Tracking and Reducing Chemicals in Toronto

9th Annual ChemTRAC Report

December 2019

416.338.7600 toronto.ca/health | Toronto Public Health

Table of Contents

List of Tables

List of Figures

Chapter 1: Raising Public Awareness and Identifying Opportunities to Reduce Air Pollution

In an urban environment like Toronto, the public's health may be affected by a number of environmental factors, including chemicals that are released to the air, water and land. Exposure to these chemicals can occur in our homes, workplaces and outside.

Smog-forming pollutants and other chemical substances come from different sources. Some come from sources outside the city, others from inside the city itself. Production of electricity, heating of buildings, transportation and commercial and industrial facilities contribute to air quality. Overall, air quality is impacted by the sources that exist in different neighbourhoods and how weather patterns carry pollutants in the air.

People can come in contact with chemicals outdoors and indoors, in homes and workplaces. Prolonged exposure to toxic substances, and in some cases even at low levels, may be linked to a range of adverse health effects.

Through evidence-based research, 25 priority chemicals with adverse impacts on health have been identified by Toronto Public Health as being a priority for reduction in the city. The ChemTRAC program was developed to help better understand the sources of these 25 priority chemicals in Toronto and to encourage pollution prevention initiatives and measures to protect health. As part of Toronto's Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423), ChemTRAC collects information from businesses and institutions in Toronto. Programs in Canada and other countries that are comparable to ChemTRAC have been found to have an impact on reducing priority chemicals used and released from facilities[1,2,3,4].

The ChemTRAC program includes three main components:

- The Environmental Reporting and Disclosure Bylaw, which requires businesses to track and report their manufacturing, use and release of priority chemicals if they meet reporting requirements;
- The analysis and public release of reported chemical data; and,
- The promotion of pollution prevention initiatives and innovation.

ChemTRAC is a release inventory, meaning it is a database that collects information on air pollution sources and their release within the local airshed. Data collected are used to better understand contaminant trends over time, highlight key sources of chemicals, and support studies to model the concentration of these chemicals in the air. Additionally, the data are made available to the public to improve transparency, increase awareness and access to information about locally released contaminants.

This report contains information reported by facilities that operated in Toronto during the 2018 calendar year. For more information about ChemTRAC, including a list of the 25 priority substances and their reporting requirements, please visit https://www.toronto.ca/chemtrac/.

Chapter 2: ChemTRAC Data Highlights – 2018

Facility Representation by Sector

The Environmental Reporting and Disclosure Bylaw requires facilities in Toronto to report their use and release of the 25 priority chemicals annually, if they meet reporting requirements. In 2018, a total of almost 670 facilities reported on their operations. Table 1 shows the number of facilities within each industrial sector that reported information on their manufacture, use and release of these chemicals.

Table 1: Number of facilities that reported data on priority substances for 2018 operations.

Sector	Number of facilities that reported in 2018
Automotive repair and maintenance	87
Chemical wholesale	3
Computer and electronic product manufacturing	15
Dry cleaning and laundry services	64
Electrical equipment, appliance and component manufacturing	18
Fabricated metal product manufacturing	78
Food, beverage and tobacco products manufacturing	65
Funeral services	5
Manufacturing	98
Medical and diagnostic laboratories	2
Non-metallic mineral product manufacturing	22
Paper product manufacturing	8
Power generation	2
Primary metal manufacturing	12
Printing and publishing	53
Waste management and remediation services	9
Water and wastewater treatment	8
Wood products manufacturing	41
All others	78
Total	**668**

Priority Substances Manufactured, Processed or Used

Table 2 shows, for each priority substance, the amounts reported as manufactured, processed, and otherwise used (usually called MPO), as well as the sum of these amounts. Approximately 100,000,000 kg of priority substances were reported in total. Volatile organic compounds (VOCs), manganese, particulate matter <2.5 μm ($PM_{2.5}$), nitrogen oxides (NO_x), lead, non-hexavalent chromium and nickel were the priority substances with the largest reported amounts.

Table 2: Total amounts of priority substances manufactured, processed, and otherwise used.

Priority Substance	Manufactured (kg)	Processed (kg)	Otherwise Used (kg)	Sum (MPO) (kg)
VOCs	678,075	85,183,963	4,208,847	90,069,435
Manganese	-	2,958,397	4,153	2,962,550
$PM_{2.5}$	324,706	1,716,677	2,374	2,043,636
NO_x	1,471,167	763	5,397	1,459,124
Lead	0	1,180,644	9,220	1,189,864
Chromium, Non-Hex	-	1,172,656	2,614	1,175,907
Nickel	-	1,128,645	7,076	1,135,721
Tetrachloroethylene	-	310,220	15,699	326,269
Dichloromethane	149,613	88,253	35,492	275,518
Chromium, Hex	-	59,656	729	184,797
Formaldehyde	6,574	5,571	25,014	37,159
Trichloroethylene	-	20,836	15,199	36,035
PAHs	66	11,042	6	11,114
Chloroform	141	2,739	3,337	6,217
Cadmium	-	1,595	76	2,568
Acetaldehyde	1,200	-	-	1,200
Mercury	-	540	293	833
Benzene	-	212	385	597
1,2-Dibromoethane	-	-	220	220
Vinyl Chloride	1	-	170	171
1,2-Dichloroethane	-	-	25	25
Carbon Tetrachloride	-	-	-	-
Acrolein	-	-	-	-
1,4-Dichlorobenzene	-	-	-	-
1,3-Butadiene	-	-	-	-
Total	**2,631,543**	**93,842,409**	**4,335,326**	**100,918,960**

(-) represents a null value.

Priority Substances Released to the Environment

Similar to data from 2015, 2016 and 2017, the total releases to air represents a small proportion (about 10 per cent overall) of the total amount reported as manufactured, processed or used by facilities. This proportion varies for each pollutant. Table 3 shows the total amounts released to air for each substance in 2018. Volatile organic compounds (VOCs), nitrogen oxides (NO_x), and $PM_{2.5}$ were the priority substances with the largest reported amounts released to the air.

Table 3: Total amounts of priority substances released to the air in 2018.

Priority Substance	Released to Air (kg)
VOCs	5,369,519
NO_x	1,417,460
$PM_{2.5}$	287,617
Dichloromethane	34,095
Trichloroethylene	27,053
Formaldehyde	8,903
Tetrachloroethylene	7,739
Chloroform	1,202
Acetaldehyde	1,200
PAHs	894
Manganese	849
Chromium, Non-hexavalent	708
Nickel	517
Lead	197
Benzene	84
Chromium, Hexavalent	22
Mercury	20
Cadmium	4
Vinyl chloride	1
Total	**7,212,084**

Health Ranking of Substances

The health effect of a toxic chemical depends not only on its toxicity but also on the amount at which it is present in the environment. A commonly used method to compare the health effects of substances with different toxicity is the use of Toxic Equivalency Potential (TEP)[5]. This method consists of multiplying the amount of the chemical by its chemical-specific TEP value. This provides a TEP Score that reflects both the amount and the toxicity of a substance. The substances can then be compared with each other to give a better indication of the relative health risk.

There are two sets of TEP values: one for cancer-related health effects and another for non-cancer health effects. Some of ChemTRAC's 25 priority substances have the potential to cause both cancer and non-cancer health effects and therefore are assigned a TEP score for each category. Table 4 shows the releases to air ranked by the cancer TEP and Table 5 ranks the releases by non-cancer TEP.

Table 4: Reported quantities of priority substances released to air in 2018 ranked by Cancer toxic equivalent potential (TEP) score.

Priority Substance	Released to Air (kg)	Cancer TEP value	Cancer TEP Score
PAHs	894	6,300	5,632,200
Cadmium	4	26,000	104,000
Tetrachloroethylene	7,739	0.96	7,429
Dichloromethane	34,095	0.2	6,819
Lead	197	28	5,516
Chromium, Hexavalent	22	130	2,899
Chloroform	1,202	1.6	1,923
Nickel	517	2.8	1,448
Trichloroethylene	27,053	0.05	1,353
Formaldehyde	8,903	0.02	178
Benzene	84	1.00	84
Acetaldehyde	1,200	0.01	12
Vinyl chloride	1	1.9	2

Table 5: Reported quantities of priority substances released to air in 2018 ranked by Non-Cancer toxic equivalent potential (TEP) score.

Priority Substance	Released to Air (kg)	Non-Cancer TEP value	Non-Cancer TEP Score
Lead	197	580,000	114,260,000
Mercury	20	5,000,000	100,000,000
Cadmium	4	1,900,000	7,600,000
VOCs	5,369,519	1.0	5,369,519
PM2.5	287,617	17	4,889,489
NOx	1,471,460	2.2	3,237,212
Chromium (total)*	730	3,100	2,263,930
Nickel	517	3,200	1,654,400
Manganese	849	780	662,220
Tetrachloroethylene	7,739	65	503,035
Dichloromethane	34,095	7.0	238,665
Formaldehyde	8,903	16	142,448
Trichloroethylene	27,053	0.63	17,043
Chloroform	1,202	14	16,828
Acetaldehyde	1,200	9.3	11,160
Benzene	84	8.1	680
Vinyl chloride	1	69	69

** Includes both hexavalent and non-hexavalent chromium*

Industry Contribution to Total Release

The information reported by businesses on operations that took place in 2018 can be summarized by industry. Table 6 shows the percentage contribution by industry sectors to: 1) total release by mass, 2) Cancer TEP, and 3) Non-Cancer TEP.

Table 6: Sector contribution to Total Release (by mass), Cancer TEP and Non-Cancer TEP in 2018.

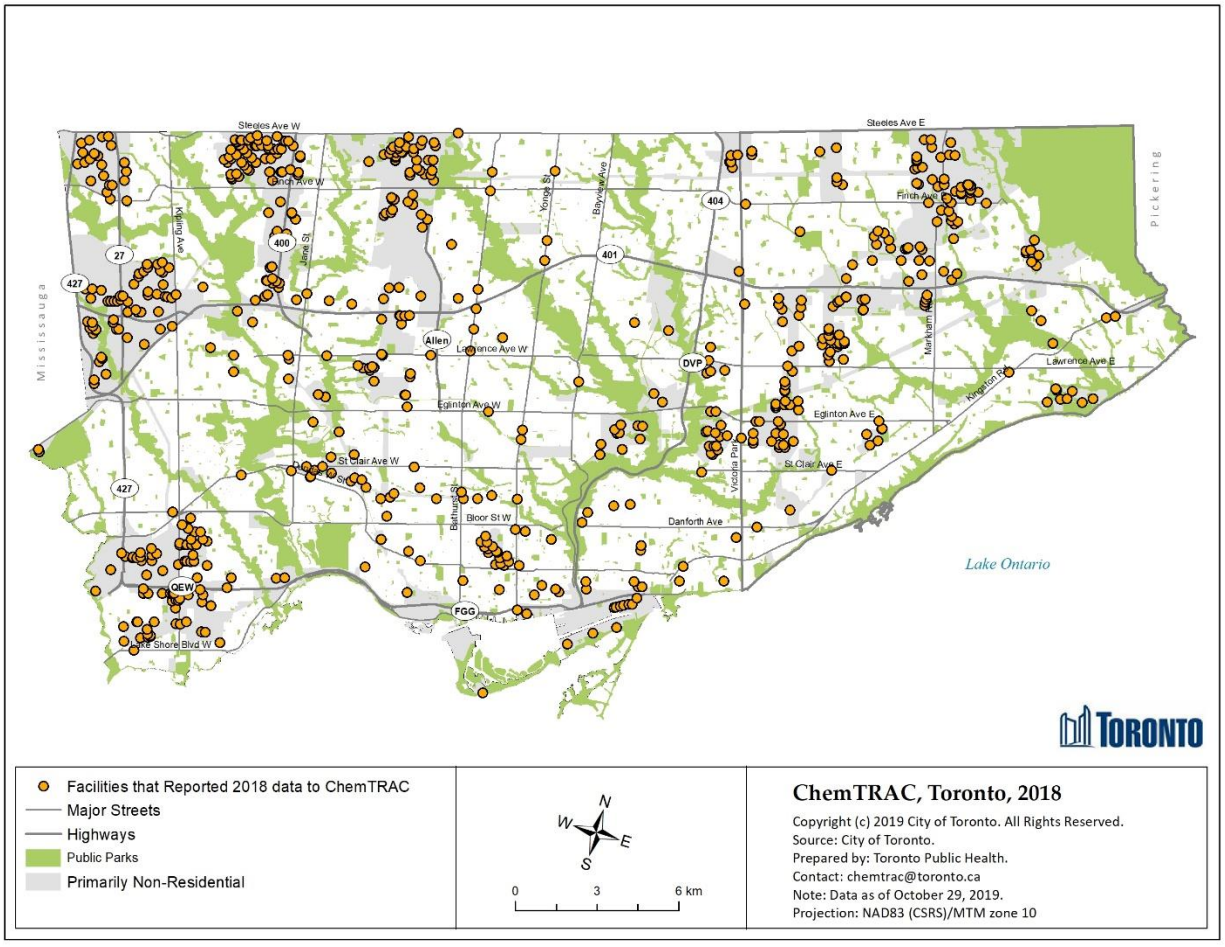
Sector[a]	Percent Contribution to Total Release (by mass)[b]	Percent Contribution to Cancer TEP [b]	Percent Contribution to Non-Cancer TEP [b]
Automotive	<1	<1	<1
Chemical Wholesale	6	<1	<1
Computer & Elect. Prod. Mfg	<1	<1	1
Dry Cleaning	<1	<1	<1
Electrical Equip, Appl/Comp Mfg	<1	2	3
Fab Metal Prod Mfg	7	<1	1
Food & Beverage	10	<1	<1
Funeral Services	<1	<1	21
Manufacturing	37	5	7
Medical	<1	<1	<1
Non Metallic Mineral Prod Mfg	2	<1	8
Paper Prod Mfg	5	<1	<1
Power Generation	4	<1	<1
Primary Metal Mfg	<1	<1	32
Printing	12	<1	<1
Waste Management	<1	96	<1
Wastewater Treatment	5	2	23
Wood Industries	3	0	<1
All other	7	<1	<1

[a] *Sectors are defined based on the North American Industry Classification System (NAICS)*
[b] *<1 indicates a value less than one*

Chapter 3: Distribution of Facilities in Toronto

Figure 1 shows the location of facilities that reported data to ChemTRAC for the 2018 reporting year. The reporting facilities are not uniformly distributed across the city. The majority are located in primarily non-residential areas[1] and there are clusters of facilities in various parts of the city.

Figure 1: Distribution of facilities within residential and non-residential areas that provided information on the manufacture, use or release of priority substances in 2018.



[1] "Primarily non-residential areas" refer to areas with greater concentration of industries relative to other areas of the city.

Figure 2 shows the location of the reporting facilities over a map of the Low Income Measure (LIM)[6]. Twenty seven percent of the facilities are located in areas of the city where more than 30% of the residents are below the LIM (5th quintile). Fourteen percent of the facilities are located in areas where less than 15% of the residents are below the LIM (1st quintile).

Figure 2: Distribution of facilities that provided information on the manufacture, use or release of priority substances in 2018 and socioeconomic status as represented by proportion of residents living at or below the 2017 Low Income Measure (LIM).

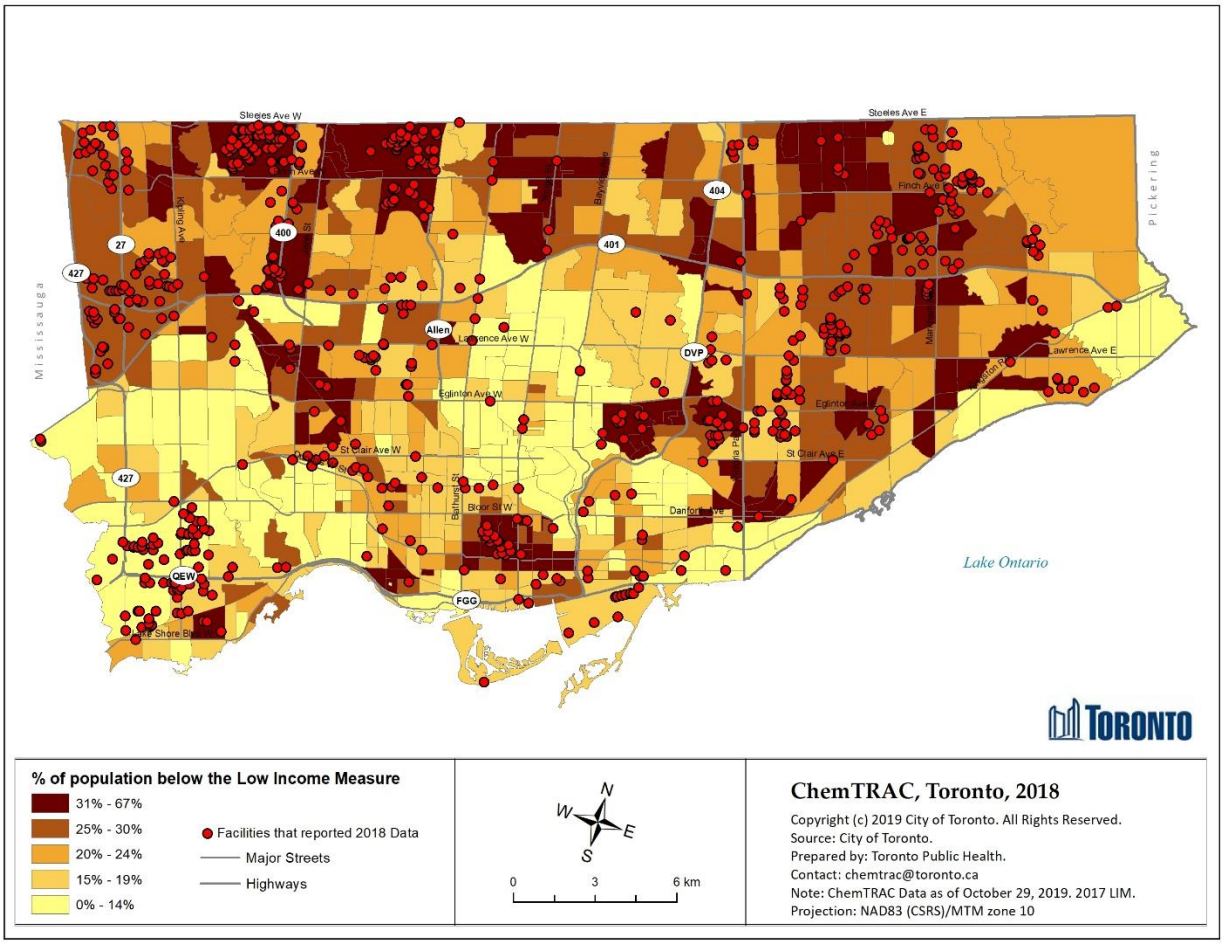


Figure 3 shows a map of the total Cancer Toxic Equivalent Potential (TEP) of the reporting facilities. TEPs allow the toxicity of very different substances to be compared in the same scale. A bigger circle means a higher potential for adverse health effects.

To do this, the toxicity of each substance is scaled relative to benzene, a chemical with a well-known cancer toxicity profile. The size of the circles represents the number of kilograms of benzene that would need to be emitted to have the same potential toxicity as the mixture of reported emissions from each facility.

Figure 3: Location of 2018 air releases by Cancer Toxic Equivalent Potential.

