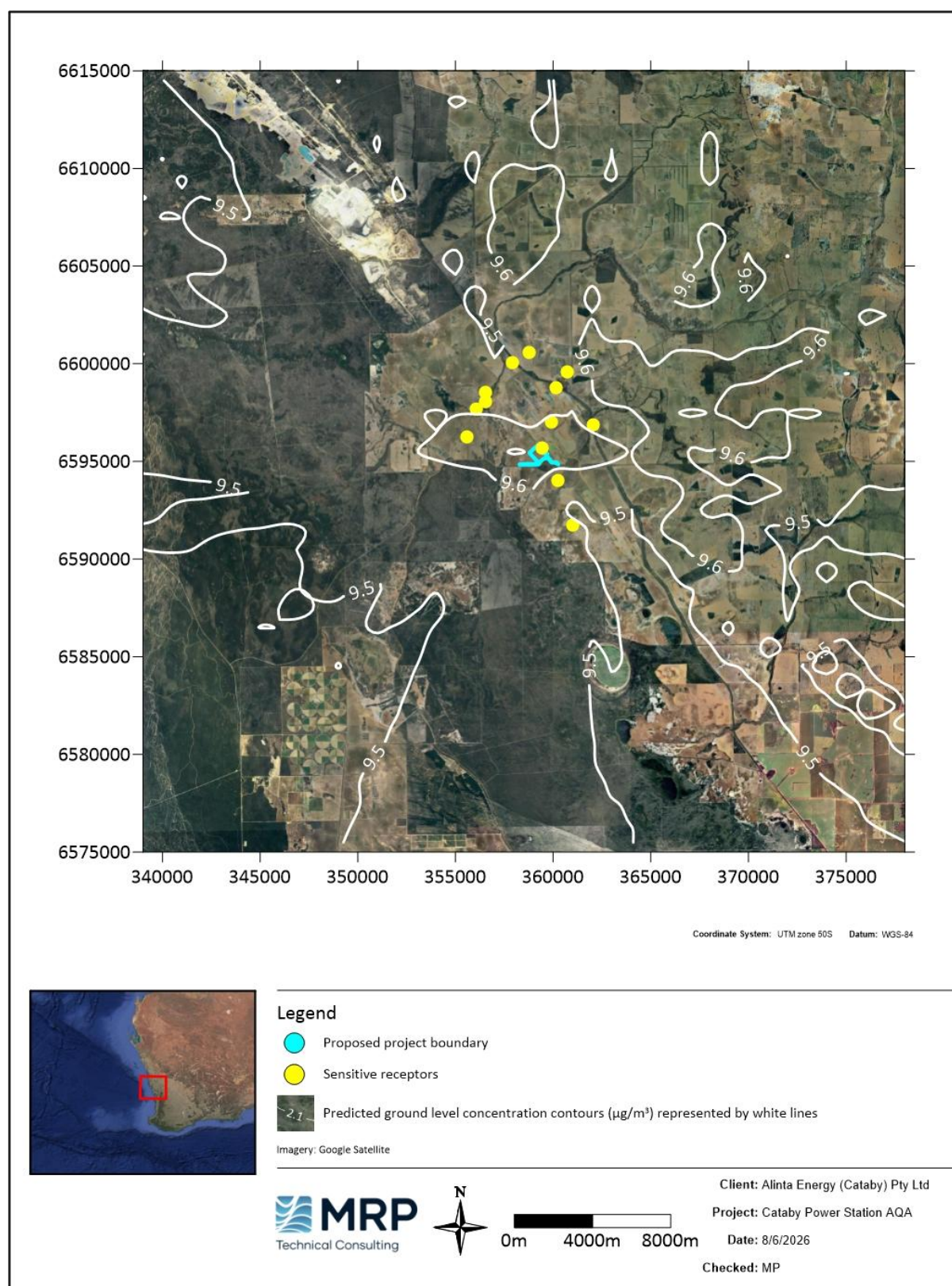


Figure 5-23: Predicted cumulative maximum 24-hour average GLCs of PM_{10} ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)

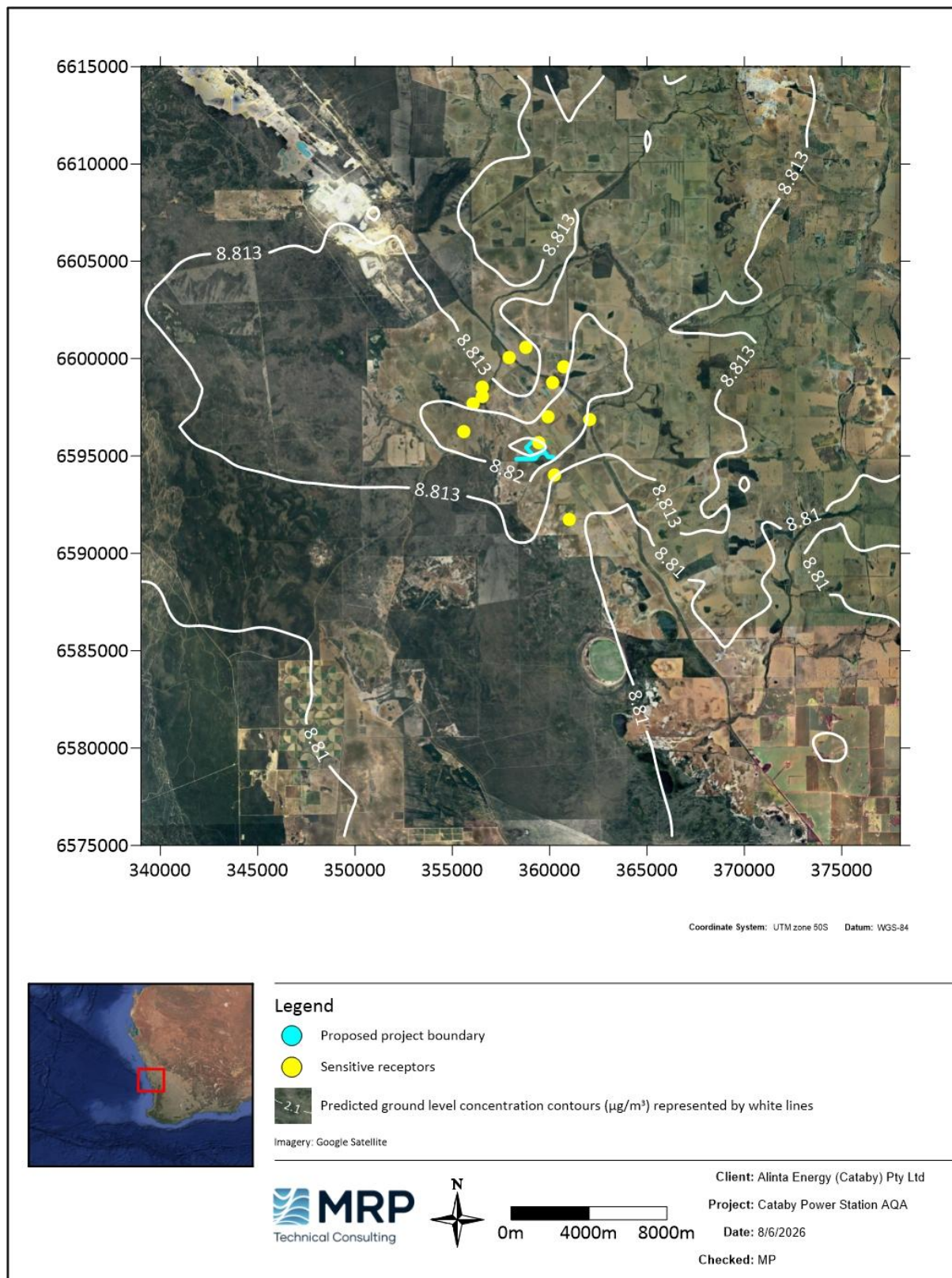


Figure 5-24: Predicted cumulative annual average GLCs of PM_{10} ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)

5.4 Particulate matter (PM_{2.5})

Contour plots showing predicted concentrations of PM_{2.5} can be found in Figure 5-25 to Figure 5-32 below, with relevant air quality criteria displayed as a red contour line. Table 5-4 presents the predicted GLCs across the entire modelled domain, offsite, and at nearby sensitive receptors in the region.

Results of the modelling indicated that there were no exceedances of the relevant 24-hour maximum or annual average ambient guideline values (AGVs) for PM_{2.5} predicted across the entire modelled domain.

Table 5-4: Summary of predicted maximum 24-hour average and annual average GLCs of PM_{2.5}

Maximum 24-hour average PM _{2.5} GLCs											
Receptor	Criteria	Background		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
				Normal operations - isolation		Normal operations - cumulative		Start-up operations		Shutdown operations	
	(µg/m³) ¹	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline
Max GLC across modelling domain	18	5.8	32%	0.51	2.8%	6.3	35%	6.8	38%	6.2	35%
Max GLC offsite				0.51	2.8%	6.3	35%	6.8	38%	6.2	35%
Residence 1				0.13	<1%	5.9	33%	6.0	33%	5.9	33%
Residence 2				0.05	<1%	5.8	32%	5.9	33%	5.8	32%
Cataby Mineral Sands onsite receptor				0.18	1.01%	6.0	33%	6.1	34%	5.9	33%

Annual average PM _{2.5} GLCs											
Receptor	Criteria	Background		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
				Normal operations - isolation		Normal operations - cumulative		Start-up operations		Shutdown operations	
	(µg/m³) ¹	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline	(µg/m³) ¹	% of guideline
Max GLC across modelling domain	6.4	5.6	88%	0.07	1.1%	5.7	89%	5.8	90%	5.7	89%
Max GLC offsite				0.05	<1%	5.7	89%	5.7	90%	5.7	89%
Residence 1				0.01	<1%	5.7	88%	5.7	88%	5.7	88%
Residence 2				0.004	<1%	5.6	88%	5.6	88%	5.6	88%
Cataby Mineral Sands onsite receptor				0.02	<1%	5.7	88%	5.7	89%	5.7	88%

Notes
1. Referenced to 25°C, and 101.3 kPa.

