

January 13, 2022

Director  
Environmental Approvals Branch  
Manitoba Environment, Climate and Parks  
1007 Century Street  
Winnipeg MB R3H 0W4  
Canada

Dear Director,

Arow Global Limited is submitting the Environmental license application. Based on a Class 2 Development under the *Classes of Development Regulation M.R. 164/88*, and as such would require a license under *The Environment Act*. Please find enclosed the following:

- 1) The Environment Act Proposal Form.
- 2) A \$7,500 cheque to the Minister of Finance for the Class 2 Development application fee.
- 3) One flash drive containing an electronic version of the Arow Global Environment License Proposal.
- 4) Two (2) hard copies of the Arow Global Environment Act Proposal.

Please do not hesitate to contact me if you would like more information regarding this application. I am available by phone (204)227-2995 or by email at [dambrosio@arowglobal.com](mailto:dambrosio@arowglobal.com).

Yours truly,

Diego Ambrosio  
*Environmental Health and Safety Coordinator*

# Environment Act Proposal Form



|                                                                                                                    |                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name of the development:<br>Arow Global Limited                                                                    |                                                                                                                                                                                   |
| Type of development per Classes of Development Regulation (Manitoba Regulation 164/88):<br>Class 2 - Manufacturing |                                                                                                                                                                                   |
| Legal name of the applicant:<br>Arow Global Limited                                                                |                                                                                                                                                                                   |
| Mailing address of the applicant: 404 Egesz St                                                                     |                                                                                                                                                                                   |
| Contact Person: Diego Ambrosio                                                                                     |                                                                                                                                                                                   |
| City: Winnipeg                                                                                                     | Province: Manitoba Postal Code: R2X 1X5                                                                                                                                           |
| Phone Number: (204) 227-2995 Fax:                                                                                  | email: dambrosio@arowglobal.com                                                                                                                                                   |
| Location of the development: 404 Egesz St, Winnipeg, MB                                                            |                                                                                                                                                                                   |
| Contact Person: Diego Ambrosio                                                                                     |                                                                                                                                                                                   |
| Street Address: 404 Egesz St                                                                                       |                                                                                                                                                                                   |
| Legal Description: Arow Global Limited                                                                             |                                                                                                                                                                                   |
| City/Town: Winnipeg                                                                                                | Province: Manitoba Postal Code: R2X 1X5                                                                                                                                           |
| Phone Number: (204) 227-2995 Fax:                                                                                  | email: dambrosio@arowglobal.com                                                                                                                                                   |
| Name of proponent contact person for purposes of the environmental assessment:<br>Diego Ambrosio                   |                                                                                                                                                                                   |
| Phone: (204) 227-2995<br>Fax:                                                                                      | Mailing address: 404 Egesz St, Winnipeg, MB, R2R 1X5                                                                                                                              |
| Email address: dambrosio@arowglobal.com                                                                            |                                                                                                                                                                                   |
| Webpage address: <a href="https://arowglobal.com/">https://arowglobal.com/</a>                                     |                                                                                                                                                                                   |
| Date: 2022-12-13                                                                                                   | Signature of proponent, or corporate principal of corporate proponent:<br><div style="border: 1px solid black; height: 40px; width: 100%;"></div><br>Printed name: Diego Ambrosio |

PRINT

RESET



5 Donwood Drive, Winnipeg, MB R2G 0V9  
Phone (204) 668-3141  
Email: [contact@winnipegairtesting.com](mailto:contact@winnipegairtesting.com)