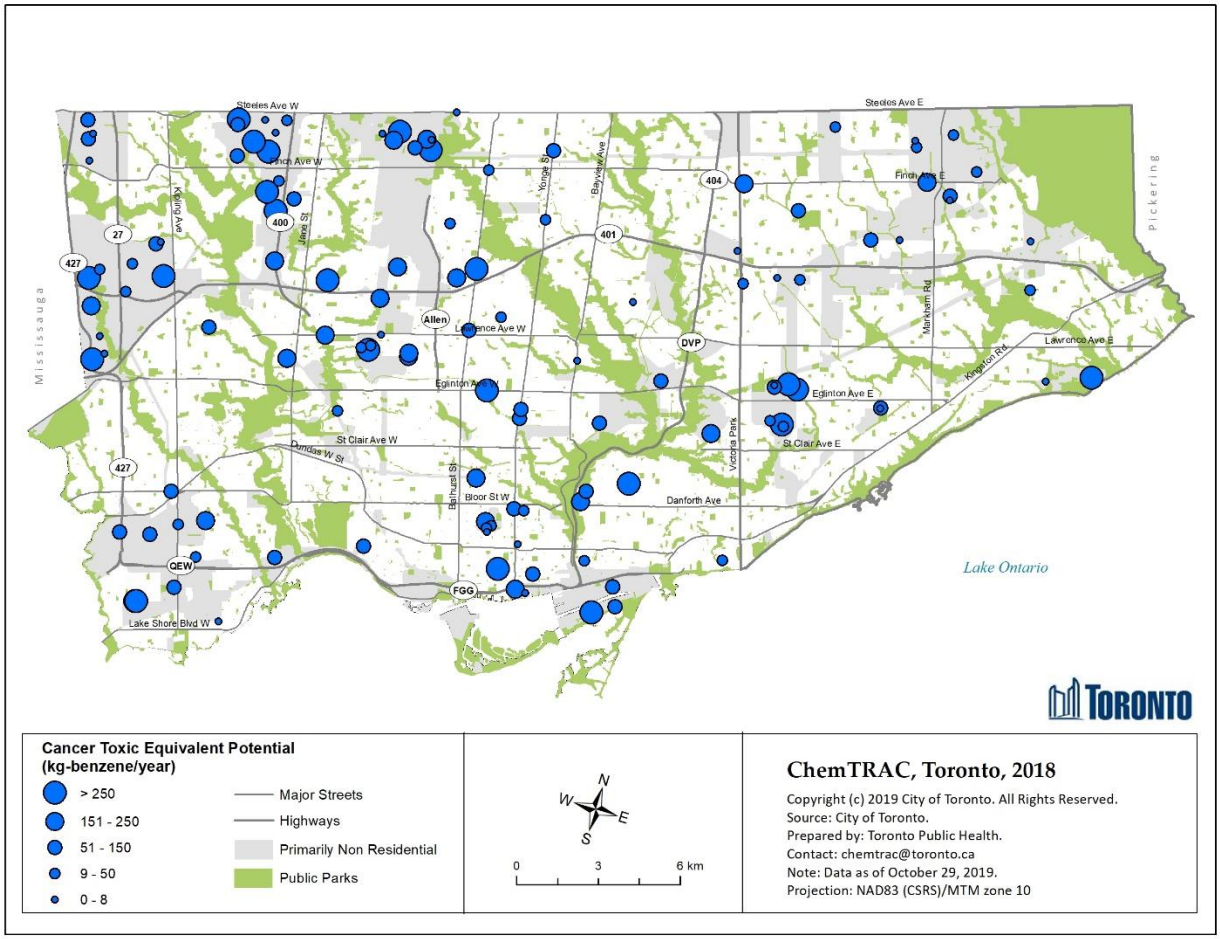
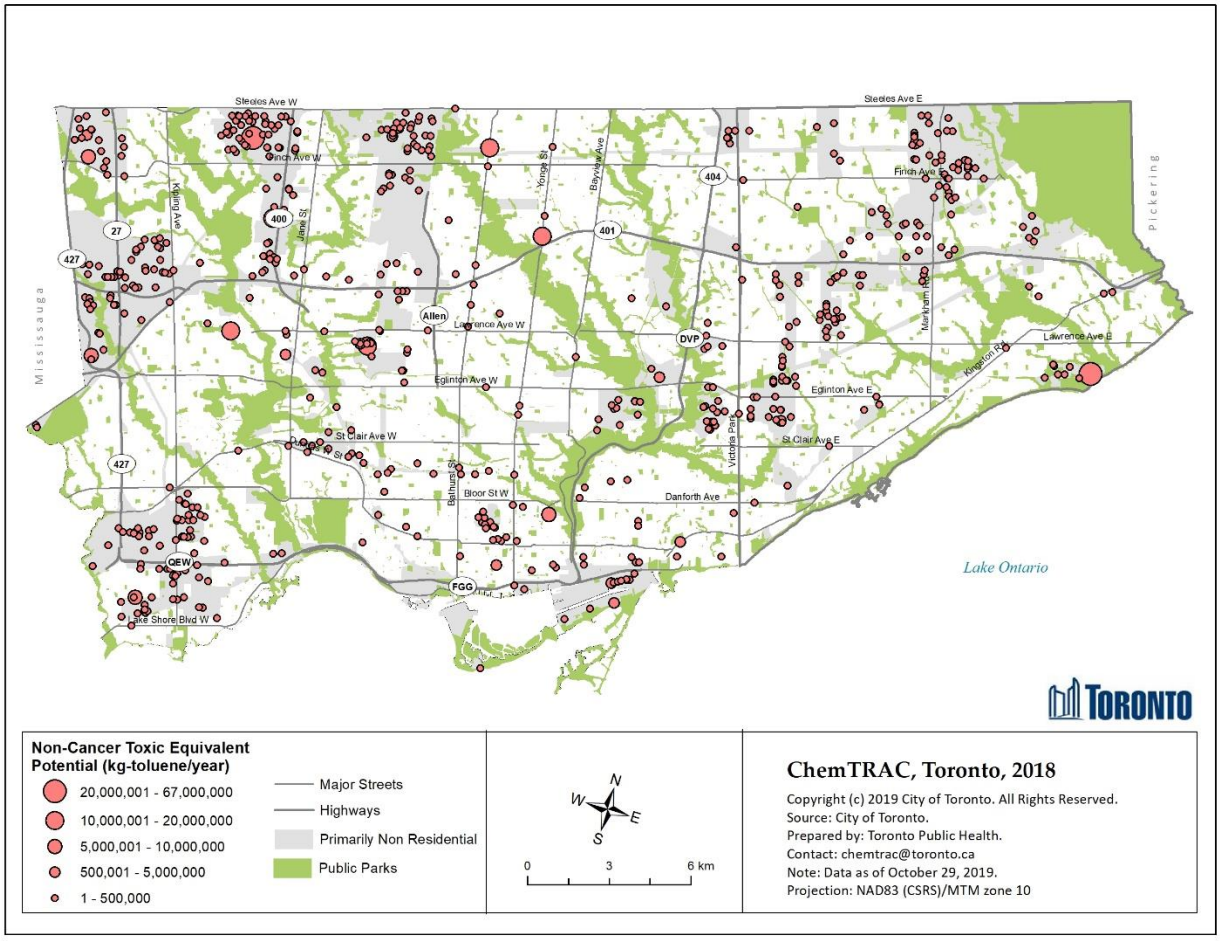


Figure 4 presents a map of the total Non-Cancer Toxic Equivalent Potential (TEP) of the reporting facilities. TEPs allow the toxicity of very different substances to be compared in the same scale. A bigger circle means a higher potential for adverse health effects.

To do this, the toxicity of each substance is scaled relative to toluene, a chemical with a well-known non-cancer toxicity profile. The size of the circles represents the number of kilograms of toluene that would need to be emitted to have the same potential toxicity as the mixture of reported emissions from each facility.

Figure 4: Location of 2018 air releases by Non-Cancer Toxic Equivalent Potential.



Chapter 4: Sector Quick Facts

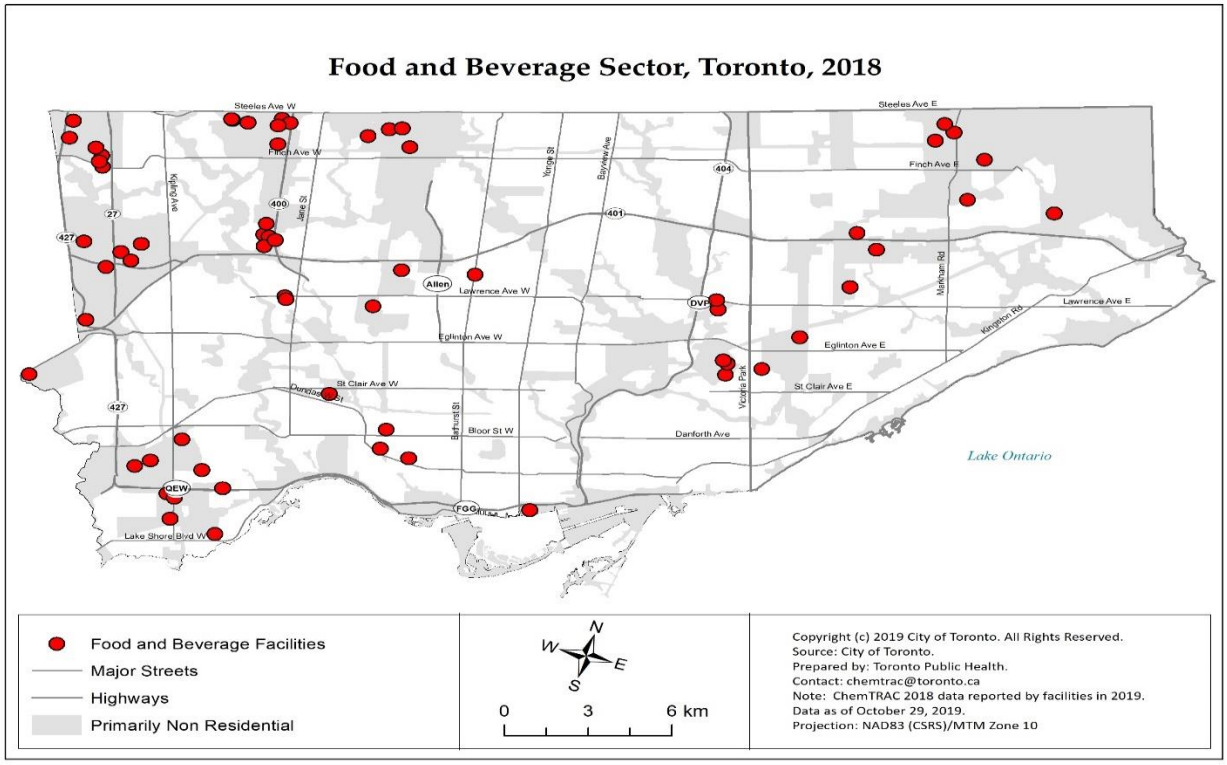
The information reported by businesses for the 2018 calendar year is summarized by industry type below. Where more than five substances were reported by a sector, we present only the top five substances manufactured, processed, or otherwise used in that sector.

Food and Beverage Manufacturing

Types of activities: meat processing, baking, fruit and vegetable canning, frozen food manufacturing and dairy product manufacturing, beverage manufacturing - soft drink, ice, and bottled water manufacturing, beer brewers and wine distillers, and tobacco manufacturing.

- Number of facilities that reported: 65
- Range in number of employees per facility: 1 to 741
- Total amount of chemicals released: 705,150 kilograms
- Total amount of chemicals manufactured, processed or used: 1,405,317 kilograms
- Number of priority substances reported: 6

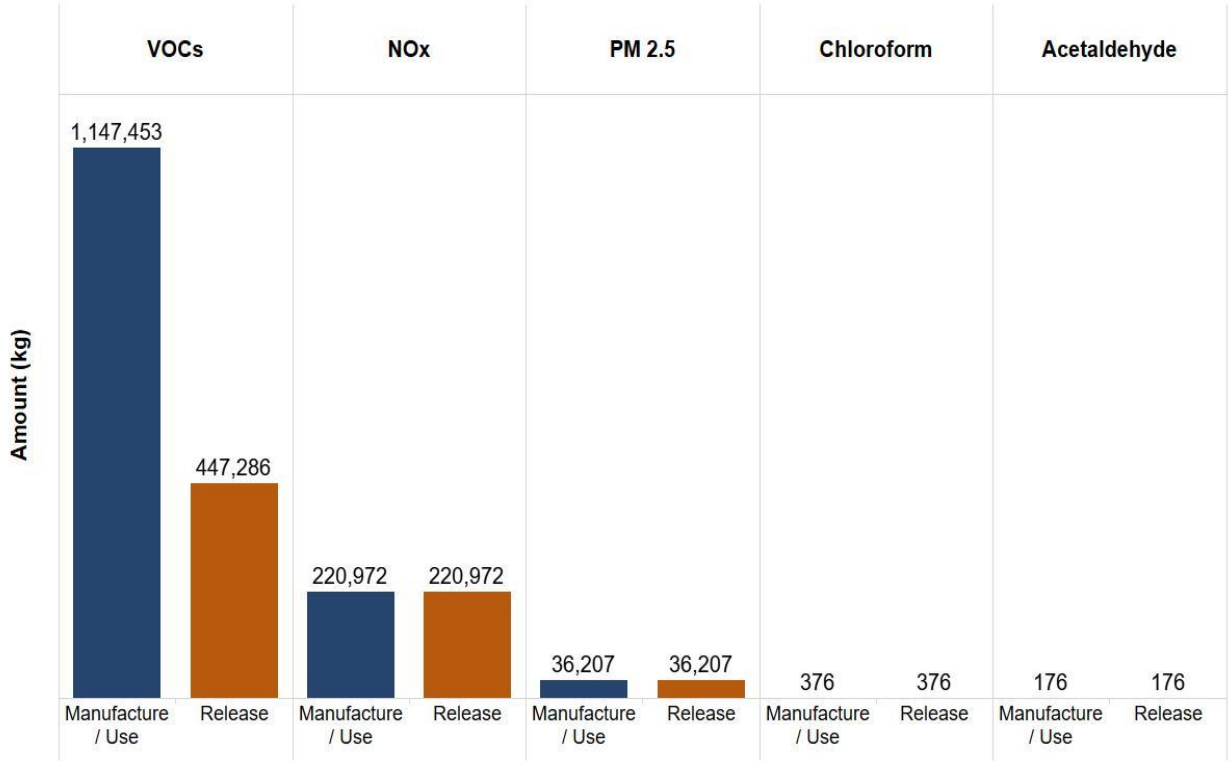
Figure 5: Location of facilities from the Food and Beverage Sector in 2018



Top five substances reported were:

- Volatile organic compounds (VOCs)
- Nitrogen oxides (NOx)
- Particulate matter 2.5 ($PM_{2.5}$)
- Chloroform
- Acetaldehyde

Figure 6: Amount of top five substances reported by Food and Beverage facilities for 2018 *



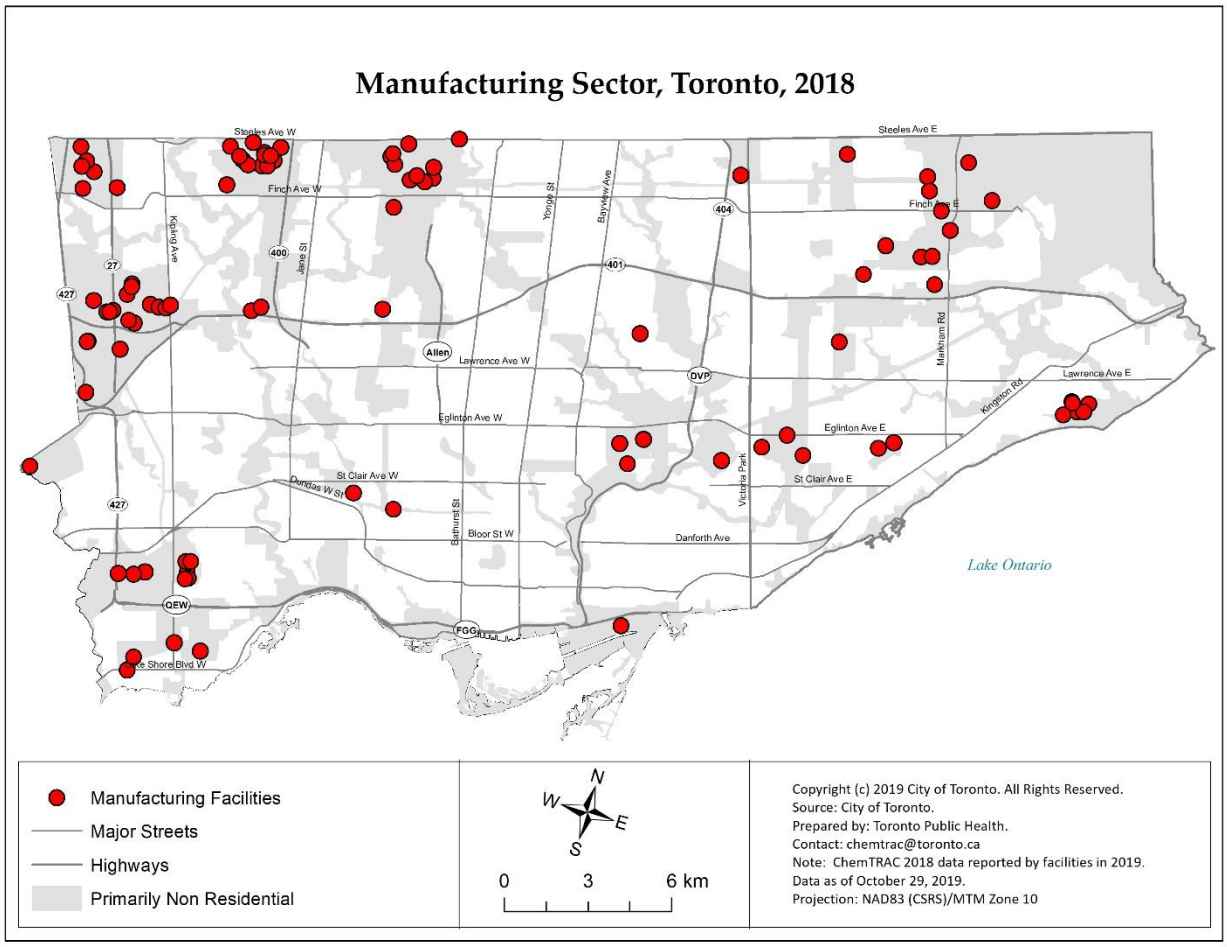
* The substances are arranged in descending order of amounts released

Manufacturing (including chemical and petroleum products)

Types of activities: manufacturing of basic chemicals, synthetic fibers, plastics, pigments, paints, fertilizers, drugs, cosmetics and soaps.