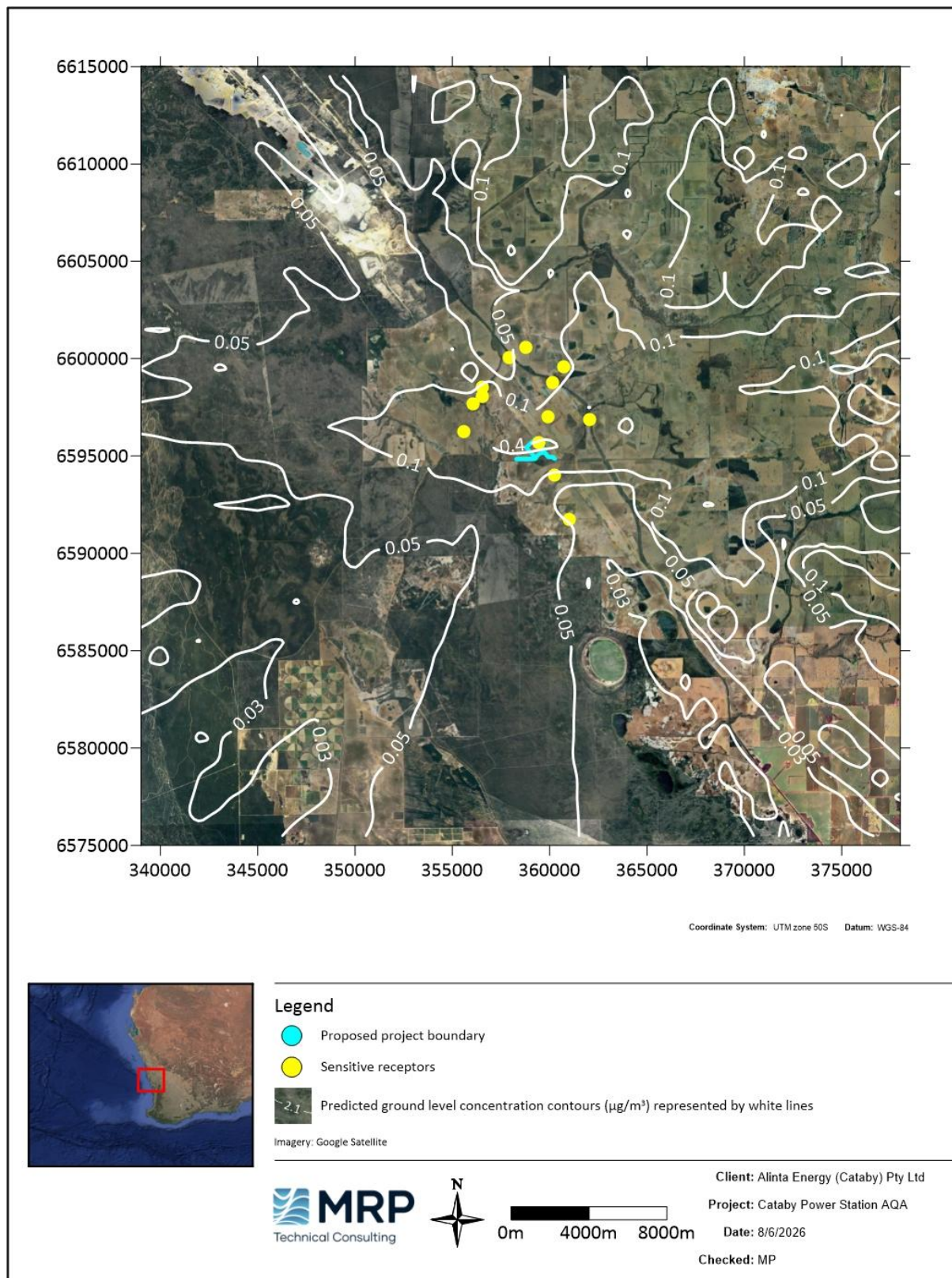


Figure 5-25: Predicted maximum 24-hour average GLCs of $\text{PM}_{2.5}$ ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)

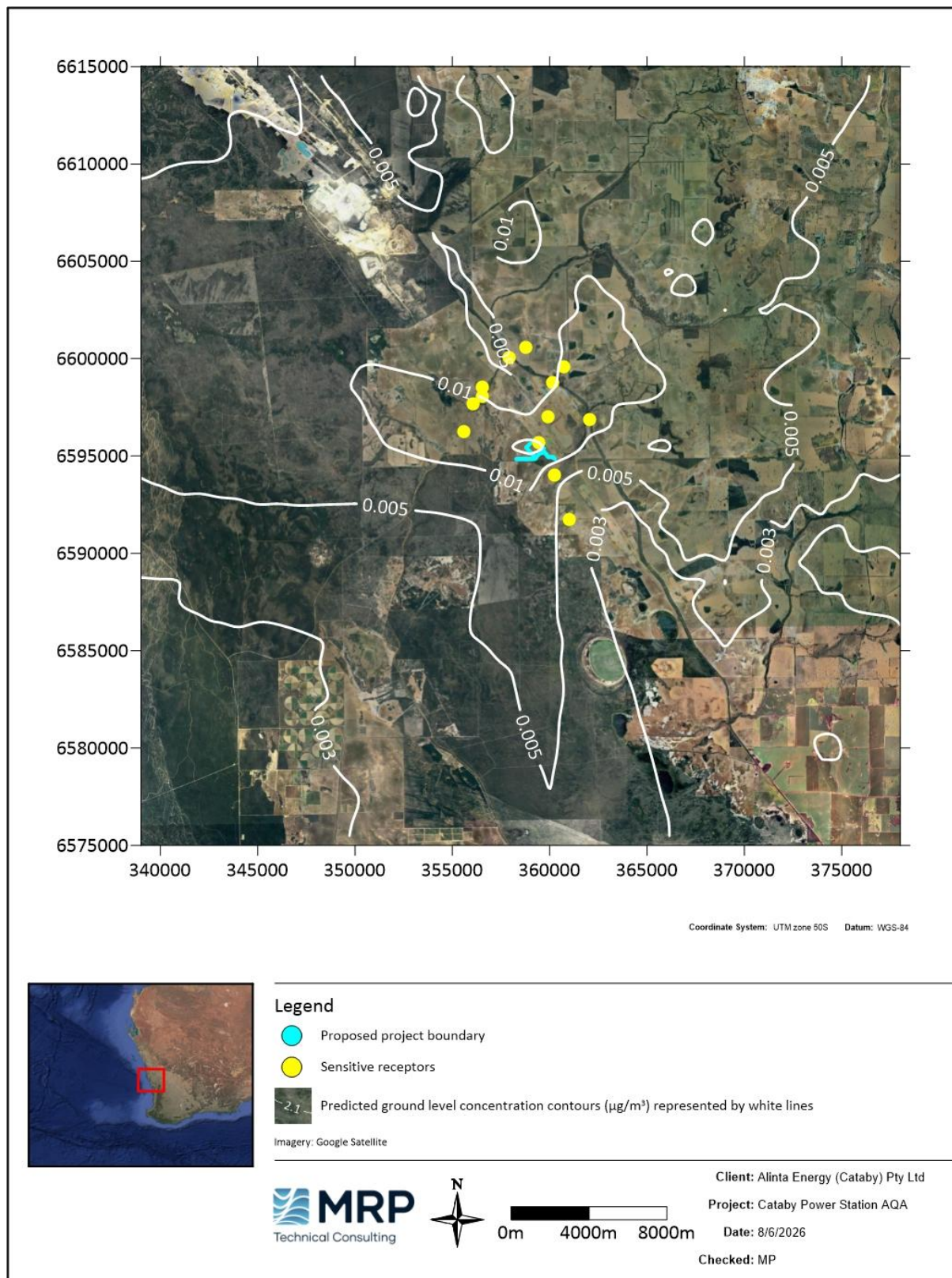


Figure 5-26: Predicted annual average GLCs of $\text{PM}_{2.5}$ ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)

