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| Date: | 31 March, 2021 |
| Ref: | 207401.0112-report-letter.docx |
| To: | Rylan Loemker |
| Company: | Jackson Environment and Planning |
| Email: | rylan@jacksonenvironment.com.au |
| Author: | Samuel Wong/SF |
| Subject: | Tomago Resource Recovery Facility and Truck Depot – Air Quality Information Request Response |
| Pages: | 1 of 38 |

Dear Rylan,

This letter responds to the NSW information request items relating to air quality for the proposed Tomago Resource Recovery Facility and Truck Parking Depot located at 21D and 21F School Drive, Tomago and summarises the results of the revised detailed modelling.

New South Wales EPA issued a request for additional information for various items including air quality on 26 February 2021 for the Environmental Impact Assessment of the proposed development. An original air quality assessment was prepared by Air Noise Environment (now Trinity Consultants Australia) on 27 August 2020. A subsequent report was issued by Air Noise Environment on 17 November 2020 (hereafter referred to as the Air Quality Impact Assessment Report) in response to the NSW Department of Planning, Industry and Environment adequacy review.

# 1. NSW EPA Additional Information Request

The requested information from NSW EPA relating to Air Quality is copied below, followed by a response to each item.

### f) Industrial and commercial receptors not included in AQIA

i. *A revised AQIA that includes the industrial and commercial receptors in the complete assessment of air quality impacts; and*

ii. *A revised AQIA that accounts for the control and mitigation measures that reflect the actual proposed operations (i.e. operating proposed activities within a building).*

*Should impacts above the criteria be predicted the EPA will require consideration and assessment of additional controls until compliance is achieved.*

Revised modelling has been completed to consider the air quality impacts of the proposed facility onto the surrounding industrial and commercial receptors (in additional to the impacts at the previously considered sensitive uses). Receptors have been modelled around the boundary to represent a worst-case scenario for air quality and odour impacts.

Reductions have been adopted in the revised modelling to account for mitigation measures include:

- A 90% reduction to particulate emissions from material unloading, handling, screening and shredding has been adopted to account these activities occurring within enclosed buildings.

- A 90% reduction to odour emissions from the food de-packaging plant has been included to account for mitigation from an odour control unit.

The silt loading parameter in the haul route equation has also been revised to a more realistic value (1.1 $g/m^2$). The revised silt loading value represents the minimum value of the range (1.1 – 32.0 $g/m^2$) for haul routes servicing municipal solid waste landfills identified in Table 13.2.2-4 of the AP 42 Emission Factors for Paved Roads[1]. This value assumes that the haul routes are regularly cleaned to minimise silt content.

No other changes have been made to the parameters used to calculate particulate emissions (i.e. throughputs, haul route lengths and truck weights have not changed).

Table 1.1: Revised Odour EmissionsTable 1.1 presents the revised odour emissions rates adopted in the updated modelling. Table 1.2 presents the revised particulate emissions rates adopted in the updated modelling.

The updated modelling results are presented under Section 2.

**Table 1.1: Revised Odour Emissions**

| Source ID | Activity | OU | Unit | Sources |
|---|---|---|---|---|
| P1 | Food De-packaging Plant | 100 | OUV/s | Controlled odour emissions from grease trap unloading into a storage tank, previously completed by Air Noise Environment at a liquid waste facility. 90% reduction to odour emissions adopted to account for odour control unit. |
| P2 | Drill Mud Recovery Facility | 517.38[a] | OUV/s | Based on the highest sample undertaken by Airlabs Environmental of a liquid collection recycling truck in September 2013[b]. This data represents the odour concentration of the raw liquid drill mud material that would be transferred to the holding tanks. |
| P3 | Waste Oil Unloading | 72[c] | OUV/s | Based on previous sampling undertaken by Air Noise Environment for liquid waste facilities in Brisbane and Sydney. These facilities also involved the treatment of industrial oily water or used oil. |
| P4 | Garden Organics Primary Processing | 0.134 | $OU/m^2/s$ | An odour emission rate of 0.134 $OU/m^2/s$ has been adopted based on sampling completed by PAE Holmes of Greenwaste areas at an existing landfill at Eastern Creek Creek[d]. To derive a total odour emission rate (OU V/s), a waste area of 180 $m^2$, (roughly half the total floor area of the Garden Organic Primary Processing area) has been considered. |

[a] Emission rates based on estimated venting flow rate of 5 m/s and diameter of 0.5 m.

[b] Emission rates based on estimated venting flow rate of 0.01 $m^3/s$. This is based on the fact that 12 m 3 of liquid would be unloaded over a period of 20 minutes, and that the amount of air forced out of the tank is equivalent to the volume of liquid unloaded.

[c] Stephenson Environmental Management Australia, Modification to DA for Gross Pollution Trap & Stormwater Waste Recycling Depot – 5-6 Sleigh Place Wetherill Park NSW. Statement of Environmental Effects. 27 April 2018.

[d] Holmes Air Sciences, Odour Audit: Eastern Creek Stage 2, Prepared by Holmes Air Sciences f or National Environment al Consulting Services on behalf of Waste Service NSW, December 2003.

[1] AP 42 (5th Edition), Compilation of Air Pollutant Emission Factors, Vol. 1 Stationary Point and Area Sources, Chapter 13.2.1, Paved Roads.

### Table 1.2: Revised Particulate Estimated Emission Rates (g/s) – Average Daily Throughputs

| Source ID | Activity | Factoring Value | Factoring Unit | Mitigation Reduction | Mitigation Modelling | TSP | $PM_{10}$ | $PM_{2.5}$ | Operating Time |
|---|---|---|---|---|---|---|---|---|---|
| Material Recovery Facility | | | | | | | | | |
| V1 | Material unloading | 5.3 | Tonnes/hr | 90% | Enclosed Building | 0.00006 | 0.00003 | 0.000004 | 24 Hours |
| V1 | Material handling | 5.3 | Tonnes/hr | 90% | Enclosed Building | 0.00006 | 0.00003 | 0.000004 | 24 Hours |
| V1 | Material transfer to process line | 5.3 | Tonnes/hr | 90% | Enclosed Building | 0.00006 | 0.00003 | 0.000004 | 24 Hours |
| V1 | Screening Binder Bivitec | 5.3 | Tonnes/hr | 90% | Enclosed Building | 0.00006 | 0.00003 | 0.000004 | 24 Hours |
| V1 | Fineshredder Metso M&J 1550 | 5.3 | Tonnes/hr | 90% | Enclosed Building | 0.00040 | 0.00018 | 0.000052 | 24 Hours |
| V1 | Shredder Metso M&J 4000s | 5.3 | Tonnes/hr | 90% | Enclosed Building | 0.00040 | 0.00018 | 0.000052 | 24 Hours |
| Cardboard Baling | | | | | | | | | |
| V2 | Material handling | 5.1 | Tonnes/hr | 90% | Enclosed Building | 0.00003 | 0.00001 | 0.000002 | 24 Hours |
| Food Depackaging plant | | | | | | | | | |
| V3 | Material handling | 0.3 | Tonnes/hr | 90% | Enclosed Building | 0.00004 | 0.0000176 | 0.000003 | 24 Hours |
| Garden Organics Primary Processing | | | | | | | | | |
| V4 | Material unloading | 0.9 | Tonnes/hr | 90% | Enclosed Building | 0.000004 | 0.000002 | 0.0000003 | 24 Hours |
| V4 | Material handling | 0.9 | Tonnes/hr | 90% | Enclosed Building | 0.000004 | 0.000002 | 0.0000003 | 24 Hours |
| V4 | Fineshredder Metso M&J 1550 | 0.9 | Tonnes/hr | 90% | Enclosed Building | 0.000064 | 0.000029 | 0.0000084 | 24 Hours |
| Haul Route | | | | | | | | | |
| L1 | Onsite Haul Truck – Rigid Truck | 4.5 | VKT/hour | 0% | None | 0.00035 | 0.000068 | 0.0000165 | 24 Hours |
| L2 | Onsite Haul Truck – Semi Trailer | 0.0913 | VKT/hour | 0% | None | 0.00002 | 0.000004 | 0.0000010 | 24 Hours |
| L3 | Onsite Haul Truck – Semi Trailer | 0.069 | VKT/hour | 0% | None | 0.00002 | 0.000004 | 0.0000010 | 24 Hours |

**g) Assessment approach for VOCs require further information**

*i. A revised AQIA that clarifies the proposed operations and justifies the inclusion or exclusion of the VOC emissions in the modelling;*

*ii. A revised AQIA that includes further information on the source and approach for quantitatively assessing the VOC concentrations included in the AQIA, including any supporting emissions data; and*

*iii. A revised AQIA that includes additional information regarding the waste oil unloading that has been quantitatively assessed, including but not limited to waste oil quantities, source, unloading rates, storage capacity and emission controls.*

Fuels, oils and cleaning chemicals are proposed to be stored at the maintenance workshop located in Building 3. VOC and odour Emissions associated with the storage of fuels, oils and cleaning chemicals in the maintenance workshop are anticipated to be low, given that the materials are to stored will occur within the enclosed Building 3. There will be 2 x 69 kL tanks at the rear of Building 3 to store waste oil from on-site vehicle maintenance. The potential for VOC and odour emissions from bulk waste oil unloading into a tanker for removal off -site has been included in the modelling as these activities occur. The modelling has assumed continuous emissions during operating hours, which is highly conservative, given that bulk tanker loading will be undertaken on an as required basis (when tanks are reaching capacity). Outside of these times, natural breathing emissions from the tanks are expected to be negligible.

It is confirmed that the hazardous waste recycling facility (Building 2) will produce minimal VOC emissions. Waste materials are received and stored within Building 2 and periodically collected for processing offsite. Liquid waste will also be received by the hazardous waste recycling facility which is unloaded into a bunded storage area and subsequently decanted into holding tanks. The decanting of liquids into the holding tank will not result in significant emissions given that the liquid will be pumped and not manually decanted. Furthermore, the pumping to proposed to occur within the confines of building 2 and not external to the atmosphere. A waste (J100) and oily water / coolant (J120) tanks are located at the rear or east side of Building 2. Similar to the Building 3 waste oil tanks, there is a potential for emissions during unloading to bulk tankers, however, again, this would only be undertaken on an as required basis. Modelling of unloading has not been specifically undertaken for this unloading activity, given that the modelling already assumes continuous waste oil unloading at Building 2.

VOC and odour emission rates have been based on previous sampling undertaken by Air Noise Environment for liquid waste facilities in Wacol (Brisbane) and Glendenning (Sydney). The sampled facilities treated industrial oily water or used water. It is noted that this data has been previously used for State Significant Projects in NSW as follows:

- Application Number SSD-6767 – Glendenning Liquid Waste Facility; and
- Application Number SSD-6767-Mod1 – Modification 1 to increase throughput at Glendenning Liquid Waste Facility[2].

Odour (OUV/s) and VOC emission rates (g/s) have been derived from the measured concentrations[3] from the above listed projects and factored by an assumed flow rate of 0.01 $m^3$/s. The concentrations were measured out the vent outlet of a waste oil truck, therefore, the relatively high concentrations reported are due to the sampling being undertaken directly at the source. This is equivalent to 36 kL of waste oil being

[2] NSW Government, Glendenning Liquid Waste Facility, Modification 1 Amend Limits of Consent to Increased Used Oil/Industrial Oily Water Throughput, https://www.planningportal.nsw.gov.au/major-projects/project/13721, 2019.

[3] A measured odour concentration of 7200 OU has been considered for waste oil, and concentrations of VOCs is as per Table 14 of the AQIA.

unloading in a 1 hour period. As noted above, the modelling assumes this is happening every hour during operating hours, as a highly conservative approach.

### h) Assessment of benzene requires additional information

i. *A revised AQIA that demonstrates that the emissions of principal toxic air pollutants have been minimised to the maximum extent achievable; and*

ii. *A revised AQIA that assesses benzene for a 1-hour averaging period.*

It is noted that a typographic error was presented in Table 20 of the original assessment and that the predicted Benzene concentrations presented were 1 hour averages.

With regards to measures to minimising benzene emissions, a carbon filter drum is recommended during the unloading of waste oil into bulk tankers. Carbon filters remove VOCs and odour with a removal efficiency well in excess of 90%. This represents the most practical and effective means of minimising principal toxic emissions during bulk tanker unloading.

### i) Inadequate assessment of receptors for principal toxics

*The EPA requires a revised AQIA that assesses the impacts of principal air toxics across the modelling domain, evaluate the highest impact from air toxics at and beyond the boundary and provide contour plots of all assessed pollutants.*

The predicted concentration plots for all modelled pollutants are provided as an attachment to this letter. It is noted that the concentration plots indicate that no exceedances are predicted beyond the property boundary for any pollutant.

### j) Justification of meteorological data not provided

*The EPA requires adequate justification of the year 2019 for modelling.*

The meteorological data for the year 2019 is considered appropriate based on a comparison of wind conditions with other years of data from 2015 to 2019. However, it is noted that for the revised modelling presented in this letter, the year 2017 has been ultimately adopted as a representative data set. This is partly because, in order to address Item (k) regarding the selection of the year of background data, 2017 background air quality data has been selected (see discussion under Item (k). Therefore, representative meteorological data for the year 2017 has been combined with representative background for the year 2017.

The 2017 meteorological data set is considered representative when comparing wind conditions for the year 2015 to 2019 for nearest meteorological stations at Williamstown RAAF, Beresfield and Mayfield.

Table 1.3 to Table 1.5 present the measured average wind speed, proportion of calm conditions and proportion of wind speeds less than 2.5 m/s for the Williamstown RAAF BOM station as well as for the Beresfield and Mayfield air quality monitoring stations. The data shows that wind speed conditions for 2017 are very similar to other years of data.

**Table 1.3: Williamstown RAAF BOM Station Meteorological Data Comparison**

| Year | Calm Conditions (%) | Average Wind Speed (m/s) | Wind speeds <2.5 m/s (%) |
|---|---|---|---|
| 2015 | 9.8 | 4.2 | 10.3 |
| 2016 | 5.5 | 4.5 | 13.7 |
| **2017** | **5.6** | **4.2** | **16.7** |
| 2018 | 5.3 | 4.3 | 17.8 |

| Year | Calm Conditions (%) | Average Wind Speed (m/s) | Wind speeds <2.5 m/s (%) |
|---|---|---|---|
| 2019 | 6.0 | 4.2 | 18.4 |
| 2015 – 2019 Average | 6.4 | 4.3 | 15.4 |

**Table 1.4: Beresfield Station Meteorological Data Comparison**

| Year | Calm Conditions (%) | Average Wind Speed (m/s) | Wind speeds <2.5 m/s (%) |
|---|---|---|---|
| 2015 | 4.0 | 2.5 | 55.1 |
| 2016 | 4.2 | 2.8 | 52.5 |
| **2017** | **4.0** | **2.3** | **52.0** |
| 2018 | 4.9 | 2.4 | 58.3 |
| 2019 | 4.7 | 2.4 | 58.7 |
| 2015 – 2019 Average | 4.3 | 2.5 | 55.3 |

**Table 1.5: Mayfield Station Meteorological Data Comparison**

| Year | Calm Conditions (%) | Average Wind Speed (m/s) | Wind speeds <2.5 m/s (%) |
|---|---|---|---|
| 2015 | 1.8 | 3.0 | 44.8 |
| 2016 | 1.5 | 3.1 | 47.1 |
| **2017** | **1.6** | **2.9** | **47.2** |
| 2018 | 2.0 | 2.9 | 46.7 |
| 2019 | 2.2 | 2.7 | 51.0 |
| 2015 – 2019 Average | 1.8 | 2.9 | 47.4 |

Furthermore, wind directions for 2017 are also similar to other years of data. Appendix A presents measured wind roses for 2015 to 2017 at Williamstown RAAF, Beresfield and Mayfield, which highlights the similarities between the different years of data, including for the year 2017.

Appendix B also presents the predicted meteorological data for the year 2017.

### k) Inadequate background air quality data presented

i. *A revised AQIA that justifies that the 2019 background air quality data is representative through comparison of 2019 air quality data with additional years. Where justification cannot be provided, other background data should be considered;*

ii. *A revised AQIA that provides more detailed information on the background air quality data, including the varying 24-hour concentrations used in the assessment of cumulative impacts; and*

iii. *A revised AQIA that re-evaluates the cumulative impacts and the predicted exceedances to ensure that the assessment of additional exceedances is correct. Results should be provided for the cumulative impacts resulting from the highest background concentrations and from the highest incremental concentrations.*

Background particulate data from the NSW Department of Environment and Heritage Mayfield monitoring data from 2015 – 2019 has been reviewed to determine the measured number of exceedances to the $PM_{10}$ and $PM_{2.5}$ 24 hour criteria. It is acknowledged that the number of exceedances predicted in 2020 for both

$PM_{10}$ and $PM_{2.5}$ appear to be outliers when compared to the preceding four years and subsequent year of data. Table 1.6 presented the measured number of exceedances from 2015 to 2020 at the Mayfield station.