- Number of facilities that reported: 98
- Range in number of employees per facility: 2 to 1,456
- Total amount of chemicals released: 2,676,888 kilograms
- Total amount of chemicals manufactured, processed or used: 69,719,811 kilograms
- Number of priority substances reported: 17

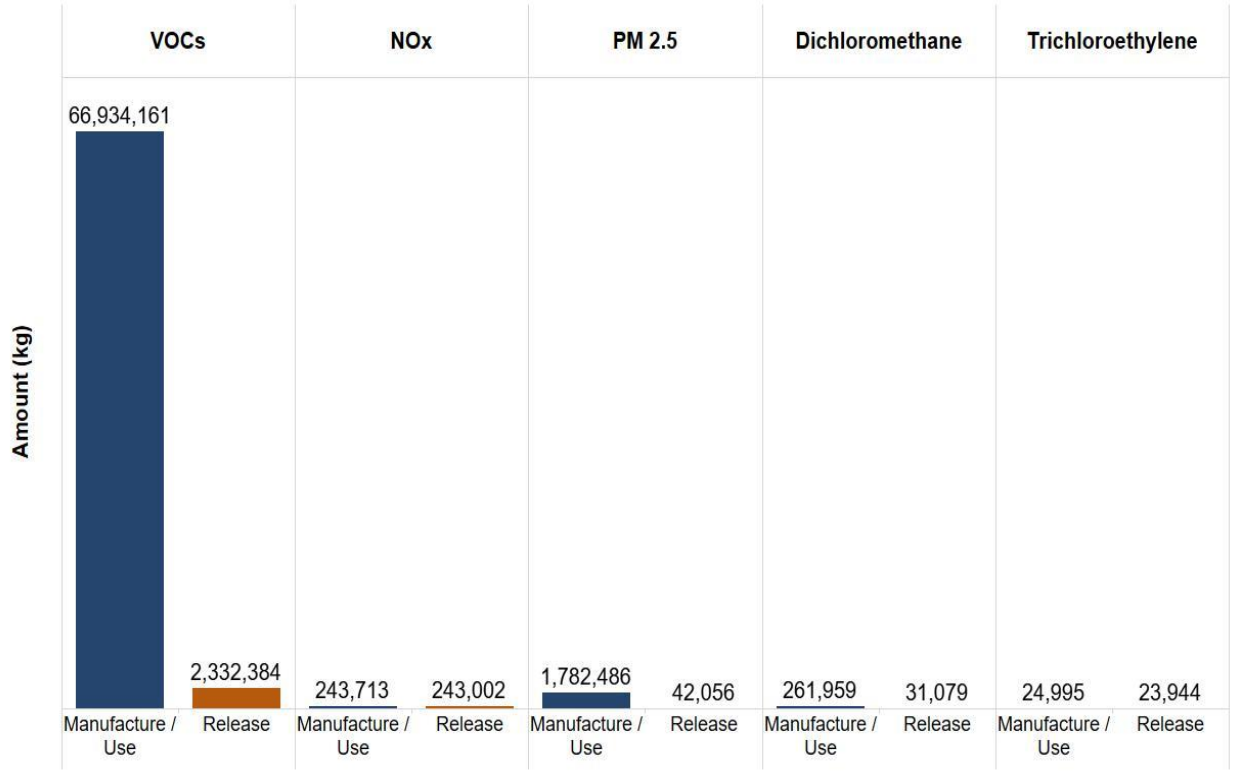
Figure 7: Location of facilities from the Manufacturing Sector in 2018



Top five substances reported were:

- Volatile organic compounds (VOCs)
- Nitrogen oxides (NOx)
- Particulate matter 2.5 ($PM_{2.5}$)
- Dichloromethane
- Trichloroethylene

Figure 8: Amount of top five substances reported by Manufacturing facilities for 2018 *



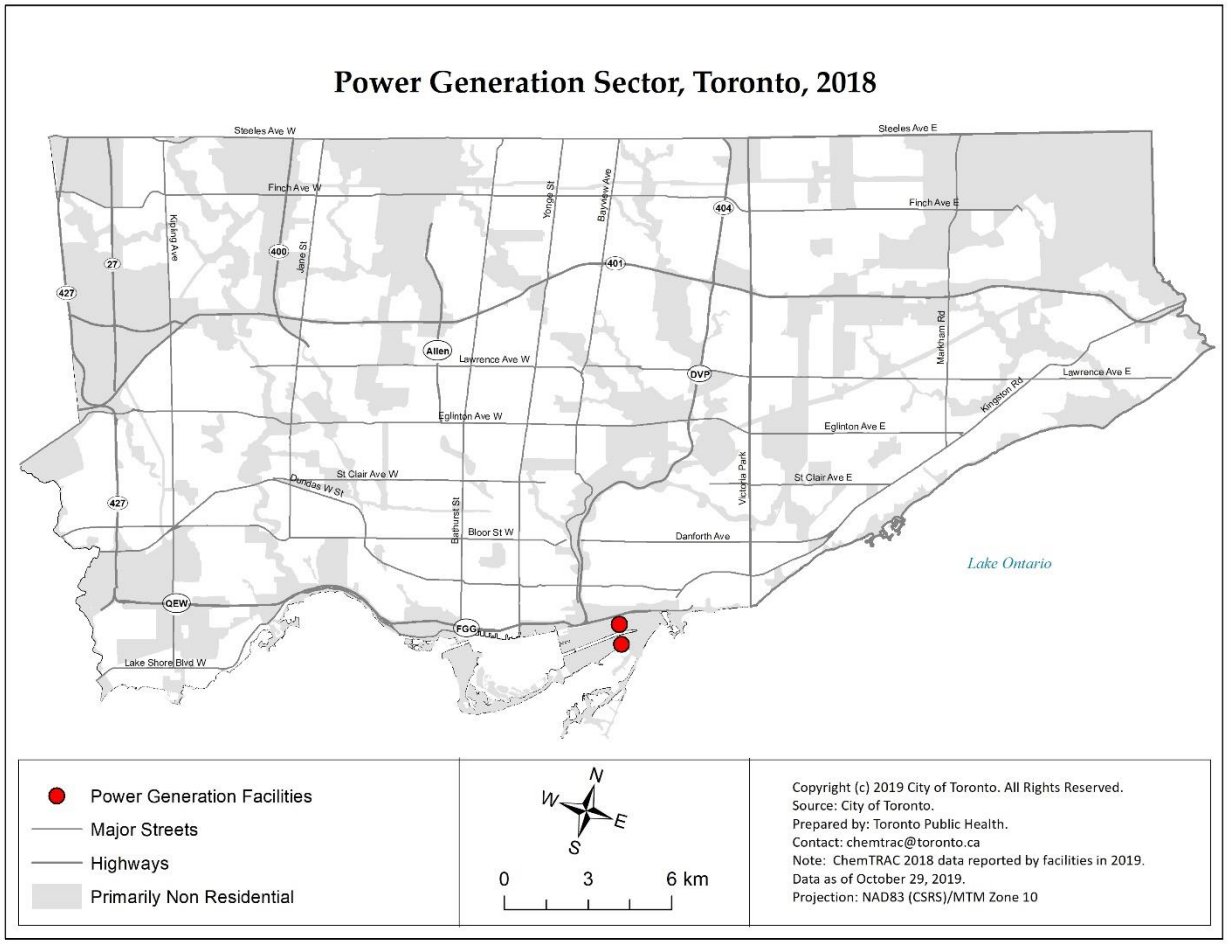
* The substances are arranged in descending order of amounts released

Power Generation

Types of activities: generation of bulk electric power.

- Number of facilities that reported: 2
- Range in number of employees per facility: 30 to 850
- Total amount of chemicals released: 255,024 kilograms
- Total amount of chemicals manufactured, processed or used: 262,053 kilograms
- Number of priority substances reported: 6

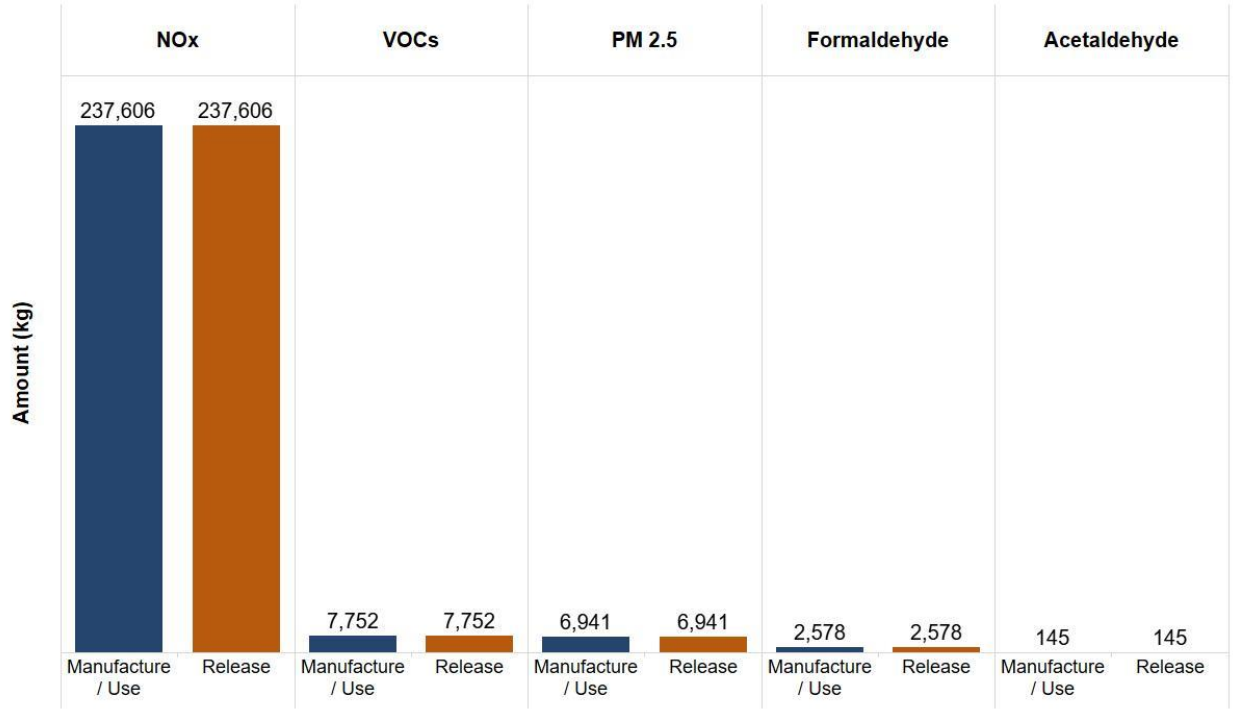
Figure 9: Location of facilities from the Power Generation Sector in 2018



Top five substances reported were:

- Nitrogen oxides (NOx)
- Volatile organic compounds (VOCs)
- Particulate matter 2.5 ($PM_{2.5}$)
- Formaldehyde
- Acetaldehyde

Figure 10: Amount of top five substances reported by Power Generation facilities for 2018 *



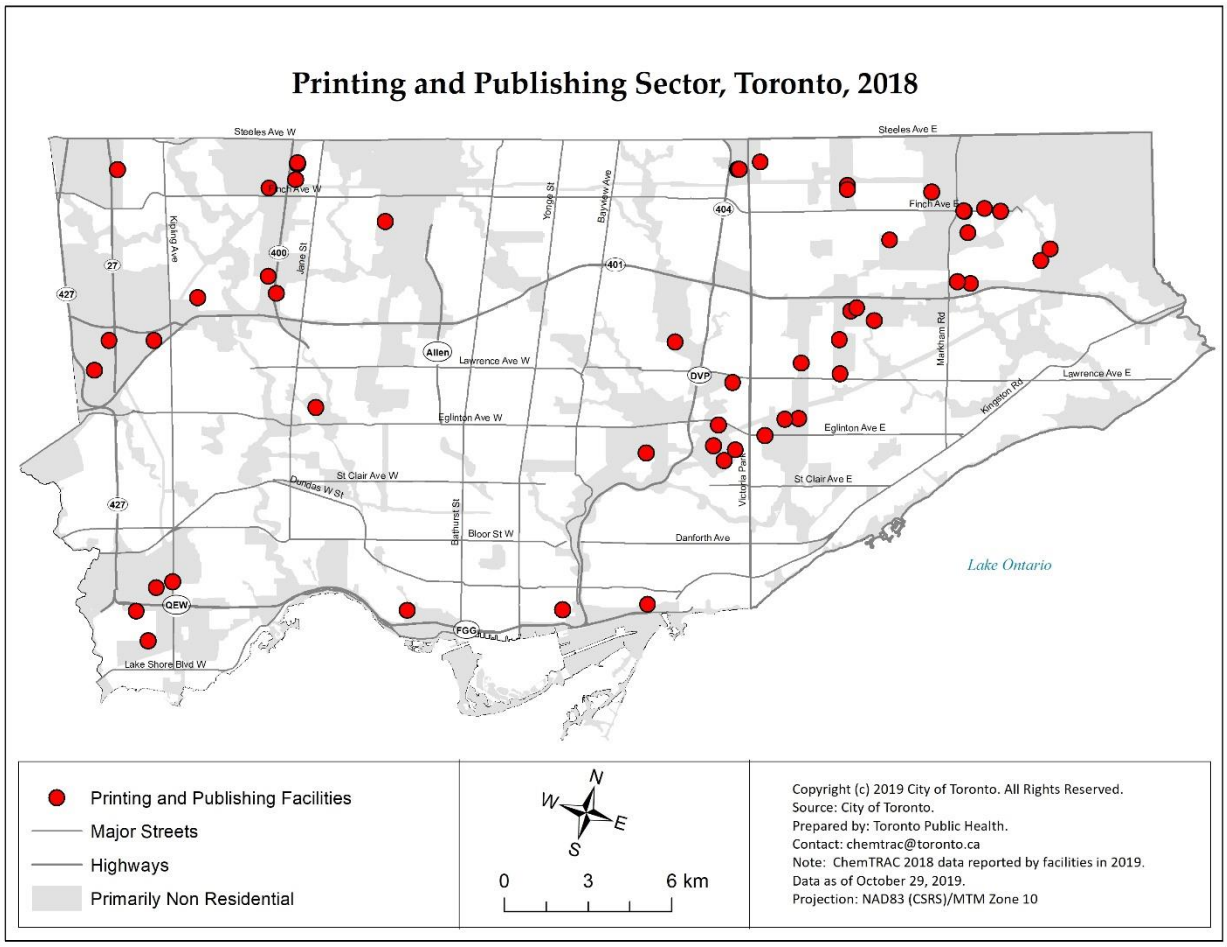
* The substances are arranged in descending order of amounts released

Printing and Publishing

Types of activities: printing newspapers, books, labels, business cards, food wrappers, etc.

- Number of facilities that reported: 53
- Range in number of employees per facility: 1 to 288
- Total amount of chemicals released: 827,273 kilograms
- Total amount of chemicals manufactured, processed or used: 1,181,951 kilograms
- Number of priority substances reported: 7

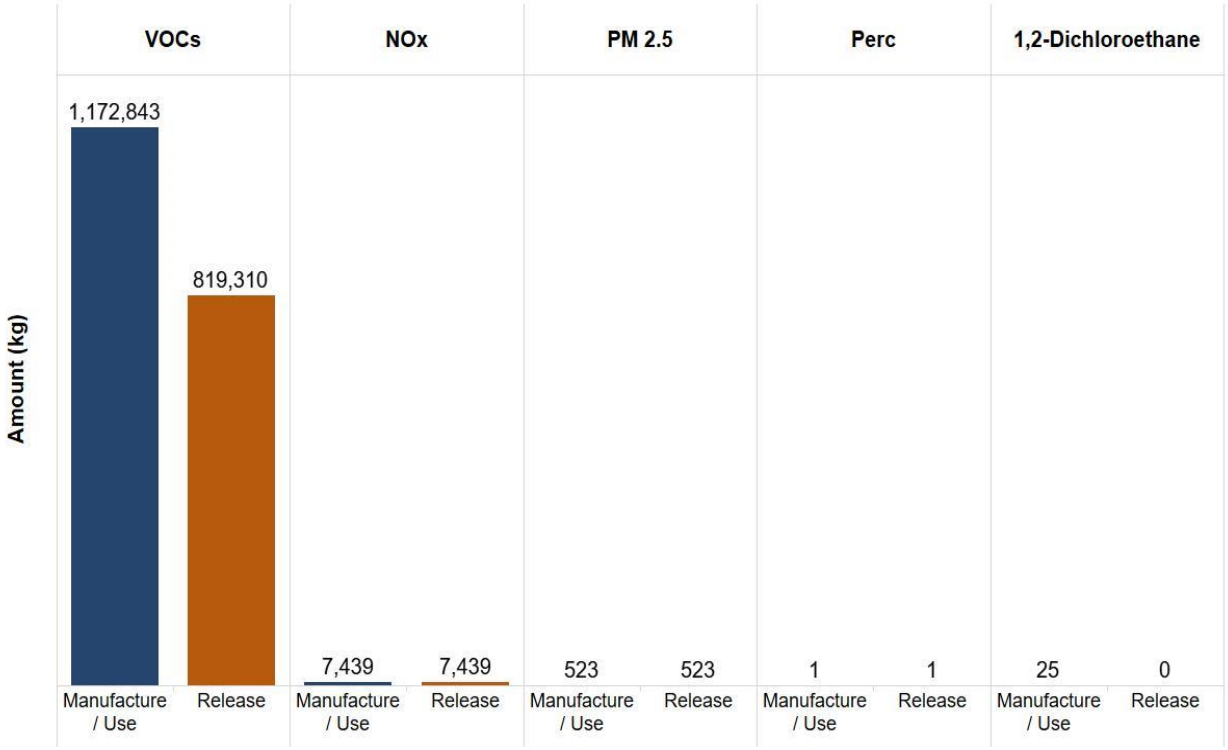
Figure 11: Location of facilities from the Printing and Publishing Sector in 2018



Top five substances reported were:

- Volatile organic compounds (VOCs)
- Nitrogen oxides (NOx)
- Particulate matter 2.5 ($PM_{2.5}$)
- Tetrachloroethylene (Perchloroethylene)
- 1,2-Dichloroethane

Figure 12: Amounts of top five substances reported by Printing and Publishing facilities for 2018*



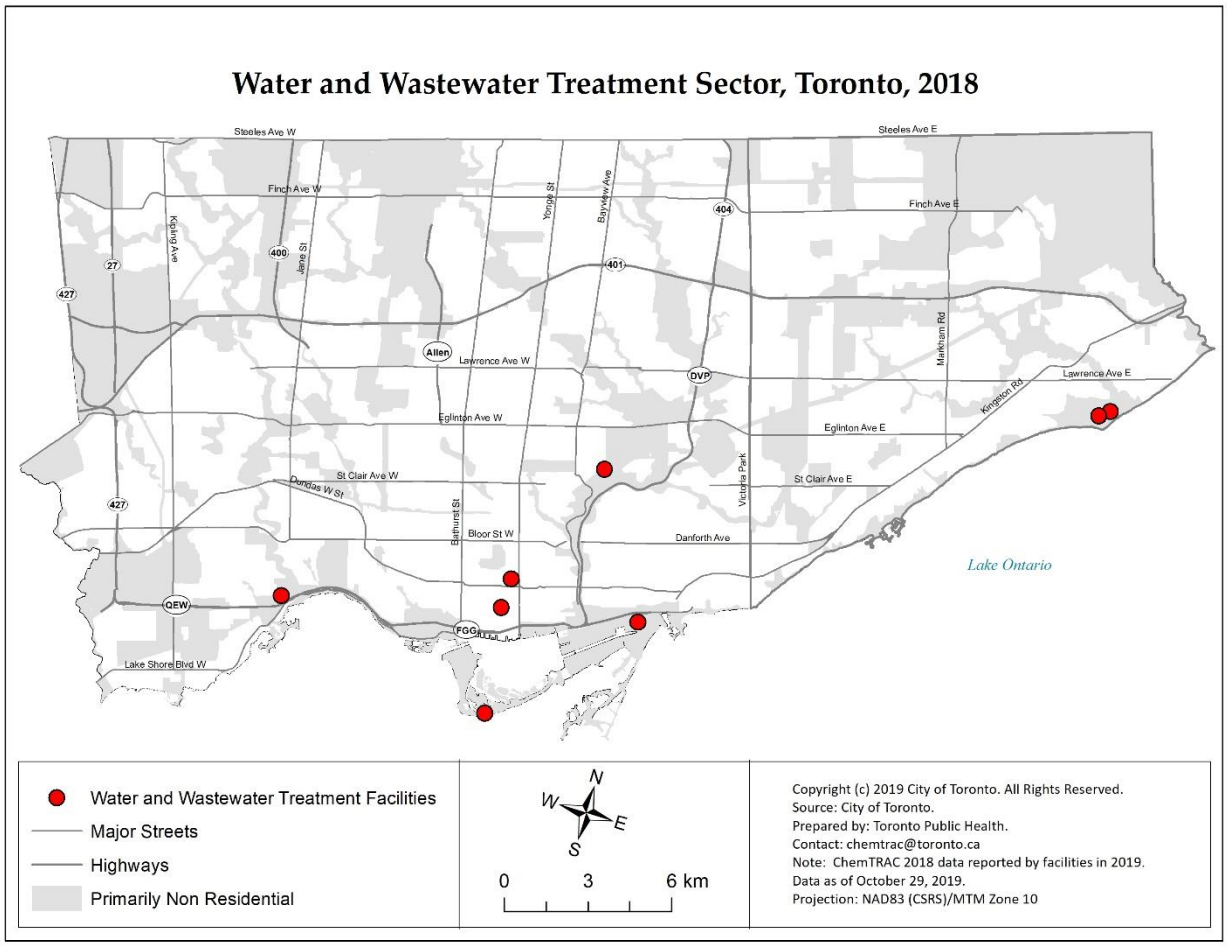
* The substances are arranged in descending order of amounts released

Water and Wastewater

Types of activities: water, wastewater and sewage treatment plants.