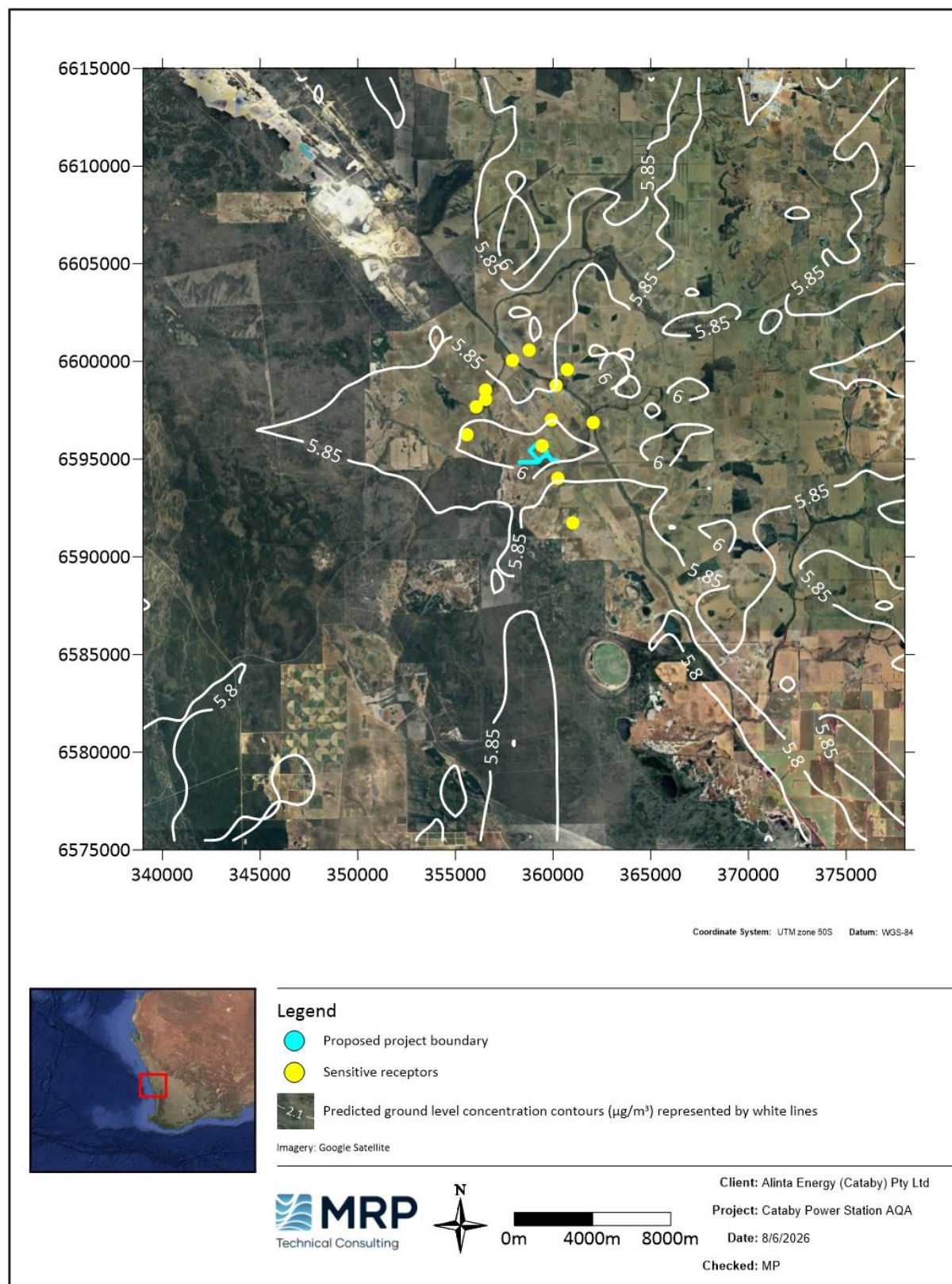


Figure 5-27: Predicted cumulative maximum 24-hour average GLCs of $\text{PM}_{2.5}$ ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)

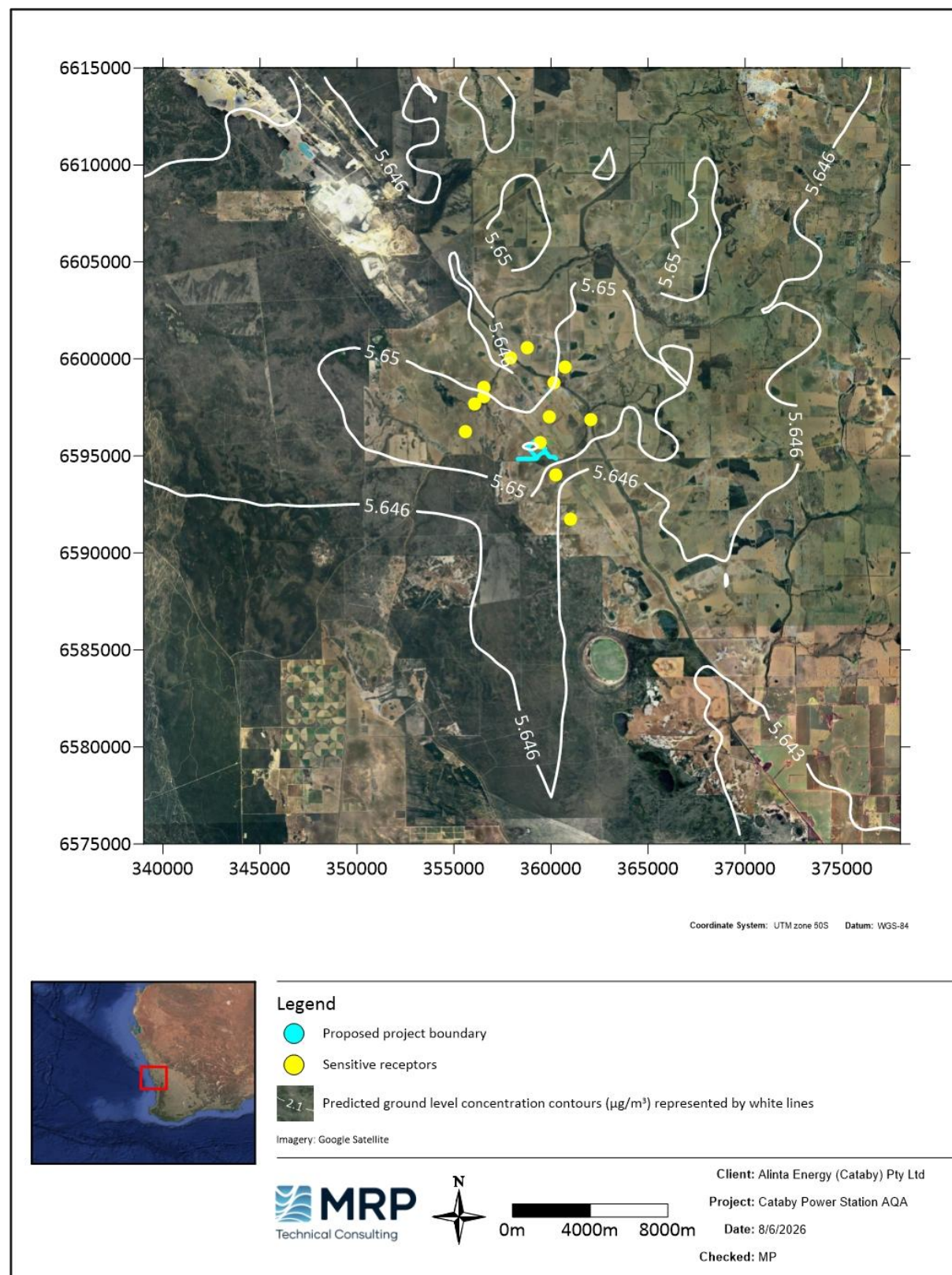


Figure 5-28: Predicted cumulative annual average GLCs of $\text{PM}_{2.5}$ ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)

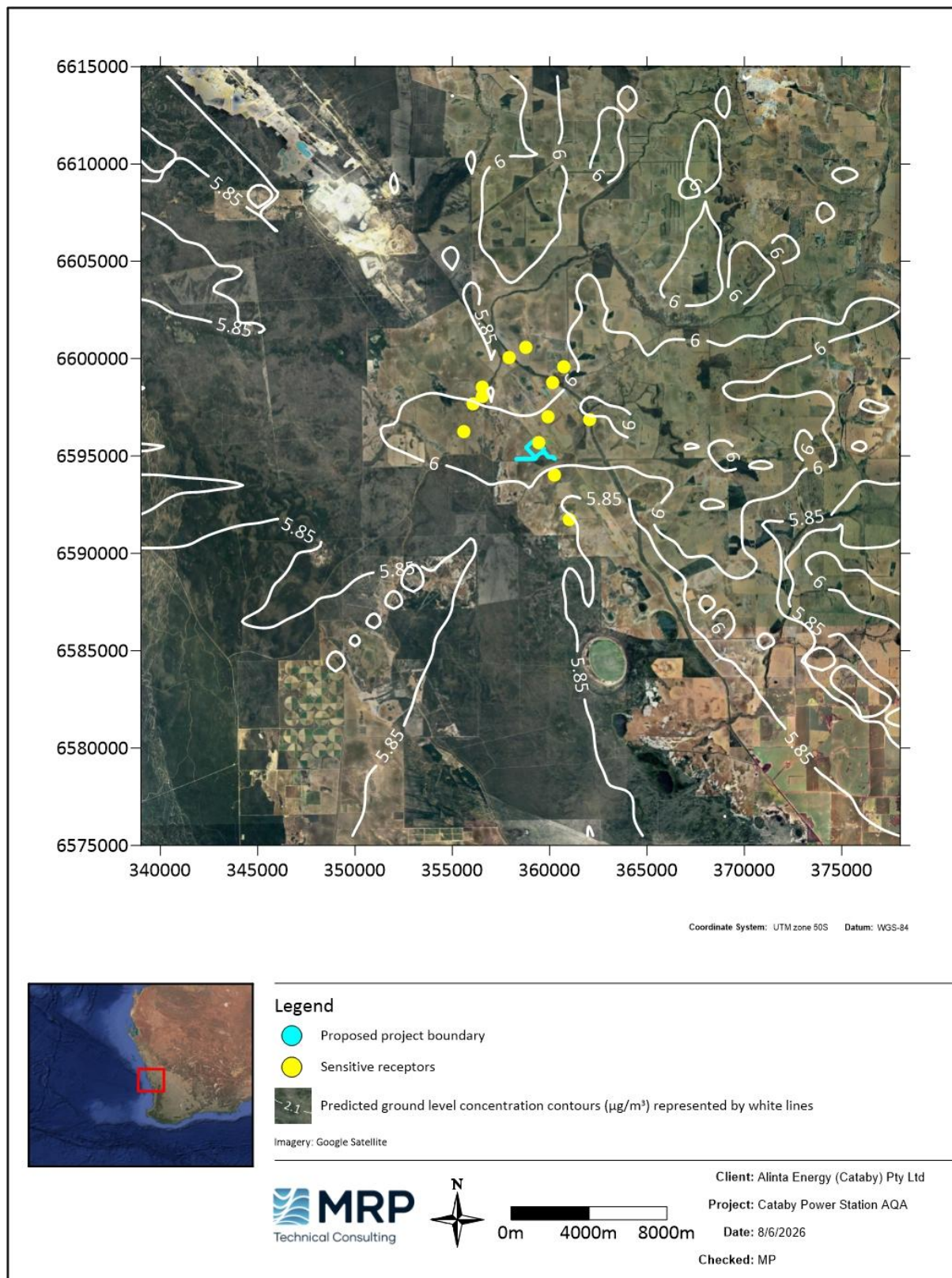


Figure 5-29: Predicted cumulative maximum 24-hour average GLCs of $\text{PM}_{2.5}$ ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)