**Table 1.6: Mayfield Air Quality Station 24 Hour $PM_{10}$ and $PM_{2.5}$ exceedances**

| Year | $PM_{10}$ 24 hour exceedances | $PM_{2.5}$ 24 hour exceedances |
|---|---|---|
| 2015 | 4 | 2 |
| 2016 | 1 | 1 |
| 2017 | 3 | 0 |
| 2018 | 11 | 0 |
| 2019 | 37 | 23 |
| 2020 | 10 | 5 |

Revised modelling has been completed for 2017 given that this year represents a typical number of $PM_{10}$ and $PM_{2.5}$ exceedance (based on the 6 year of data comparison). The updated modelling results are presented under Section 2.

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Figure 2 present the 24 hour Mayfield monitoring station $PM_{10}$ and $PM_{2.5}$ concentrations for 2017.

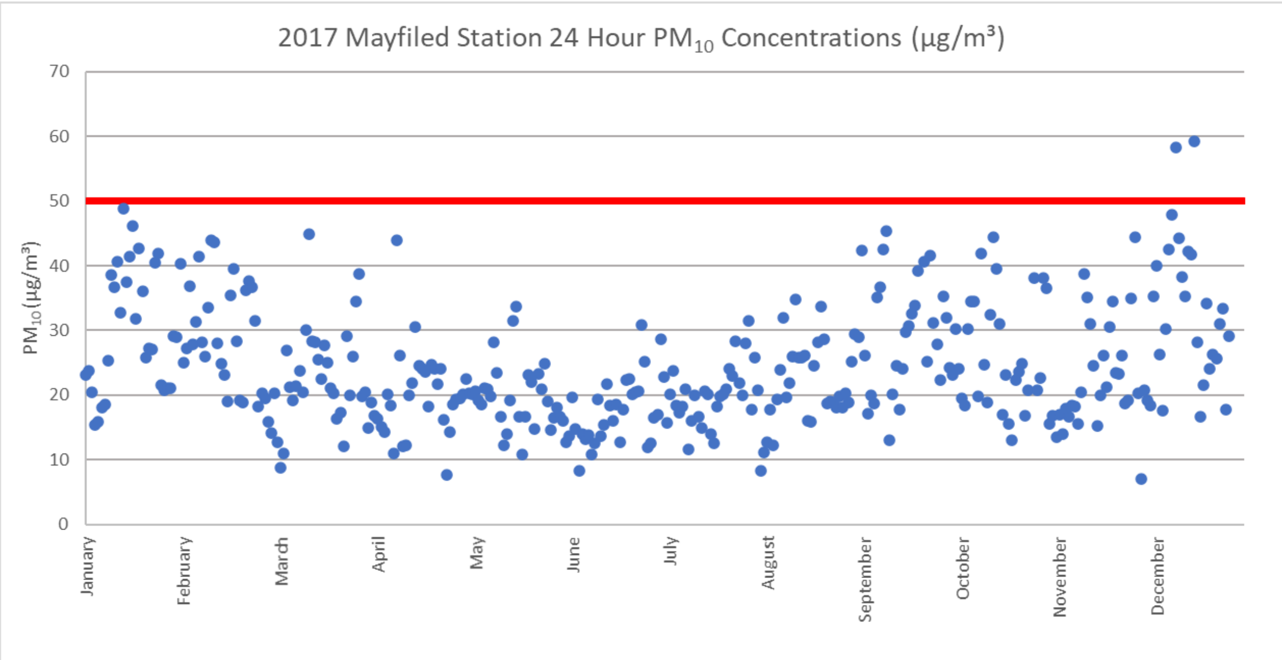



**Figure 1: 2017 Mayfield Air Quality Monitoring Station 24 Hour $PM_{10}$ Concentration**

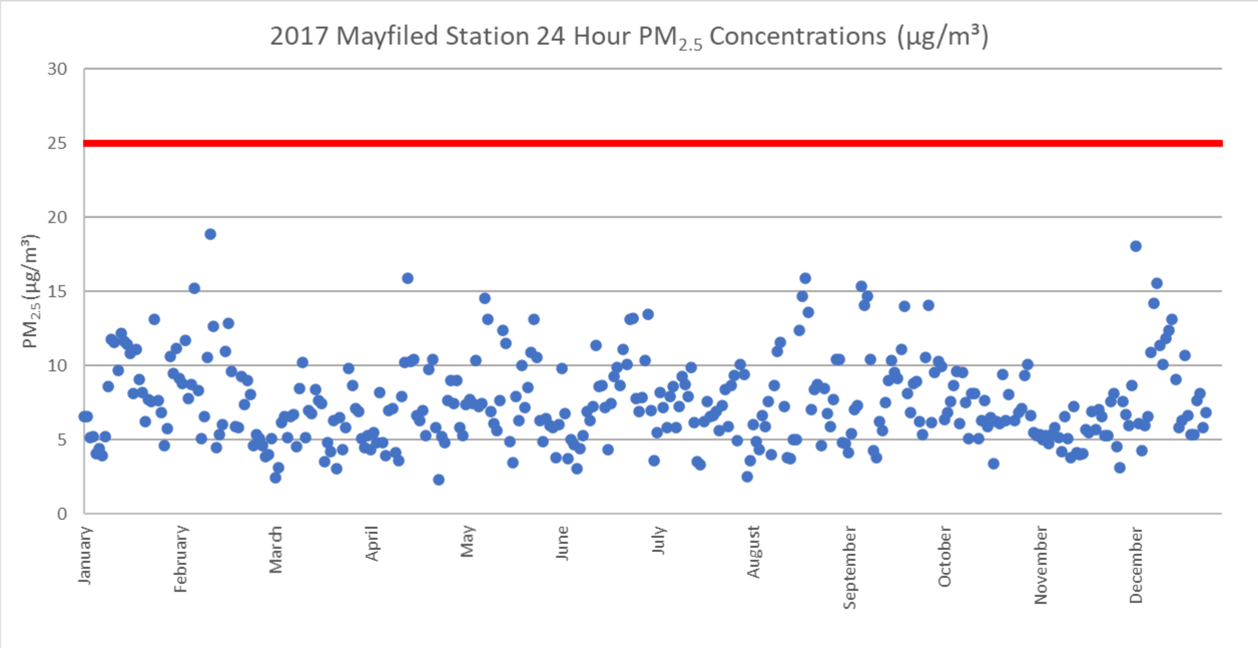



**Figure 2: 2017 Mayfield Air Quality Monitoring Station 24 Hour $PM_{2.5}$ Concentrations**

## i) Unaccounted additional point sources included in modelling

*The EPA requires a revised AQIA that includes an adequate description of all emission point sources.*

A revised figure showing the location of the location of all nine modelled point sources is presented in Figure 3. For the purpose of provided a reference to Figure 3, Table 1.7 presents the point source parameters as presented in the previous Air Quality Assessment Report.

**Table 1.7: Point Source Parameters**

| Source ID | Description | Elevation(m) | Height (m) | Exit Velocity (m/s) | Diameter (m) | Temperature (°K) |
|---|---|---|---|---|---|---|
| P1 | Food De-packaging Plant | 8.11 | 12.5 | 5 | 0.3 | Ambient |
| P2 | Drill Mud Recovery Facility | 7.98 | 12.5 | 5 | 0.5 | |
| P3 | Waste Oil Unloading | 7.65 | 2 | 2 | 0.08 | |
| P4 | Liebherr L514 | 8.11 | 2.8 | 0.1 | 0.1 | 531 |
| P5 | Caterpillar IT38G | 8.09 | 3.2 | 0.1 | 0.1 | |
| P6 | Liebherr LH22 | 7.95 | 2.6 | 0.1 | 0.1 | |
| P7 | Caterpillar 319D | 7.65 | 2.6 | 0.1 | 0.1 | |
| P8 | Linde H25D | 7.50 | 2.2 | 0.1 | 0.1 | |
| P9 | Nissan FD25T | 7.34 | 2.2 | 0.1 | 0.1 | |

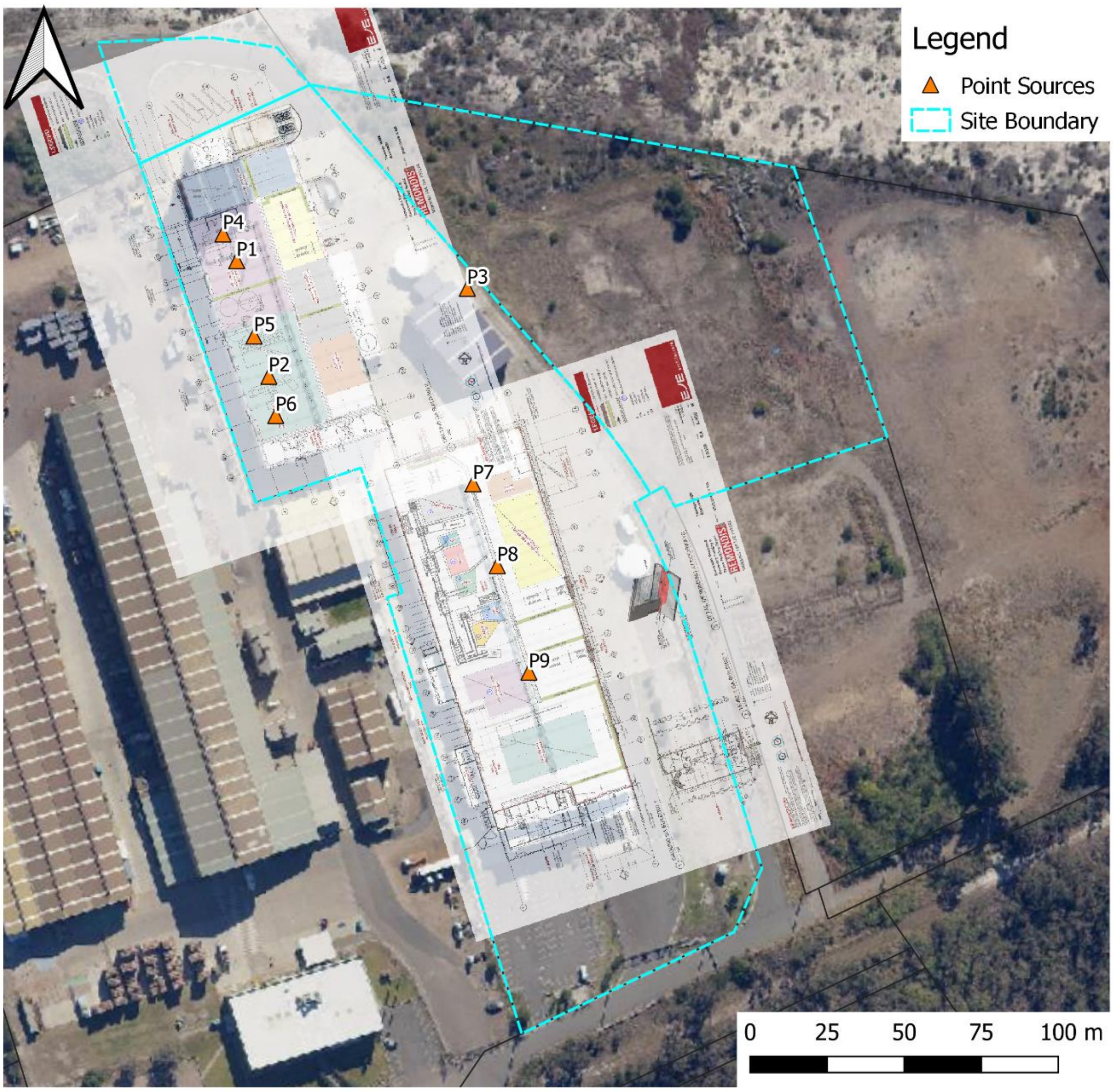



**Figure 3: Modelled Point Sources**

## m) Odour Control not considered in assessment

i. *Details of the best practise odour control system that will be installed at the facility, the control efficiency and odour emission rates and revise the odour modelling that accounts for the odour control system that will be implemented; and*

ii. *Evaluation of the risk of odour impacts and discusses additional mitigation measures that could be implemented if odour becomes an issue after the facility becomes operational.*

Detailed design of the odour control system has not been undertaken at the current development approval phase of the proposed facility. Furthermore, there is no specific odour testing at similar food depackaging facilities that the proponent or TCA is aware of. As discussed in Section 9 of the AQIA, an odour control system such as an activated carbon system would be utilised. These systems can achieve reductions of up to 97% as tested for a grease waste trap facility in Sydney. Further background and references are provided in Section 9 of the AQIA. To provide the NSW EPA with certainty as to the type of system installed, an approval condition could be placed on the site requiring further design details of the control system to be provided to the NSW EPA for approval, prior to commencement of operations.

With regards to evaluating the risk of odour impacts, the air dispersion modelling undertaken demonstrates that the risk is low. At the boundary, predicted odour concentrations are no higher than 0.6 OU (peak, $99^{th}$ percentile) and less than 0.1 OU at the nearest off-site sensitive receptors. Odour control systems typically rely on sufficient supply of filter media and an exhaust fan to draw odorous air through the filter. It is therefore important the regular maintenance of the system is undertaken, including maintenance of the exhaust fan to ensure optimum functioning and on-site supply of filter media at all times. Qualitative odour observations can also be undertaken at the site boundary and a test port on the outlet side of the control system (to identify if breakthrough of the filter media is occurring).

# 2. Revised Dispersion Modelling Results

Table 2.1 presents the predicted CALPUFF modelling results for the five sensitive receptors and the property boundary receptors. Ground level concentration plots for all pollutants are provided as an attachment to this letter.

Table 2.2 and Table 2.3 present the top 10 highest ranking 24 hour $PM_{10}$ and $PM_{2.5}$ concentrations at Receptor 4, representing the discrete receptor with the highest particulate concentrations. Table 2.4 and Table 2.5 present the top 20 and top 10 highest ranking 24 hour $PM_{10}$ and $PM_{2.5}$ concentrations at the boundary receptor with the maximum concentration.

**Table 2.1: Predicted Air Modelling Results – Source Only**

| Receptor | $SO_2$ | | | TSP | $PM_{10}$ | | $PM_{2.5}$ | | Tolu-ene | Xy-lene | Ben-zene | Cu-mene | Ethyl-benzene | Trimethyl-benzene | Odour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 hr | 24 hr | Annual | Annual | 24 hr | Annual | 24 hr | Annual | 1 hr | 1 hr | 1 hr | 1 hr | 1 hr | 1 hour | Peak 1 hour, $99^{th}$%ile |
| 1 | 0.2 | 0.1 | 0.01 | 0.1 | 0.3 | 0.03 | 0.1 | 0.01 | 0.08 | 0.02 | 0.01 | 0.001 | 0.005 | 0.004 | 0.02 |
| 2 | 0.6 | 0.2 | 0.02 | 0.3 | 0.5 | 0.06 | 0.1 | 0.01 | 0.21 | 0.06 | 0.03 | 0.002 | 0.013 | 0.010 | 0.04 |
| 3 | 0.9 | 0.2 | 0.03 | 0.4 | 0.6 | 0.08 | 0.2 | 0.02 | 0.31 | 0.09 | 0.04 | 0.003 | 0.019 | 0.015 | 0.05 |
| 4 | 1.8 | 0.8 | 0.08 | 1.3 | 2.5 | 0.26 | 0.6 | 0.06 | 0.60 | 0.18 | 0.08 | 0.006 | 0.037 | 0.028 | 0.08 |
| 5 | 0.9 | 0.3 | 0.02 | 0.3 | 1.1 | 0.06 | 0.3 | 0.02 | 0.29 | 0.09 | 0.04 | 0.003 | 0.018 | 0.014 | 0.04 |
| Boundary | 95.3 | 9.8 | 0.60 | 45.1 | 31.7 | 8.7 | 8.4 | 2.1 | 10.7 | 3.2 | 1.48 | 0.11 | 0.663 | 0.50 | 0.6 |
| Criteria | **570** | **228** | **60** | **90** | **50** | **25** | **25** | **8** | **360** | **190** | **29** | **21** | **8000** | **2200** | **2** |

**Table 2.2: Receptor 4 – Top 10 $PM_{10}$ 24 hour**

| Rank | Top 10 Source Only | | Top 10 Cumulative | |
|---|---|---|---|---|
| | Source Only | Cumulative | Source Only | Cumulative |
| 1 | 2.5 | 20.7 | 0.8 | 71.3 (background exceeds) |
| 2 | 2.1 | 16.6 | < 0.1 | 59.3 (background exceeds) |
| 3 | 2.0 | 20.5 | < 0.1 | 58.3 (background exceeds) |
| 4 | 2.0 | 19.8 | < 0.1 | 48.8 |
| 5 | 1.9 | 18.4 | < 0.1 | 47.9 |
| 6 | 1.8 | 17.3 | 0.7 | 46.1 |

| Rank | Top 10 Source Only | | Top 10 Cumulative | |
|---|---|---|---|---|
| | Source Only | Cumulative | Source Only | Cumulative |
| 7 | 1.4 | 29.0 | < 0.1 | 46.1 |
| 8 | 1.4 | 23.8 | < 0.1 | 44.9 |
| 9 | 1.4 | 19.6 | < 0.1 | 44.5 |
| 10 | 1.4 | 20.2 | 0.5 | 44.4 |

