

Local Air Quality Report Ambient Air Monitoring in Unity

June 18 to August 12, 2020

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1.0 INTRODUCTION

On June 16, 2020, the Ministry of Environment set up the Mobile Air Quality Station (MAQS) in the Town of Unity due to the number of industrial operations in the area and to supplement ambient air quality monitoring that has previously been performed by the ministry. Information obtained from the MAQS will also help in air zone evaluation.

The station collected air monitoring data from June 18 to August 12, 2020. During this time, average readings for all pollutants measured were low, and considered typical for an urban setting with low risk to human health and the environment.

2.0 MONITORING METHODOLOGY

2.1 Station Location

The MAQS was set up in the northeast area of Unity, as shown in Figure 1. The location was chosen for site and power accessibility, and equipment security. The location also meets the requirements of the ministry's ambient air monitoring guideline as it relates to siting criteria.

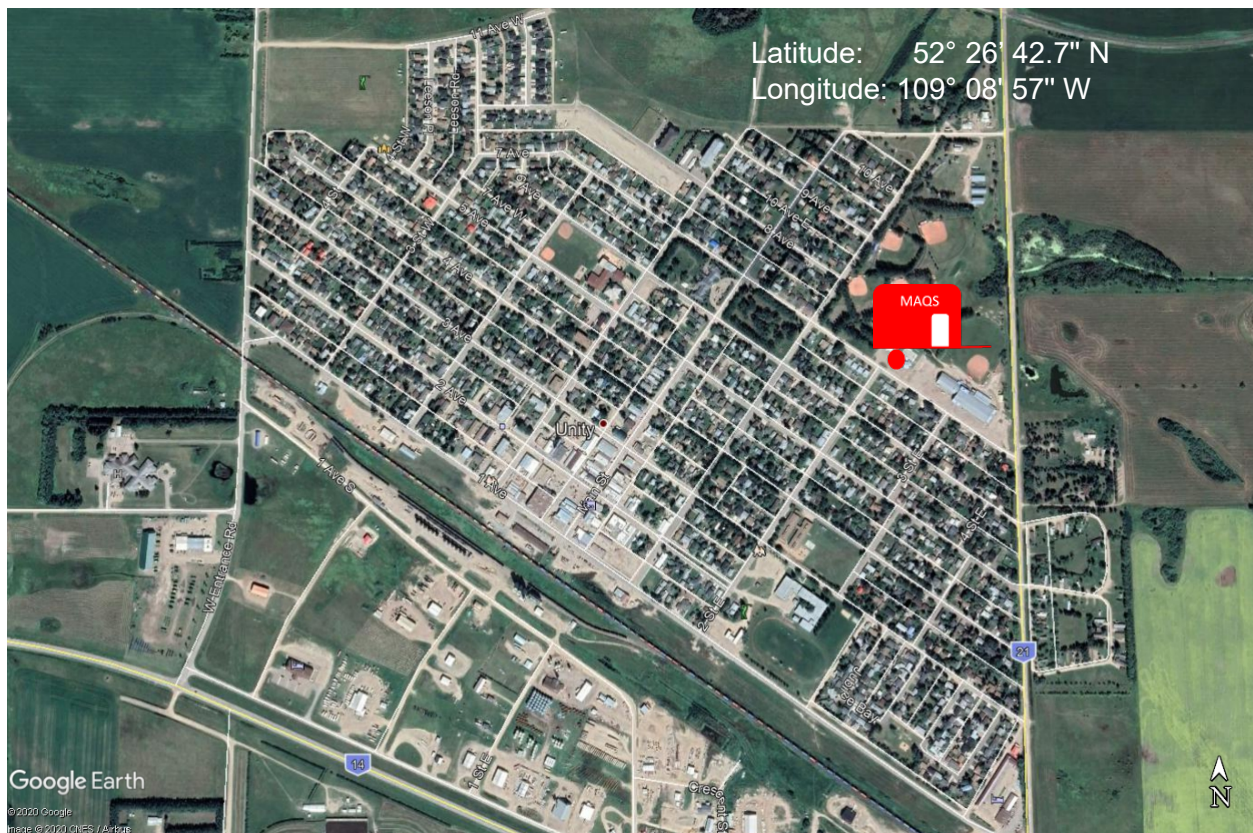


Figure 1 – MAQS Location in Unity

2.2 Parameters and Monitoring Equipment

Air contaminant concentrations were measured with the equipment listed in Table 1, below. All analyzers used in the MAQS meet the United States Environmental Protection Agency Federal Equivalent Methodology (USEPA FEM) requirements for ambient air quality monitoring. The USEPA FEM requirements are used by jurisdictions across Canada to ensure ambient air quality data is scientifically-defensible and comparable.