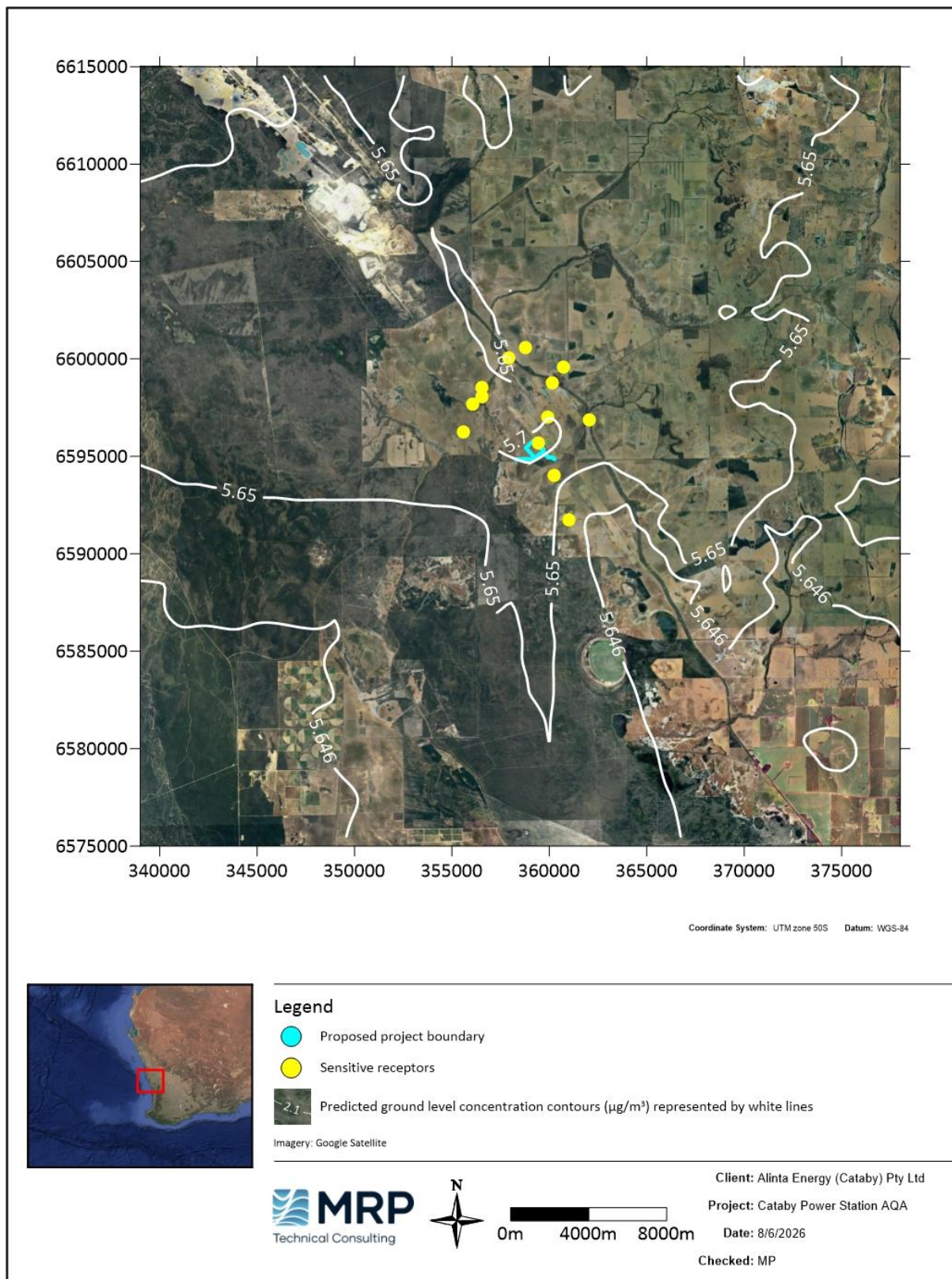


Figure 5-30: Predicted cumulative annual average GLCs of $\text{PM}_{2.5}$ ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)

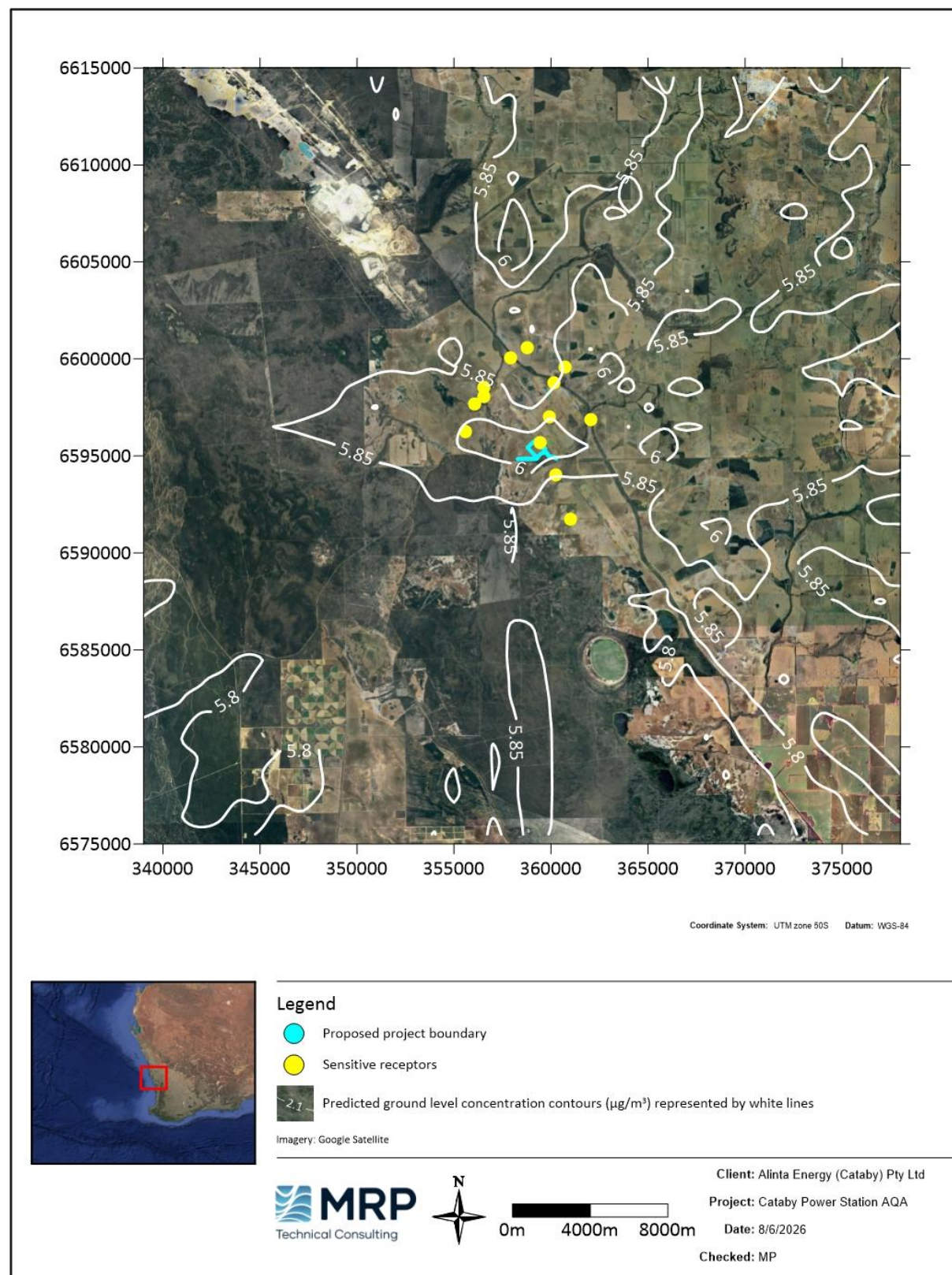


Figure 5-31: Predicted cumulative maximum 24-hour average GLCs of $\text{PM}_{2.5}$ ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)

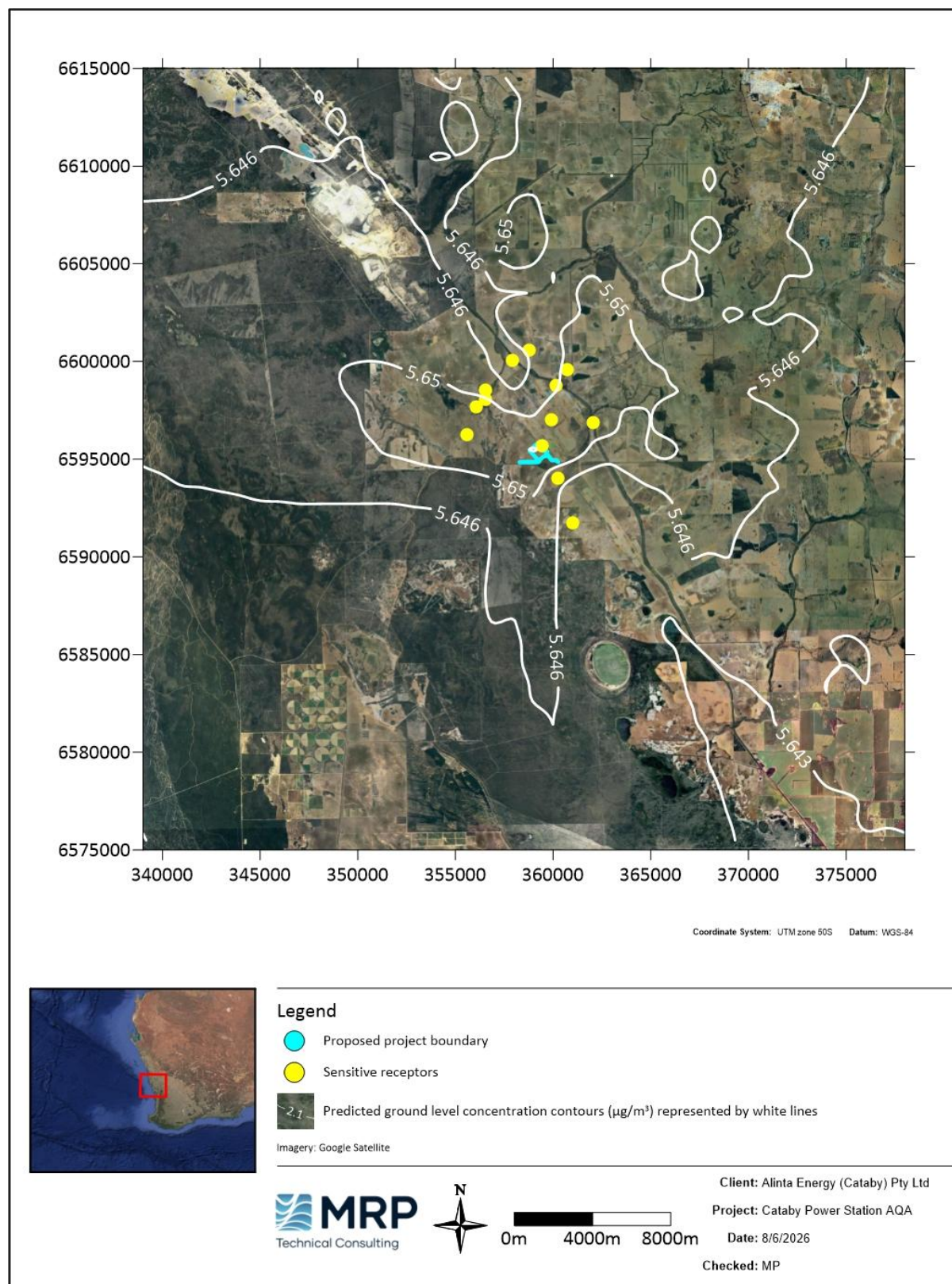


Figure 5-32: Predicted cumulative annual average GLCs of $\text{PM}_{2.5}$ ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)