### Table 2.3: Receptor 4 – Top 10 $PM_{2.5}$ 24 hour

| Rank | Top 10 Source Only | | Top 10 Cumulative | |
|---|---|---|---|---|
| | Source Only | Cumulative | Source Only | Cumulative |
| 1 | 0.6 | 8.6 | < 0.1 | 18.1 |
| 2 | 0.5 | 5.4 | 0.2 | 16.1 |
| 3 | 0.5 | 11.6 | 0.2 | 16.1 |
| 4 | 0.5 | 10.3 | 0.2 | 15.5 |
| 5 | 0.5 | 7.7 | < 0.1 | 15.5 |
| 6 | 0.4 | 6.3 | < 0.1 | 15.2 |
| 7 | 0.4 | 5.1 | < 0.1 | 14.7 |
| 8 | 0.3 | 8.5 | < 0.1 | 14.7 |
| 9 | 0.3 | 4.4 | < 0.1 | 14.5 |
| 10 | 0.3 | 9.0 | < 0.1 | 14.5 |

### Table 2.4: Worst-Case Boundary Receptor – Top 20 $PM_{10}$ 24 hour

| Rank | Top 10 Source Only | | Top 10 Cumulative | |
|---|---|---|---|---|
| | Source Only | Cumulative | Source Only | Cumulative |
| 1 | 31.7 | 50.0 | 22.1 | **92.6 (background exceeds)** |
| 2 | 29.2 | 51.6 | 19.5 | **65.8** |
| 3 | 28.9 | 54.9 | 6.6 | **65.0 (background exceeds)** |
| 4 | 28.2 | 50.6 | 3.2 | **61.5 (background exceeds)** |
| 5 | 28.1 | 44.6 | 14.8 | **57.2** |
| 6 | 28.0 | 47.8 | 13.1 | **55.4** |

| Rank | Top 10 Source Only | | Top 10 Cumulative | |
|---|---|---|---|---|
| | Source Only | Cumulative | Source Only | Cumulative |
| 7 | 27.1 | 50.9 | 18.8 | **55.4** |
| 8 | 26.3 | 43.6 | 28.9 | **54.9** |
| 9 | 25.5 | 45.9 | 11.0 | **54.5** |
| 10 | 24.7 | 43.1 | 23.1 | **54.5** |
| 11 | 24.2 | 44.1 | 9.9 | **53.8** |
| 12 | 23.7 | 43.8 | 12.7 | **53.4** |
| 13 | 23.1 | 54.5 | 8.6 | **52.5** |
| 14 | 23.1 | 45.9 | 29.2 | **51.6** |
| 15 | 22.3 | 46.1 | 17.5 | **51.3** |
| 16 | 22.2 | 46.2 | 2.3 | **51.2** |
| 17 | 22.1 | 92.6 | 16.4 | **51.1** |
| 18 | 21.5 | 33.7 | 1.9 | **51.0** |
| 19 | 21.5 | 44.8 | 12.9 | **50.9** |
| 20 | 21.5 | 46.7 | 27.1 | **50.6** |

**Table 2.5: Worst-Case Boundary Receptor – Top 10 $PM_{2.5}$ 24 hour**

| Rank | Top 10 Source Only | | Top 10 Cumulative | |
|---|---|---|---|---|
| | Source Only | Cumulative | Source Only | Cumulative |
| 1 | 8.4 | 21.5 | 3.8 | 22.7 |
| 2 | 6.7 | 20.2 | 8.4 | 21.5 |
| 3 | 6.5 | 13.9 | 6.7 | 20.2 |
| 4 | 6.1 | 13.8 | 1.7 | 19.8 |
| 5 | 6.0 | 15.3 | 3.1 | 19.0 |
| 6 | 5.4 | 15.3 | 4.1 | 18.7 |
| 7 | 5.3 | 11.2 | 2.2 | 18.1 |
| 8 | 5.1 | 14.8 | 2.8 | 18.1 |
| 9 | 4.8 | 13.5 | 2.8 | 17.4 |
| 10 | 4.8 | 13.9 | 1.7 | 17.1 |

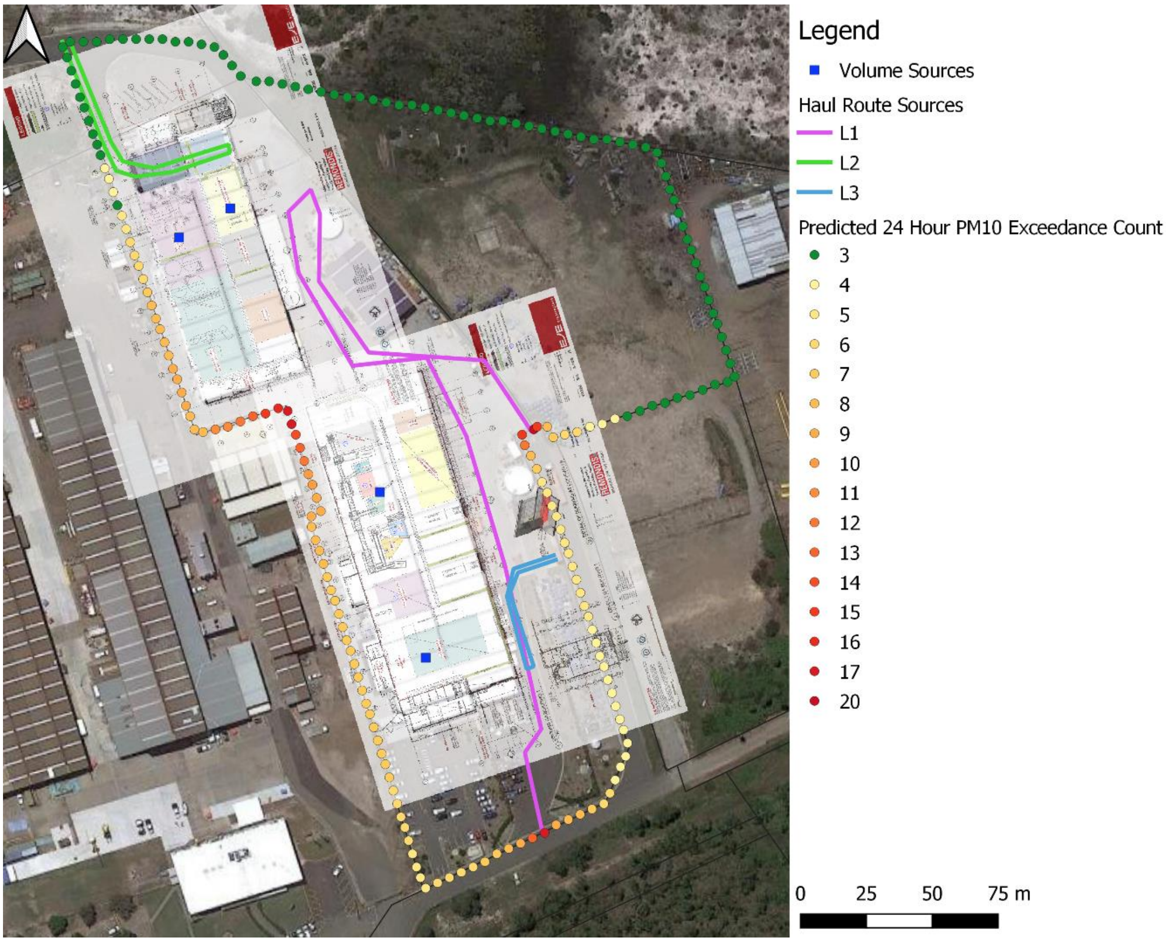



**Figure 2: Predicted Boundary Receptor $PM_{10}$ 24 Hour Exceedances**

The results show predicted compliance with the air quality criteria for all pollutants at the nearest sensitive receptors and site boundary, except for $PM_{10}$ 24-hour. For $PM_{10}$, there are no additional exceedences at the nearest off-site sensitive receptors, however, with the proposed development, the number of exceedences increases to up to 20 along the site boundary. Review of the data indicates that these exceedences are primarily due to truck movements over paved surfaces.

The modelling assumes peak daily truck movements every day of the year. Peak daily movements are estimated to be 1.5 times the average daily movements. Therefore, the 20 exceedences (or additional 17) predicted at the boundary are due to the peak daily truck movements coinciding with worst-case meteorology (easterly wind conditions). The potential for additional exceedences are expected to be lower when accounting for average daily truck movements.

The modelling already considers best practice measures for the truck routes including paved surfaces with a low silt loading content (indicating a well maintained paved surface). The most appropriate means (in addition to paved surfaces) to address potential exeedences is to utilise water sprays or a water truck when there are visible plumes of dust dispersing towards the nearest industrial buildings. This management measure can be incorporated into procedures of any operational management plan developed for the site.

# 3. Conclusions

Based on the additional review undertaken in response to the NSW information request, the following key points are summarised below:

- Revised modelling has been undertaken for a representative meteorological year with representative background data (year 2017), and also take into account nearby industrial buildings (close to the western boundary of the site) and potential air emission reductions from on-site controls (i.e. building enclosures and odour control system).
- The risk of air quality impacts for key pollutants (particulates, VOCs and odour) is low and within acceptable levels at both nearby industrial receptors and off-site residential/community receptors.
- To minimise potential benzene emissions from bulk tanker loading of waste oil, it is recommended that a passive activated carbon system is installed, such that any head space air from tankers must pass through the system prior to release to atmosphere.
- To minimise particulate impacts on the adjoining industrial uses, water sprays or water trucks should be deployed along the haul routes during windy conditions when there is a visible plume of dust dispersing toward the neighbouring industrial uses.
- Detailed design of the proposed odour control system at the food depackaging building has not been undertaken at the current development approval phase of the proposed facility. To provide the NSW EPA with certainty as to the type of system installed, an approval condition could be placed on the site requiring further design details of the control system to be provided to the NSW EPA for approval, prior to commencement of operations. Example details of a potential system with an expected odour reduction efficiency is provide in Section 9 of the AQIA.