Arow Global  
404 Egesz Street  
Winnipeg, MB R2R 1X5

January 10, 2023

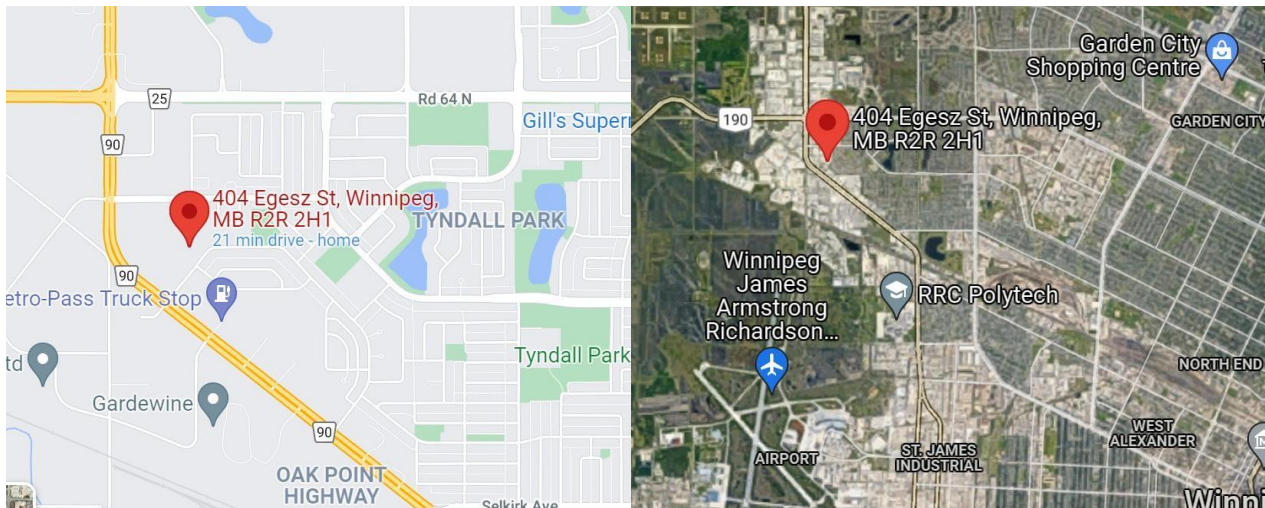
## Environmental License Proposal

### Executive Summary

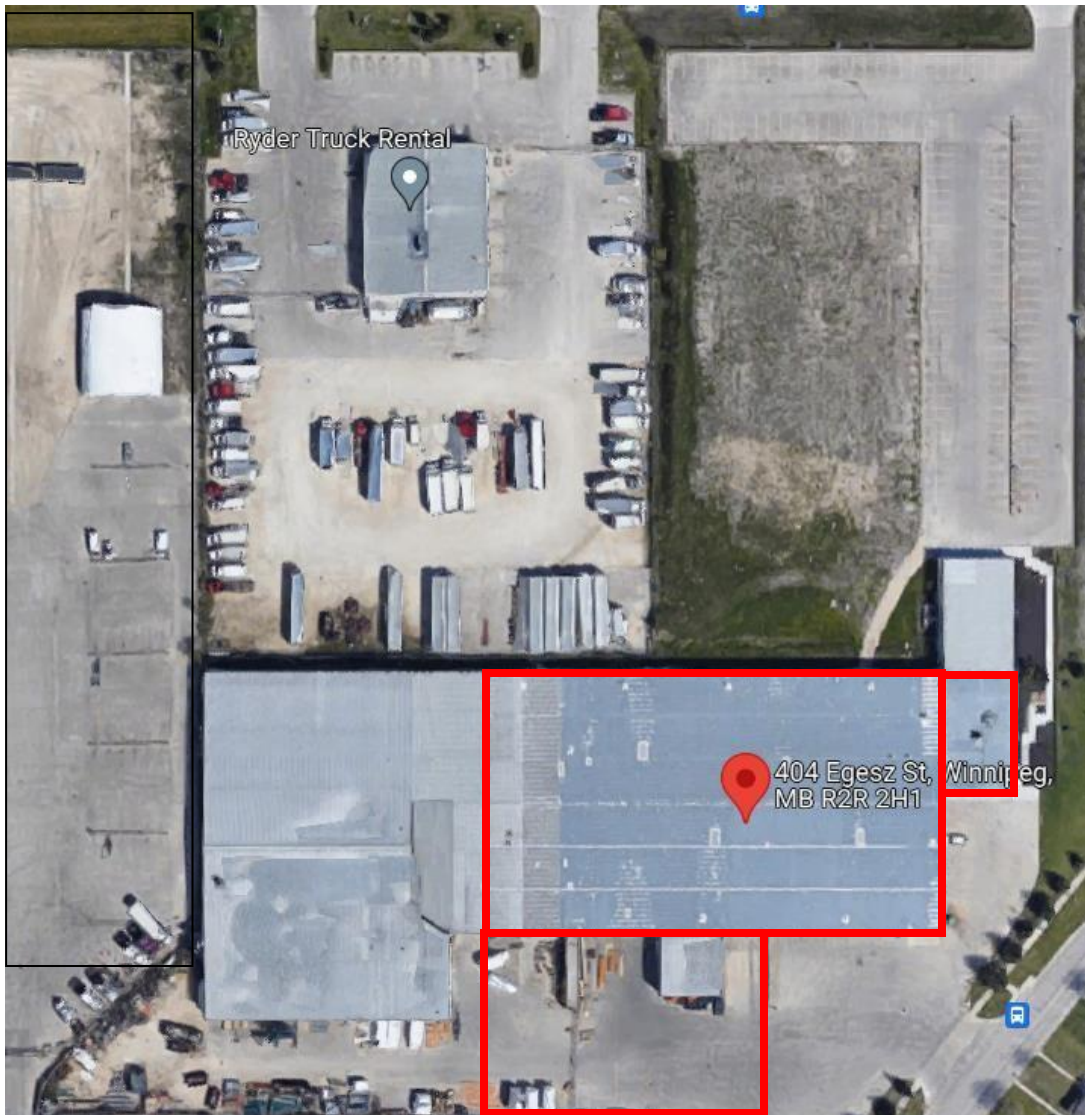
The building is situated adjacent to similar industrial companies in the Inkster West neighbourhood. The plant is shared by both Arow Global and Solutions Air. Most of the processes are assembling and machine work with a small amount of welding. Airborne emissions, noise and other emissions to the environment are minimal.

### Location

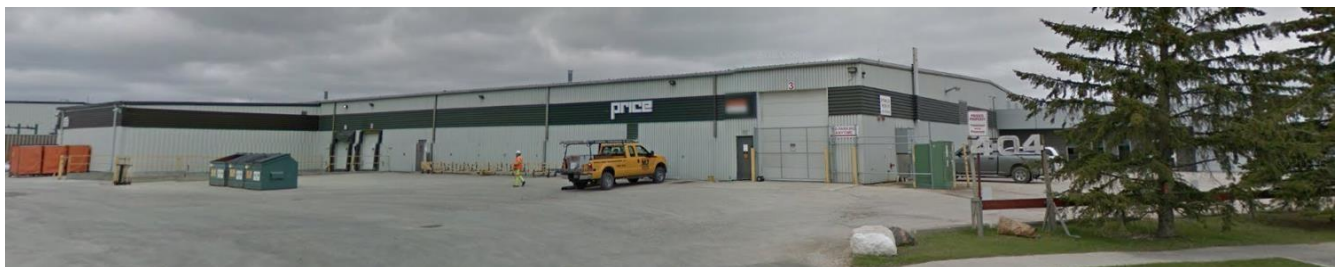
The site is located at 404 Egesz Street in the northwest section of Winnipeg adjacent to other industrial properties. The images below show the location of the facility and some of the surrounding properties.



**Above.** Images of the Arow Global facility. Source: Google Maps



The image above shows the size and layout of the lot. The building faces south towards Route 90. The parking lot for employees is located in the northeast portion of the property that in part, wraps around the Ryder Truck Rental property (also shown in the image).



**Front of Building taken from Google Earth**

The building is 170 meters wide at its longest point. The building occupies about half of the property with an employee parking lot and grass lawn on the north side and a small storage yard located on the south side of the property. The property has ample parking on site so there is no impact on street parking in the area.

## **Existing Land Use**

The site is a pre-existing building located in the Inkster West neighborhood. The land is used for light manufacturing.

## **Nearby Transportation Routes**

The building is located just 100 meters from Route 90 (Oakpoint Highway). The building is also 800 meters from railway lines and is just 1 km away from the Richardson International Airport and directly on the main flight path.

## **Nearby Industries**

The property is adjacent to the following businesses:

- Westrans Winnipeg Heavy Duty Parts
- Cummins Sales and Services
- Ryder Truck Rental
- Cervus Equipment Forklift Dealer

## **Nearby Residential Housing**

The property is abutted by residential property on the north and east.

## **Topography**

The property is a typical urban industrial lot and has no significant topographical features in that it is essentially a flat grade with no water features. The properties topography is similar to its industrial neighborhood.

## **Wildlife Fisheries and Vegetation**

The property is a typical urban site. There are no forests, prairies bushes, marshes, or waterways on or adjacent to the property. There is a string of trees along Egesz to help shield the property from view from the street. The lawn on the north side by the parking lot is residential grass and is mowed and maintained in the summer months.