5.5 Formaldehyde

Short-term concentrations of CH₂O have been assessed using the maximum 99.9th percentile of the modelled 1-hour average concentrations. This approach is consistent with guidance from the DWER on assessing air toxics and provides a robust estimate of high-end concentrations and reduces sensitivity to potential outliers in the model.

Contour plots showing predicted concentrations of CH₂O can be found in Figure 5-33 to Figure 5-40 below, with relevant air quality criteria displayed as a red contour line. Table 5-5 presents the predicted GLCs across the entire modelled domain, offsite, and at nearby sensitive receptors in the region.

Results of the modelling indicated that there were no exceedances of the relevant 1-hour or 24-hour maximum ambient guideline values (AGVs) for CH₂O predicted across the entire modelled domain.

Table 5-5: Summary of predicted maximum 99.9th percentile 1-hour average and maximum 24-hour average GLCs of CH₂O

Maximum 99.9 th percentile 1-hour average CH ₂ O GLCs											
Receptor	Criteria	Background		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
				Normal operations - isolation		Normal operations - cumulative		Start-up operations		Shutdown operations	
	(µg/m ³) ¹	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline
Max GLC across modelling domain	20	2.0	10%	1.8	8.8%	3.7	19%	4.9	24%	5.0	25%
Max GLC offsite				1.8	8.8%	3.7	19%	4.9	24%	5.0	25%
Residence 1				0.38	1.9%	2.3	12%	2.6	13%	2.6	13%
Residence 2				0.28	1.4%	2.2	11%	2.4	12%	2.5	12%
Cataby Mineral Sands onsite receptor				0.76	3.8%	2.7	14%	3.2	16%	3.3	16%

Maximum 24-hour average CH ₂ O GLCs											
Receptor	Criteria	Background		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
				Normal operations - isolation		Normal operations - cumulative		Start-up operations		Shutdown operations	
	(µg/m ³) ¹	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline	(µg/m ³) ¹	% of guideline
Max GLC across modelling domain	49	2.1	4.22%	0.43	<1%	2.5	5.1%	2.8	5.7%	2.8	5.7%
Max GLC offsite				0.43	<1%	2.5	5.1%	2.8	5.7%	2.8	5.7%
Residence 1				0.10	<1%	2.2	4.4%	2.2	4.6%	2.3	4.6%
Residence 2				0.03	<1%	2.1	4.3%	2.1	4.3%	2.1	4.3%
Cataby Mineral Sands onsite receptor				0.15	<1%	2.2	4.5%	2.3	4.7%	2.3	4.8%

Notes
1. Referenced to 25°C, and 101.3 kPa.

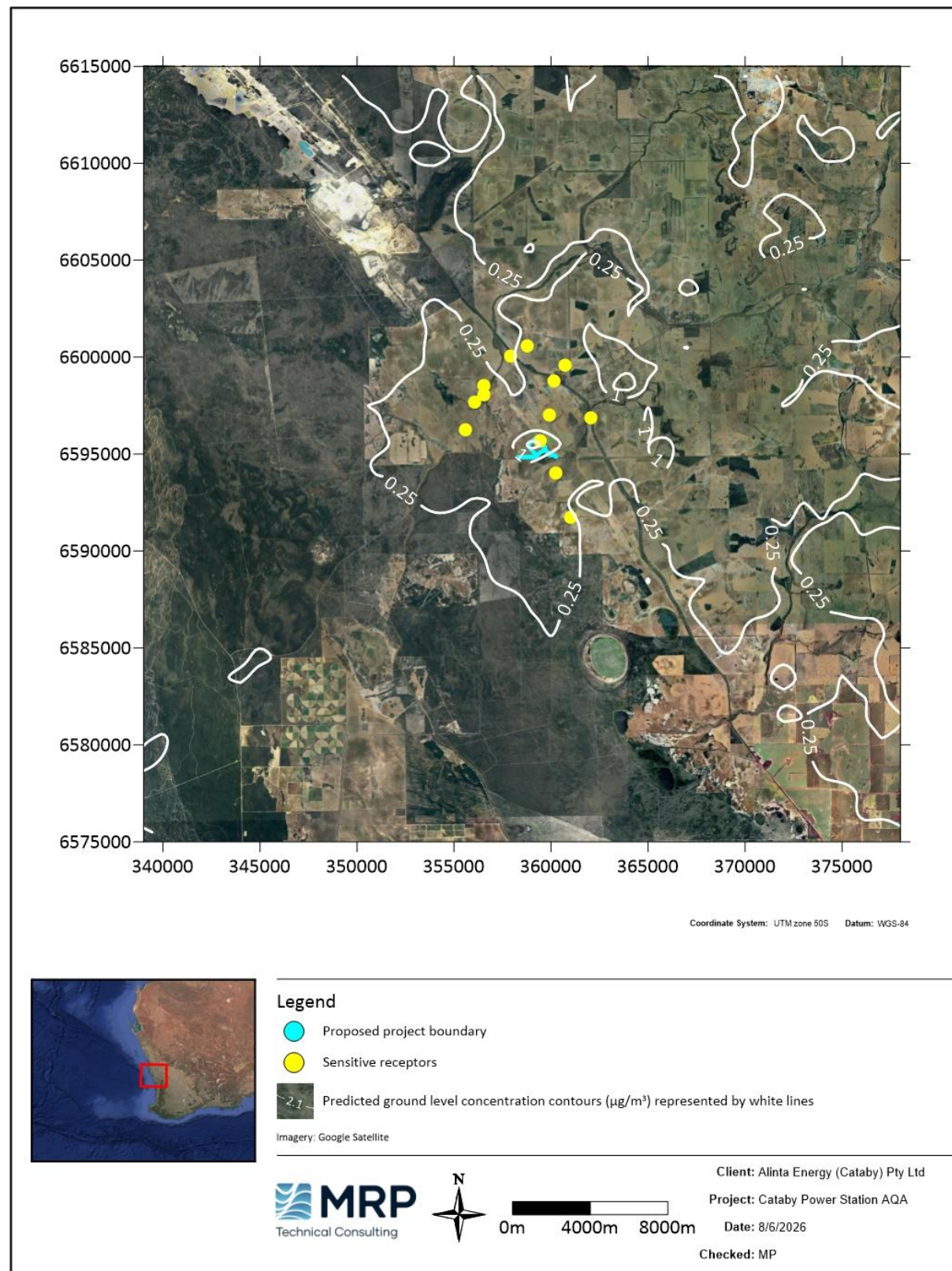


Figure 5-33: Predicted maximum 99.9th percentile 1-hour average GLCs of CH_2O ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)