- Number of facilities that reported: 8
- Range in number of employees per facility: 12 to 174
- Total amount of chemicals released: 352,880 kilograms
- Total amount of chemicals manufactured, processed or used: 357,434 kilograms
- Number of priority substances reported: 8

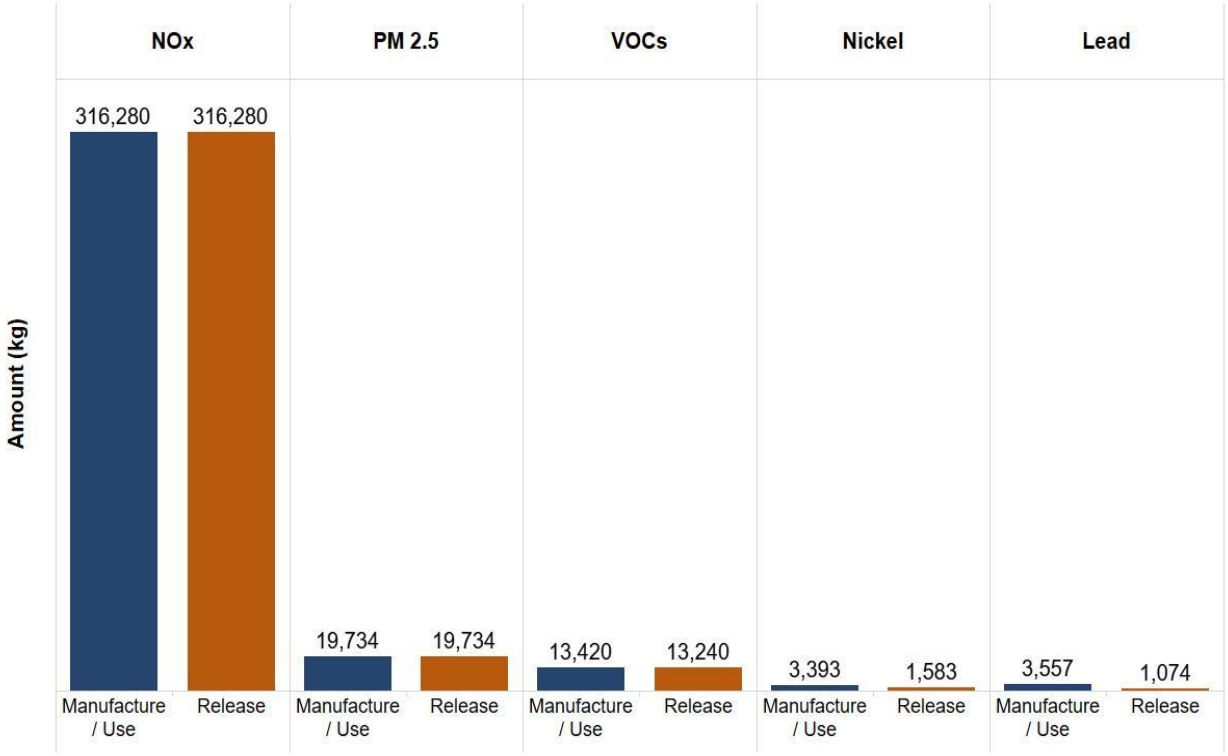
Figure 13: Location of facilities from the Water and Wastewater Treatment Sector in 2018



Top five substances reported were:

- Nitrogen oxides (NOx)
- Particulate matter 2.5 (PM2.5)
- Volatile organic compounds (VOCs)
- Nickel
- Lead

Figure 14: Amounts of top five substances reported by Water and Wastewater Treatment facilities for 2018 *



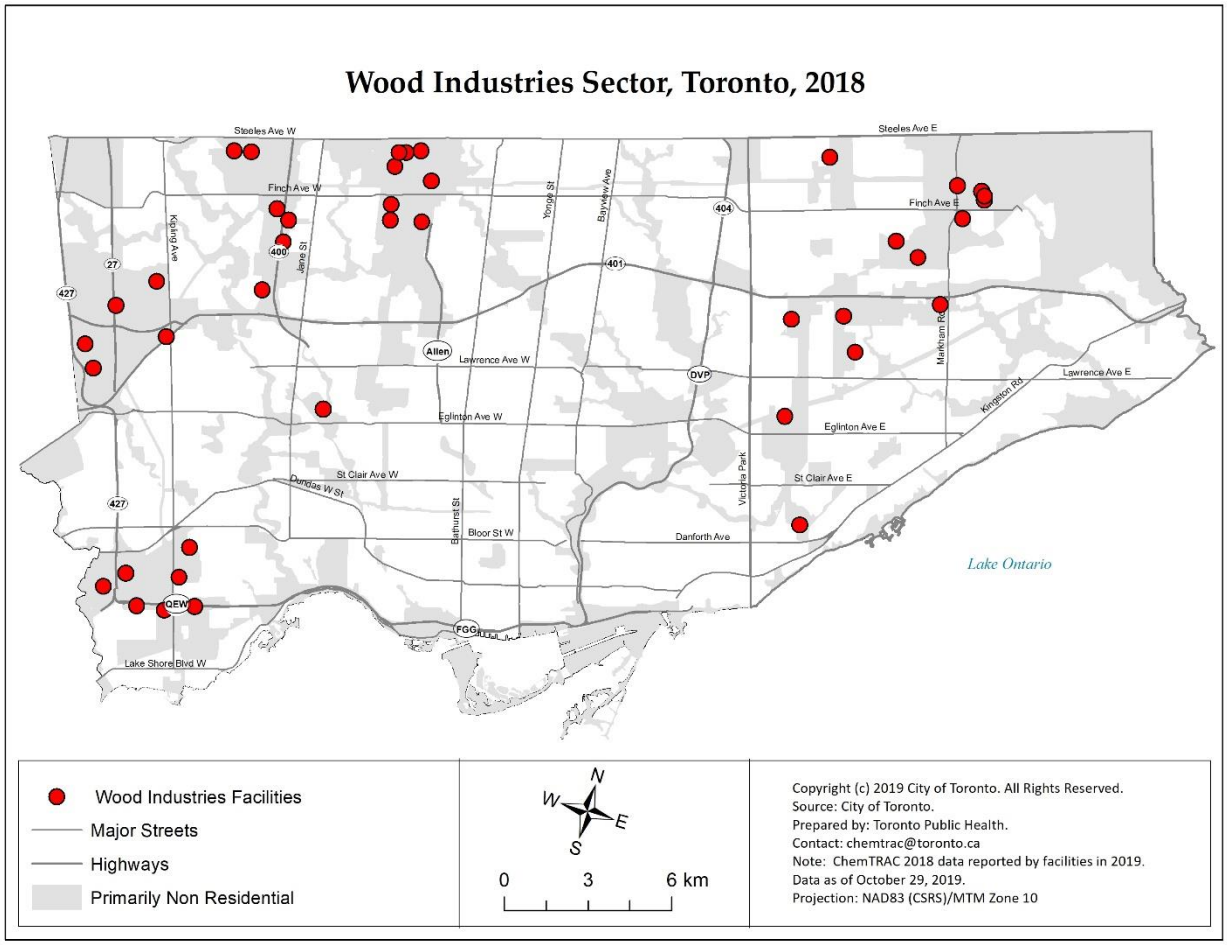
* The substances are arranged in descending order of amounts released

Wood Industries

Types of activities: creation of wood-based products including paper, cardboard, pallets, furniture and cabinetry.

- Number of facilities that reported: 41
- Range in number of employees per facility: 1 to 699
- Total amount of chemicals released: 182,014 kilograms
- Total amount of chemicals manufactured, processed or used: 195,803 kilograms
- Number of priority substances reported: 7

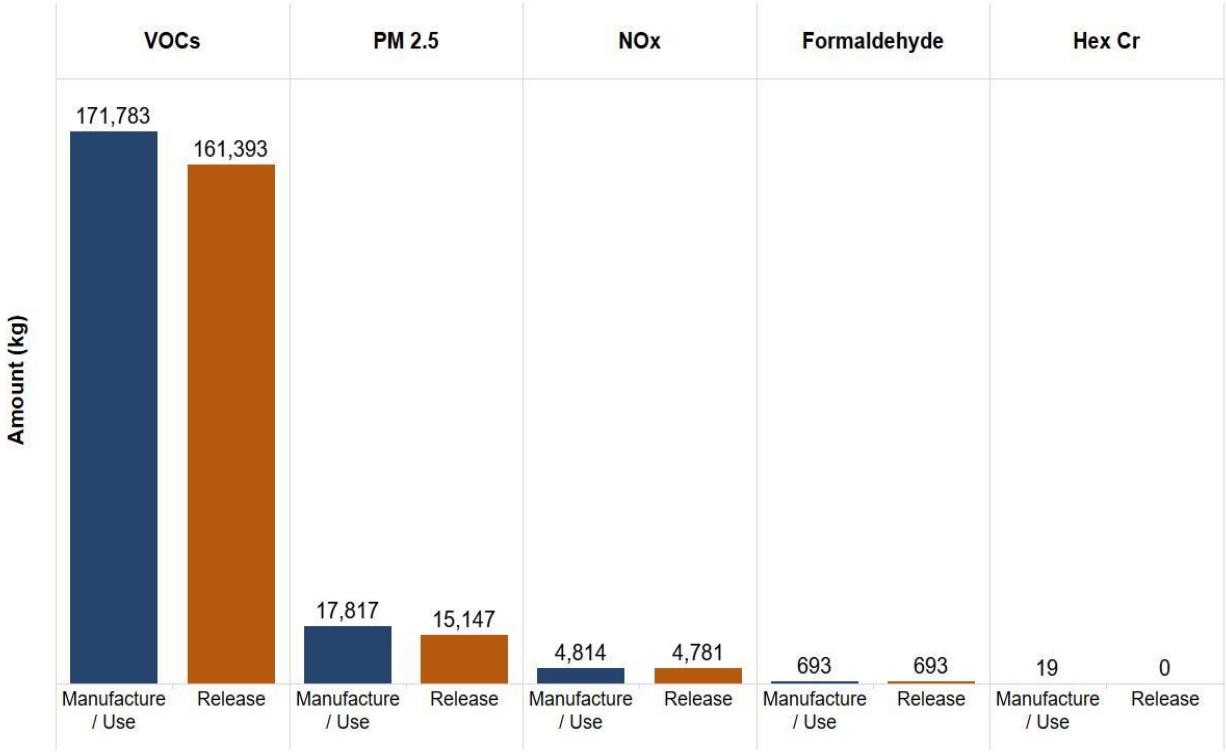
Figure 15: Location of facilities from the Wood Industries Sector in 2018



Top five substances reported were:

- Volatile organic compounds (VOCs)
- Particulate matter 2.5 ($PM_{2.5}$)
- Nitrogen oxides (NOx)
- Formaldehyde
- Chromium Hexavalent

Figure 16: Amounts top five of substances reported by Wood Industries for 2018 *



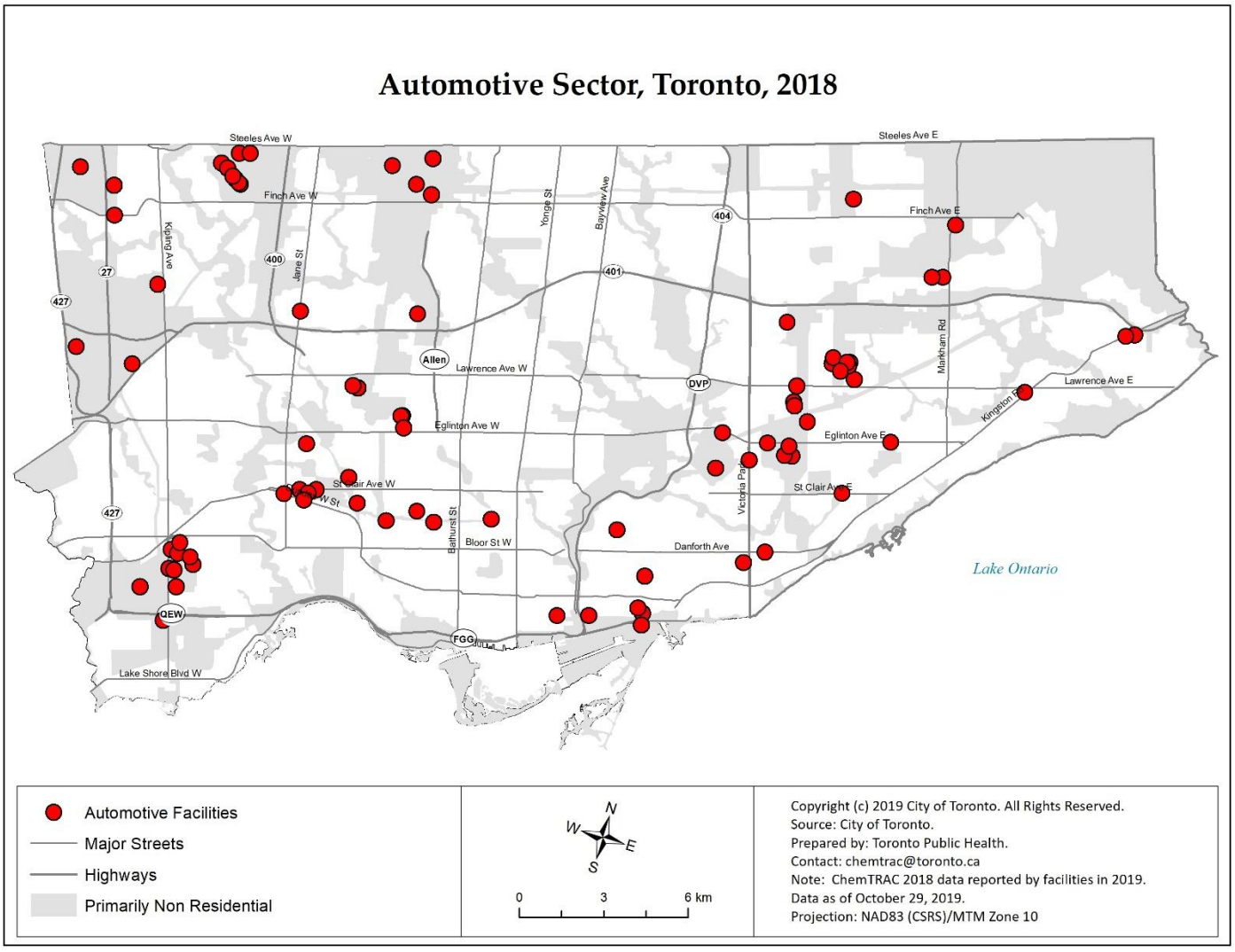
* The substances are arranged in descending order of amounts released

Auto Body, Collision Repair and Auto Refinishing Sector

Types of activities: painting, repairing and customizing cars, trucks, vans and commercial trailers.

- Number of facilities that reported: 87
- Range in number of employees per facility: 1 to 65
- Total amount of chemicals released: 38,107 kilograms
- Total amount of chemicals manufactured, processed or used: 55,039 kilograms
- Number of priority substances reported: 3

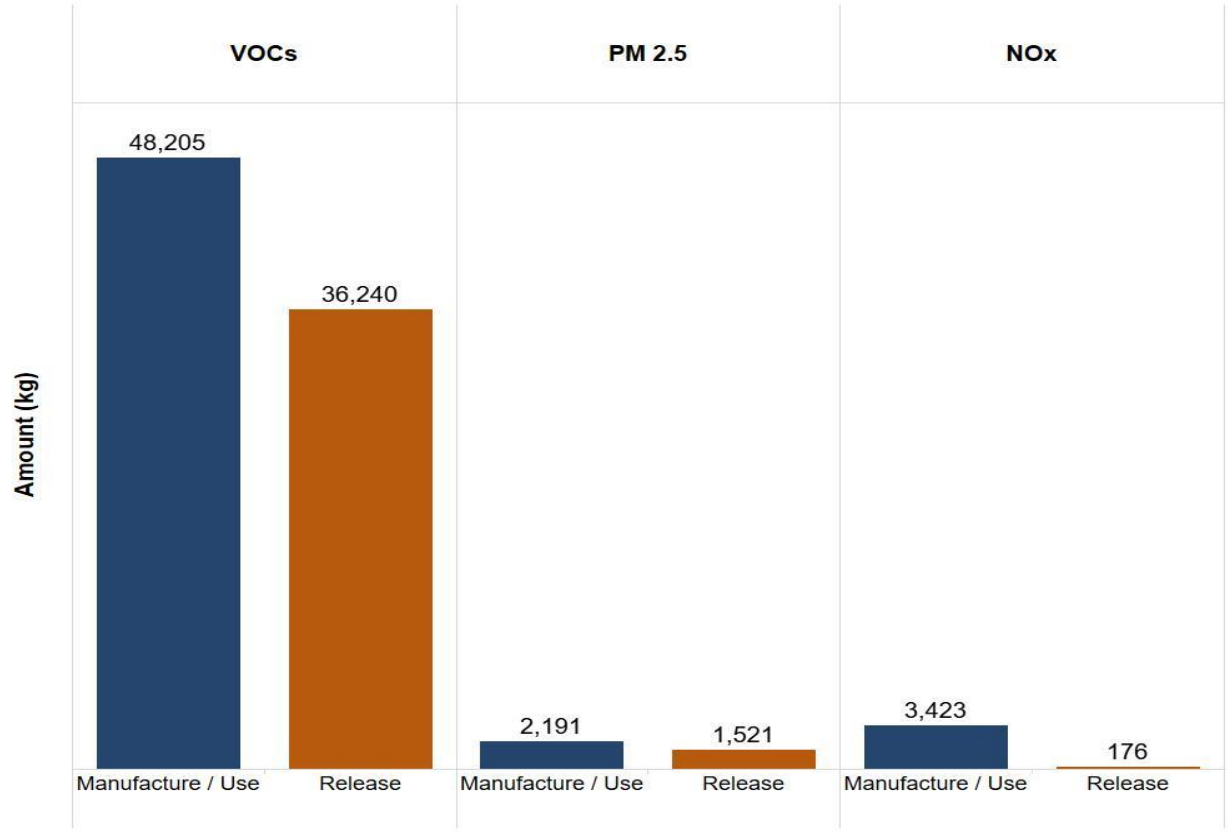
Figure 17: Location of facilities from the Autobody, Collision Repair and Auto Refinishing Sector in 2018



The three substances reported were:

- Volatile organic compounds (VOCs)
- Particulate matter 2.5 ($PM_{2.5}$)
- Nitrogen oxides (NOx)

Figure 18: Amounts of the three substances reported by Autobody, Collision Repair, and Auto Refinishing facilities for 2018 *