The Manitoba Species and Ecosystems at Risk website was reviewed. There is no evidence that the site affects or puts at risk any of the species or ecosystems listed on the website.

Source: <https://www.gov.mb.ca/fish-wildlife/wildlife/ecosystems/index.html>

## Local Surface Water Bodies

There are no waterways or standing water on the property. There are two artificial ponds nearby. The ponds are in Cutler Park and Albina Park. The nearest body of water is approximately 700 meters from the property and separated by private residences.



## Heritage Resources

The property is a small commercial site inside the boundaries of the City of Winnipeg. There are no known Heritage sites or resources located on the property.

## Indigenous Communities

The facility is not anticipated to have any impacts on indigenous communities. The facility is already constructed, and no new developments are included in the environmental assessment plan.

## Industrial Processes

The facility is a modern and clean facility. The most common processes are standard operations for metal fabrication (CNC milling, laser cutting, etc.) and assembly.

### CNC Milling



There are several CNC milling machines. The process uses HYSOL 50 mixed with water as a metal working fluid. The liquid would contain aluminum shavings as part of the milling process. The working fluid is occasionally replaced. The used working fluid is disposed of with a hazardous waste disposal company. The aluminum shavings are recycled through a metal recycling company.

### Metal Cutting Lasers



Two industrial lasers produce fine metal dust in the cutting process. Local exhaust ventilation captures fugitive dust from the cutting process and collects the dust in drums. The dust and cutting remnants are recycled with a metal recycling company.

The metal fumes from the lasers are collected in a fume capture system and the metal dust is recycled.

### **Laser Fume Collection System**

### Router

An infinity router is used to process polycarbonate. The process produces some shavings and dust. In the absence of a viable recycling market, this material goes to landfill.

### Industrial Brakes

There are a few industrial brakes. The hydraulic oil is replaced periodically as part of normal maintenance. The used hydraulic oil is taken away with the maintenance company as part of the maintenance contract.

### Grinding Booths

A grinding booth is used to smooth parts and remove burrs from work pieces. The grinding is limited to aluminum. The dust and scrap from the process is recycled with a metal recycling company.

## Welding

Welding is performed. There are typically 2 welders per shift. The welding process is almost all welding on aluminum parts. The process occurs in a booth. The booth is vented to the outside of the plant (north wall) without any additional filtration or controls.

## Window Leakage Test

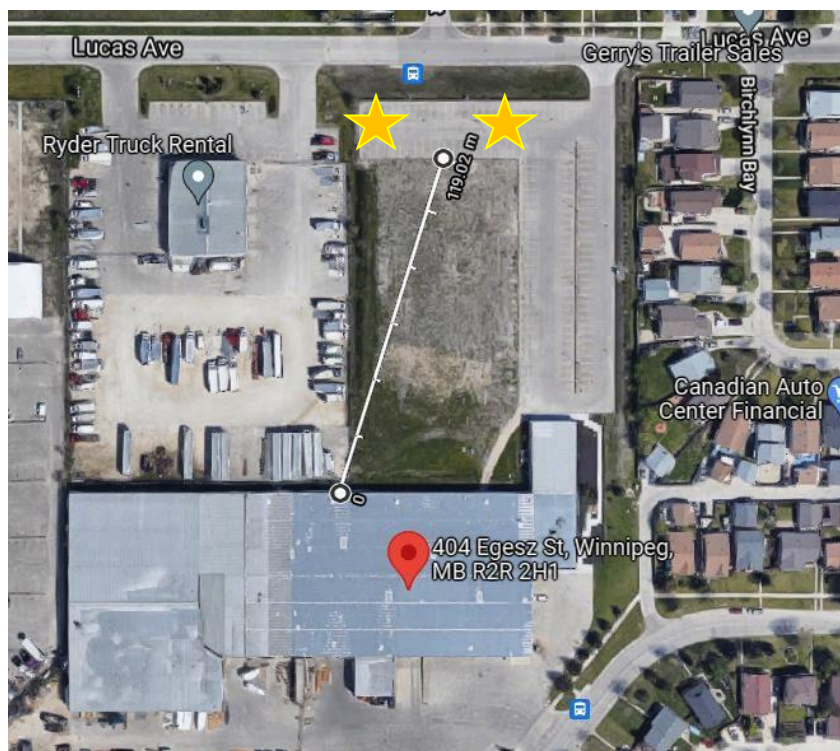
One of the parts that the plant produces is windows for buses. The windows are exposed to water jets to detect any leakage in the window. The process uses ordinary water at room temperature with no additional chemicals. The runoff of the process is ordinary water and goes to sewer.

## Pressure Washing of Parts

Final parts are pressure washed using a combination of water, Hysol 50 and Cool Lube 2210.

## **Downwind Emissions**

The downwind emissions were evaluated using three broad parameters: dust, metals, and volatile organic compounds (VOCs).



Two sampling locations were used. On the day of the sampling there was a 10 km/hour wind out of the SSW. Sampling was performed on the north edge of the south lawn (and thus still on the property). The samples average 120 meters downwind of the plant.

It should be noted that while the samplers are in a position to collect emissions from the facility, the sampling does not and cannot separate the emissions from the plant from emissions from other nearby facilities, by the other company that shares the building, or the natural background of the area.

Many of the ambient air quality standards are based on a 24-hour period. The facility operates 16 to 24 hours per day. Sampling was performed during the day shift when the maximum activity in the facility would be expected. Sampling performed over a full 24 hours would include times

that the facility is closed and thus would average out as a lower value than included in this report. Thus, the comparison of the sample results in this report to ambient standards based on 24 hours is conservative.

### Total Dust

There is no process that produces dust or exhausts dust from the facility. In fact, the processes inside the facility are well controlled with local exhaust systems so that there is no to minimal dust inside the facility. As a result, there is no exhaust stack or other point of emission on the local exhaust controls other than a small amount of welding.