Yours faithfully

**Trinity Consultants Australia**

Samuel Wong
Environmental Manager

# Appendix A – Comparison of Measured Wind Roses 2015 to 2019

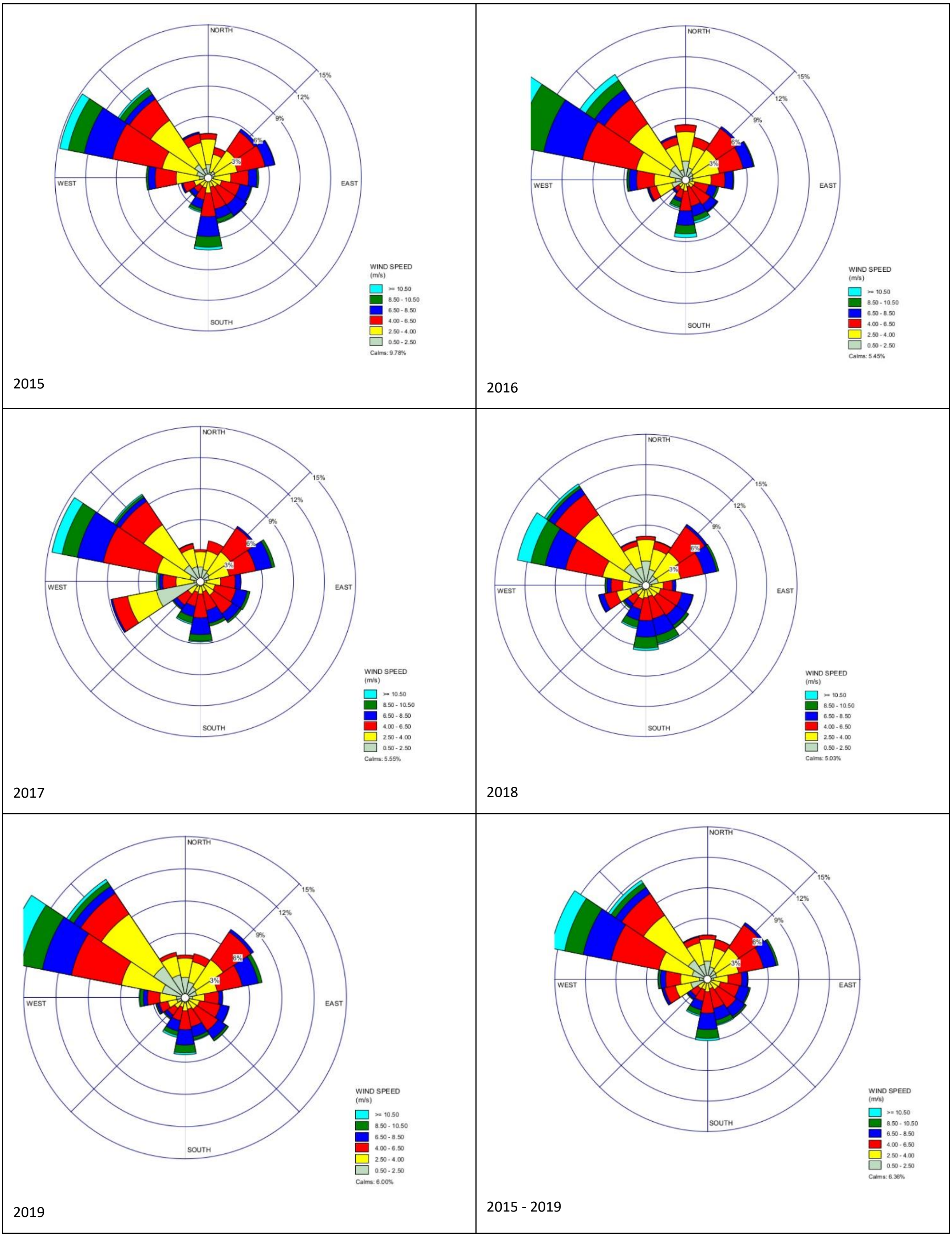



**Figure A1: 2015-2019 Measured Wind Roses - Williamstown**

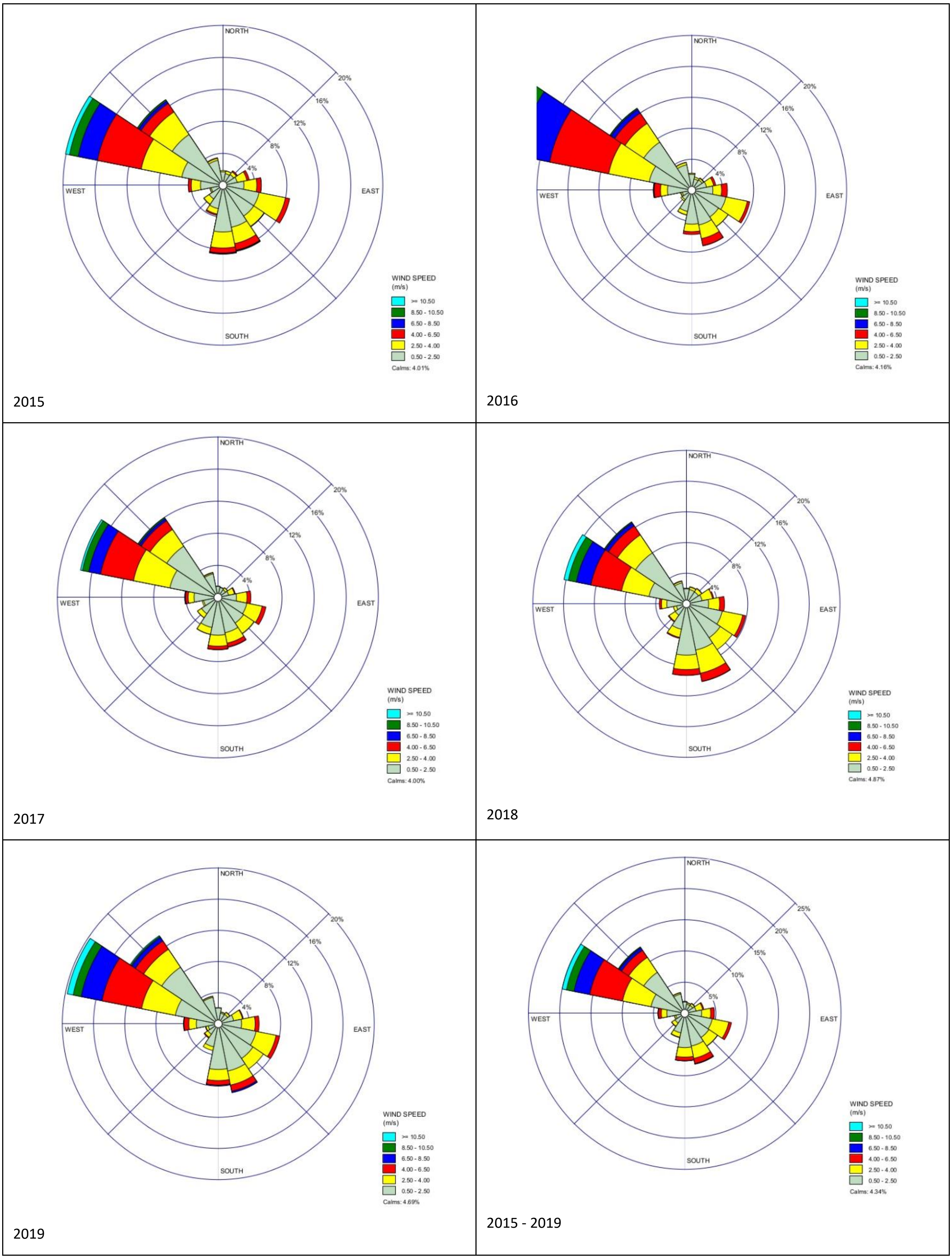



**Figure A2: 2015-2019 Measured Wind Roses - Beresfield**

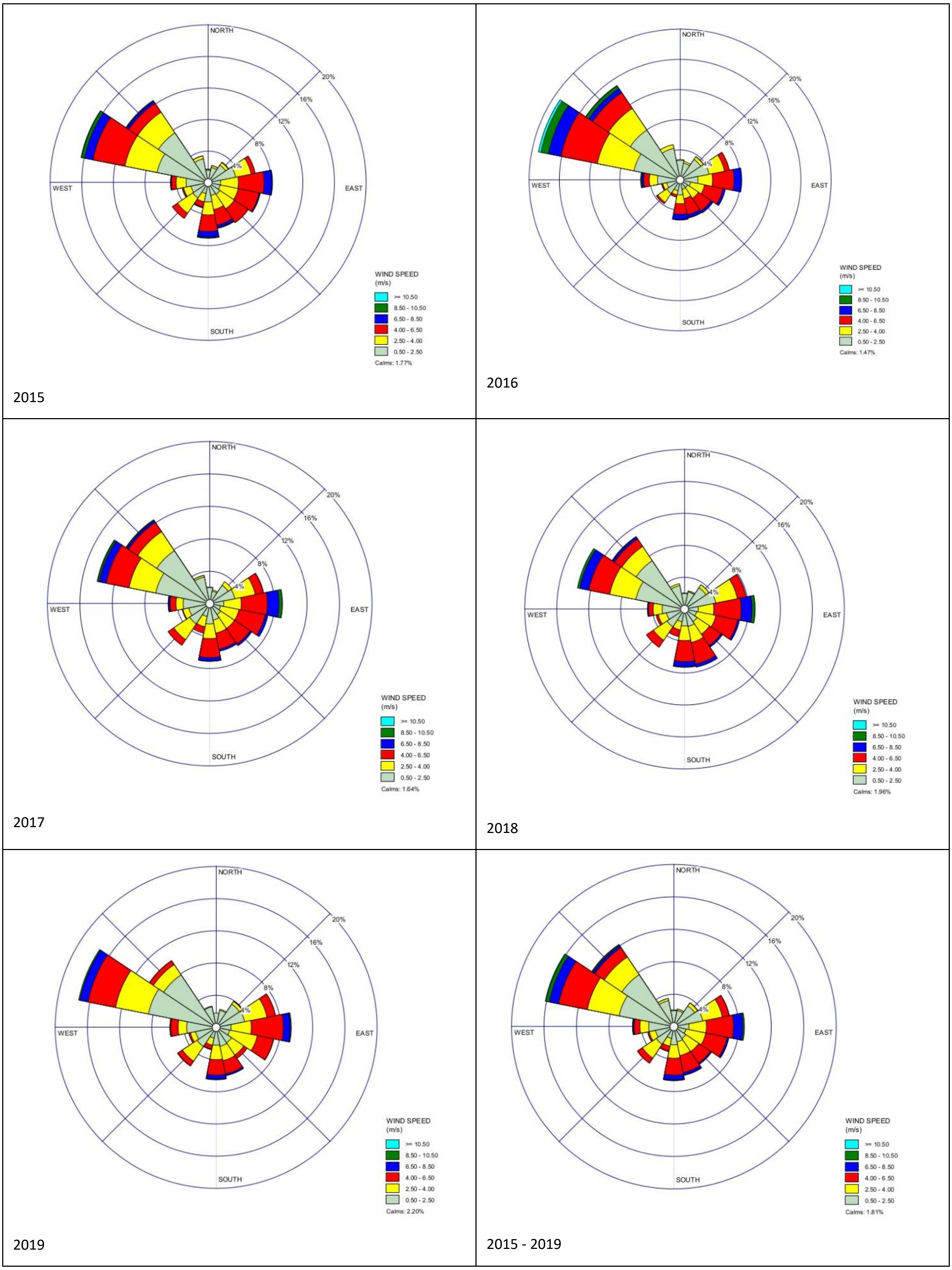



**Figure A3: 2015-2019 Measured Wind Roses - Mayfield**

# Appendix B - Revised Meteorological Modelling Results

As previously discussed, revised meteorological modelling was undertaken for 2017 as the background data for 2017 provided a more realistic data set in relation to particulate concentrations. Also as discussed, the 2017 year is considered representative of typical meteorology.

Presented in Figure B1 – Figure B2 are the measured and predicted wind roses for Williamstown RAAF, Beresfield and Mayfield.

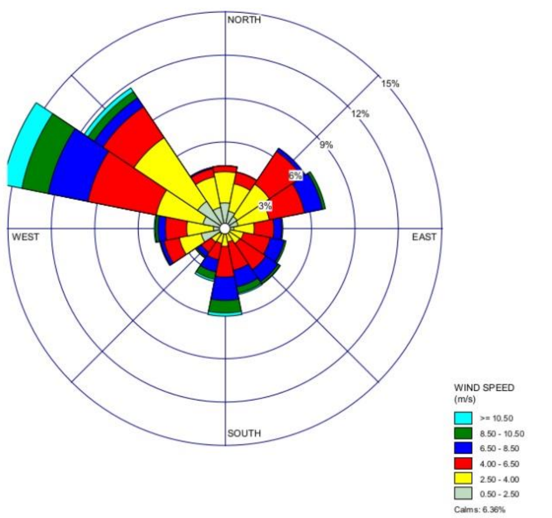
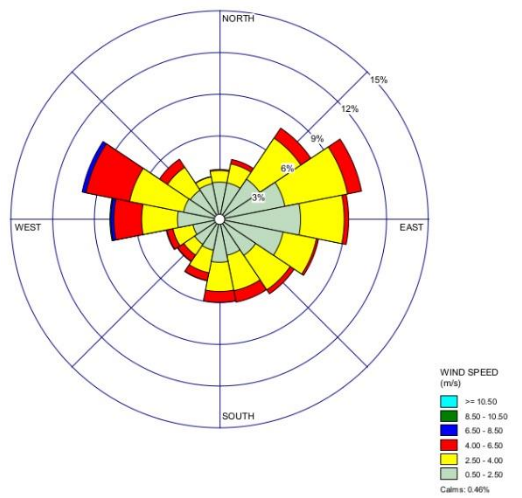
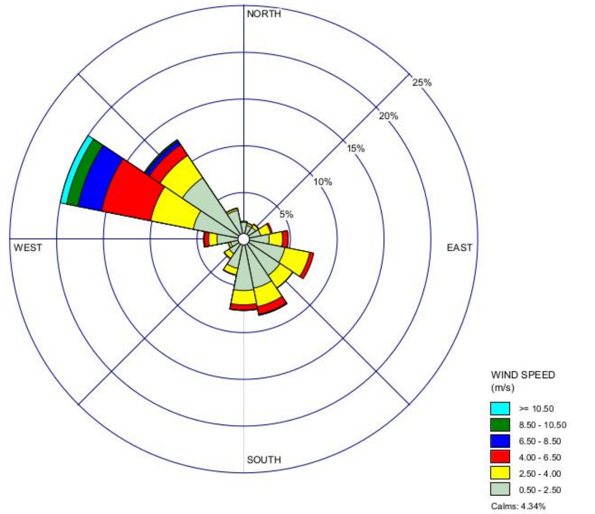
| | |
|---|---|
|  |  |
| Williamstown RAAF Measured Wind Rose (2015 – 2019) | Williamstown RAAF CALMET Predicted Wind Rose (2017) |

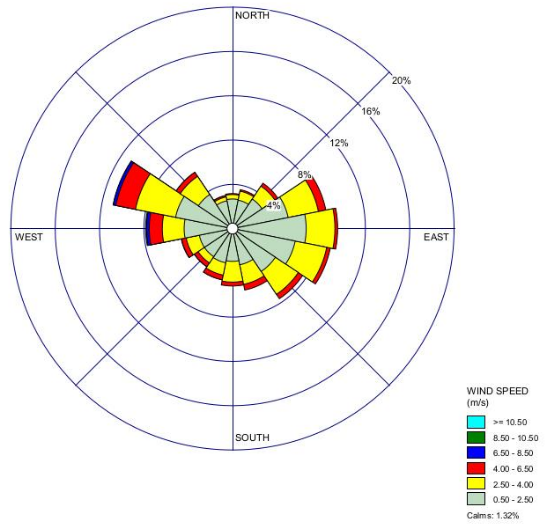




**Figure B1: Williamstown RAAF Measured and Predicted Wind Roses**

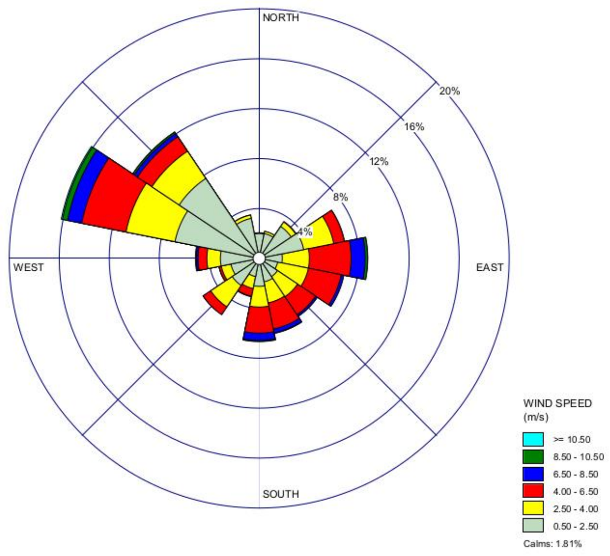



Beresfield Measured Wind Rose (2015 – 2019)

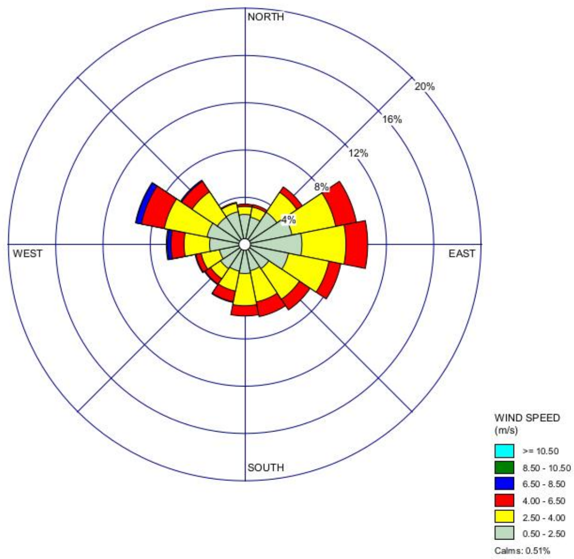



Beresfield CALMET Predicted Wind Rose (2017)

**Figure B4: Beresfield Measured and Predicted Wind Roses**




Mayfield Measured Wind Rose (2015 – 2019)




Mayfield CALMET Predicted Wind Rose (2017)

**Figure B5: Mayfield Measured and Predicted Wind Roses**

As with the 2019 CALMET predicted wind roses present in the Air Quality Impact Assessment, the 2017 wind roses reflect the north westerly flows to a different extent. Similarly, to the 2019 predictions, easterly flows are over represented by the CALMET model.

A comparison of the measured and predicted wind speed is presented in Table B1.

**Table B1: Comparison of Measured and Predicted Wind Speeds**

| Category (m/s) | Mayfield | | Beresfield | | Williamstown RAAF | |
|---|---|---|---|---|---|---|
| | Measured | Predicted | Measured | Predicted | Measured | Predicted |
| 0.5 – 2.5 | 47.3% | 46.8% | 55.3% | 62.1% | 15.4% | 50.1% |
| 2.5 – 4.0 | 24.8% | 36.5% | 21.2% | 28.0% | 29.4% | 36.6% |
| 4.0 – 6.5 | 20.1% | 15.0% | 10.1% | 7.9% | 28.4% | 12.2% |
| 6.5 – 8.5 | 4.1% | 1.1% | 3.2% | 0.6% | 12.5% | 0.6% |
| 8.5 – 10.5 | 0.9% | 0.1% | 1.4% | 0.1% | 5.1% | 0.1% |
| >= 10.5 | 0.2% | 0.0% | 0.8% | 0.0% | 2.3% | 0.0% |
| Calms | 1.8% | 0.5% | 4.3% | 1.3% | 6.4% | 0.5% |

Wind speeds are over predicted for the 0.5 – 2.5 m/s category at Williamstown RAAF by a significant margin and to a lesser extent at Beresfield. At Mayfield, the 0.5 – 2.5 m/s category is similar between predicted and measured data sets (difference of 0.5%). However, the combined 0.5 - 4.0 m/s is over-represented by 10% (72.1% measured and 83.3% predicted) indicating low to moderate wind speeds are over-represented at Mayfield. As previously noted in the Air Quality Impact Assessment, the over prediction of low wind speeds feature of the model has a potential to result in conservative pollutant concentrations. In relation to calms, calm conditions are slightly under represented for all stations. It is noted that calms are a minor feature of the area with the measured proportion of calm conditions being less than 1.8% to 6.4% across the stations.

Figure B6– Figure B9 present the CALMET site predicted wind rose, atmospheric stability class, mixing height and temperature. The predicted site conditions are noted to be similar to those predicted for the site for 2019 as presented in the Air Quality Impact Assessment.