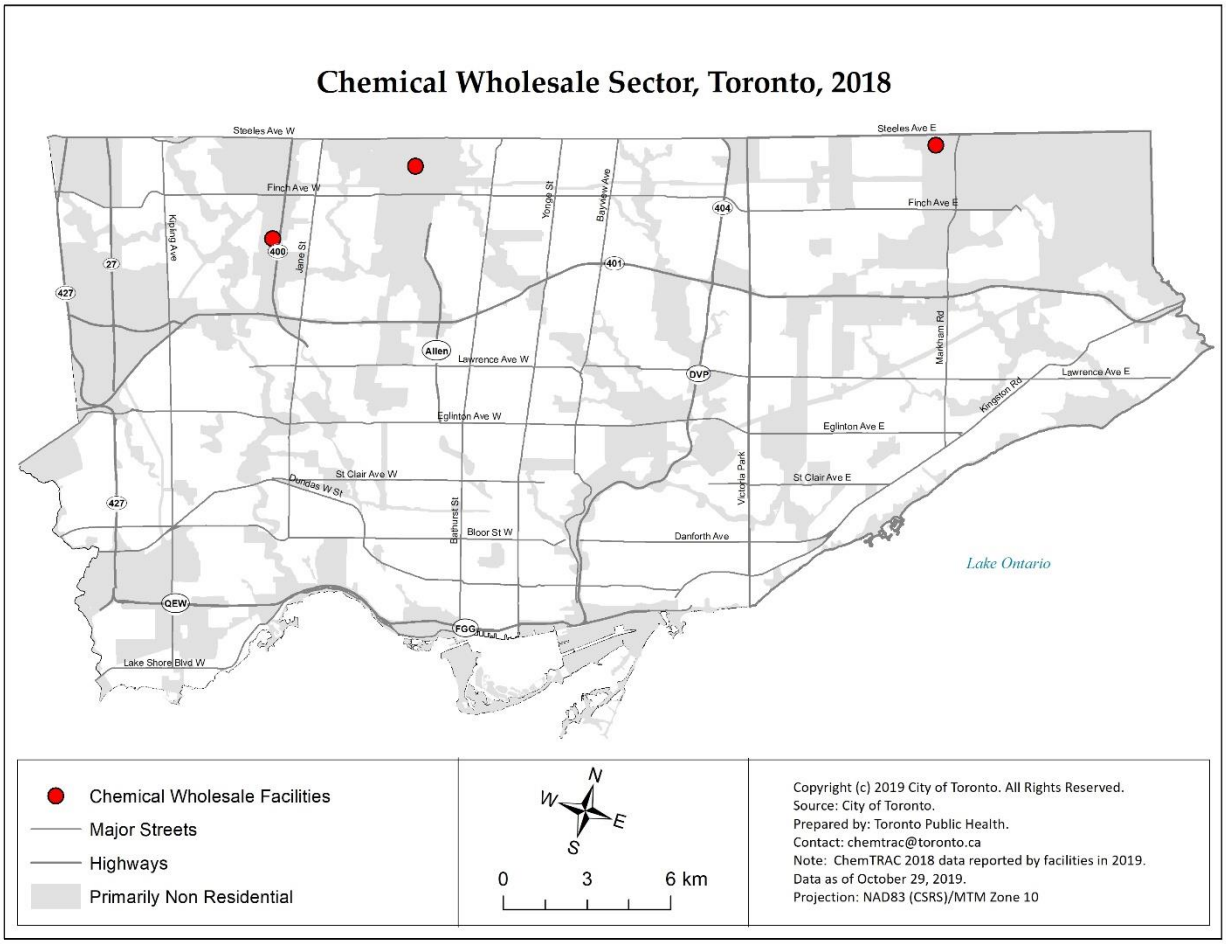
* The substances are arranged in descending order of amounts released

Chemical Wholesale

Types of activities: wholesale of industrial and household chemicals, cleaning compounds and preparations, plastics resins, plastic basic forms and shapes, and industrial gases.

- Number of facilities that reported: 3
- Range in number of employees per facility: 18 to 125
- Total amount of chemicals released: 465,329 kilograms
- Total amount of chemicals manufactured, processed or used: 18,308,009 kilograms
- Number of priority substances reported: 2

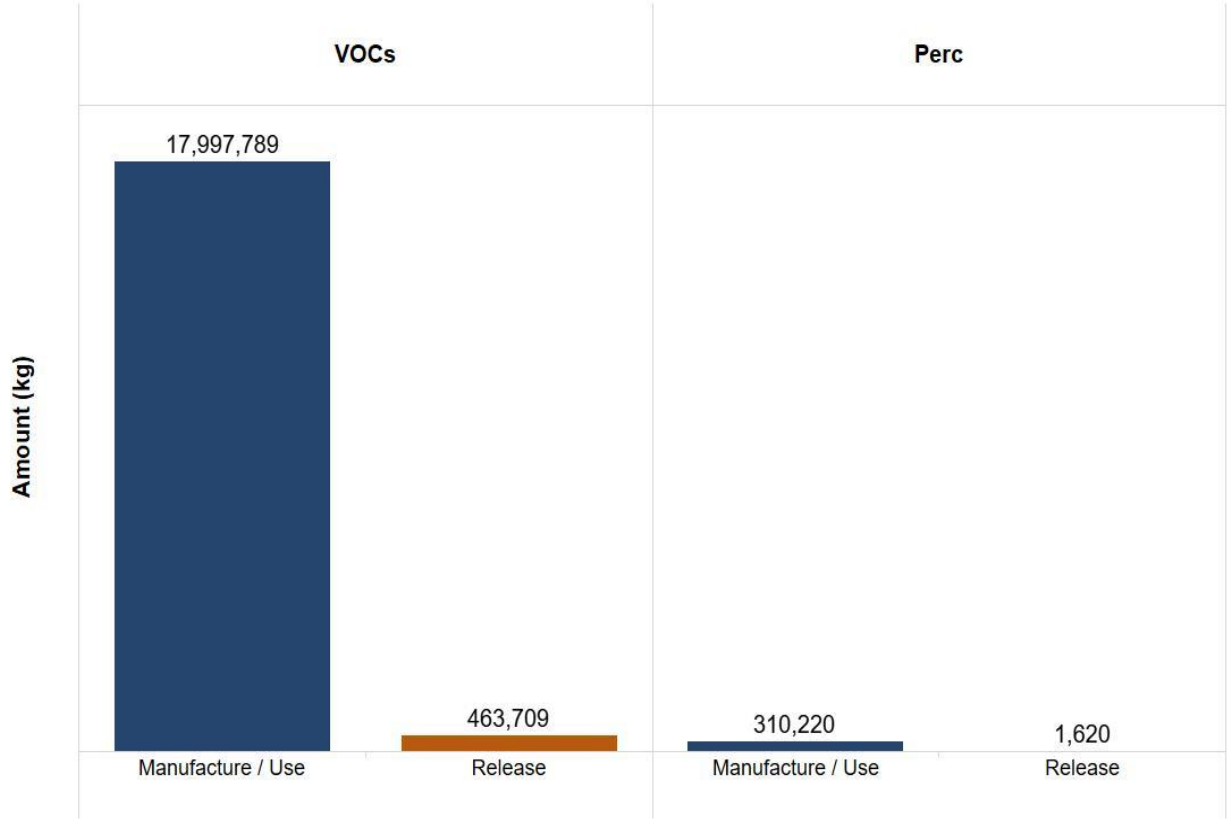
Figure 19: Location of facilities from the Chemical Wholesale Sector in 2018



The two substances reported were:

- Volatile organic compounds (VOCs)
- Tetrachloroethylene (Perchloroethylene)

Figure 20: Amount of the two substances reported by Chemical Wholesale facilities in 2018 *



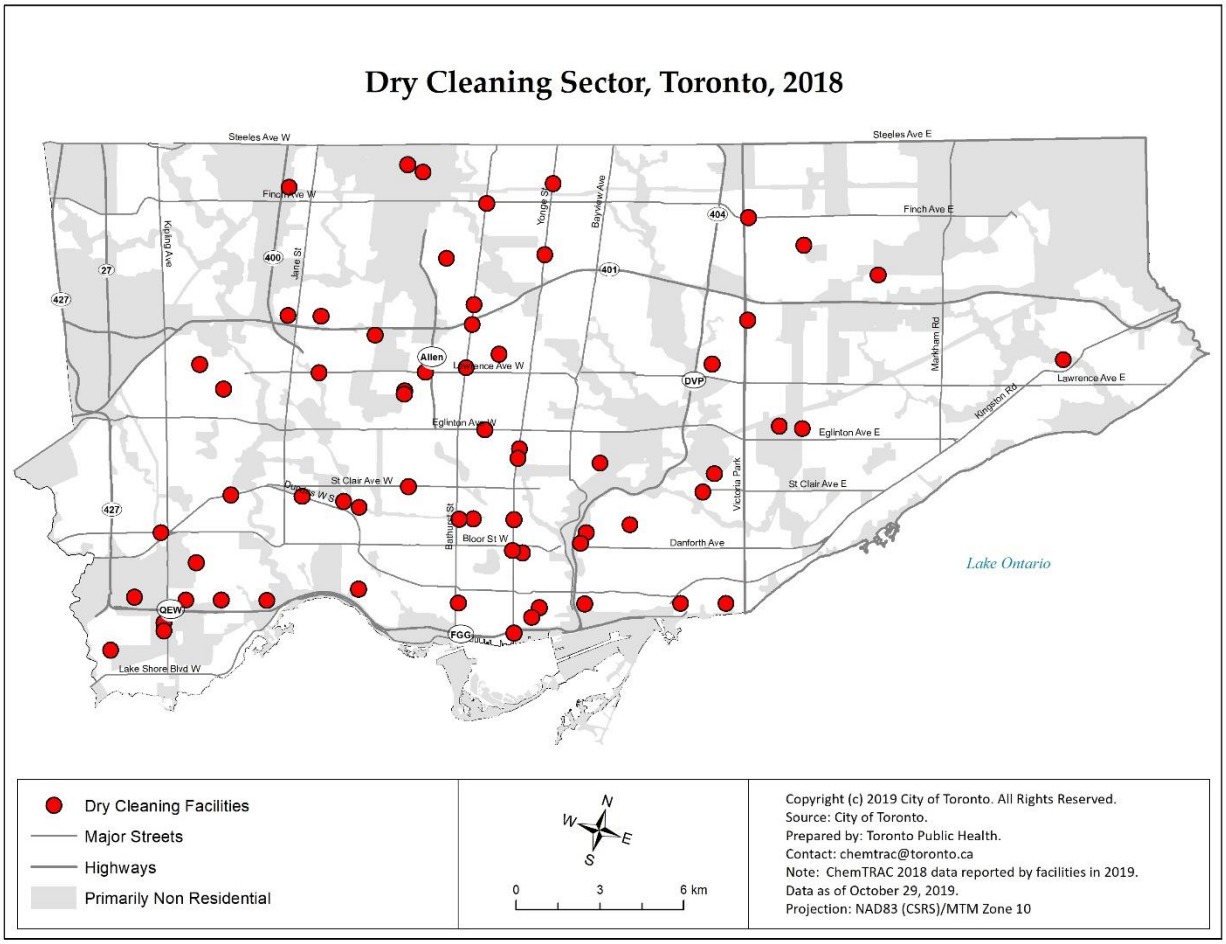
* The substances are arranged in descending order of amounts released

Dry Cleaning and Industrial Laundry

Types of activities: self-service laundry, laundering services, laundering and supplying laundered uniforms, linens and other fabric items, and dry cleaning.

- Number of facilities that reported: 65
- Range in number of employees per facility: 1 to 169
- Total amount of chemicals released: 38,388 kilograms
- Total amount of chemicals manufactured, processed or used: 112,922 kilograms
- Number of priority substances reported: 6

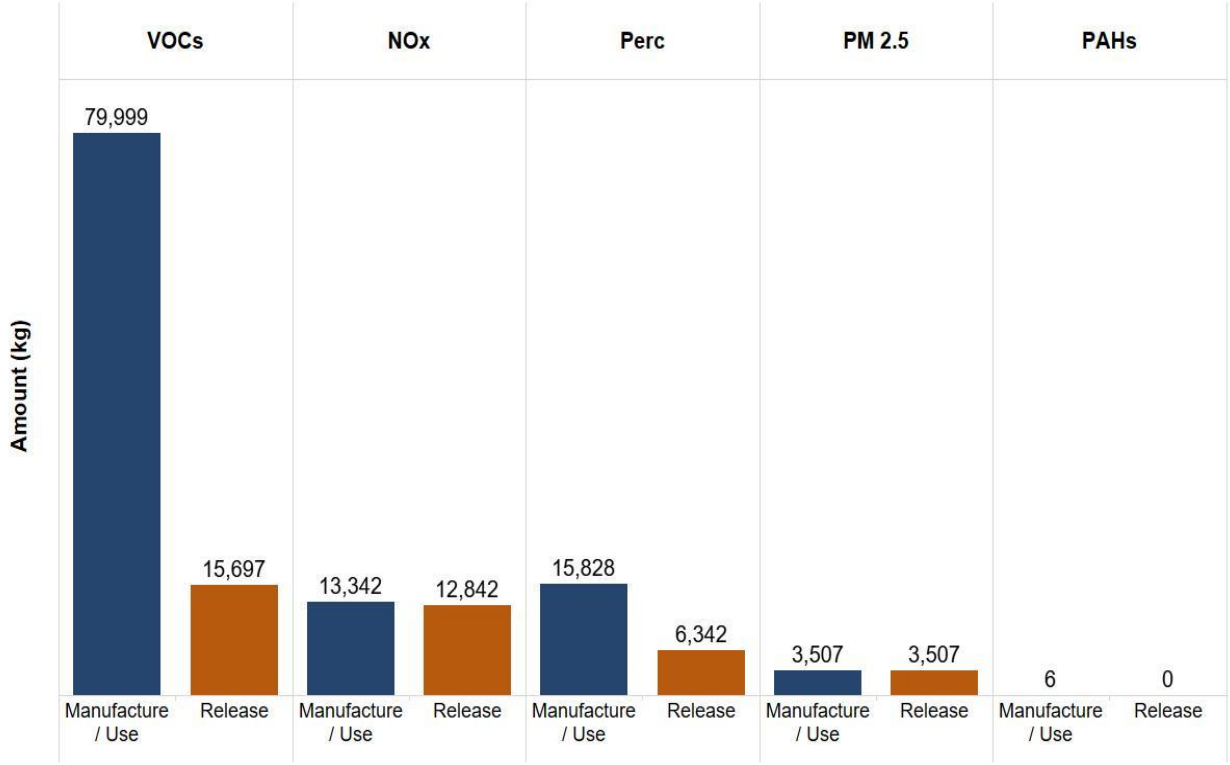
Figure 21: Location of facilities from the Dry Cleaning Sector in 2018



Top five substances reported were:

- Volatile organic compounds (VOCs)
- Nitrogen oxides (NOx)
- Tetrachloroethylene (Perchloroethylene)
- Particulate matter 2.5 ($PM_{2.5}$)
- Polycyclic Aromatic Hydrocarbons (PAHs)

Figure 22: Amounts of top five substances reported by Dry Cleaning and Industrial Laundry facilities for 2018 *



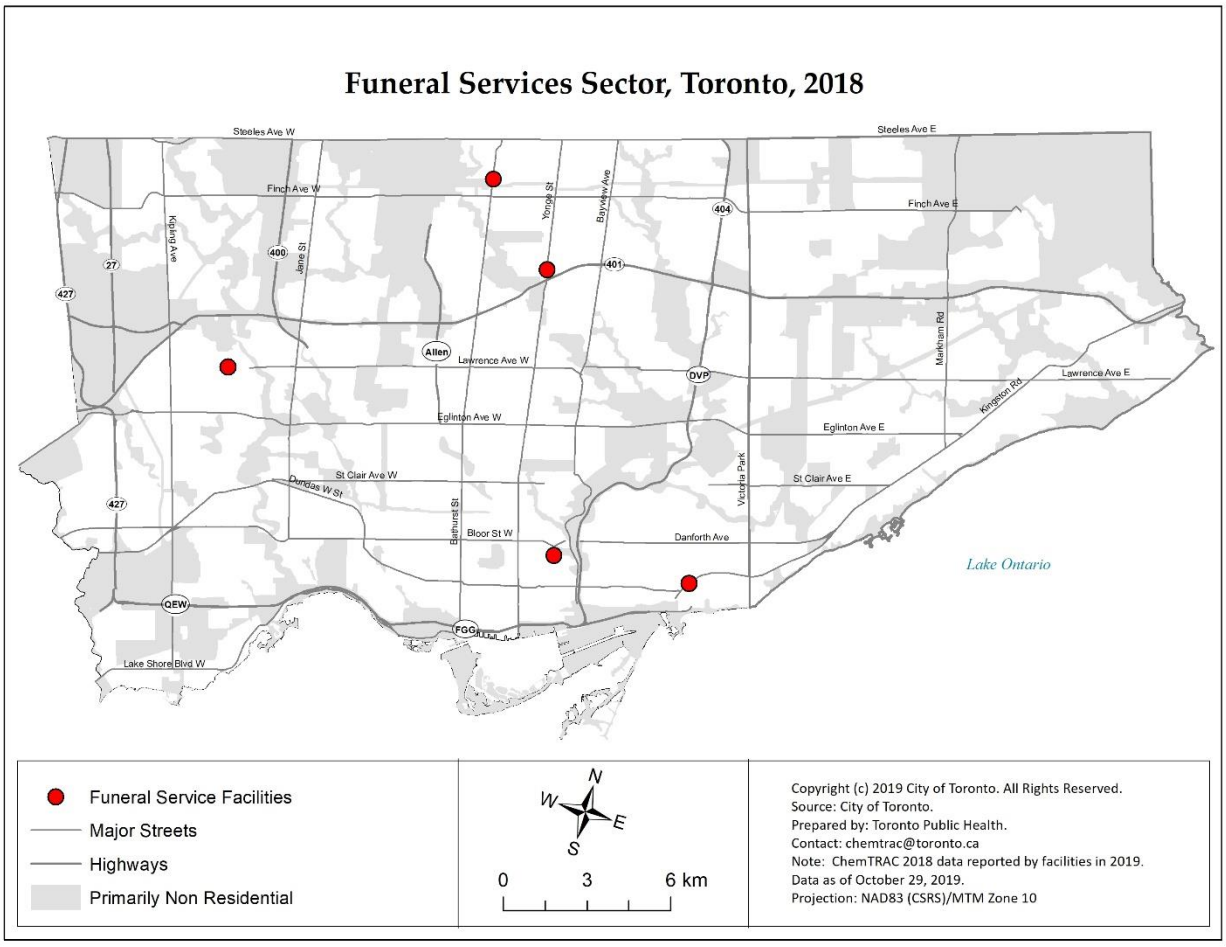
* The substances are arranged in descending order of amounts released

Funeral Services

Types of activities: funeral homes, cemeteries and crematoria.