The downwind sampling was performed over a period of approximately 6.5 hours. Portable sampling pumps were used to draw air through a preweighed filter at a flow rate of 3 litres per minute (Lpm). The samples were subsequently analyzed at an AIHA-accredited laboratory using NIOSH Method 0500.

| Parameter                                         | Concentration (mg/m <sup>3</sup> ) |
|---------------------------------------------------|------------------------------------|
| West Sample                                       | 0.041                              |
| East Sample                                       | 0.042                              |
| Canadian National Air Quality Objective (24 Hour) | 0.120                              |

Canada uses a nation-wide criteria for PM<sub>10</sub> (those particles that are 10 microns in size or less. However, if the total dust levels (i.e., a sample that includes particles both less than 10 microns and also greater than 10 microns) is greater than the PM<sub>10</sub> guideline, then it must be concluded that the results are in compliance with the PM<sub>10</sub> criteria. The PM<sub>2.5</sub> is 30 ug/m<sup>3</sup>. While the results do not necessarily rule out non-compliance, it is very unlikely that the PM<sub>2.5</sub> from the plant is above the criteria. The 24-hour average PM<sub>2.5</sub> values in urban settings from Canada averages about 6 ug/m<sup>3</sup> with peak values as high as 17 – 27 ug/m<sup>3</sup>. If we subtract this lower level from the total dust results, the result would be less than 30 ug/m<sup>3</sup>. Bear in mind that facility does not operate at full production load on a 24-hour basis, and the facility was downwind of a major transportation artery on the day of the testing.

Source of PM<sub>2.5</sub> data:

<https://www.canada.ca/content/dam/eccc/documents/pdf/cesindicators/air-quality/air-qualityen.pdf>

### Metals

The same samples used in the total dust samples were analyzed for metals. The samples were analyzed for a broad metal scan using NIOSH Method 7300.

### Downwind Metals Sampling Results

| Sample Location                 | Aluminum Concentration ( $\mu\text{g}/\text{m}^3$ ) | Iron Concentration ( $\mu\text{g}/\text{m}^3$ ) |
|---------------------------------|-----------------------------------------------------|-------------------------------------------------|
| West Sample                     | 1.33                                                | 6.06                                            |
| East Sample                     | <0.878                                              | 1.14                                            |
| Ontario AAQC                    | 120                                                 | 4                                               |
| 10% of Workplace Exposure Limit | 100                                                 | 350*                                            |

AAQC = Ambient Air Quality Criteria

\* Iron portion of iron oxide TLV from ACGIH

There are no Manitoba air quality standards for metals. In fact, most jurisdictions do not have criteria for metals. To put the values in some context, some values are provided. The Ontario Ambient Air Quality Criteria (AAQC) is shown in the above table. The two samples average below the Ontario Criteria. In addition, the 24 average results would be lower as samples were collected while the plant was running but the plant only runs two shifts per day. In addition, as the company is in an industrial area, there may be some background level of iron in the area. Secondly, it is common practice to use 10% of the occupational exposure limit as a rough guideline for acceptable exposure to the general population. While these two approaches are similar for aluminum, the Ontario guideline seems very conservative relative to 10% of the allowable workplace exposure.

The sample results were very low. The metals analysis included other metals not shown in the above table, but no other metals were detected in either sample. The full metal results are appended to this report.

### VOCs

There are no specific processes that would emit or release VOCs (volatile organic compounds). For example, there is no spray painting or use of large amounts of solvents. As a general precaution, downwind sampling was performed for a broad scan of VOCs.

### Downwind Total VOC Sampling Results

| Sample Location          | Concentration ( $\text{mg}/\text{m}^3$ ) |
|--------------------------|------------------------------------------|
| West Sample              | <0.200                                   |
| East Sample              | <0.200                                   |
| Residential VOC Criteria | 0.500                                    |

There was a trace amount of VOCs found in the samples. For example, in the West Sample, toluene was found at 1 part per billion (ppb) and xylene was found at 0.6 ppb. Additional VOC testing data has been appended to this report.

## Solid Non-Hazardous Waste

Solid materials that cannot be recycled are disposed of through a waste management company. This type of waste includes non-recyclable packaging, personal protective equipment, damaged wood pallets, and similar items.

The solid waste is combined for the plant and disposed of under a single account. The quantities of non-hazardous solid waste disposed of through a waste management company for the last three years are as follows:

- 2019 – 175 MT
- 2020 – 161 MT
- 2021 – 133 MT

As shown by the data, efforts to reduce packaging waste and other efforts have resulted in a significant reduction in non-hazardous solid waste over time.

## Hazardous Waste

The following information is based on 2020 data.

| Category                                  | Annual Volume | Comment / Example             |
|-------------------------------------------|---------------|-------------------------------|
| Waste Adhesives                           | None          |                               |
| Waste Paint                               | 410           | Paint sludge                  |
| Flammable Solids                          | None          | Paint dust, paint filters     |
| Waste Aerosols                            | None          |                               |
| Flammable Liquids                         | None          | Thinners, solvents            |
| Waste Isocyanates                         | 101           |                               |
| Waste solids containing Flammable Liquids | 205           | Rags with flammable liquids   |
| Waste Oil                                 | 410<br>205    | Compressor Oil<br>Cutting Oil |
| Fluorescent Tubes                         | 120           |                               |

## Discharge to Sewer

There are very few processes that produce liquid waste. There is some waste oil, but all such material is collected and disposed of through a hazardous waste company, and none is discharged to sewer.

## Noise

## Daytime Measurements

Noise datalogging equipment was used to collect average noise levels during the daytime. One sample was located on the south side of the building. This location would collect noise generated by the plant including any commercial or shipping trucks on the property. A second sample was located along Egesz at the end of the row of trees. The sample adjacent to the plant had an average noise level of 76.5 dBA. The sample taken along Egesz was 80.3 dBA. The sample along Egesz had higher average noise levels due to community traffic noise (i.e., traffic along Egesz itself).



The yellow stars show the location of the two daytime noise sampling locations

## Evening Measurements

Noise measurements were performed in the early evening using a handheld noise meter. This process allows both the levels of noise around the plant to be quantified and the source of the noise to be identified. At this time of night, the facility would be operating the second or afternoon shift.

November 27, 2021, 7:45 PM

| Location          | Noise Level (dBA) | Comment                                                                            |
|-------------------|-------------------|------------------------------------------------------------------------------------|
| North Parking Lot | 52 - 55           | Mostly Route 90 and truck idling at Ryders.<br>No noticeable noise from the plant. |
|                   | 42-44             | Background level with no discernable source.                                       |
|                   | 52 - 62           | Plane taking off from Richardson International Airport.                            |

|                        |    |                                                  |
|------------------------|----|--------------------------------------------------|
| South Side of Facility | 47 | Backup alarm on forklift from adjacent property. |
|                        | 47 | Dog barking in community.                        |

## Hazardous Waste Storage



There is an outside storage unit for hazardous waste waiting for collection by a hazardous waste unit. The unit is clearly posted and located behind a chain link fence to separate it from the public.