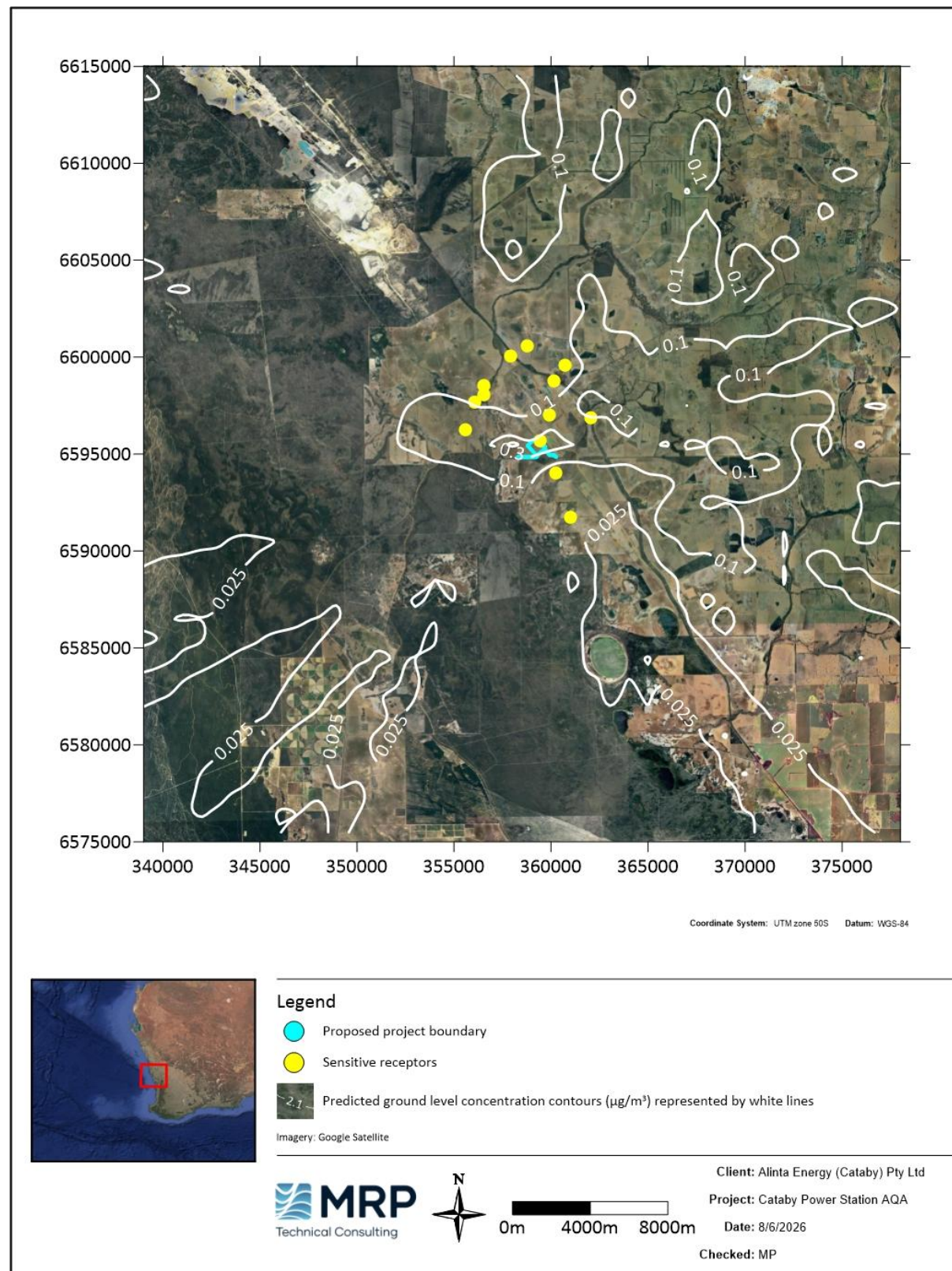


Figure 5-34: Predicted maximum 24-hour average GLCs of CH_2O ($\mu\text{g}/\text{m}^3$) for normal operations in isolation (Scenario 1)

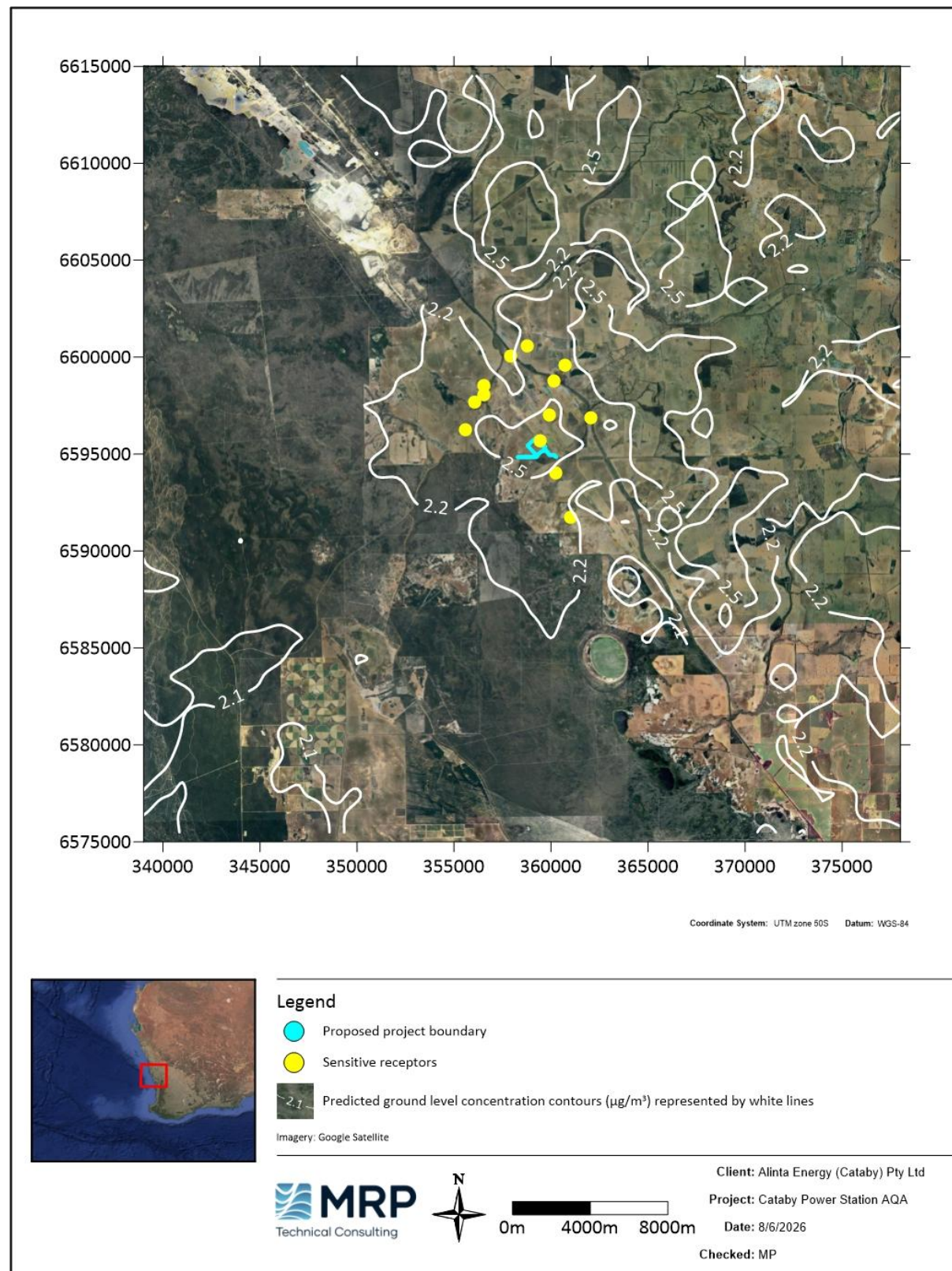


Figure 5-35: Predicted cumulative maximum 99.9th percentile 1-hour average GLCs of CH_2O ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)

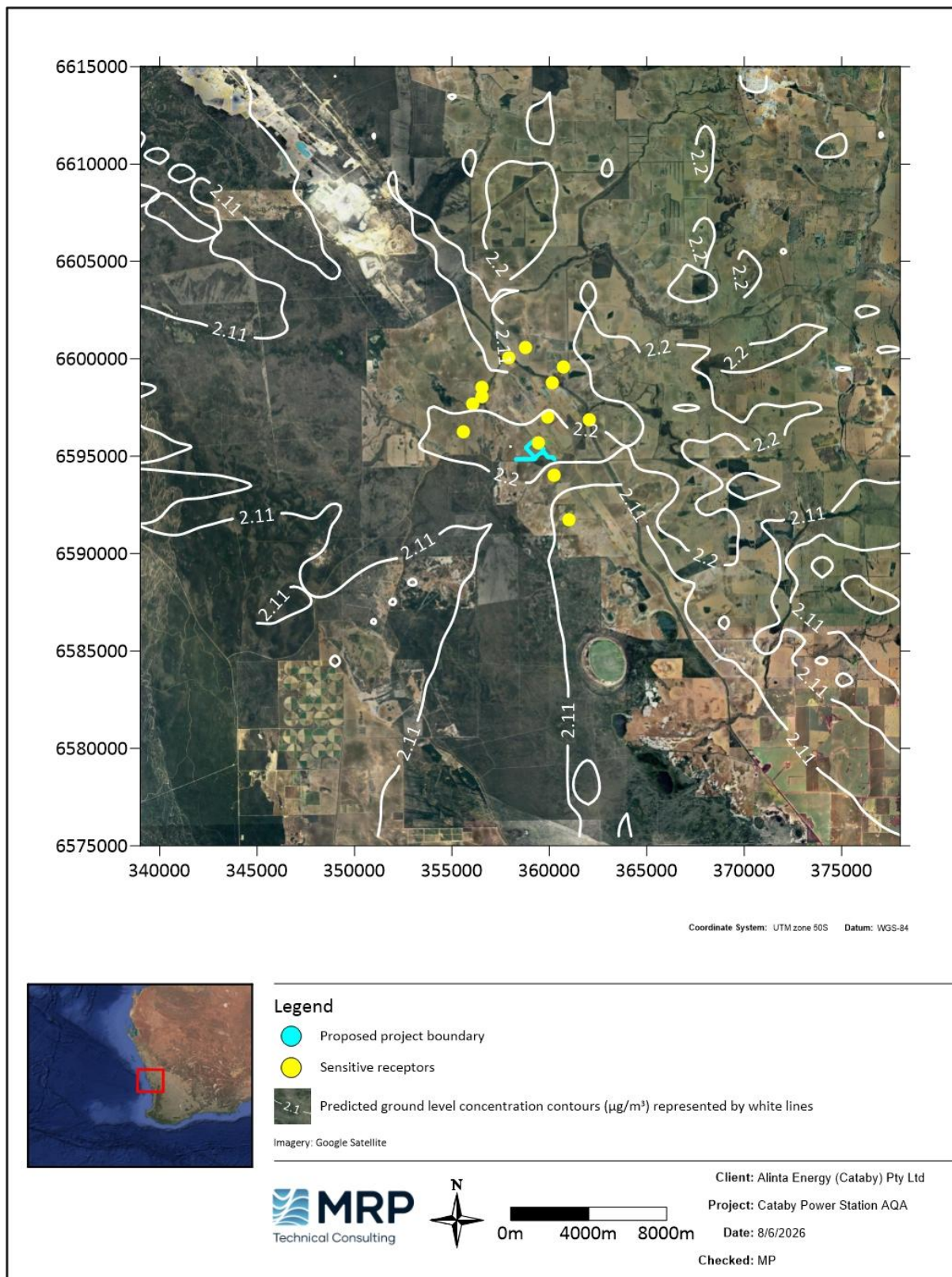


Figure 5-36: Predicted cumulative maximum 24-hour average GLCs of CH_2O ($\mu\text{g}/\text{m}^3$) for normal operations (Scenario 2)