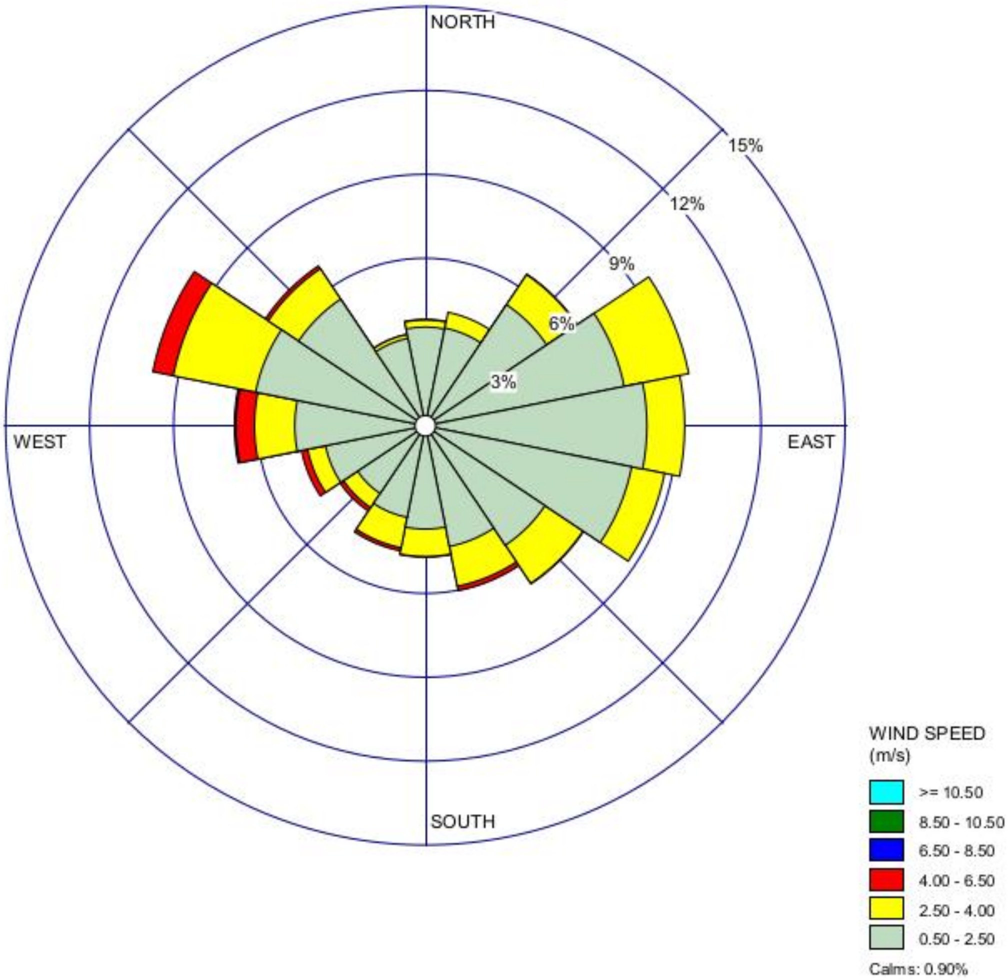



**Figure B6: CALMET Site Predicted Wind Rose**

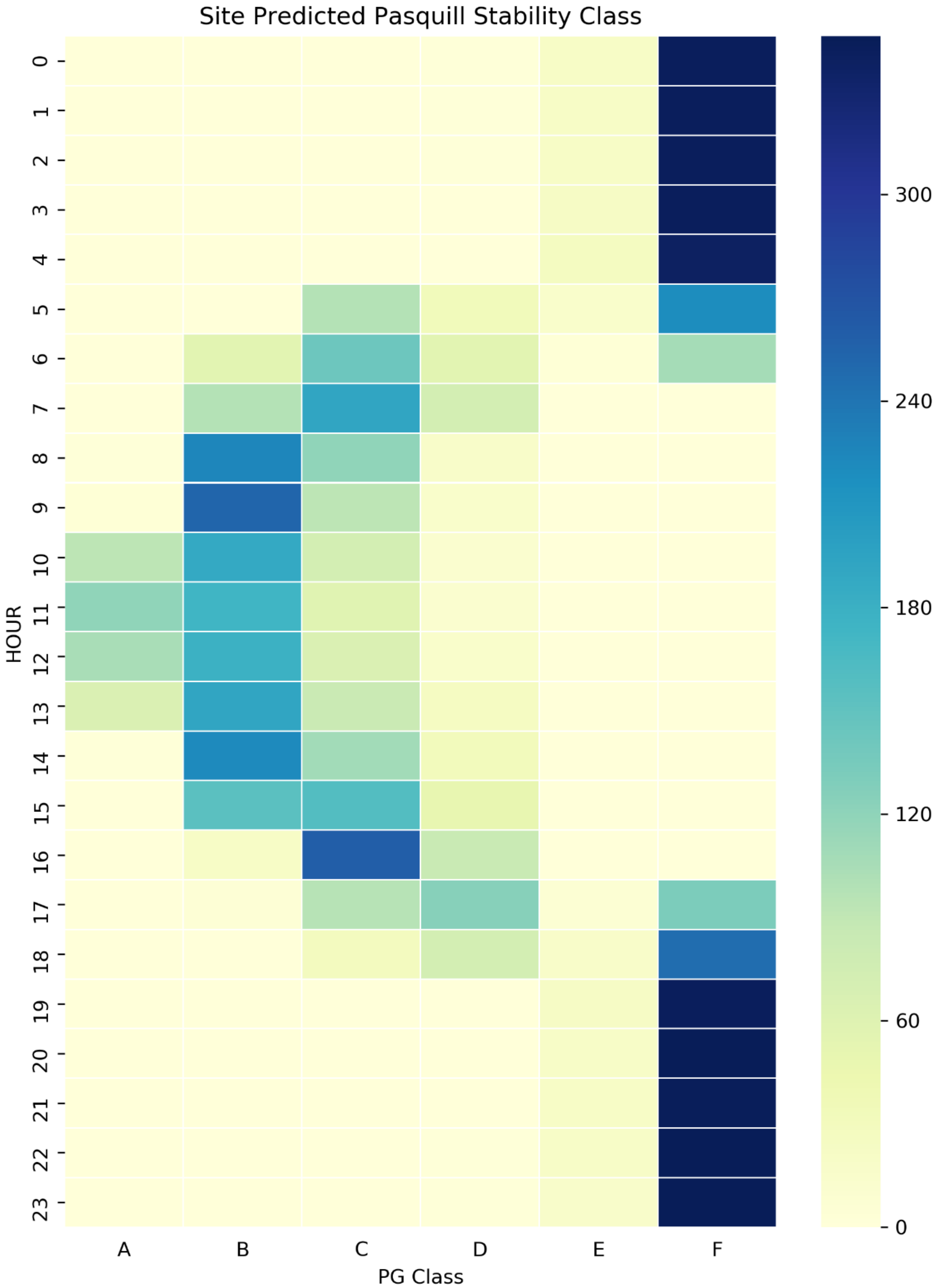



**Figure B7: CALMET Site Predicted Stability Class**

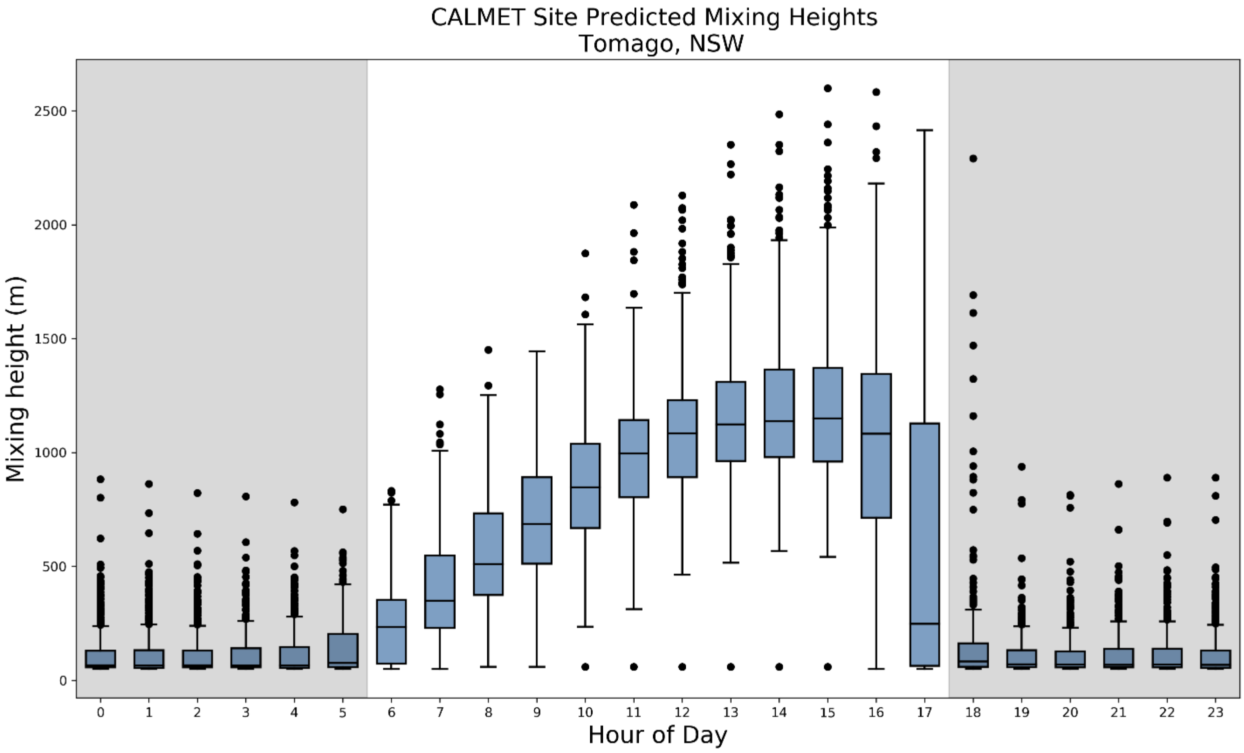



**Figure B8: CALMET Site Predicted Mixing Heights**

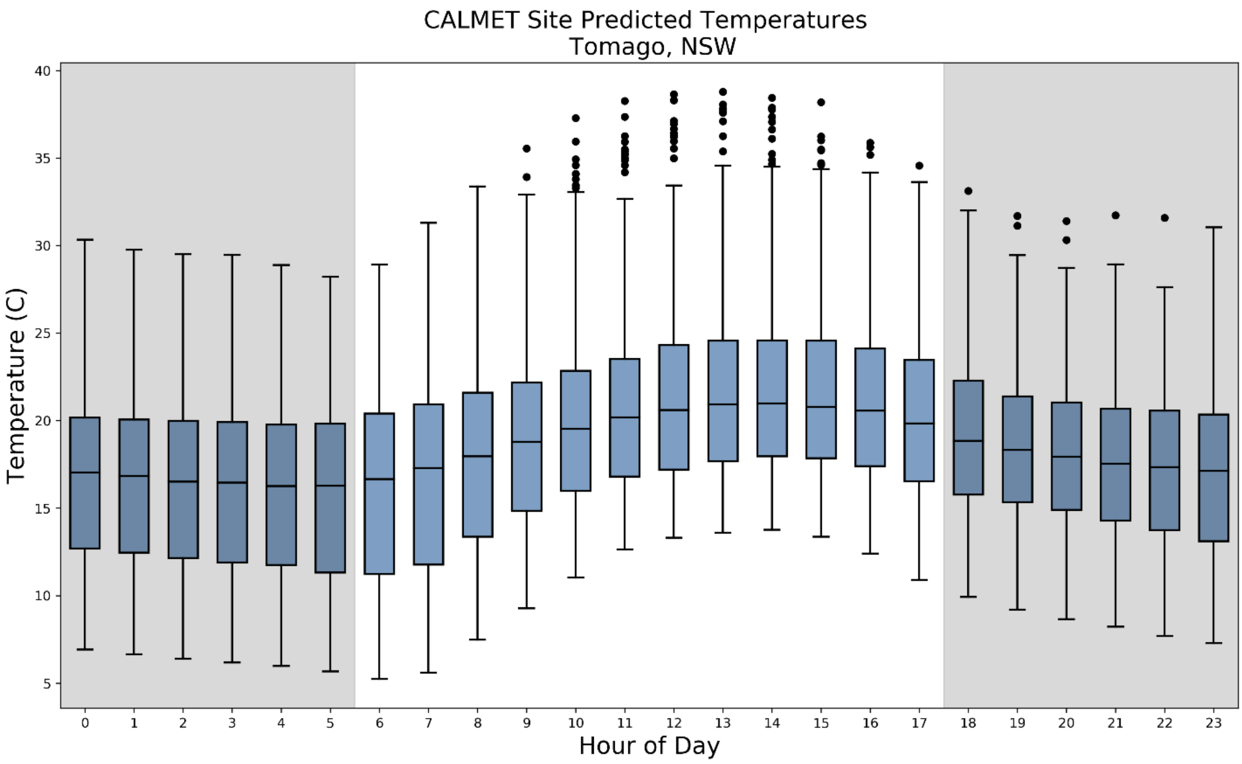



**Figure B9: CALMET Site Predicted Temperature**

Overall, predicted wind conditions are considered appropriate for the assessment of potential air quality impacts from the proposed development.