There is some empty drum storage on site as well. It is located at the west end of the lot and is shielded from view from the street by the plant itself. This area is also behind the chain link fence. There are typically 10 – 15 drums present at any time awaiting proper disposal.

## Recycling

The plant recycles materials whenever possible. Examples include metal dust from the laser process and hydraulic oils from machinery.

## Waste to Landfill

There is little to no waste sent to landfill. It is likely there are some small amounts of waste such as damaged wood pallets but there was no identified process or waste stream of material that goes to landfill.

## Aesthetics

The building is neat and well maintained. There is minimal traffic to and from the facility and this traffic occurs during normal day hours. Employee parking is at the north end of the property that allows workers to enter from Route 90 and enter the lot while passing only a couple of residential homes.

## Potential for Chemical Spill

There are limited chemicals on site. The largest chemical by volume is likely hydraulic oil which is essentially non-toxic. It is extremely unlikely that there would be a chemical spill that would escape the building or in any way impact the community.

### **Indigenous Communities**

The small pre-existing urban lot would no impact on indigenous communities.

I hope this is information is of assistance to you. Should you have any questions, or if we can be of any further assistance, please contact me at (204) 668-3141.

Sincerely,

Winnipeg Air Testing

Per:

A black rectangular box redacting the signature of Doug Wylie.

Doug Wylie, CIH, ROH, CRSP, CRM  
Occupational Hygienist

## Laboratory Results

Total Dust

**Customer:** Winnipeg Air Testing (4201)  
**Address:** 5 Donwood Drive, Suite B  
Winnipeg, MB R2G 0V9

**Order #:**

**Attn:**

**Project:** Solution/AROW

**Location:**

**Number:** 5286

**Matrix**

**Received**

**Analyzed**

**Reported**

**PO Number:**

| Sample ID  | Cust. Sample ID | Location | Date     | Pre-Wt     | Post-Wt |
|------------|-----------------|----------|----------|------------|---------|
| Parameter  | Method          |          | Time     |            |         |
| 447447-001 |                 | West     | 11/04/21 | 0.014953 g |         |
| TND        | NIOSH 0500      |          |          | 0.01500 g  |         |
| 447447-002 |                 | East     | 11/04/21 | 0.012832 g |         |
| TND        | NIOSH 0500      |          |          | 0.01288 g  |         |

Note: The total dust concentration is calculated by subtracting the preweight of the filter from the postweight. The West sample had a volume of 1150 liters and the east sample had a volume of 1140 litres.

For example, the West sample had a weight difference of 0.000047 grams (0.047 mg). 0.047 milligrams divided by 1140 litres (1.150 m<sup>3</sup>) equates to 0.041 mg/m<sup>3</sup>. The East sample had very similar laboratory results and sample volume.

## Metal Concentrations Downwind

**Project:** Solution/AROW

**Reported**

11/18/21

**Location:**

**Number:** 5286

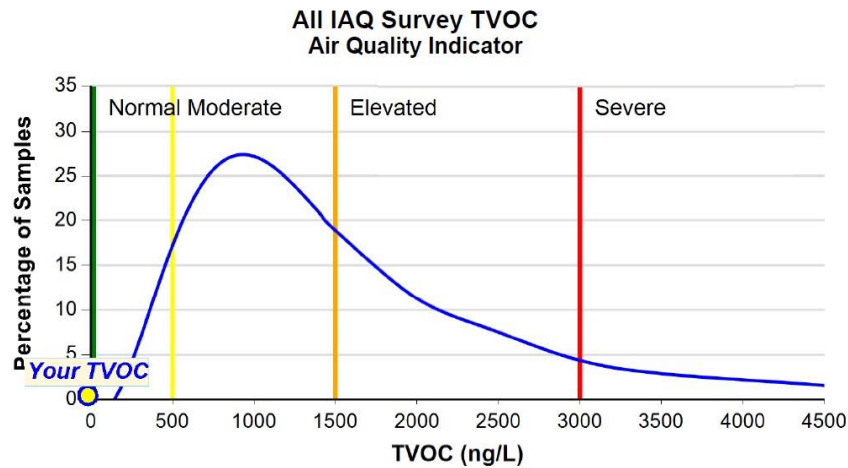
**PO Number:**

| Sample ID         | Cust. ID | Location    | Date            | Time      | Flow     | Volume        |
|-------------------|----------|-------------|-----------------|-----------|----------|---------------|
| Parameter         |          | Method      |                 | Total     | RL*      | Conc.         |
| <b>447447-001</b> |          | <b>West</b> | <b>11/04/21</b> |           |          | <b>1150 L</b> |
| Aluminum          |          | NIOSH 7300M |                 | 1.52 µg   | 1.00 µg  | 1.33 µg/m3    |
| Antimony          |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.349 µg/m3  |
| Beryllium         |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.349 µg/m3  |
| Cadmium           |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.349 µg/m3  |
| Chromium          |          | NIOSH 7300M |                 | <1.00 µg  | 1.00 µg  | <0.871 µg/m3  |
| Cobalt            |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.349 µg/m3  |
| Copper            |          | NIOSH 7300M |                 | <1.00 µg  | 1.00 µg  | <0.871 µg/m3  |
| Iron              |          | NIOSH 7300M |                 | 6.96 µg   | 1.00 µg  | 6.06 µg/m3    |
| Lead              |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.349 µg/m3  |
| Manganese         |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.349 µg/m3  |
| Molybdenum        |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.349 µg/m3  |
| Nickel            |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.349 µg/m3  |
| Titanium          |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.349 µg/m3  |
| Vanadium          |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.349 µg/m3  |
| Zinc              |          | NIOSH 7300M |                 | <1.00 µg  | 1.00 µg  | <0.871 µg/m3  |
| <b>447447-002</b> |          | <b>East</b> | <b>11/04/21</b> |           |          | <b>1140 L</b> |
| Aluminum          |          | NIOSH 7300M |                 | <1.00 µg  | 1.00 µg  | <0.878 µg/m3  |
| Antimony          |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.351 µg/m3  |
| Beryllium         |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.351 µg/m3  |
| Cadmium           |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.351 µg/m3  |
| Chromium          |          | NIOSH 7300M |                 | <1.00 µg  | 1.00 µg  | <0.878 µg/m3  |
| Cobalt            |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.351 µg/m3  |
| Copper            |          | NIOSH 7300M |                 | <1.00 µg  | 1.00 µg  | <0.878 µg/m3  |
| Iron              |          | NIOSH 7300M |                 | 1.30 µg   | 1.00 µg  | 1.14 µg/m3    |
| Lead              |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.351 µg/m3  |
| Manganese         |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.351 µg/m3  |
| Molybdenum        |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.351 µg/m3  |
| Nickel            |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.351 µg/m3  |
| Titanium          |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.351 µg/m3  |
| Vanadium          |          | NIOSH 7300M |                 | <0.400 µg | 0.400 µg | <0.351 µg/m3  |
| Zinc              |          | NIOSH 7300M |                 | <1.00 µg  | 1.00 µg  | <0.878 µg/m3  |

Note: only aluminum and iron were detected in either sample. All the other metals were either not present in the ambient air or too low to detect.