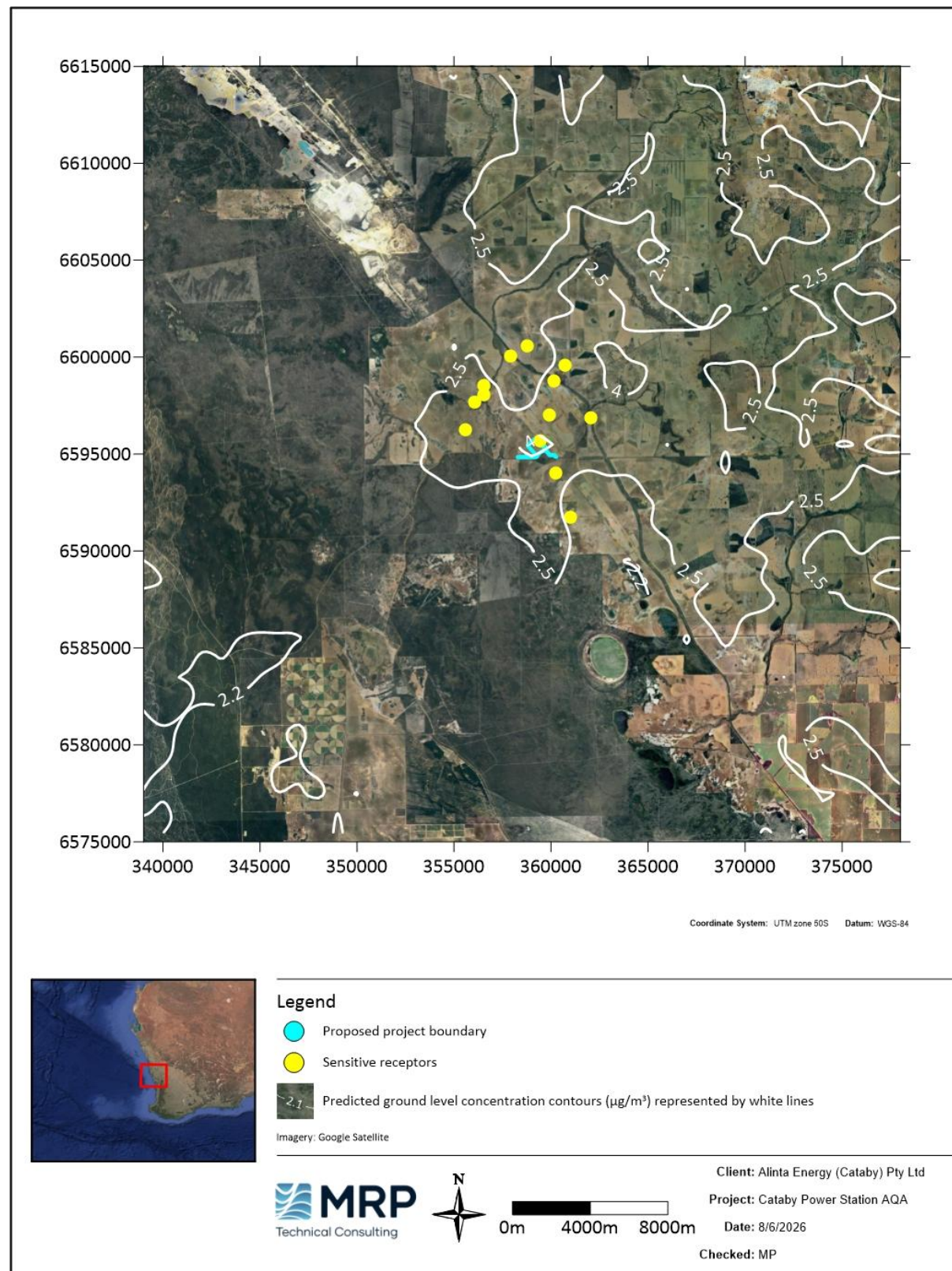


Figure 5-37: Predicted cumulative maximum 99.9th percentile 1-hour average GLCs of CH_2O ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)

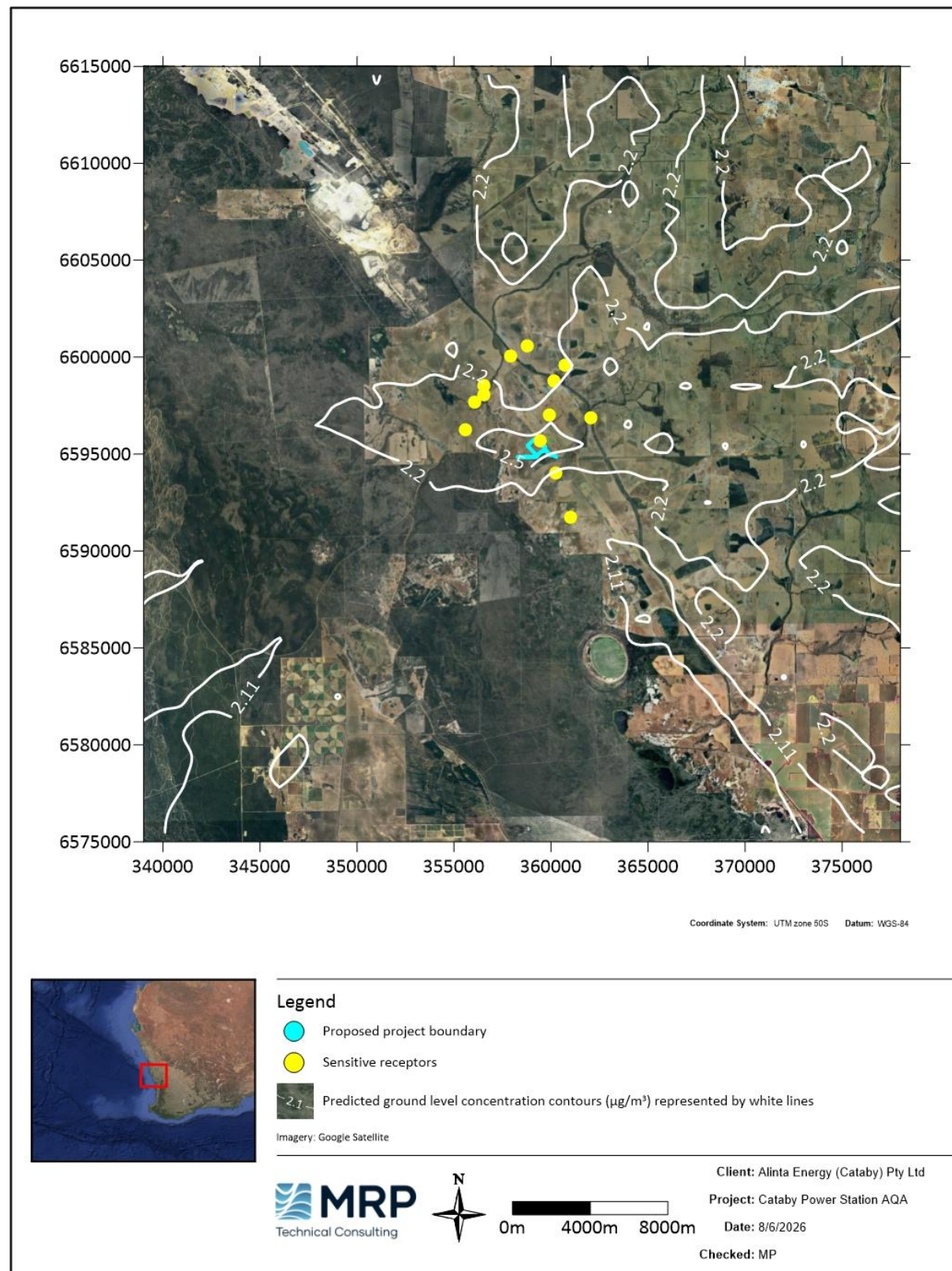


Figure 5-38: Predicted cumulative maximum 24-hour average GLCs of CH_2O ($\mu\text{g}/\text{m}^3$) for start-up operations (Scenario 3)

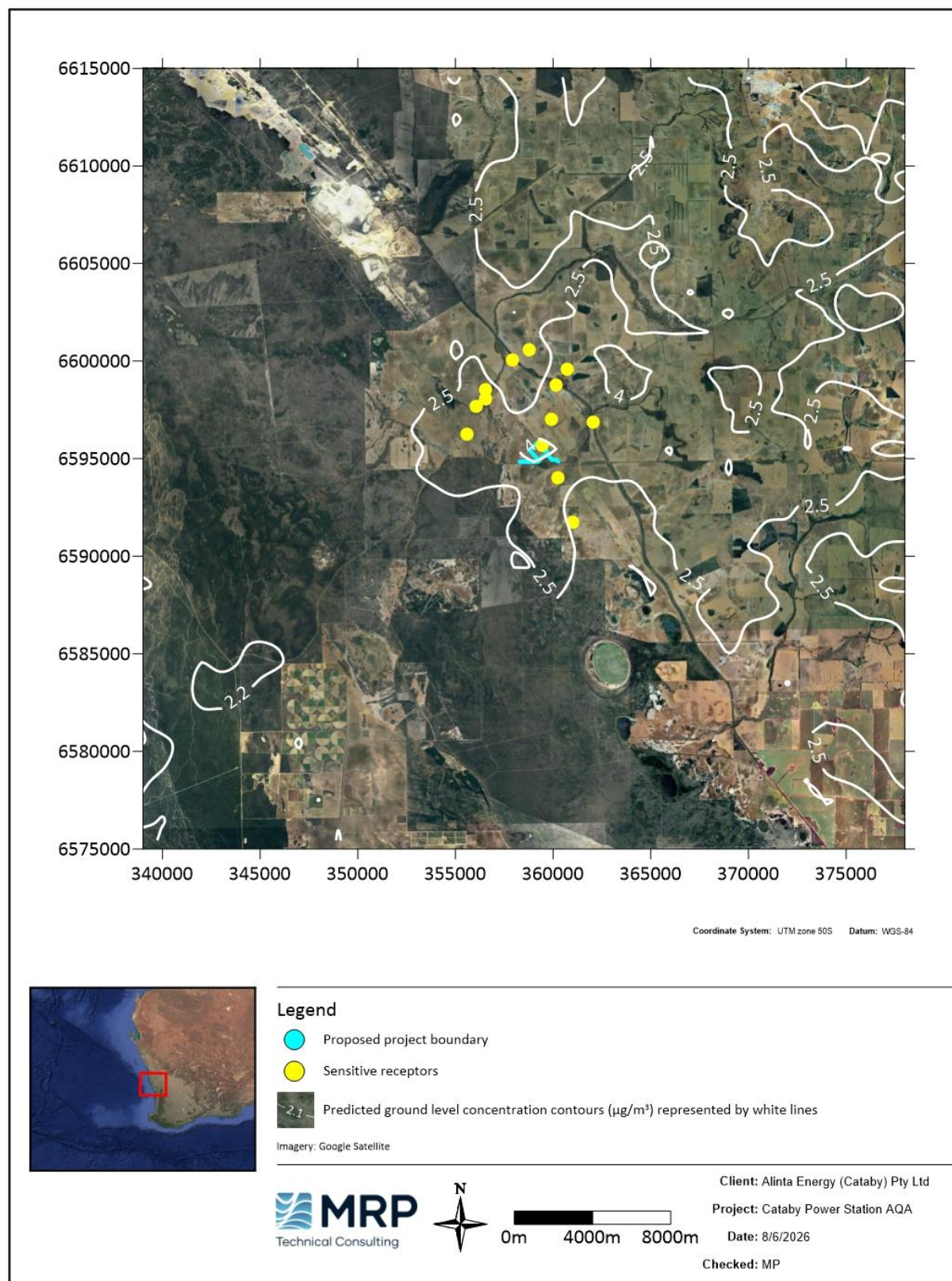


Figure 5-39: Predicted cumulative maximum 99.9th percentile 1-hour average GLCs of CH_2O ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)