# Appendix C - Ground Level Concentration Plots

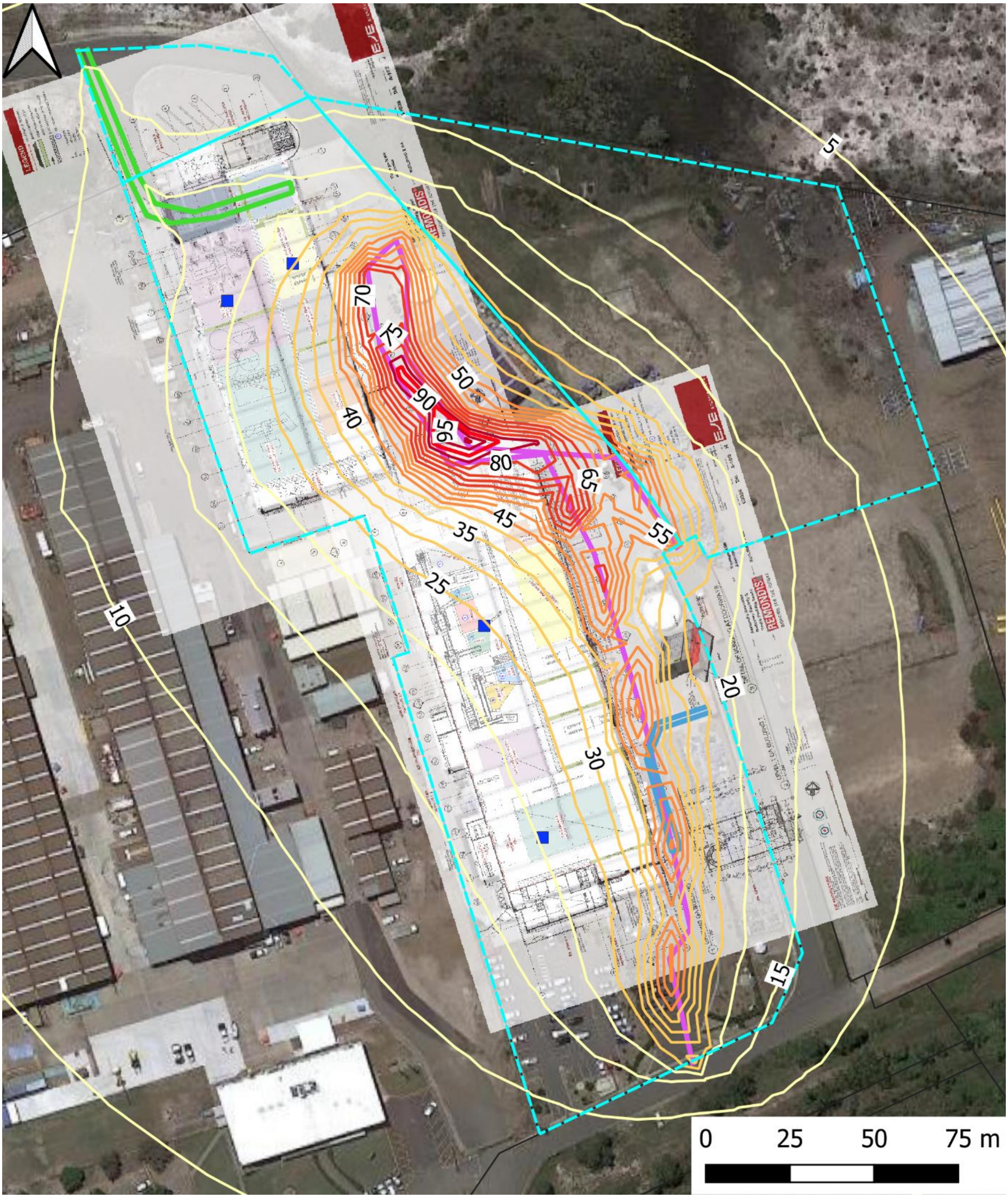



**Figure C110: Predicted Ground Level Source Only Annual TSP concentrations**

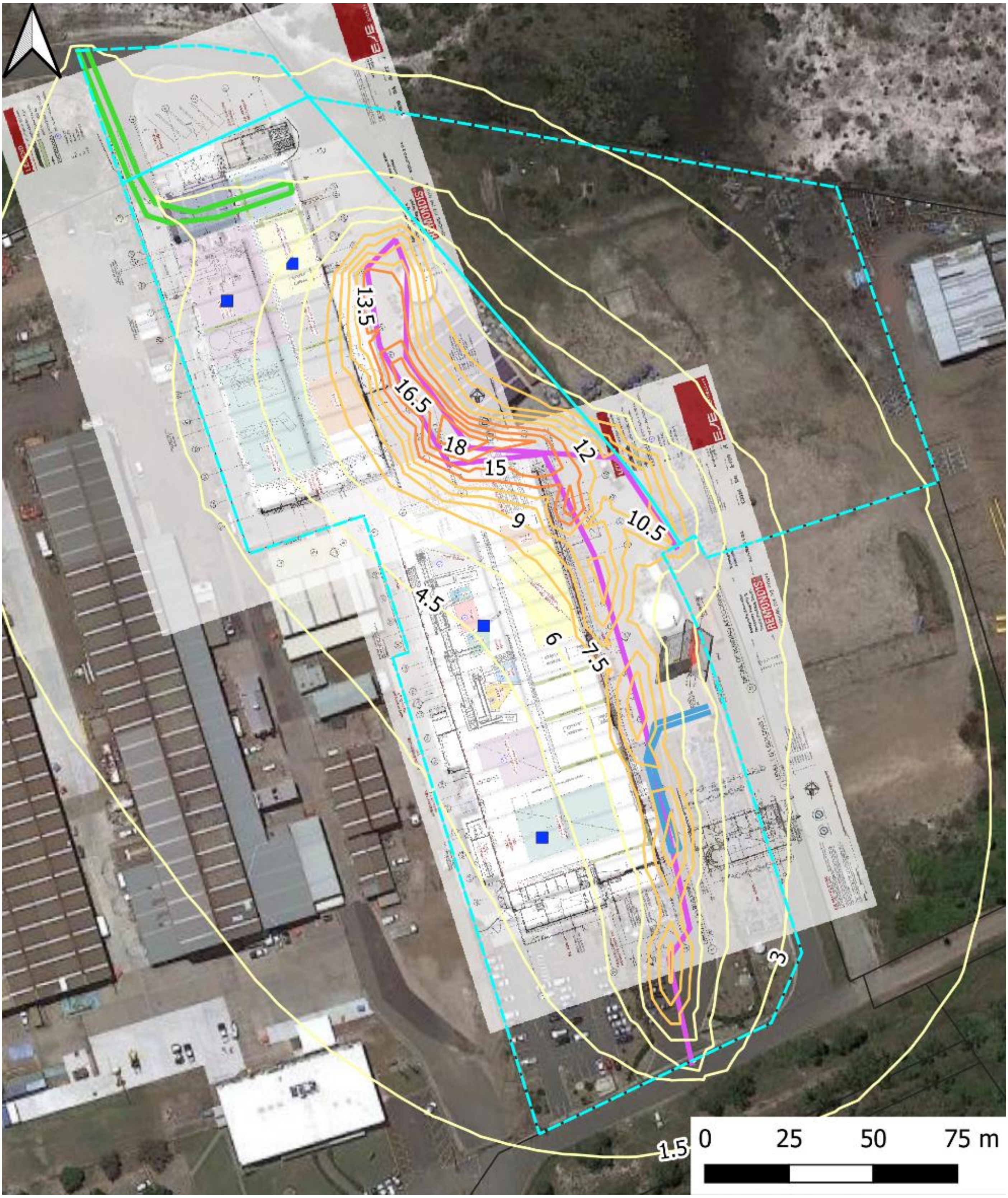



**Figure C211: Predicted Ground Level Source Only Annual $PM_{10}$ concentrations**

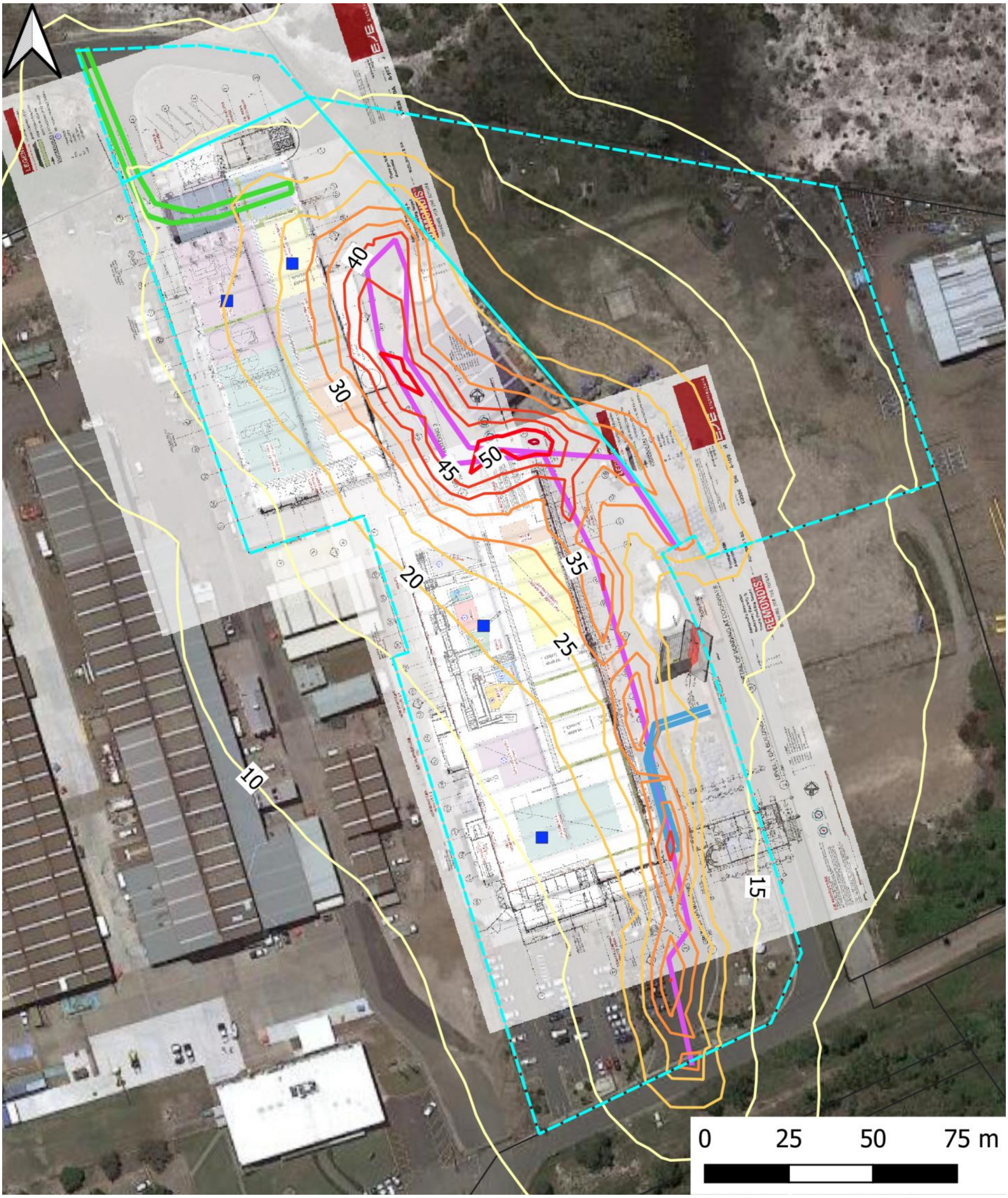



**Figure C312: Predicted Ground Level Source Only 24 Hour $PM_{10}$ concentrations**

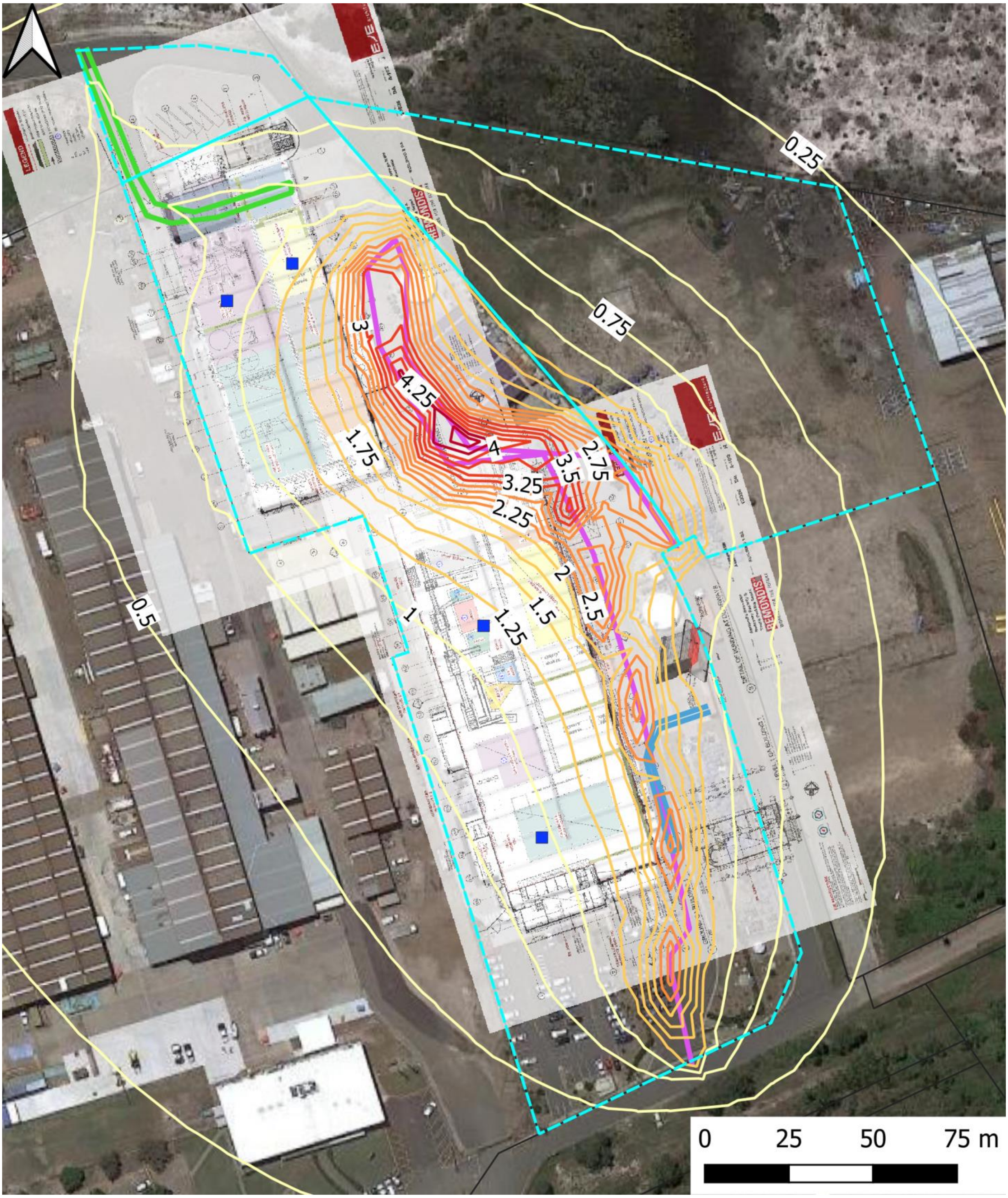



**Figure C413: Predicted Ground Level Source Only Annual $PM_{2.5}$ concentrations**

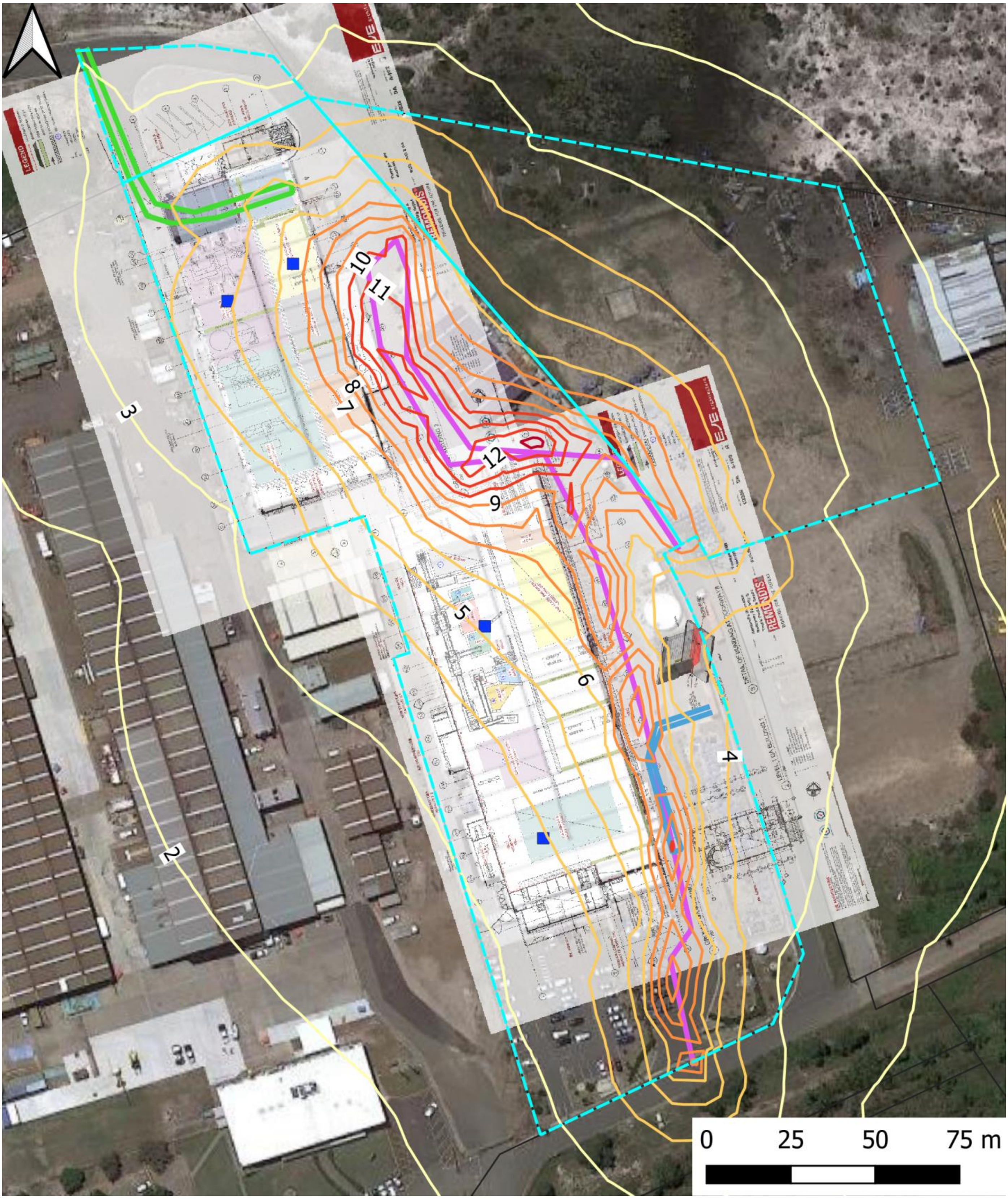