# Volatile Organic Compounds

## VOCs - East Sample



## VOCs by Source

| Building Sources | Contamination Index Category       | Estimated VOC Level (ng/L) | Severity | Source Prediction & Suggestions for VOC Reduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------|------------------------------------|----------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | Coatings (Paints, Varnishes, etc.) | 24                         | Normal   | Includes interior and exterior paints (including low- or no-VOC paints), varnishes, lacquers, some sealants, and other products that can be classified as a coating over a surface. Typically, VOCs from these products are in the 10 to 14 carbon size range and can linger for several months after application, sometimes longer. Ventilate as much as possible during and after application of any of these products. Dispose of opened but unused products and related supplies if possible or store in areas that will minimize off gassing. Additional sources include fuel oil or diesel fuel. |
|                  | PVC Cement                         | 0                          | Normal   | PVC cement is used to join pieces of PVC pipe together, usually for plumbing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                  | Building Materials-Toluene Based   | 0                          | Normal   | Adhesives and glues used in construction and maintenance, arts and crafts; adhesive removers; contact cement; sealants; coatings (paint, polyurethane, lacquer, thinner); automotive products, including parts cleaners. Additional sources include gasoline and other fuels.                                                                                                                                                                                                                                                                                                                          |
|                  | Gasoline                           | 28                         | Normal   | VOCs from gasoline are typically a result of off-gassing from gas containers, small spills, and gas-powered equipment used in facilities maintenance in nearby garage or storage areas. Most vehicles in good operating condition do not emit gasoline vapors due to the tightly sealed gas tank. This category does not include exhaust emissions. Gasoline VOCs can linger on clothing after refueling at a gas station. Gasoline includes chemical compounds that are also included in the Light Solvents category.                                                                                 |
|                  | Fuel Oil, Diesel Fuel, Kerosene    | 0                          | Normal   | Typically found in garages and facilities maintenance areas. These fuels are not very volatile so they will not readily get into the air, but they can linger for a long time and produce a strong, unpleasant odor. This category does not include exhaust emissions. Additional sources include coatings such as paints, varnishes, sealants, waxes, etc.                                                                                                                                                                                                                                            |
|                  | Light Hydrocarbons                 | 3                          | Normal   | Building materials; aerosol cans; liquefied petroleum gas (LPG); refrigerant; natural gas; propellant; blowing agent. Includes chemical compounds such as propane, butane, and isobutane.                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | Light Solvents                     | 11                         | Normal   | Stoddard solvent; mineral spirits; some coatings (paints, varnish, enamels, etc.); wax remover; adhesives; automotive products; light oils. Typically, VOCs from these products are in the 6 to 9 carbon size range.                                                                                                                                                                                                                                                                                                                                                                                   |

| Occupant Sources | Contamination Index Category          | Estimated VOC Level (ng/L) | Severity | Source Prediction & Suggestions for VOC Reduction                                                                                                                                                                                                                                                                                            |
|------------------|---------------------------------------|----------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | HFCs and CFCs (Freons <sup>TM</sup> ) | 1                          | Normal   | Most often used as refrigerants for air conditioners and refrigerator/freezers and propellants for blown-in insulation, cushions, aerosol cans, etc. Many of these chemical compounds are being phased out because of the Montreal Protocol.                                                                                                 |
|                  | Personal Care and Cleaning Products   | 9                          | Normal   | Personal care products such as soap, deodorant, lotions, perfumes, hair coloring supplies, nail care supplies, oral hygiene products, etc. Cleaning agents such as surface, window, and flooring products, also restroom and antibacterial products. These products contain many VOCs that will dissipate if use is discontinued or reduced. |
|                  | Odorants and Fragrances               | 2                          | Normal   | Air fresheners, scented cleaning products, and scented personal care products.                                                                                                                                                                                                                                                               |
|                  | Dry Cleaning Solvents                 | 0                          | Normal   | Typical dry-cleaning methods employ the use of carcinogenic chemicals. Dry-cleaning should be allowed to vent outside, without plastics bags, before being placed inside.                                                                                                                                                                    |

## Specific VOCs identified in Sample

| Compound | CAS | Estimated VOC Level (ng/L) | Estimated VOC Level (ppb) | Description |
|----------|-----|----------------------------|---------------------------|-------------|
|----------|-----|----------------------------|---------------------------|-------------|

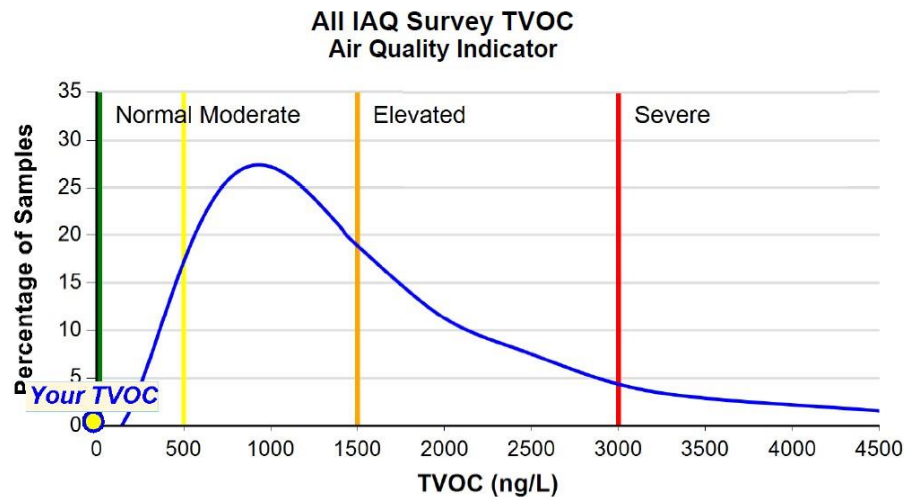
The notes below indicate any additional significant compounds present in this air sample or other noteworthy information.