- Number of facilities that reported: 5
- Range in number of employees per facility: 5 to 14
- Total amount of chemicals released: 439 kilograms
- Total amount of chemicals manufactured, processed or used: 675 kilograms
- Number of priority substances reported: 3

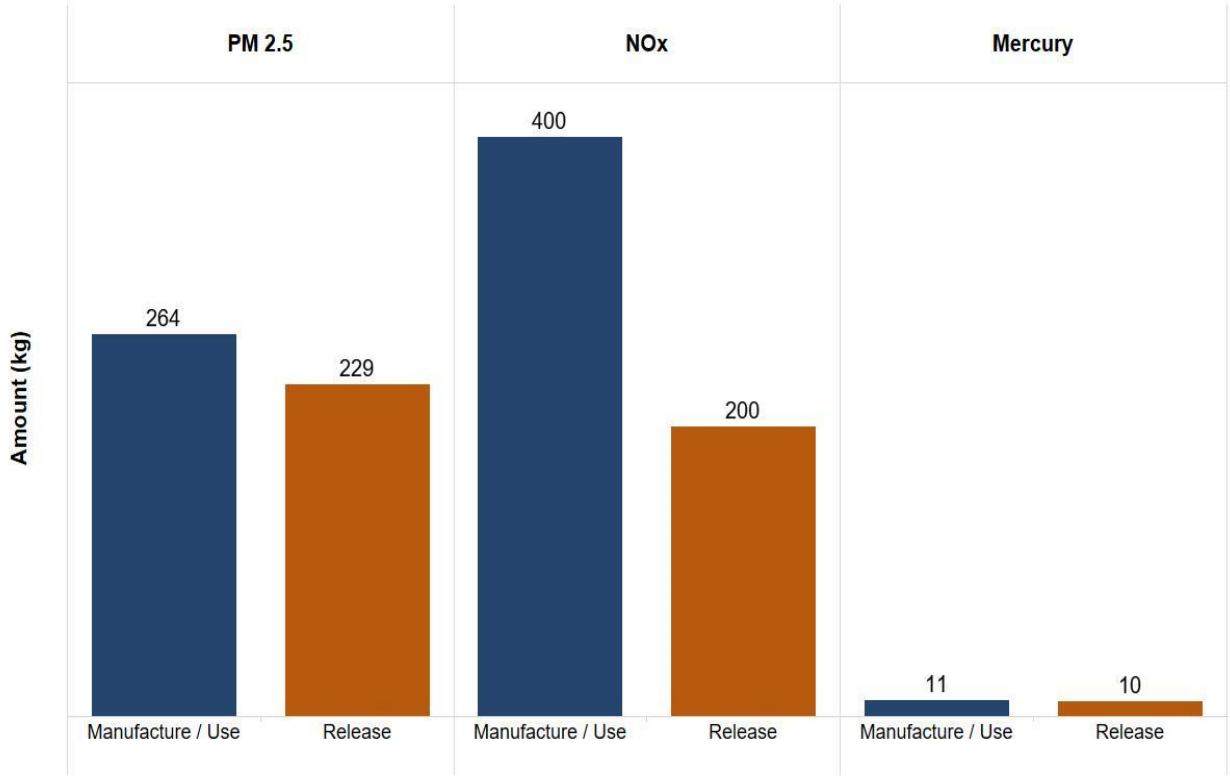
Figure 23: Location of facilities from the Funeral Services Sector in 2018



The three substances reported were:

- Particulate matter 2.5 ($PM_{2.5}$)
- Nitrogen oxides (NOx)
- Mercury and its compounds

Figure 24: Amount of the three substances reported by Funeral Services facilities for 2018 *



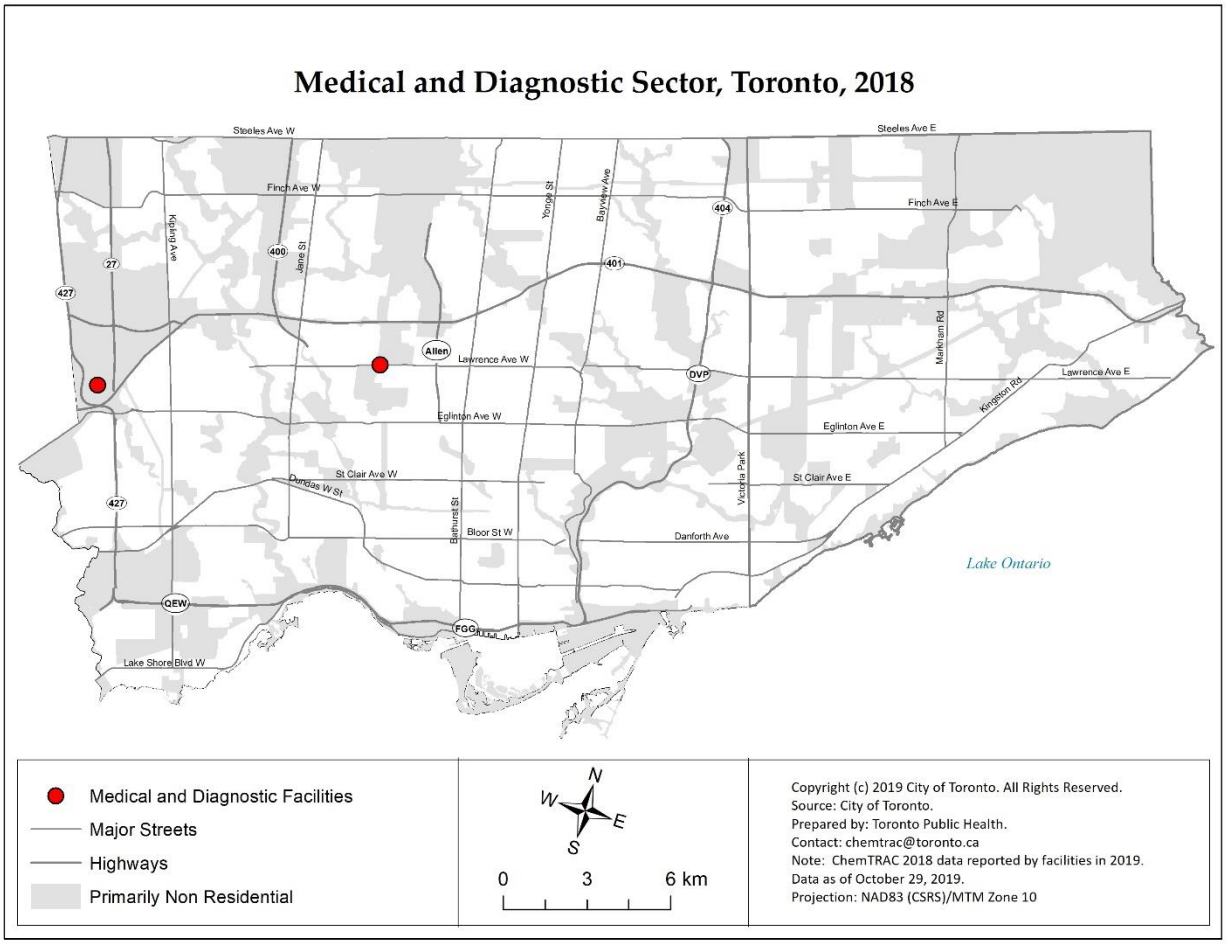
* The substances are arranged in descending order of amounts released

Medical and Diagnostic

Types of activities: analytic or diagnostic services to the medical profession or patient on referral from a health practitioner.

- Number of facilities that reported: 2
- Range in number of employees per facility: 105 to 885
- Total amount of chemicals released: 228 kilograms
- Total amount of chemicals manufactured, processed or used: 808 kilograms
- Number of priority substances reported: 2

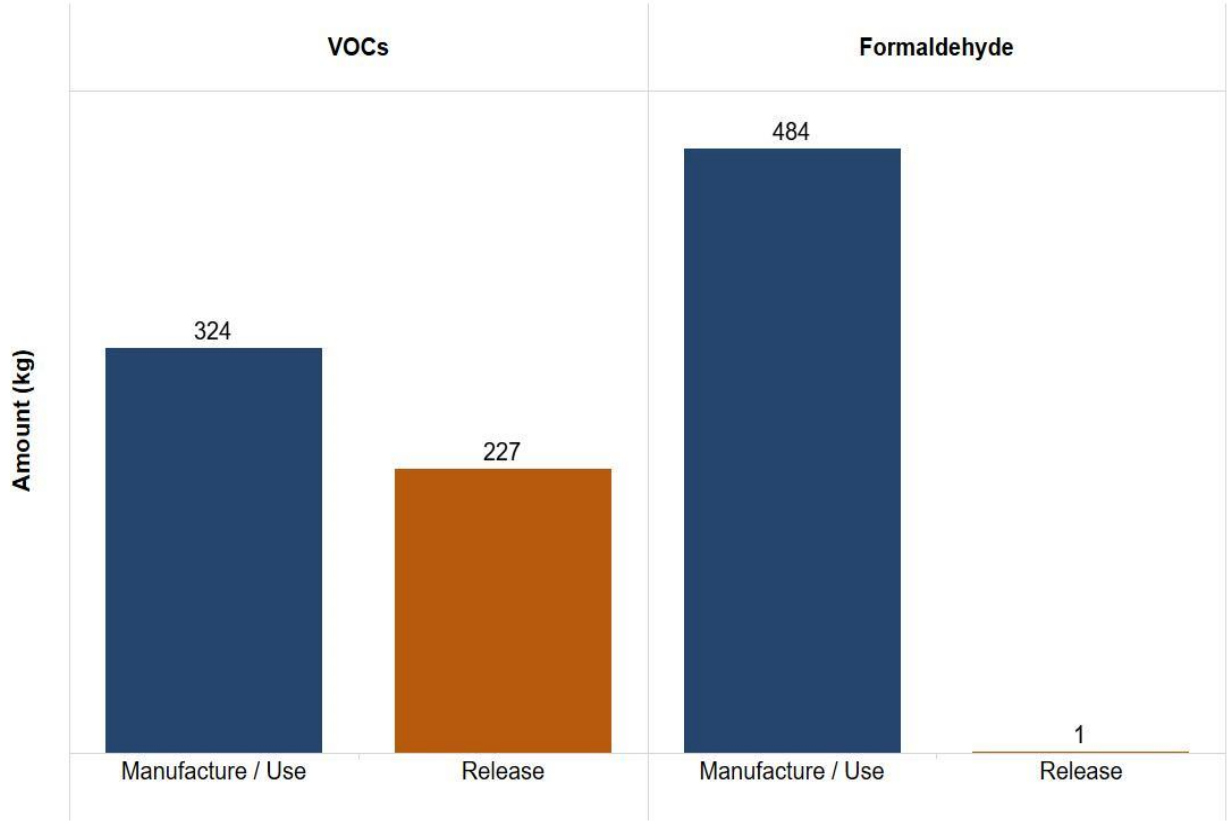
Figure 25: Location of facilities from the Medical and Diagnostic Sector in 2018



The two substances reported were:

- Volatile organic compounds (VOCs)
- Formaldehyde

Figure 26: Amounts of the two substances reported by Medical and Diagnostic facilities for 2018*



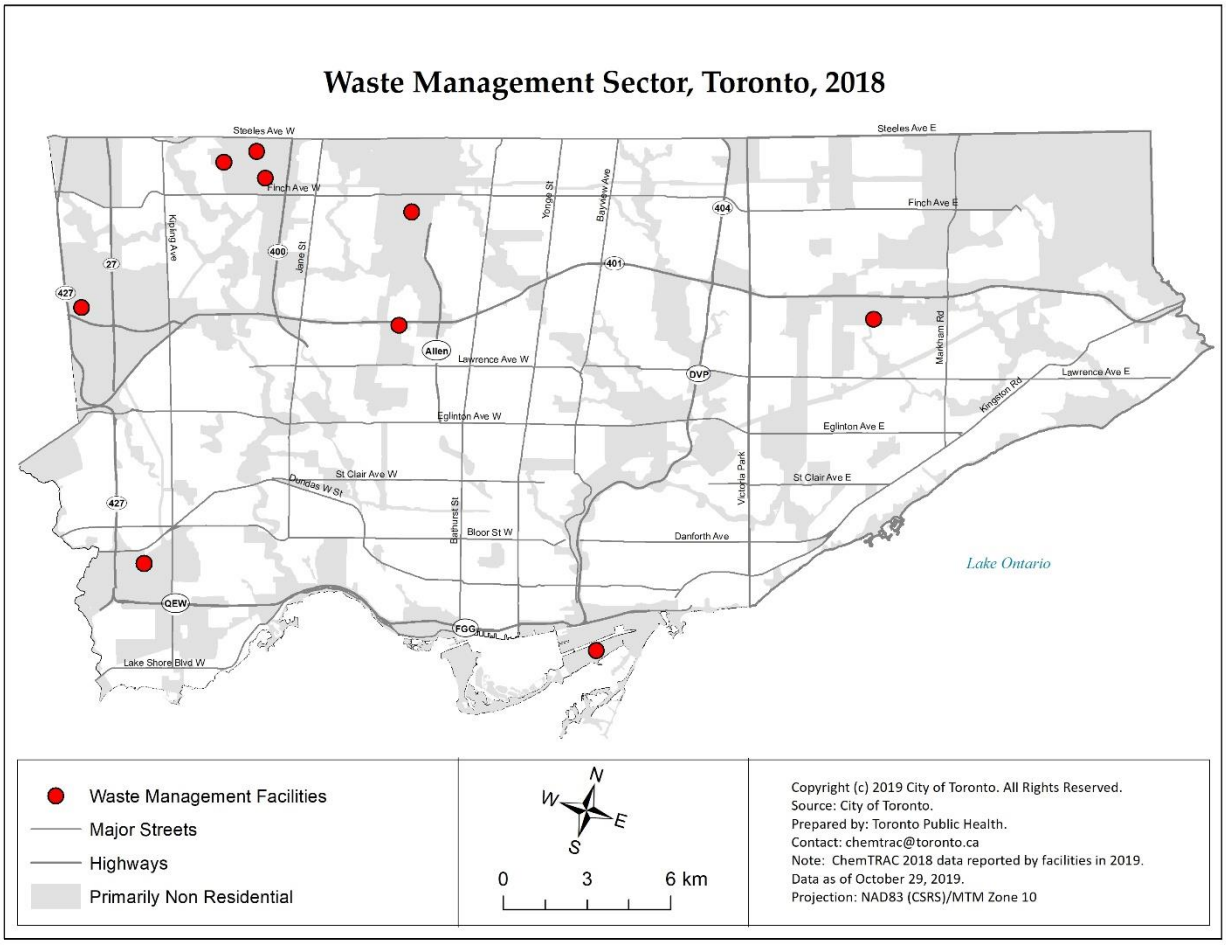
* The substances are arranged in descending order of amounts released

Waste Management and Remediation

Types of activities: waste collection, treatment and disposal services, environmental remediation services, septic tank pumping services and recovery facilities.

- Number of facilities that reported: 9
- Range in number of employees per facility: 1 to 191
- Total amount of chemicals released: 35,502 kilograms
- Total amount of chemicals manufactured, processed or used: 926,401 kilograms
- Number of priority substances reported: 11

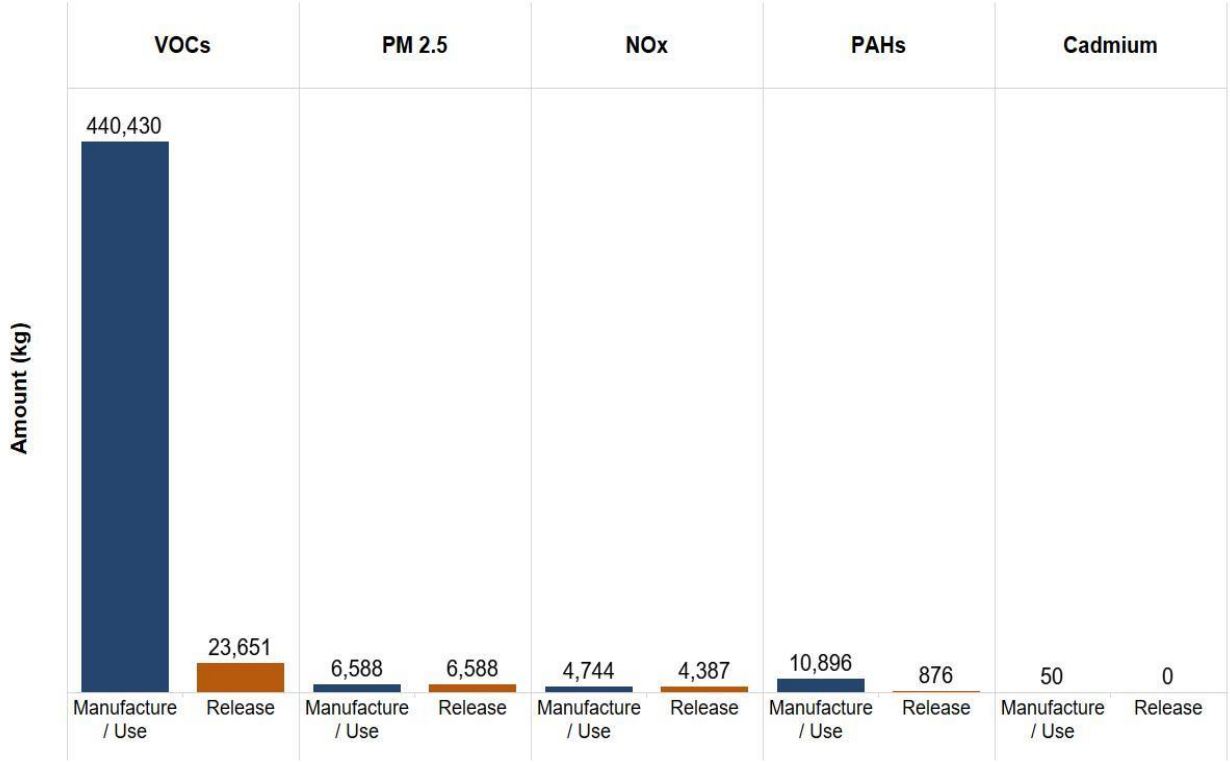
Figure 27: Location of facilities from the Waste Management Sector in 2018



Top five substances reported were:

- Volatile organic compounds (VOCs)
- Particulate matter 2.5 ($PM_{2.5}$)
- Nitrogen oxides (NOx)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Cadmium

Figure 28: Amounts of top five substances reported by Waste Management facilities for 2018 *



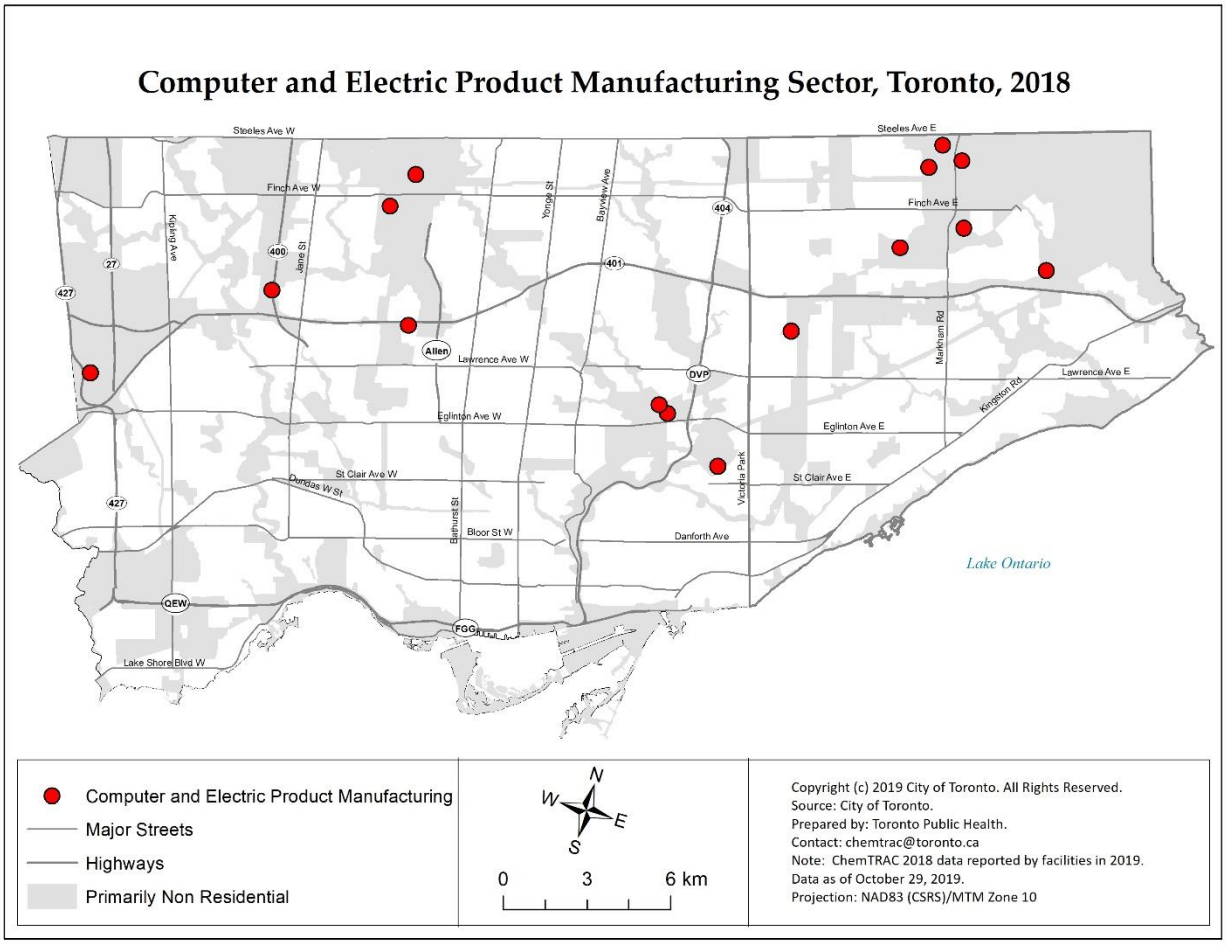
* The substances are arranged in descending order of amounts released

Computer and Electric Product Manufacturing

Types of activities: manufacture of computers, computer peripherals, and communications equipment.