**Figure C514: Predicted Ground Level Source Only 24 Hour $PM_{2.5}$ concentrations**

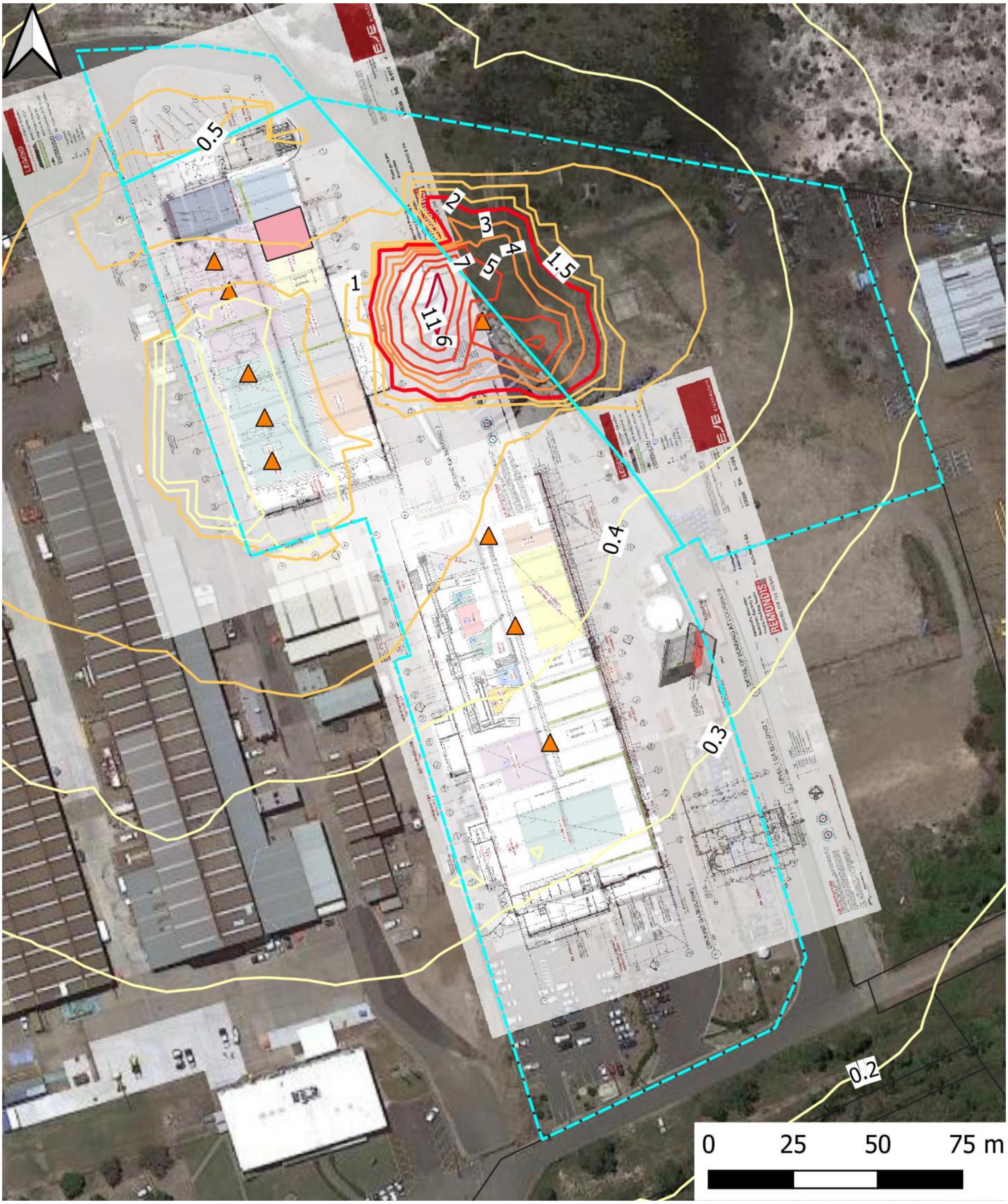



**Figure C615: Predicted Ground Level Source Only Peak 1 Hour Odour concentrations, 99$^{th}$ Percentile**

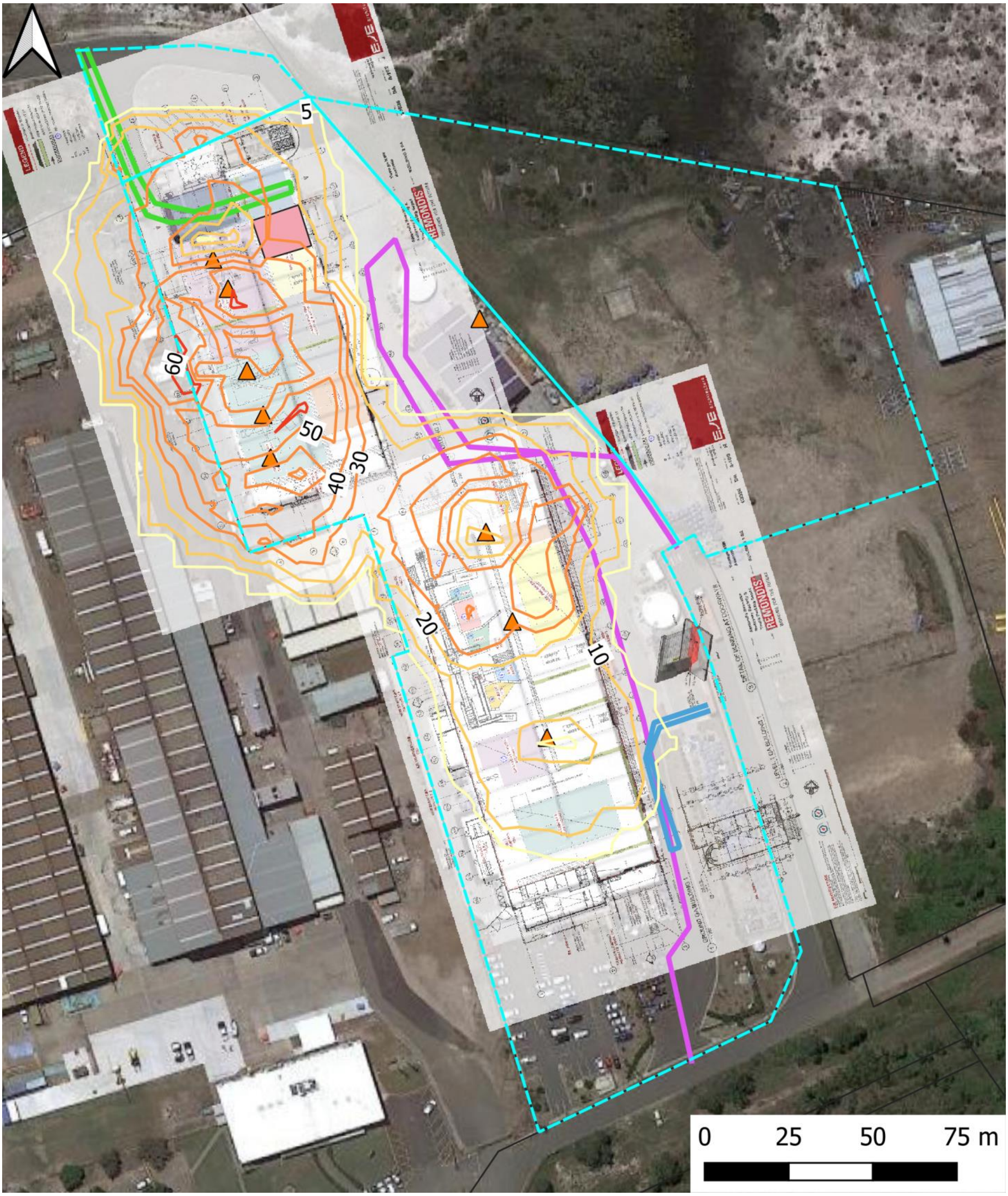



Figure C716: Predicted Ground Level Source Only 1 Hour $SO_2$ concentrations

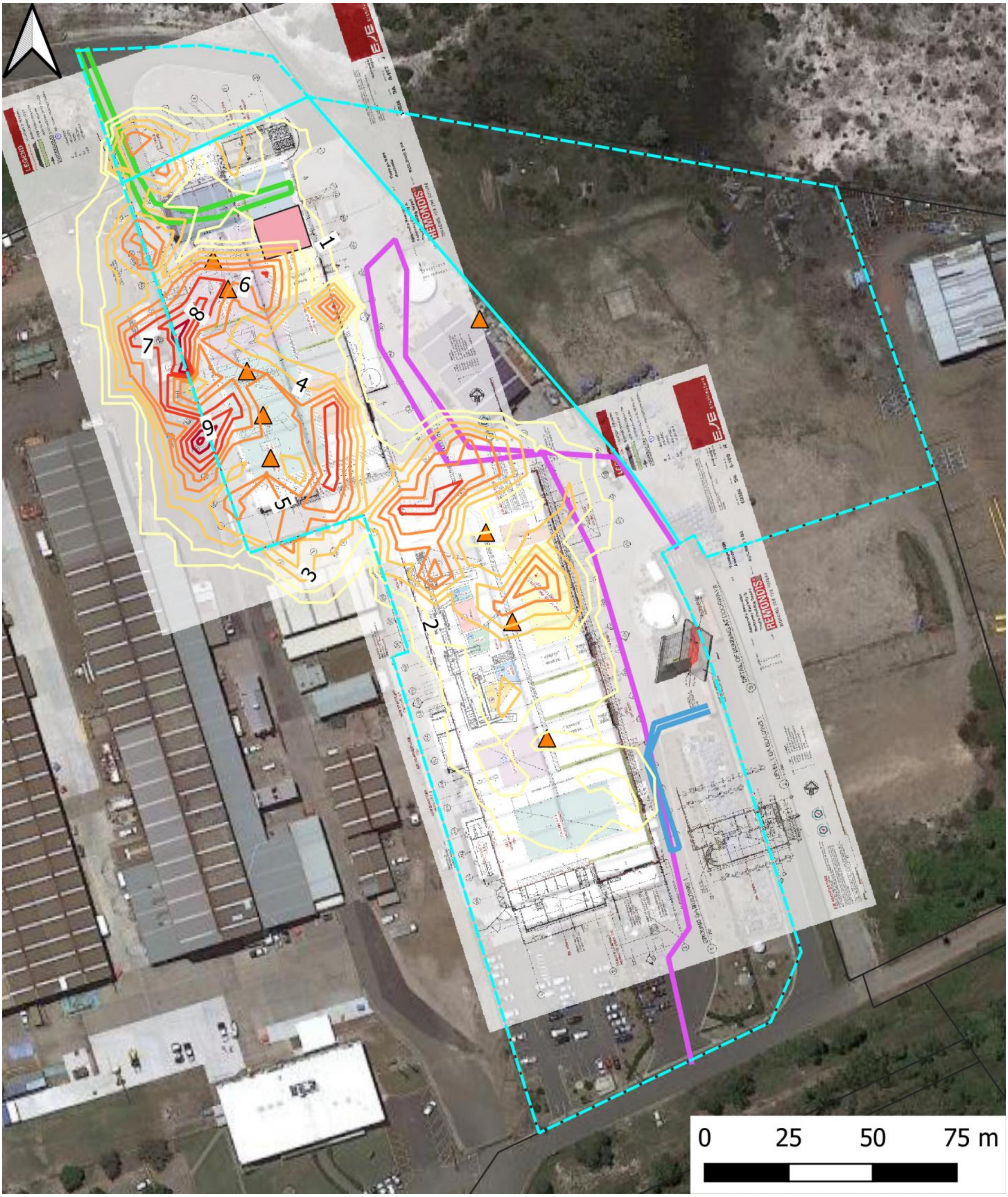



**Figure C817: Predicted Ground Level Source Only 24 Hour $SO_2$ concentrations**

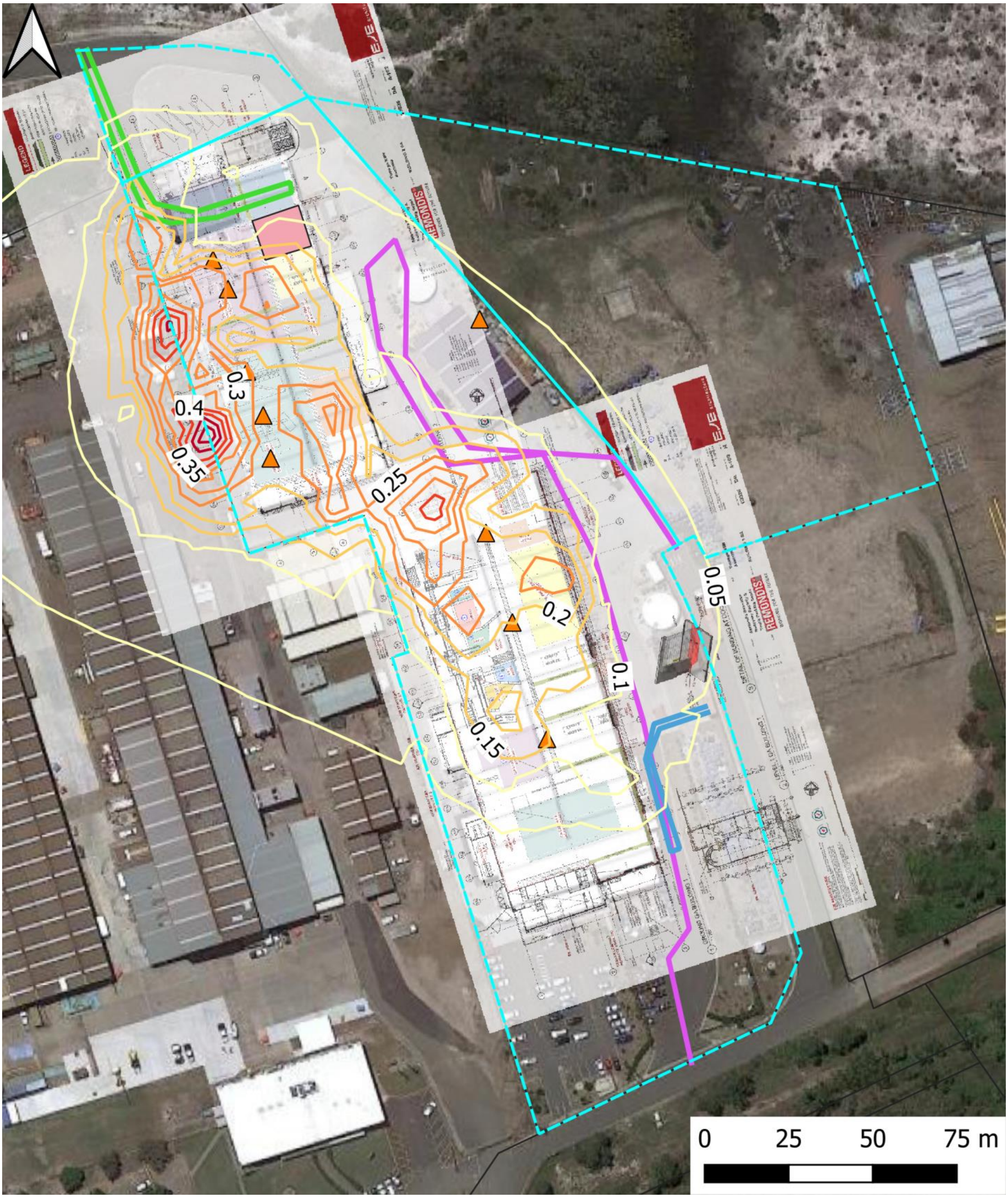



**Figure C918: Predicted Ground Level Source Only Annual $SO_2$ concentrations**

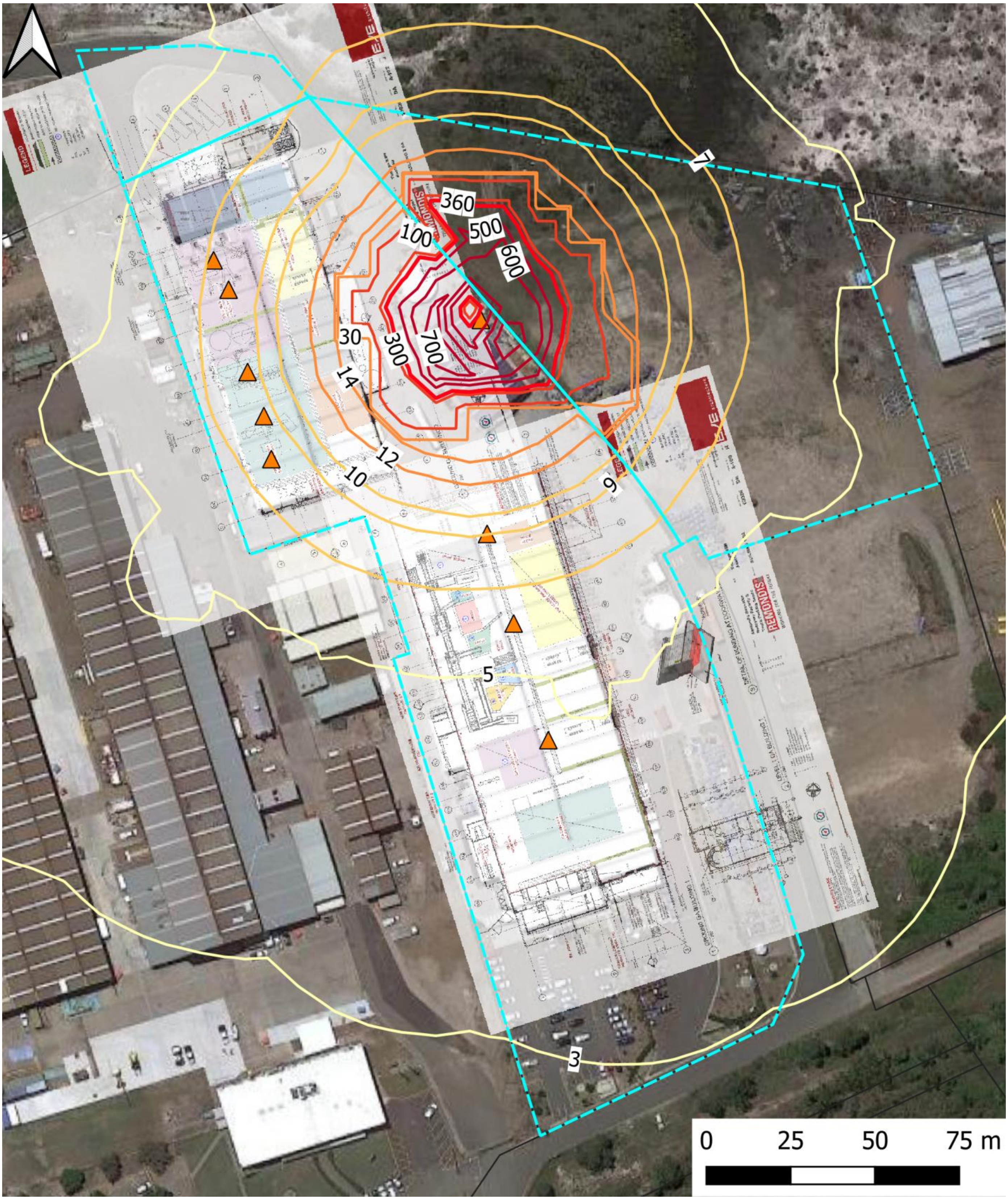



**Figure C1019: Predicted Ground Level Source Only 1 Hour Toluene concentrations**

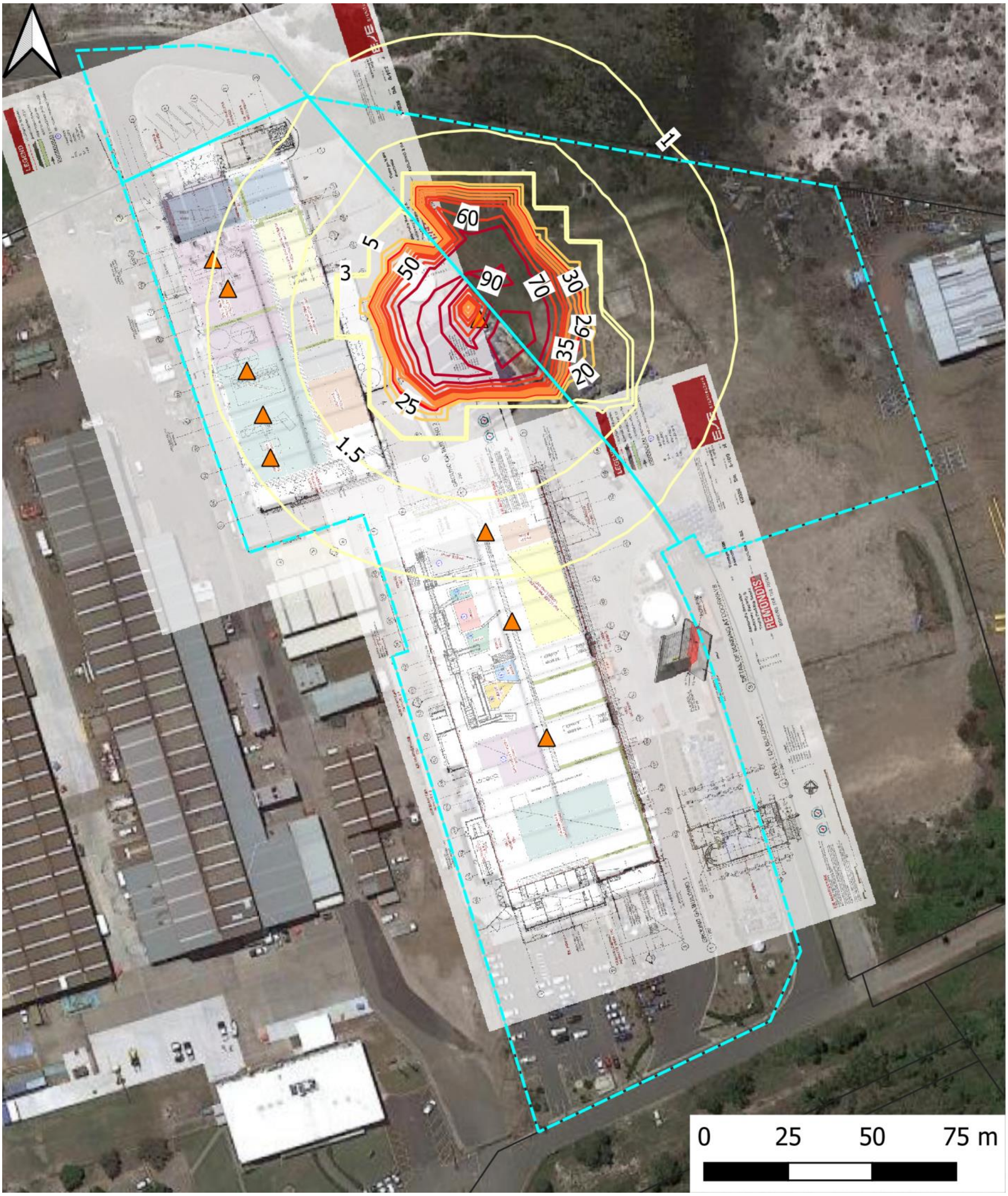