No significant VOCs were detected in this air sample.

## Standard List of Standard Solvents of Environmental Concern

| Compound              | CAS                | Estimated VOC Level (ng/L) | Estimated VOC Level (ppb) | NIOSH Exposure Limit               | Description                                                                                                                                                  |
|-----------------------|--------------------|----------------------------|---------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Carbonyl Sulfide      | 463-58-1           | 2                          | 0.6                       | None Listed                        | Fumigant; contaminated drywall; fuel combustion byproduct; some foods; naturally occurring at low levels                                                     |
| Carbon Disulfide      | 75-15-0            | < 1                        | < 0.3                     | 3,000 ng/L (1,000 ppb)             | Solvent; fumigant; contaminated drywall; combustion byproduct                                                                                                |
| Methylene Chloride    | 75-09-2            | < 1                        | < 0.3                     | Carcinogen                         | Automotive products; degreasing solvent; paint stripper; adhesive remover; aerosol propellant; insecticide                                                   |
| Hexane (C 6)          | 110-54-3           | < 1                        | < 0.3                     | 180,000 ng/L (50,000 ppb)          | Solvent; adhesive; grease; lubricant; paints and coatings; petroleum fuel component                                                                          |
| 1,1,1-Trichloroethane | 71-55-6            | < 1                        | < 0.2                     | C; 1,900,000 ng/L (350,000 ppb)    | Adhesives, lubricants, cleaners, solvents                                                                                                                    |
| Benzene               | 71-43-2            | < 1                        | < 0.3                     | 320 ng/L (100 ppb)                 | Gasoline. Less common sources include some discontinued solvents; printing and lithography; paints and coatings; rubber; dry cleaning; adhesives; detergents |
| 1,2-Dichloroethane    | 107-06-2           | < 1                        | < 0.2                     | Carcinogen; 4,000 ng/L (1,000 ppb) | PVC production; solvent for rubber, insecticides, oils, waxes, gums, resins; rug and upholstery cleaners                                                     |
| Trichloroethene       | 79-01-6            | < 1                        | < 0.2                     | Carcinogen                         | Dry cleaning; degreasers and cleaners for home/automotive; varnish removers; anesthetic                                                                      |
| Methyl methacrylate   | 80-62-6            | < 1                        | < 0.3                     | 410,000 ng/L (100,000 ppb)         | Acrylic Polymers for paints and coatings, adhesives, fillers; solvent; pharmaceuticals; personal care                                                        |
| Toluene               | 108-88-3           | 4                          | 1                         | 375,000 ng/L (100,000 ppb)         | Gasoline; adhesives (building and arts/crafts); contact cement; solvent; heavy duty cleaner                                                                  |
| Tetrachloroethene     | 127-18-4           | < 1                        | < 0.1                     | Carcinogen                         | Dry cleaning; adhesives, automotive cleaners, polishes                                                                                                       |
| Ethylbenzene          | 100-41-4           | < 1                        | < 0.2                     | 435,000 ng/L (100,000 ppb)         | Gasoline; paints and coatings; solvent; pesticide                                                                                                            |
| m,p-Xylene            | 108-38-3; 106-42-3 | 2                          | 0.5                       | 435,000 ng/L (100,000 ppb)         | Gasoline; paints and coatings; adhesives and cements; solvent; print cartridges                                                                              |
| o-Xylene              | 95-47-6            | < 1                        | < 0.2                     | 435,000 ng/L (100,000 ppb)         | Gasoline; paints and coatings; adhesives and cements; solvent; print cartridges                                                                              |
| Styrene               | 100-42-5           | < 1                        | < 0.2                     | 215,000 ng/L (50,000 ppb)          | Polystyrene foam; synthetic rubber; flavoring agent                                                                                                          |
| 1,4-Dichlorobenzene   | 106-46-7           | < 1                        | < 0.2                     | Carcinogen                         | Moth balls/crystals; room deodorant                                                                                                                          |
| Naphthalene           | 91-20-3            | < 1                        | < 0.2                     | 50,000 ng/L (10,000 ppb)           | Gasoline; diesel; Moth balls/crystals; insecticide                                                                                                           |

## West VOC Sample



## VOCs by Source

| Building Sources | Contamination Index Category       | Estimated VOC Level (ng/L) | Severity | Source Prediction & Suggestions for VOC Reduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------|------------------------------------|----------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | Coatings (Paints, Varnishes, etc.) | 41                         | Normal   | Includes interior and exterior paints (including low- or no-VOC paints), varnishes, lacquers, some sealants, and other products that can be classified as a coating over a surface. Typically, VOCs from these products are in the 10 to 14 carbon size range and can linger for several months after application, sometimes longer. Ventilate as much as possible during and after application of any of these products. Dispose of opened but unused products and related supplies if possible or store in areas that will minimize off gassing. Additional sources include fuel oil or diesel fuel. |
|                  | PVC Cement                         | 0                          | Normal   | PVC cement is used to join pieces of PVC pipe together, usually for plumbing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                  | Building Materials-Toluene Based   | 0                          | Normal   | Adhesives and glues used in construction and maintenance, arts and crafts; adhesive removers; contact cement; sealants; coatings (paint, polyurethane, lacquer, thinner); automotive products, including parts cleaners. Additional sources include gasoline and other fuels.                                                                                                                                                                                                                                                                                                                          |
|                  | Gasoline                           | 34                         | Normal   | VOCs from gasoline are typically a result of off-gassing from gas containers, small spills, and gas-powered equipment used in facilities maintenance in nearby garage or storage areas. Most vehicles in good operating condition do not emit gasoline vapors due to the tightly sealed gas tank. This category does not include exhaust emissions. Gasoline VOCs can linger on clothing after refueling at a gas station. Gasoline includes chemical compounds that are also included in the Light Solvents category.                                                                                 |
|                  | Fuel Oil, Diesel Fuel, Kerosene    | 0                          | Normal   | Typically found in garages and facilities maintenance areas. These fuels are not very volatile so they will not readily get into the air, but they can linger for a long time and produce a strong, unpleasant odor. This category does not include exhaust emissions. Additional sources include coatings such as paints, varnishes, sealants, waxes, etc.                                                                                                                                                                                                                                            |
|                  | Light Hydrocarbons                 | 4                          | Normal   | Building materials; aerosol cans; liquefied petroleum gas (LPG); refrigerant; natural gas; propellant; blowing agent. Includes chemical compounds such as propane, butane, and isobutane.                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | Light Solvents                     | 15                         | Normal   | Stoddard solvent; mineral spirits; some coatings (paints, varnish, enamels, etc.); wax remover; adhesives; automotive products; light oils. Typically, VOCs from these products are in the 6 to 9 carbon size range.                                                                                                                                                                                                                                                                                                                                                                                   |