Table 1 – Parameters and Ambient Air Sampling Equipment Used

Parameter	Analyzer Type
Sulphur Dioxide (SO ₂)	Teledyne T100
Hydrogen Sulphide (H ₂ S)	Teledyne T101
Nitrogen Oxides (NO-NO ₂ -NO _x)	Thermo Environmental 42i
Ozone (O ₃)	Teledyne T100
Carbon Monoxide (CO)	Thermo Environmental 48i
Fine Particulate Matter (PM _{2.5}), Course Particulate Matter (PM ₁₀)	Teledyne T640
Hydrocarbons (methane/non-methane)	Thermo Environmental 55i
Benzene, Toluene, Ethylbenzene, Xylene	AirToxic GC866
Wind Direction, Wind Speed, Temperature, Relative Humidity	Vaisala WXT520

2.3 Data Quality

Ministry of Environment staff calibrated all analyzers upon initial setup and checked them remotely each week. Each analyzer also performed an automated daily verification. A final calibration was performed before demobilizing the MAQS to ensure data quality.

2.4 Data Collection

Data from all analyzers were digitally collected via an Envidas Ultimate data acquisition system and sent to a central server. The system calculates and stores minute and hourly averages of each parameter.

3.0 MONITORING RESULTS

The summary results for this location are presented in Tables 2, 3, and 4, below. Graphical representation of the entire monitoring period, including the Saskatchewan Ambient Air Quality Standards (SAAQS), for each pollutant is presented in the appendix.

Table 2 – One-hour Average Summary

	O₃	NO₂	CH₄	Non-methane hydrocarbons	SO₂	H₂S	CO	PM_{2.5}	PM₁₀
Units	ppb	ppb	ppm	ppm	ppb	ppb	ppm	µg/m ³	µg/m ³
SAAQS	82	159	--	--	172	11	13		
Minimum	1.1	0.3	1.66	0	0	0	0	0.6	1.4
Maximum	52.7	25.3	2.67	2.43	1.5	13.7	0.36	18.5	262.6
Average	23.0	2.8	1.79	.01	0.1	0.6	0.08	4.5	16.7