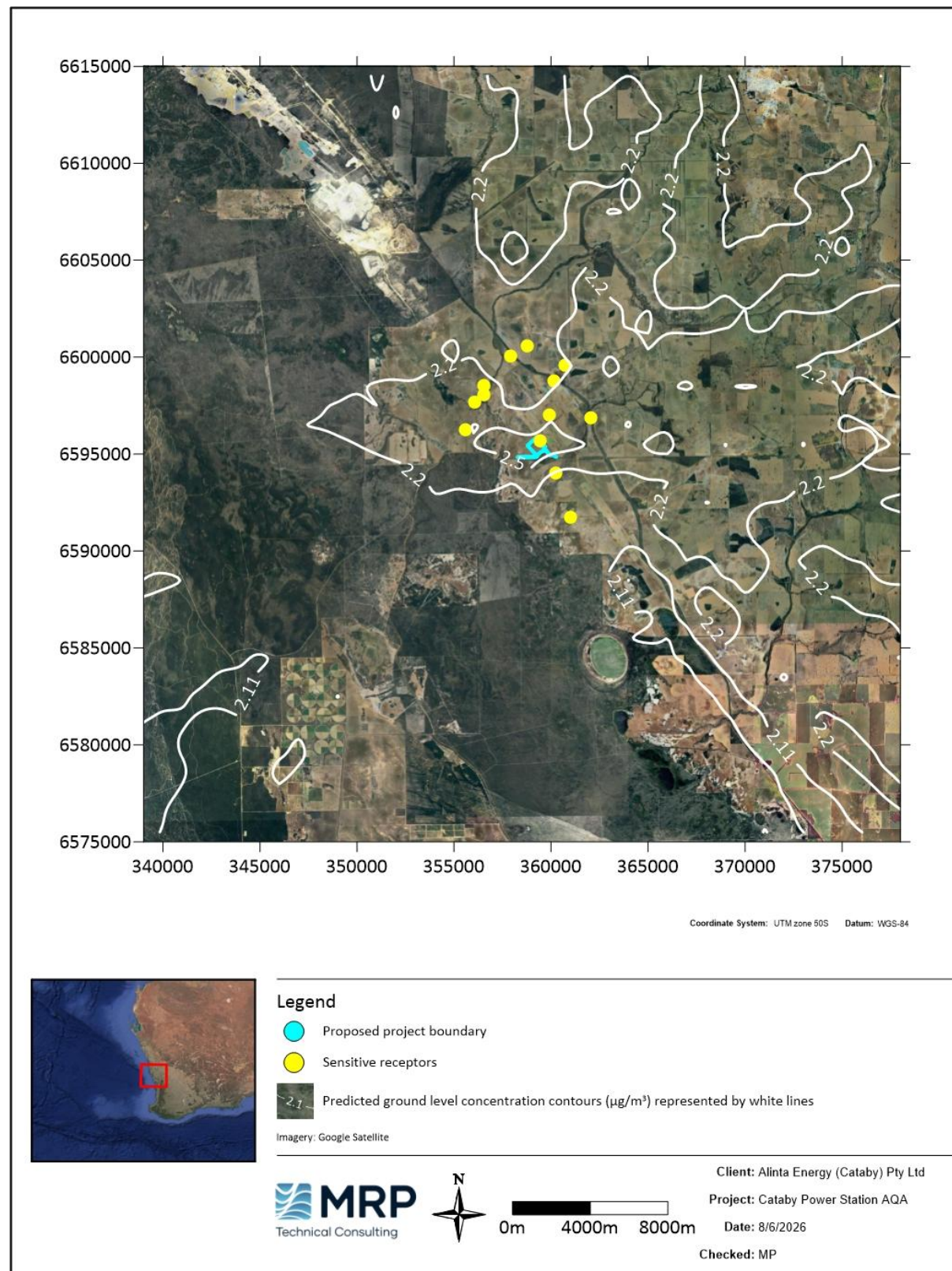


Figure 5-40: Predicted cumulative maximum 24-hour average GLCs of CH_2O ($\mu\text{g}/\text{m}^3$) for shutdown operations (Scenario 4)

6 Summary

As part of the regulatory approval process, Alinta requested MRP to undertake an assessment of the air quality impacts associated with the proposed development of 400 Megawatts (MW) of energy supply to the SWIS known as the Cataby Power Station. The assessment has considered the potential air quality impacts arising from emissions of nitrogen dioxide, carbon monoxide, particulates (including PM₁₀ and PM_{2.5}) and formaldehyde associated with a number of scenarios the analysis has considered the use of controls such as selective catalytic reduction and the use of oxidation catalyst, however the use of these controls are not required for regulatory compliance.

The results of air dispersion modelling predicted concentrations of all pollutants at all locations within the modelled grid including at all sensitive receptor locations in the region to be below the respective relevant ambient air quality criteria for all modelled scenarios and averaging periods.

The assessment has incorporated several conservative assumptions including the following which indicate that the results of the modelling could be considered a conservative estimate of worst case GLCs in the region:

- Emissions from the plant assumed worst case concentrations as guaranteed by vendors. Emissions concentrations of NO_x from the proposed power station are expected to be significantly lower than those that were modelled.
- Modelling was undertaken assuming continuous operation of the sources at 100% load when it is expected to operate as a peaking station.
- Emissions from shutdown and start-up operations are expected to be sporadic and despite these operations only occurring for short periods of time (between 3.6 and 23 minutes) it has been assumed that normal operations from the plant continued for the remainder of each hour.

The assessment incorporated both selective catalytic reduction and oxidation catalysts to reduce emissions of NO_x, CO and CH₂O from the exhaust stream. The use of selective catalytic reduction has been included in this assessment however, sensitivity testing indicated that selective catalytic reduction is not required to comply with relevant ambient air quality criteria for NO₂ and will be revisited as part of detailed design.

Based on the outcomes of the air dispersion modelling which predicted GLCs of the pollutants of concern for all averaging periods well below relevant air quality guidelines across the entire modelled domain and considering the inherent conservativity incorporated into the assessment, the proposed turbine and reciprocating engine combination using the proposed control equipment are likely to present a low risk of impacting the environment and health at sensitive receptors in the region.

7 References

Bureau of Meteorology (BoM). (2024). Climate Statistics for Australian Locations. December 2024. Accessed from: http://www.bom.gov.au/climate/averages/tables/cw_009178.shtml

Copernicus Atmosphere Monitoring Service (CAMS). (2024). Reanalysis data from the Copernicus Atmosphere Monitoring Service (CAMS). Accessed from: <https://atmosphere.copernicus.eu>

Cole, H. S., & Summerhays, J. E. (1979). A review of techniques available for estimating short-term NO₂ concentrations. *Journal of the Air Pollution Control Association*, 29(8), 812–817.

Department of Water and Environmental Regulation (DWER). (2006). Air Quality Modelling Guidance Notes. March 2006. Accessed from: <https://www.wa.gov.au/system/files/2023-03/Air-quality-modelling-guidance-notes-2006.pdf>

Department of Water and Environmental Regulation (DWER). (2017). Guideline Risk assessments Part V, Division 3, Environmental Protection Act 1986. February 2017. Accessed from: <https://www.wa.gov.au/system/files/2023-06/guideline-risk-assessments.pdf>

Department of Water and Environmental Regulation (DWER). (2019). Guideline Air Emissions Draft for external consultation. October 2019. Accessed from <https://www.wa.gov.au/system/files/2022-11/Draft-guideline-air-emissions.pdf>

Environmental Protection Authority (EPA). (2020). Environmental Factor Guideline – Air Quality. April 2020. Accessed from: https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EFG%20-%20Air%20Quality%20-%2003.04.2020.pdf

EPA Victoria (VIC EPA). (2001). State Environment Protection Policy (Air Quality Management). Special Gazette No. S 240, 21 December 2001.

EPA Victoria (VIC EPA). (2013). Construction of input meteorological data files for EPA Victoria's regulatory air pollution model (AERMOD) (Publication No. 1550). Accessed from <https://www.epa.vic.gov.au/-/media/epa/files/publications/1550.pdf>

EPA Victoria (VIC EPA). (2013). *Guidance notes for using the regulatory air model AERMOD in Victoria* (Publication No. 1551). Accessed from <https://www.epa.vic.gov.au/about-epa/publications/1551>

National Environmental Protection Council (NEPC). (2021). National Environmental Protection (Ambient Air Quality) Measure. May 2021. Accessed from: <https://www.legislation.gov.au/F2007B01142/latest/text>

National Environmental Protection Council (NEPC). (2011). National Environmental Protection (Air Toxics) Measure. October 2011. Accessed from:
<https://www.legislation.gov.au/F2007B01121/latest/text>