- Number of facilities that reported: 15
- Range in number of employees per facility: 12 to 740
- Total amount of chemicals released: 38,369 kilograms
- Total amount of chemicals manufactured, processed or used: 110,947 kilograms
- Number of priority substances reported: 9

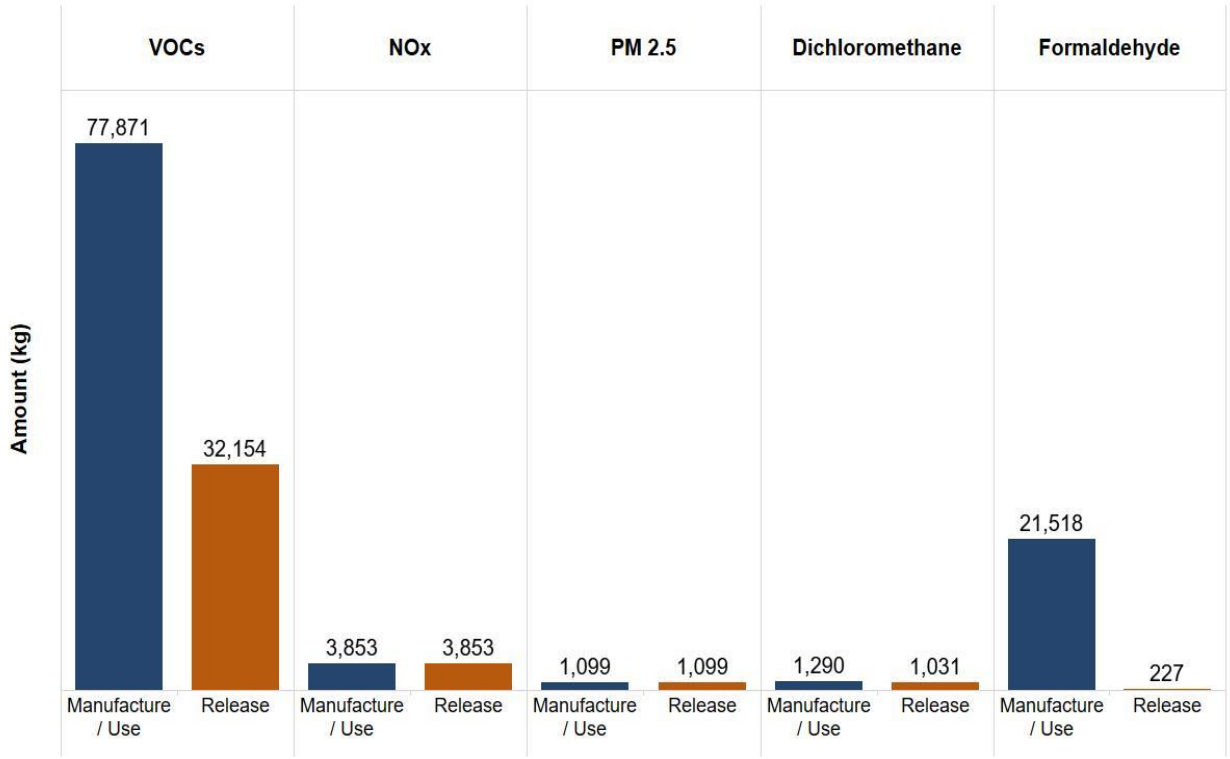
Figure 29: Location of facilities from the Computer and Electric Product Manufacturing Sector in 2018



Top five substances reported were:

- Volatile organic compounds (VOCs)
- Nitrogen oxides (NOx)
- Particulate matter 2.5 ($PM_{2.5}$)
- Dichloromethane
- Formaldehyde

Figure 30: Amounts of top five substances reported by Computer and Electric Product Manufacturing facilities for 2018 *



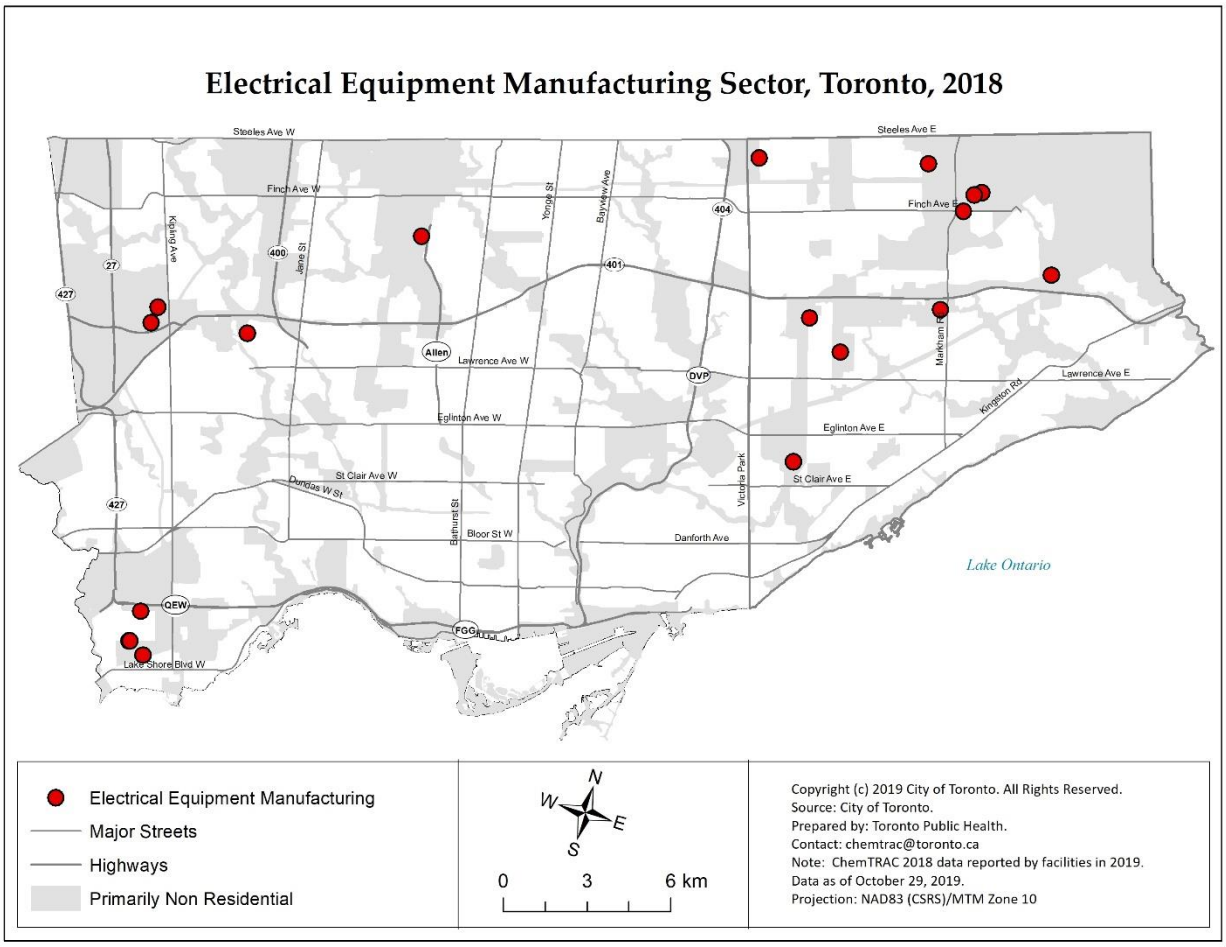
* The substances are arranged in descending order of amounts released

Electrical Equipment, Appliance and Component Manufacturing

Types of activities: manufacture of product that generate, use and distribute electrical power. Common activities include metal cutting, metal processing, painting and welding.

- Number of facilities that reported: 18
- Range in number of employees per facility: 12 to 360
- Total amount of chemicals released: 20,452 kilograms
- Total amount of chemicals manufactured, processed or used: 96,986 kilograms
- Number of priority substances reported: 10

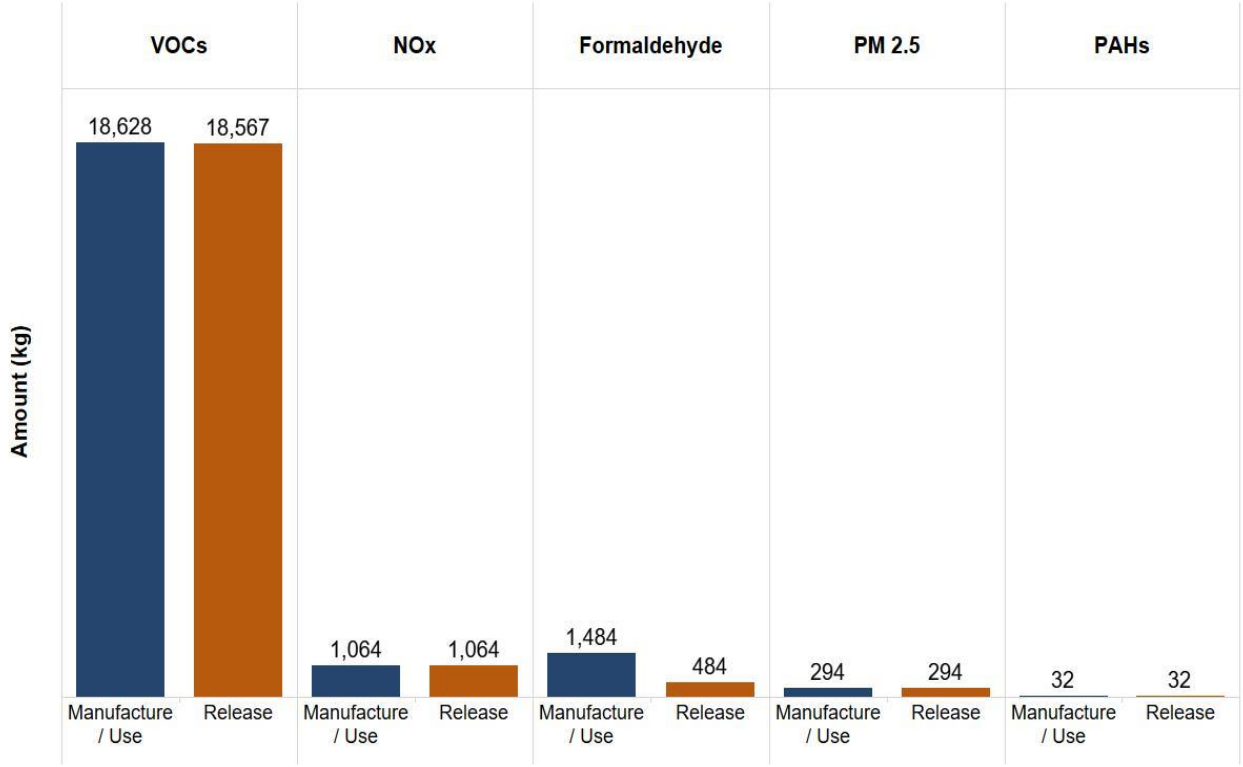
Figure 31: Location of facilities from the Electrical Equipment Appliance and Component Manufacturing Sector in 2018



Top five substances reported were:

- Volatile organic compounds (VOCs)
- Nitrogen oxides (NOx)
- Formaldehyde
- Particulate matter 2.5 ($PM_{2.5}$)
- Polycyclic aromatic hydrocarbons (PAHs)

Figure 32: Amounts of top five substances reported by Electrical Equipment, Appliance and Component Manufacturing facilities for 2018 *



* The substances are arranged in descending order of amounts released

Fabricated Metal Product Manufacturing

Types of activities: transformation of metal to end-use products by forging, stamping, bending, forming, machining, welding and assembling.

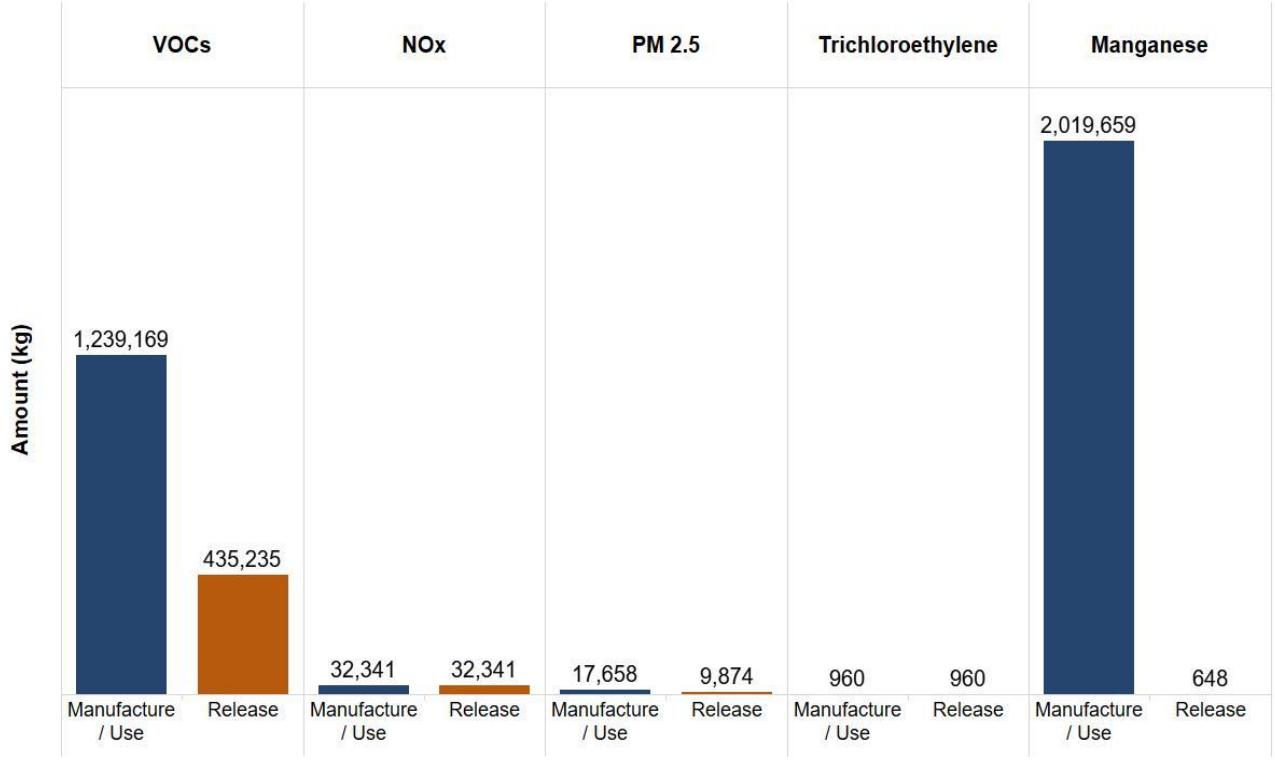
- Number of facilities that reported: 78
- Range in number of employees per facility: 1 to 566
- Total amount of chemicals released: 479,631 kilograms
- Total amount of chemicals manufactured, processed or used: 5,124,615 kilograms
- Number of priority substances reported: 11

Figure 33: Location of facilities from the Fabricated Metal Product Manufacturing Sector in 2018

Top five substances reported were:

- Volatile organic compounds (VOCs)
- Nitrogen oxides (NOx)
- Particulate matter 2.5 ($PM_{2.5}$)
- Trichloroethylene
- Manganese

Figure 34: Amounts of top five substances reported by Fabricated Metal Product Manufacturing facilities for 2018 *



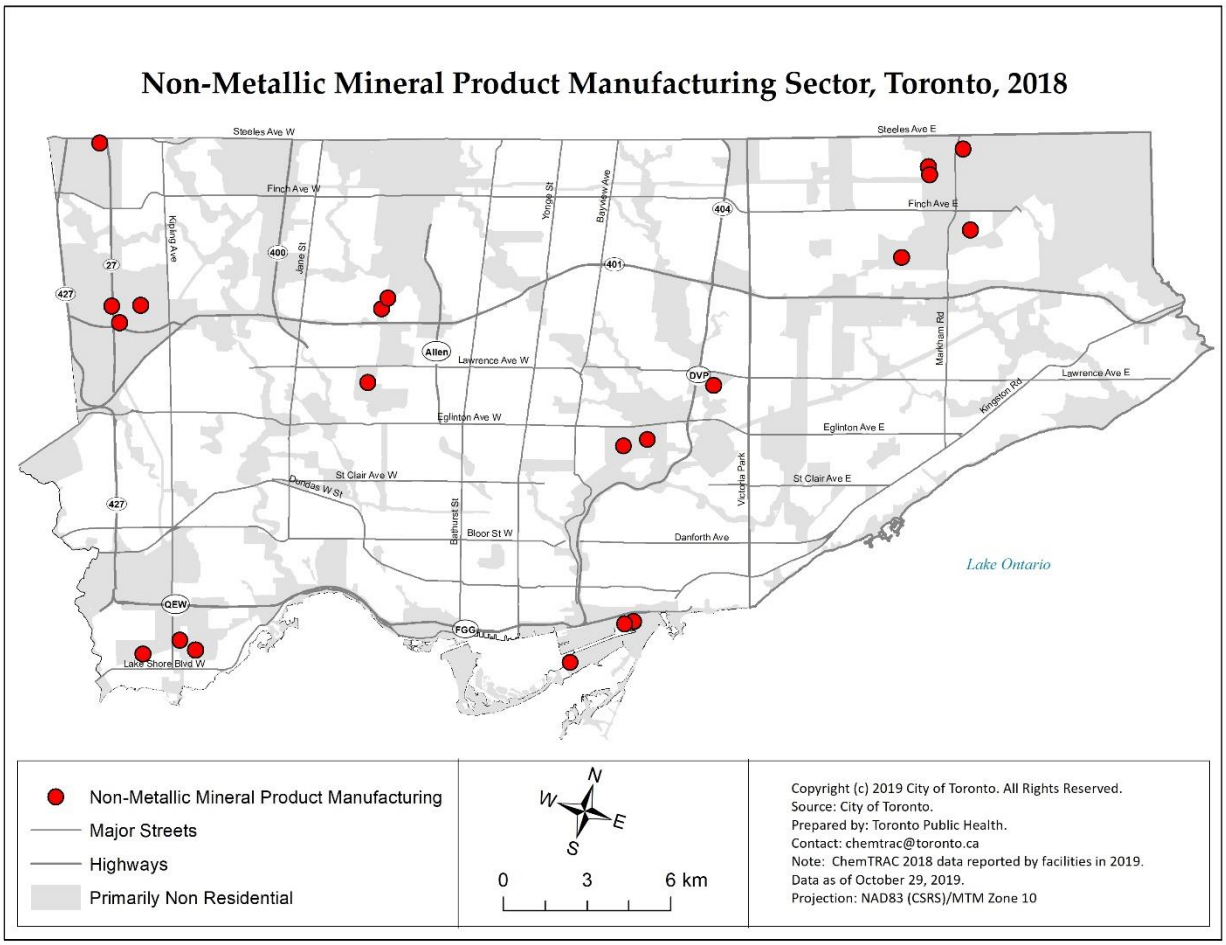
* The substances are arranged in descending order of amounts released

Non-Metallic Mineral Product Manufacturing

Types of activities: transformation of mined or quarried non-metallic minerals, such as sand, gravel, stone, clay, and refractory materials into products for intermediate or final consumption. Processes used include grinding, mixing, cutting, shaping, and honing.