**Figure C1120: Predicted Ground Level Source Only 1 Hour Benzene concentrations**

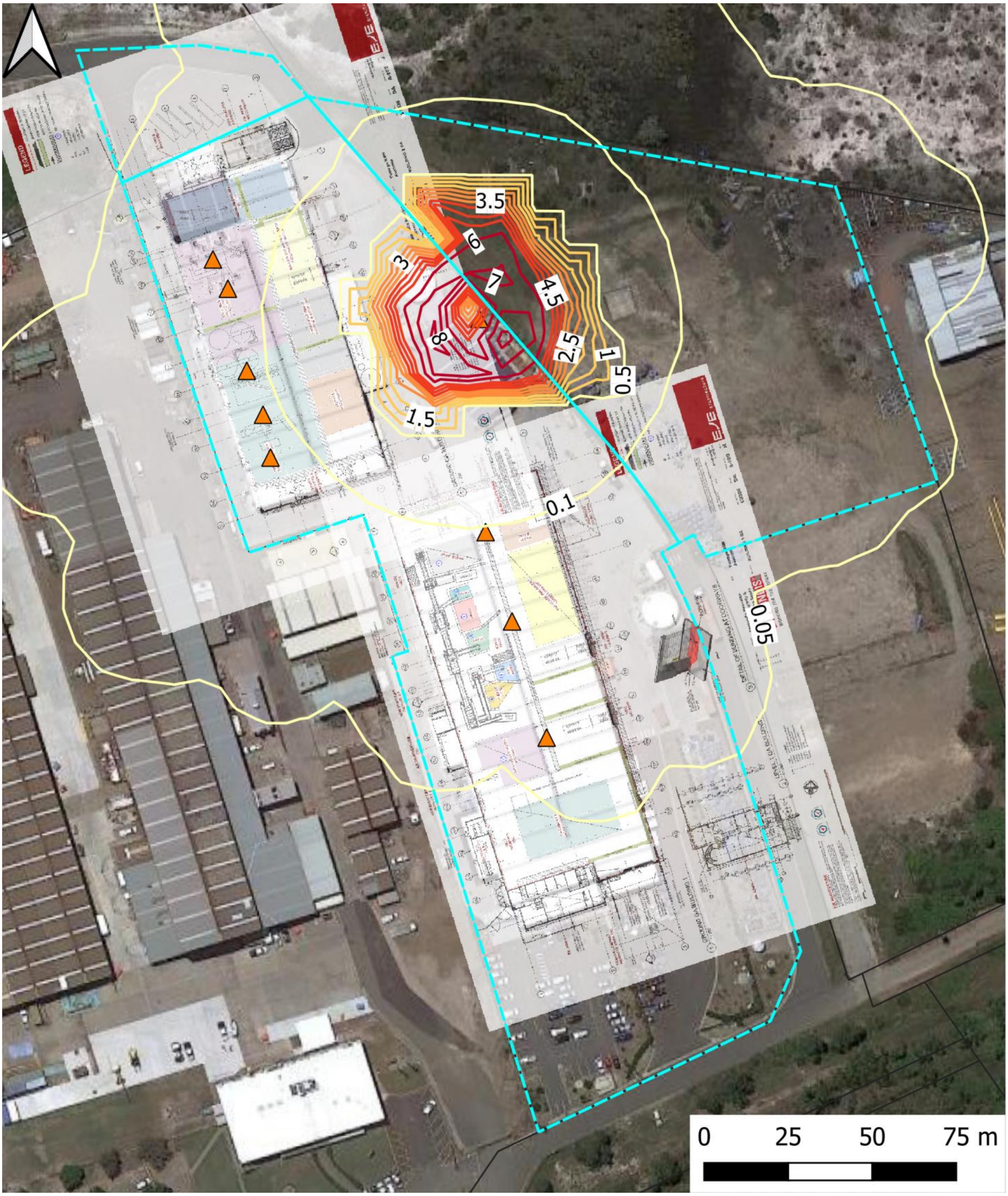



**Figure C1221: Predicted Ground Level Source Only 1 Hour Cumene concentrations**

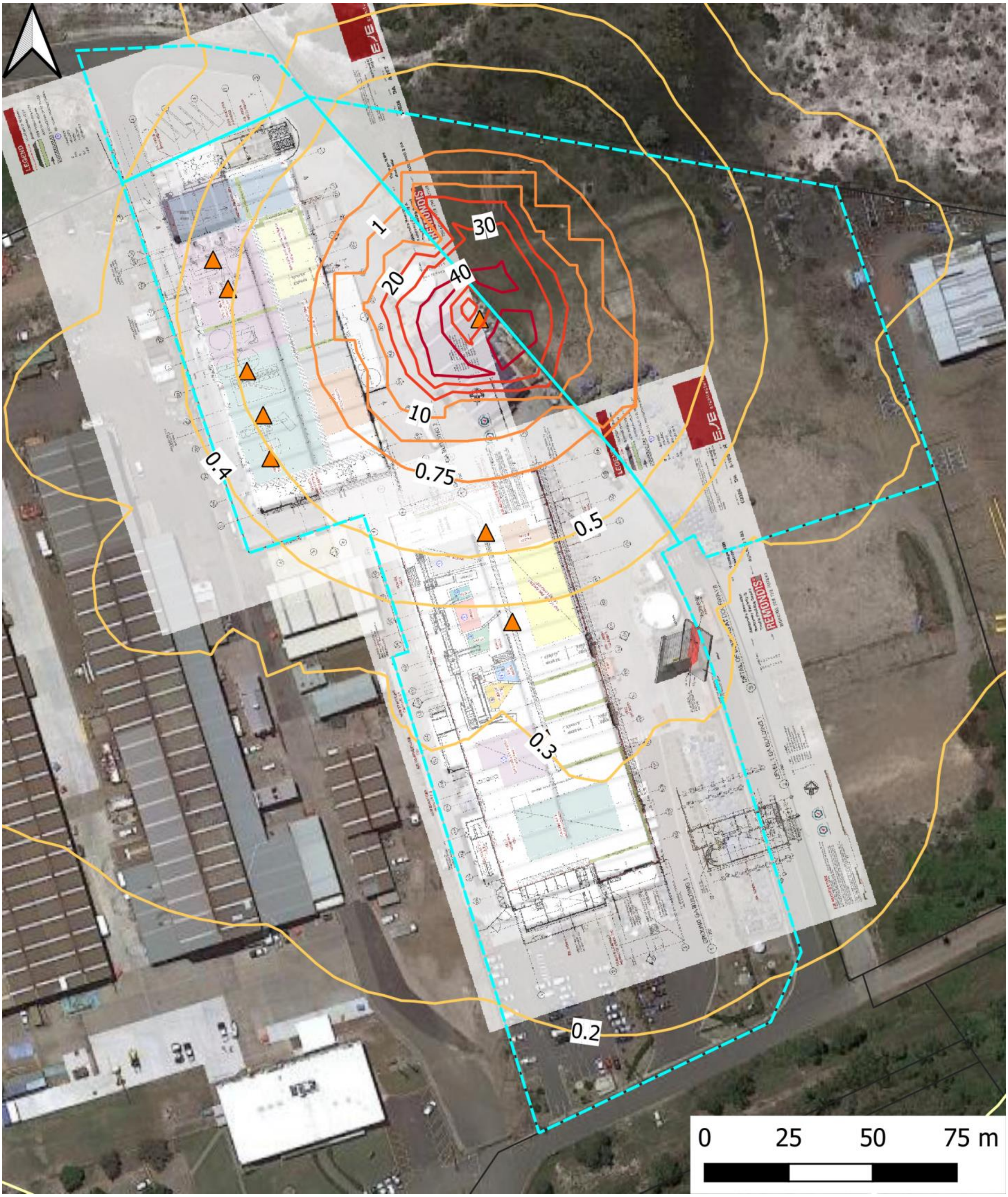



**Figure C1322: Predicted Ground Level Source Only 1 Hour Ethylbenzene concentrations**

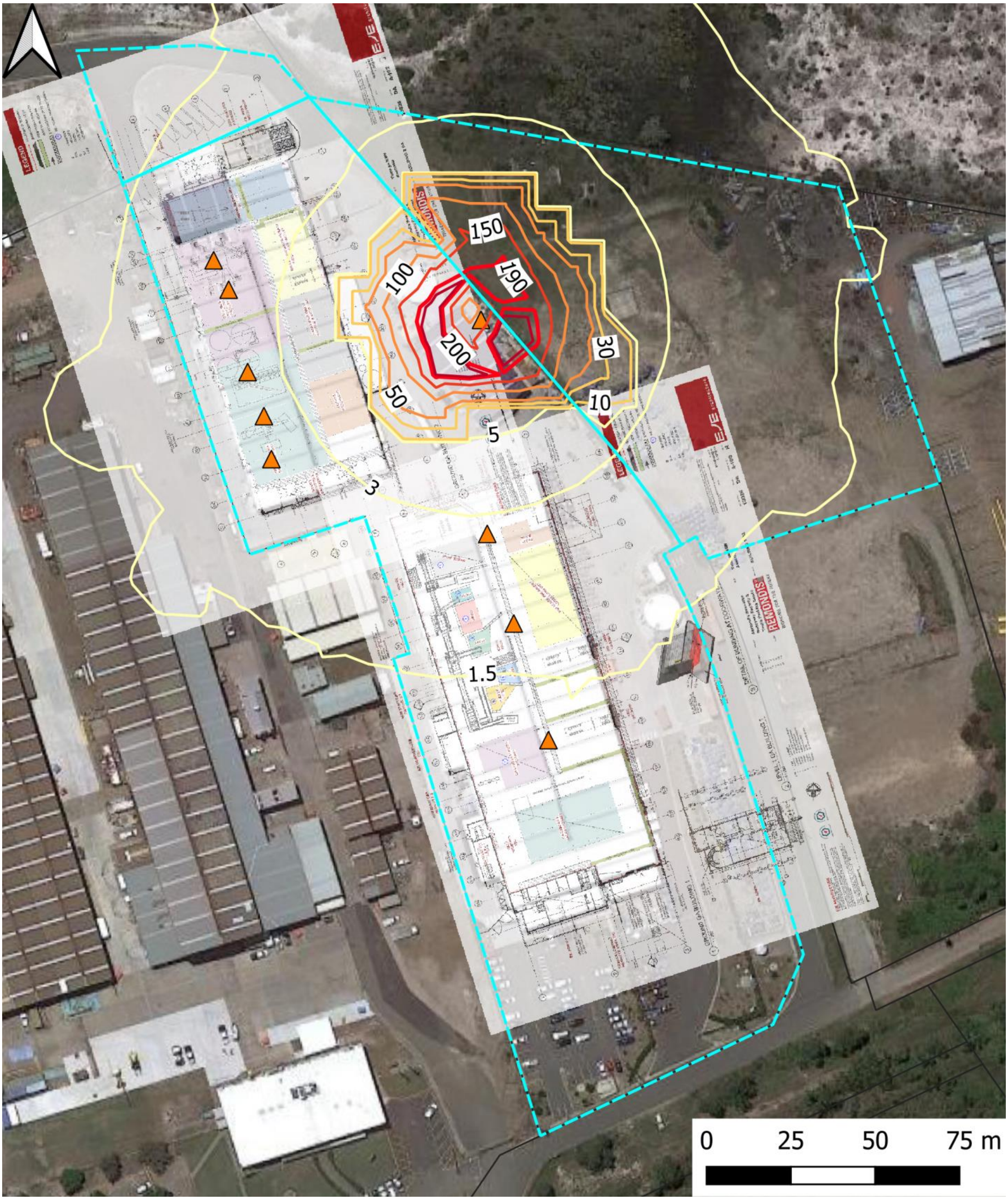



**Figure C1423: Predicted Ground Level Source Only 1 Hour Xylene concentrations**

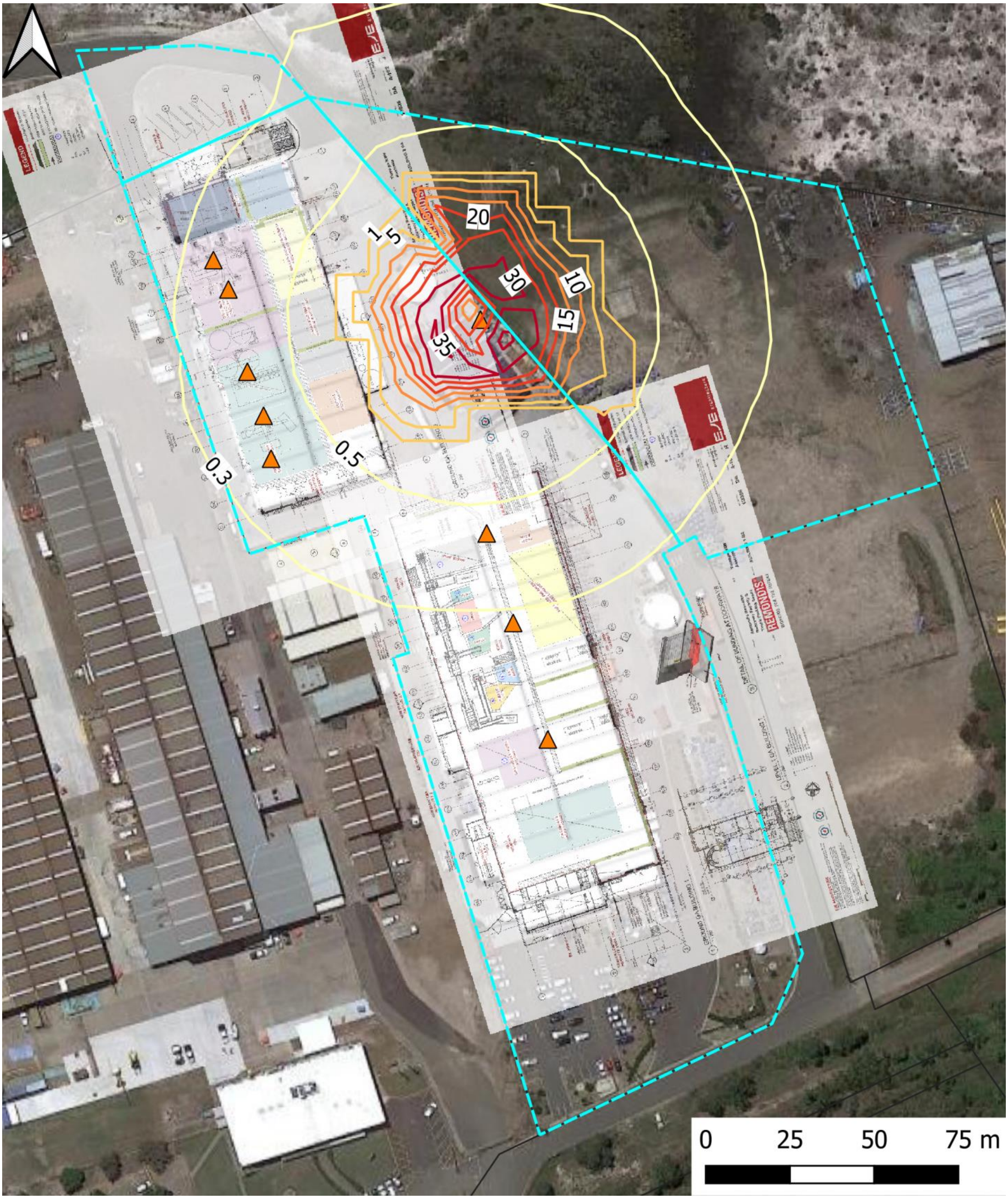



**Figure C1524: Predicted Ground Level Source Only 1 Hour Trimethylbenzene concentrations**