| Contamination Index Category          | Estimated VOC Level (ng/L) | Severity | Source Prediction & Suggestions for VOC Reduction                                                                                                                                                                                                                                                                                            |
|---------------------------------------|----------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HFCs and CFCs (Freons <sup>TM</sup> ) | 1                          | Normal   | Most often used as refrigerants for air conditioners and refrigerator/freezers and propellants for blown-in insulation, cushions, aerosol cans, etc. Many of these chemical compounds are being phased out because of the Montreal Protocol.                                                                                                 |
| Personal Care and Cleaning Products   | 10                         | Normal   | Personal care products such as soap, deodorant, lotions, perfumes, hair coloring supplies, nail care supplies, oral hygiene products, etc. Cleaning agents such as surface, window, and flooring products, also restroom and antibacterial products. These products contain many VOCs that will dissipate if use is discontinued or reduced. |
| Odorants and Fragrances               | 3                          | Normal   | Air fresheners, scented cleaning products, and scented personal care products.                                                                                                                                                                                                                                                               |
| Dry Cleaning Solvents                 | 0                          | Normal   | Typical dry-cleaning methods employ the use of carcinogenic chemicals. Dry-cleaning should be allowed to vent outside, without plastics bags, before being placed inside.                                                                                                                                                                    |

## Specific VOCs identified in Sample

| Compound | CAS | Estimated VOC Level (ng/L) | Estimated VOC Level (ppb) | Description |
|----------|-----|----------------------------|---------------------------|-------------|
|----------|-----|----------------------------|---------------------------|-------------|

The notes below indicate any additional significant compounds present in this air sample or other noteworthy information.

No significant VOCs were detected in this air sample.

## Standard List of Standard Solvents of Environmental Concern

| Compound              | CAS                | Estimated VOC Level (ng/L) | Estimated VOC Level (ppb) | NIOSH Exposure Limit               | Description                                                                                                                                                  |
|-----------------------|--------------------|----------------------------|---------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Carbonyl Sulfide      | 463-58-1           | 2                          | 0.7                       | None Listed                        | Fumigant; contaminated drywall; fuel combustion byproduct; some foods; naturally occurring at low levels                                                     |
| Carbon Disulfide      | 75-15-0            | < 1                        | < 0.3                     | 3,000 ng/L (1,000 ppb)             | Solvent; fumigant; contaminated drywall; combustion byproduct                                                                                                |
| Methylene Chloride    | 75-09-2            | < 1                        | < 0.3                     | Carcinogen                         | Automotive products; degreasing solvent; paint stripper; adhesive remover; aerosol propellant; insecticide                                                   |
| Hexane (C 6)          | 110-54-3           | < 1                        | < 0.3                     | 180,000 ng/L (50,000 ppb)          | Solvent; adhesive; grease; lubricant; paints and coatings; petroleum fuel component                                                                          |
| 1,1,1-Trichloroethane | 71-55-6            | < 1                        | < 0.2                     | C; 1,900,000 ng/L (350,000 ppb)    | Adhesives, lubricants, cleaners, solvents                                                                                                                    |
| Benzene               | 71-43-2            | < 1                        | < 0.3                     | 320 ng/L (100 ppb)                 | Gasoline. Less common sources include some discontinued solvents; printing and lithography; paints and coatings; rubber; dry cleaning; adhesives; detergents |
| 1,2-Dichloroethane    | 107-06-2           | < 1                        | < 0.2                     | Carcinogen; 4,000 ng/L (1,000 ppb) | PVC production; solvent for rubber, insecticides, oils, waxes, gums, resins; rug and upholstery cleaners                                                     |
| Trichloroethene       | 79-01-6            | < 1                        | < 0.2                     | Carcinogen                         | Dry cleaning; degreasers and cleaners for home/automotive; varnish removers; anesthetic                                                                      |
| Methyl methacrylate   | 80-62-6            | < 1                        | < 0.3                     | 410,000 ng/L (100,000 ppb)         | Acrylic Polymers for paints and coatings, adhesives, fillers; solvent; pharmaceuticals; personal care                                                        |
| Toluene               | 108-88-3           | 4                          | 1                         | 375,000 ng/L (100,000 ppb)         | Gasoline; adhesives (building and arts/crafts); contact cement; solvent; heavy duty cleaner                                                                  |
| Tetrachloroethene     | 127-18-4           | < 1                        | < 0.1                     | Carcinogen                         | Dry cleaning; adhesives, automotive cleaners, polishes                                                                                                       |
| Ethylbenzene          | 100-41-4           | < 1                        | < 0.2                     | 435,000 ng/L (100,000 ppb)         | Gasoline; paints and coatings; solvent; pesticide                                                                                                            |
| m,p-Xylene            | 108-38-3; 106-42-3 | 3                          | 0.6                       | 435,000 ng/L (100,000 ppb)         | Gasoline; paints and coatings; adhesives and cements; solvent; print cartridges                                                                              |
| o-Xylene              | 95-47-6            | < 1                        | < 0.2                     | 435,000 ng/L (100,000 ppb)         | Gasoline; paints and coatings; adhesives and cements; solvent; print cartridges                                                                              |
| Styrene               | 100-42-5           | < 1                        | < 0.2                     | 215,000 ng/L (50,000 ppb)          | Polystyrene foam; synthetic rubber; flavoring agent                                                                                                          |
| 1,4-Dichlorobenzene   | 106-46-7           | < 1                        | < 0.2                     | Carcinogen                         | Moth balls/crystals; room deodorant                                                                                                                          |
| Naphthalene           | 91-20-3            | < 1                        | < 0.2                     | 50,000 ng/L (10,000 ppb)           | Gasoline; diesel; Moth balls/crystals; insecticide                                                                                                           |

## Data on Background PM<sub>2.5</sub> Levels in Canadian Urban Settings

Between 2002 and 2016

- the annual average and annual peak concentration of PM<sub>2.5</sub> were below their respective 2020 standards<sup>4</sup>
- no trends, either increasing or decreasing, were found over the period

**Figure 3. Fine particulate matter concentrations, Canada, 2002 to 2016**

Annual ambient concentration in micrograms per cubic metre