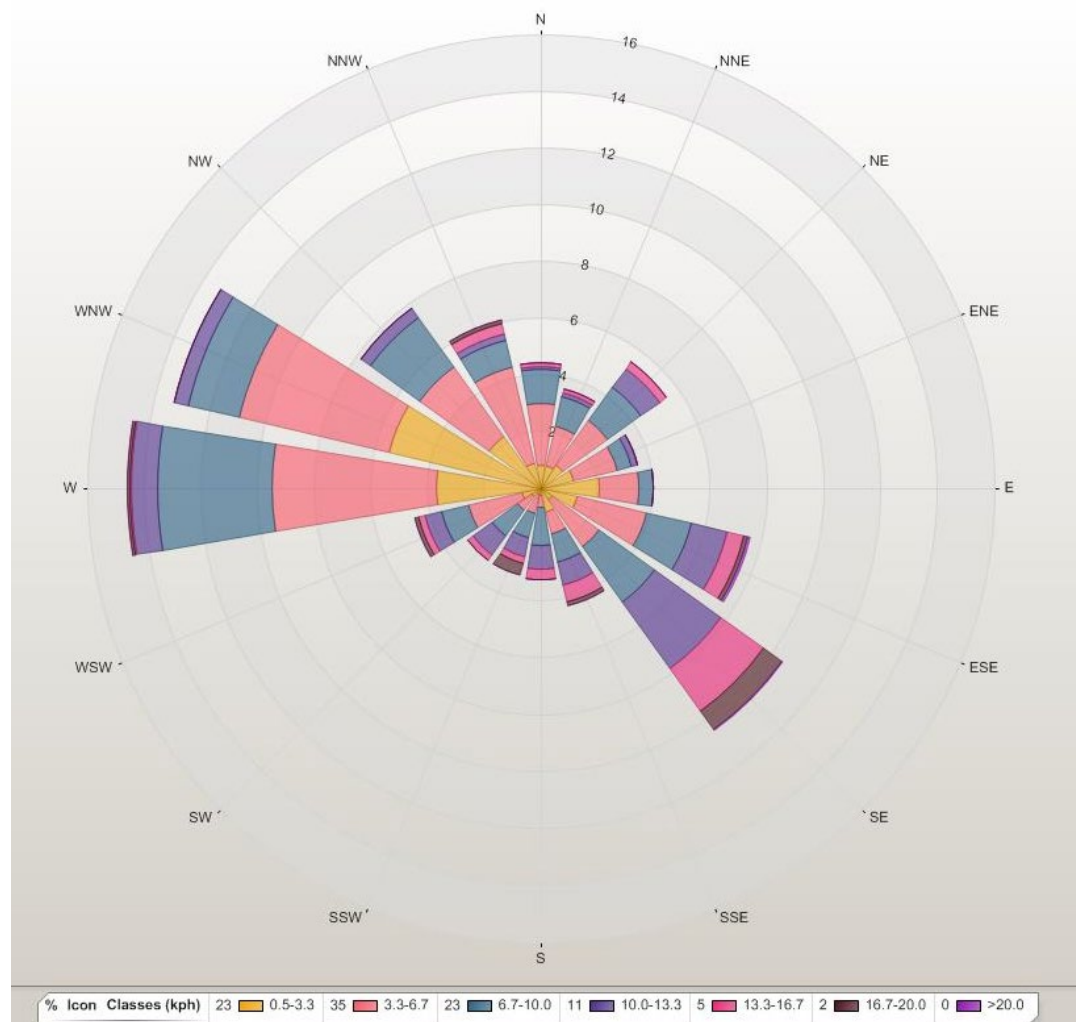
Table 3 – Eight-hour Average Summary

	O₃	CO
Units	ppb	ppm
SAAQS	63	5
Minimum	2.2	0.03
Maximum	48.8	0.20
Average	23.0	0.08

Table 4 – Daily Average Summary

	NO₂	SO₂	H₂S	PM_{2.5}	PM₁₀
Units	ppb	ppb	ppb	µg/m ³	µg/m ³
SAAQS	106	48	3.6	28	50
Minimum	0.5	0.0	0.1	1.8	6.1
Maximum	10.4	0.2	2.8	9.0	47.6
Average	2.8	0.1	0.6	4.5	16.9

Figure 2 – Wind Rose (Prevailing Winds) at Sample Location



4.0 DISCUSSION OF RESULTS

Average concentrations for all parameters were considered low. Readings obtained for sulphur dioxide, ozone, carbon monoxide, nitrogen dioxide, and fine particulates were all below the Saskatchewan Ambient Air Quality Standards (SAAQS).

Hydrogen sulphide exceeded the one-hour standard on one occasion on August 5, between 06:00 and 07:00 hrs, with a reading of 13.7 parts per billion (ppb). Winds were calm, resulting in poor dispersion of the pollutants. The amount of hydrogen sulphide measured would not have resulted in human health issues but residents may have noticed a nuisance odour for a time in the morning. Due to the calm wind conditions, this exceedance was likely a result of several potential sources in the surrounding area, including natural sources. Wind speeds picked up within a couple of hours and the pollutants quickly dissipated. Due to the low health and environmental risk of the measured exceedance, further evaluation was not required.

Saskatchewan does not currently have a standard for hydrocarbons. However, the levels recorded for methane and non-methane hydrocarbons during the monitoring period were low and are considered background levels.

Prevailing winds in the area are mostly from the west to west northwest, followed by southeast.

Coarse particulate (PM10) levels were elevated on June 22nd and 23rd for a couple of hours each morning. This was due to sandblasting in the immediate vicinity.

5.0 CONCLUSION

Hydrogen sulphide exceeded the one-hour SAAQS of 11 ppb on one occurrence. Otherwise hydrogen sulphide levels observed in Unity were below the one-hour standard and the 24-hour standard of 11 ppb and 3.6 ppb, respectively, for the duration of the monitoring period. The hydrogen sulphide levels observed in Unity do not pose a health or environmental risk, but may have reached levels that residents could smell.

All parameters are considered typical for an urban setting and the results for the monitoring period indicate a low health risk for the residents of Unity.

6.0 APPENDIX