- Number of facilities that reported: 22
- Range in number of employees per facility: 1 to 200
- Total amount of chemicals released: 156,425 kilograms
- Total amount of chemicals manufactured, processed or used: 753,798 kilograms
- Number of priority substances reported: 8

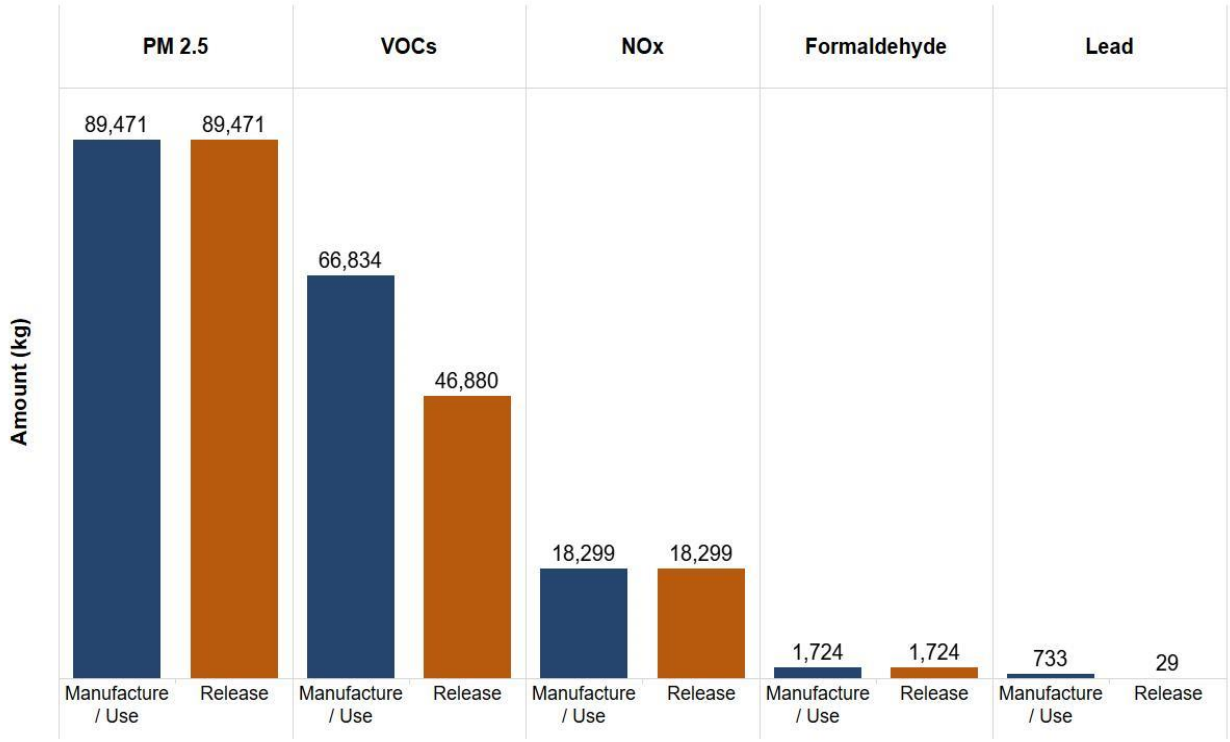
Figure 35: Location of facilities from the Non-Metallic Mineral Product Manufacturing Sector in 2018



Top five substances reported were:

- Particulate matter 2.5 ($PM_{2.5}$)
- Volatile organic compounds (VOCs)
- Nitrogen oxides (NOx)
- Formaldehyde
- Lead

Figure 36: Amounts of top five substances reported by Non-Metallic Mineral Product Manufacturing facilities for 2018 *



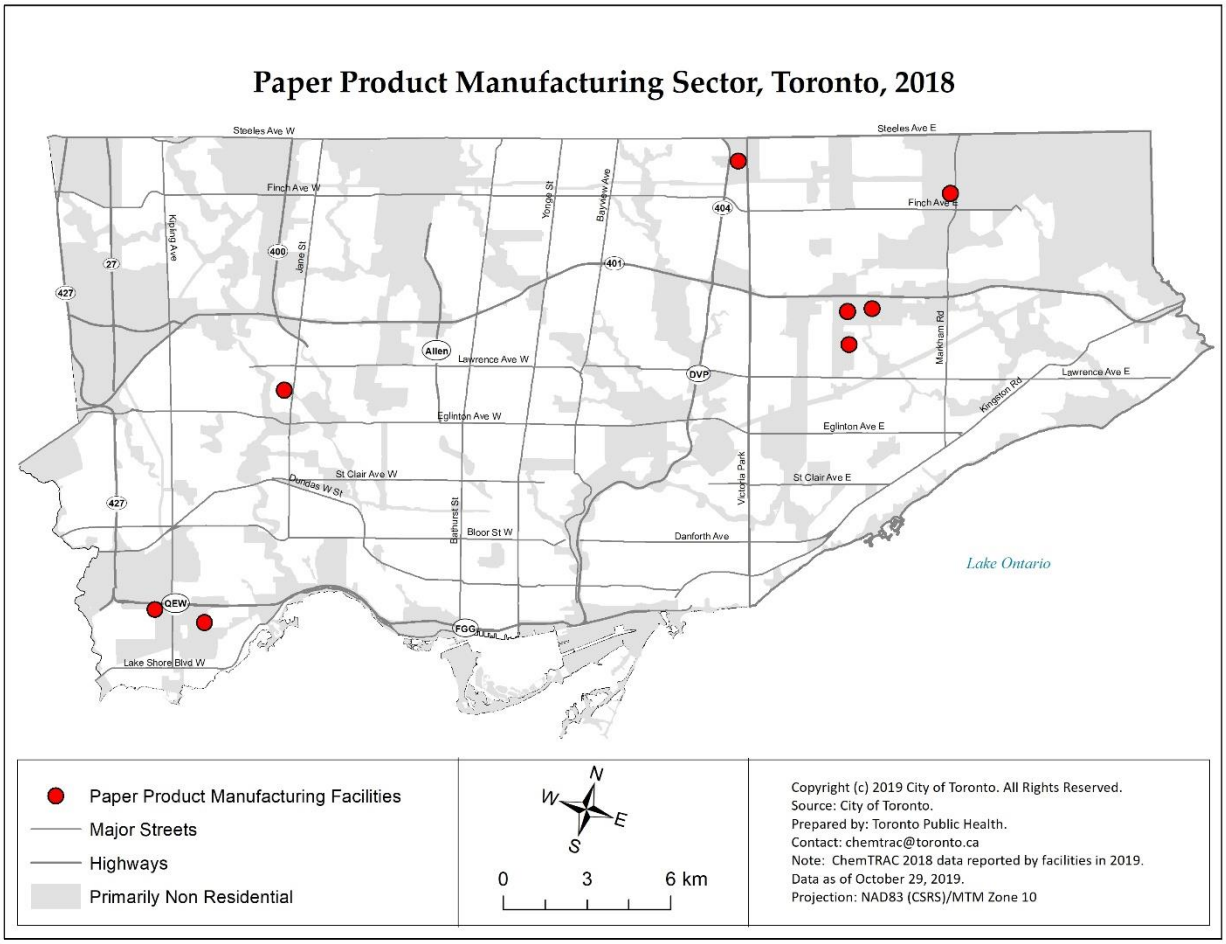
* The substances are arranged in descending order of amounts released

Paper Product Manufacturing

Types of activities: manufacture of pulp, paper and paper products. The manufacture of pulp involves separating the cellulose fibres from other impurities in wood, used paper or other fibre sources. The manufacture of paper involves matting these fibres into a sheet. Converted paper products are produced from paper and other materials by various cutting and shaping techniques.

- Number of facilities that reported: 8
- Range in number of employees per facility: 62 to 457
- Total amount of chemicals released: 346,872 kilograms
- Total amount of chemicals manufactured, processed or used: 346,872 kilograms
- Number of priority substances reported: 5

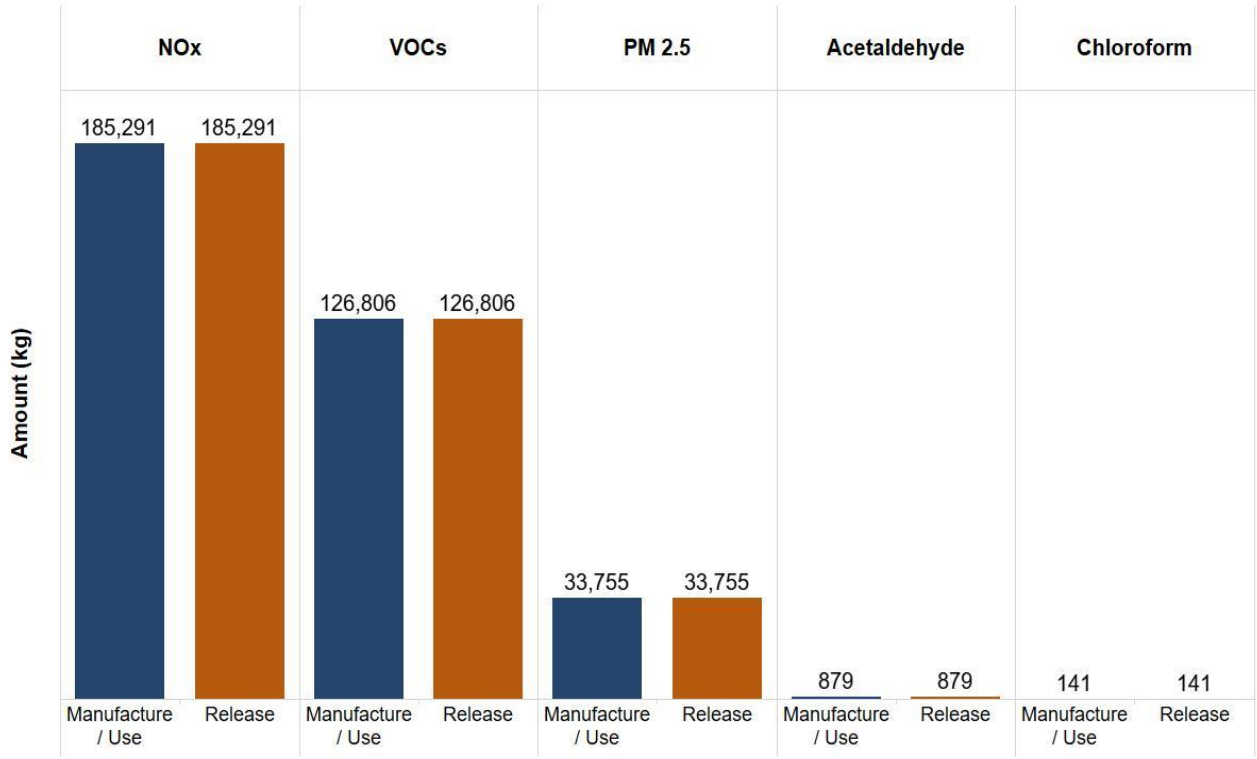
Figure 37: Location of facilities from the Paper Product Manufacturing Sector in 2018



The five substances reported were:

- Nitrogen oxides (NOx)
- Volatile organic compounds (VOCs)
- Particulate matter 2.5 ($PM_{2.5}$)
- Acetaldehyde
- Chloroform

Figure 38: Amounts of the five substances reported by Paper Product Manufacturing facilities for 2018 *



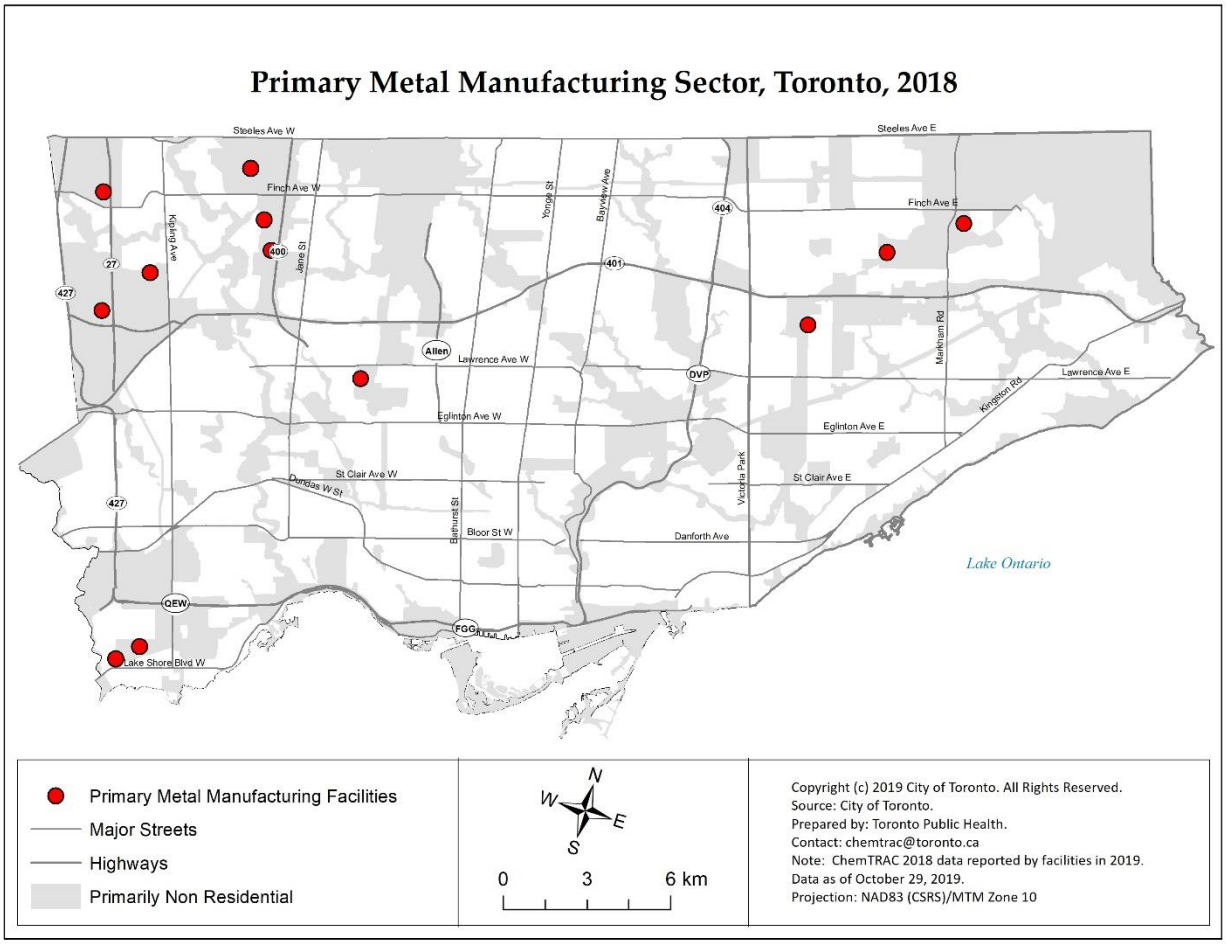
* The substances are arranged in descending order of amounts released

Primary Metal Manufacturing

Types of activities: primarily engaged in smelting and refining ferrous and non-ferrous metals from ore, pig iron or scrap in blast or electric furnaces. The output of smelting and refining is used in rolling and drawing operations to produce sheets, strips, bars, rods and wire, and in molten form to produce castings and other basic metal products.

- Number of facilities that reported: 12
- Range in number of employees per facility: 5 to 350
- Total amount of chemicals released: 52,684 kilograms
- Total amount of chemicals manufactured, processed or used: 688,642
- Number of priority substances reported: 10

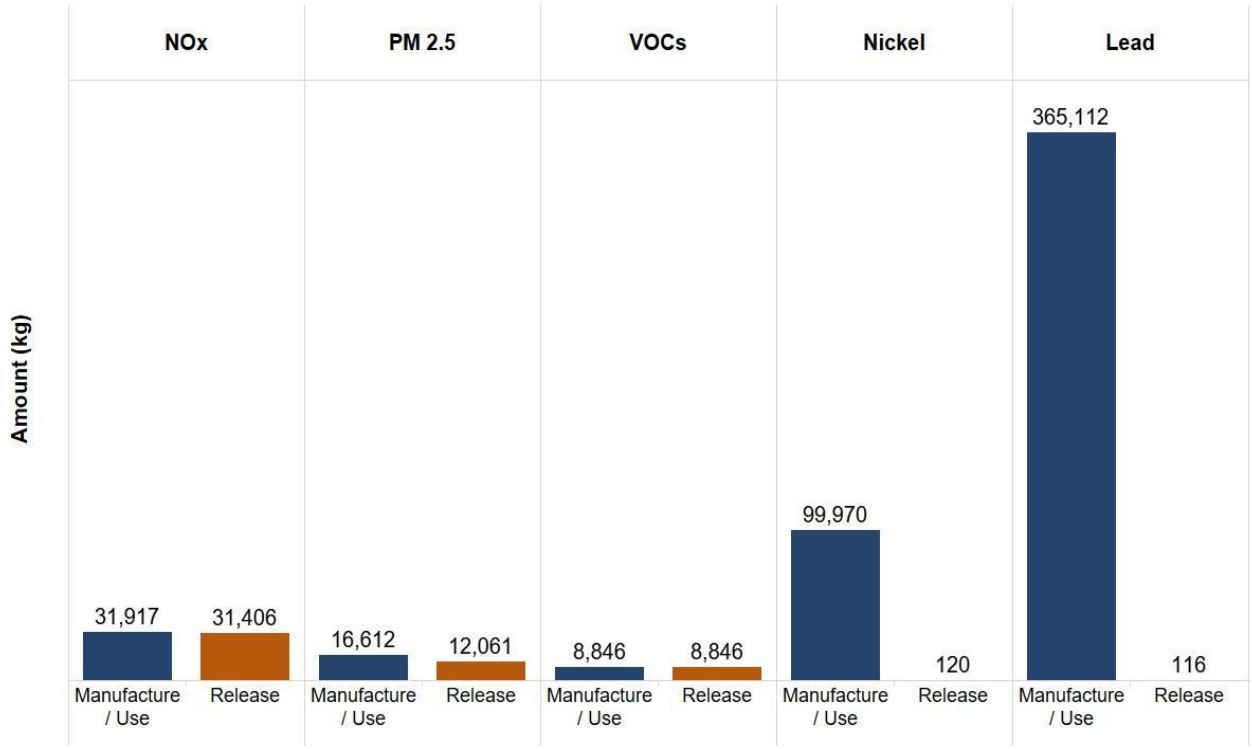
Figure 39: Location of facilities from the Primary Metal Manufacturing Sector in 2018



Top five substances reported were:

- Nitrogen oxides (NOx)
- Particulate matter 2.5 ($PM_{2.5}$)
- Volatile organic compounds (VOCs)
- Nickel
- Lead

Figure 40: Amounts of top five substances reported by Primary Metal Manufacturing facilities for 2018 *



***** The substances are arranged in descending order of amounts released

References

1 Toronto Public Health (2008). Environmental Reporting, Disclosure and Innovation: A Proposed Program for the City of Toronto.

2 Keenan, C., Kanner, J. L., & Stoner, D. (1997). Survey evaluation of the Massachusetts toxics use reduction program. Toxics Use Reduction Institute, University of Massachusetts Lowell.

3 Lopez, J., Coté, R., & Marche, S. (2005). Environmental supply chain management influences, practices, and opportunities in Nova Scotia. Halifax, Nova Scotia: Eco-Efficiency Centre, Dalhousie University Faculty of Management.

4 Peters, M., & Turner, R. K. (2004). SME environmental attitudes and participation in local-scale voluntary initiatives: Some practical applications. Journal of Environmental Planning and Management, 47(3), 449-473.

5 GoodGuide (2011). Scorecard - The Pollution Information Site.

6 Statistics Canada (2019). Taxfiler (T1FF) – Income of Individuals, 2017 (Table I-13).