



GEORGIA

DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL PROTECTION DIVISION

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MEMORANDUM

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CC: James Boylan, APB Branch Chief
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SUBJECT: Investigation Findings for 2023-2024 Odor Complaints in Rincon, Georgia

In September 2023, the Georgia Environmental Protection Division (EPD) received complaints regarding odors from residents living near the DRT America facility in Rincon, Georgia (AIRS No. 103-00021) following an equipment failure at the facility on September 24, 2023. These complaints initiated an investigation into the air pollutants potentially contributing to the odors. Many odorous compounds can be detected by the human nose at concentrations far lower than the screening concentration for health effects established by the U.S. Environmental Protection Agency (EPA). To evaluate the air quality near the DRT facility, Georgia EPD collected ambient air canister grab samples at two locations (Rincon City Hall and Ebenezer Middle School), in addition to canister grab samples on the facility property (Figure 1).

Canister grab samples are collected when a clean, fully evacuated canister under a vacuum of at least 28 inches of mercury (inHg) is exposed to ambient air for a period of 30-60 seconds. A sample of air is pulled into the canister quickly to provide a snapshot of the pollutants in the ambient air at the time of collection. From September 26, 2023, through October 18, 2024, Georgia EPD collected a total of 297 air samples to analyze for volatile organic compounds (VOCs). At each site, two side-by-side samples were collected on a weekly basis. These samples were analyzed by the Georgia EPD Laboratory in Norcross, Georgia. The samples collected at the DRT facility are not representative of ambient air samples but were collected for comparison to the community samples collected at Ebenezer Middle School and Rincon City Hall.

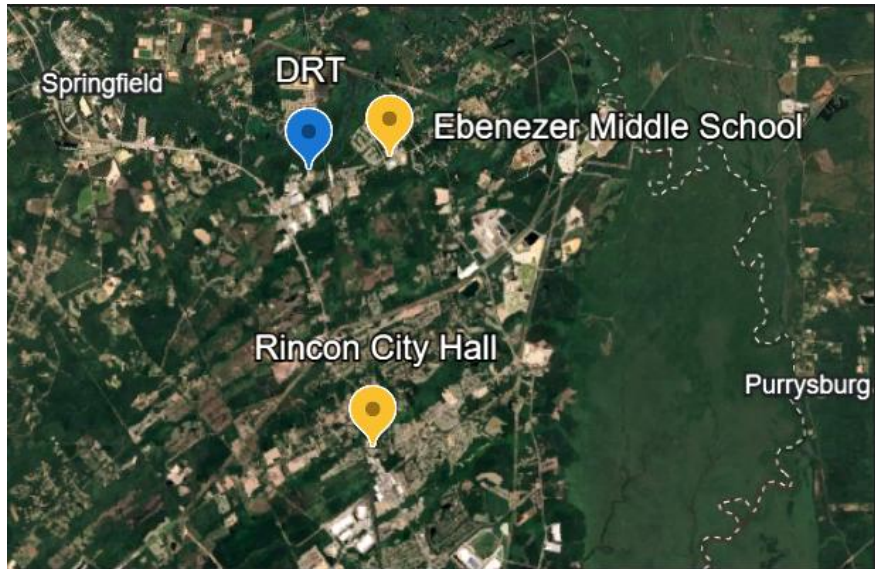


Figure 1. Canister grab sampling site locations close to the DRT facility in Rincon, GA.

Wind speed and wind direction data were gathered from the Savannah-Hilton Head International Airport meteorological station (indicated with the purple dot in Figure 2). For the period of sample collection, wind data was compiled to show the average wind speed and wind direction (Figures 3). The average wind speeds and directions are displayed for the entire sampling period and not the exact wind speed and direction for the specific dates the samples were collected.

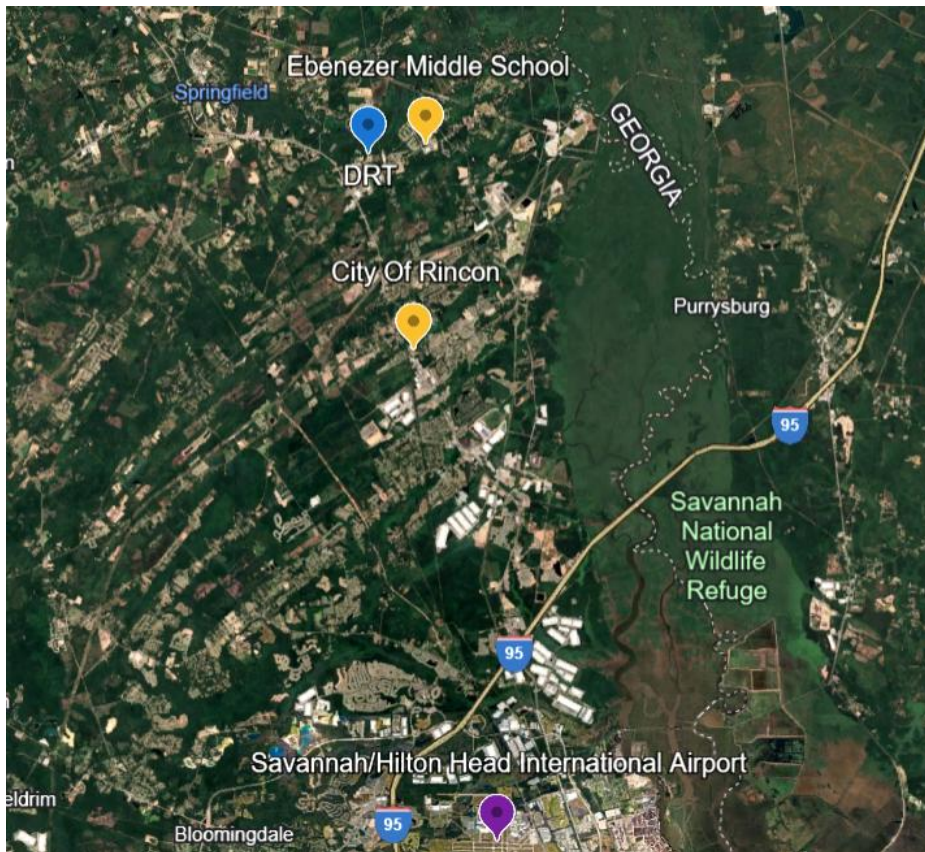


Figure 2. Wind speed and wind direction data gathered from the Savannah/Hilton Head International Airport, located approximately 14 miles from the DRT facility.



Windrose Plot for [SAV] Savannah - Hilton Head
Obs Between: 26 Sep 2023 01:53 AM - 19 Oct 2024 12:53 AM America/New_York

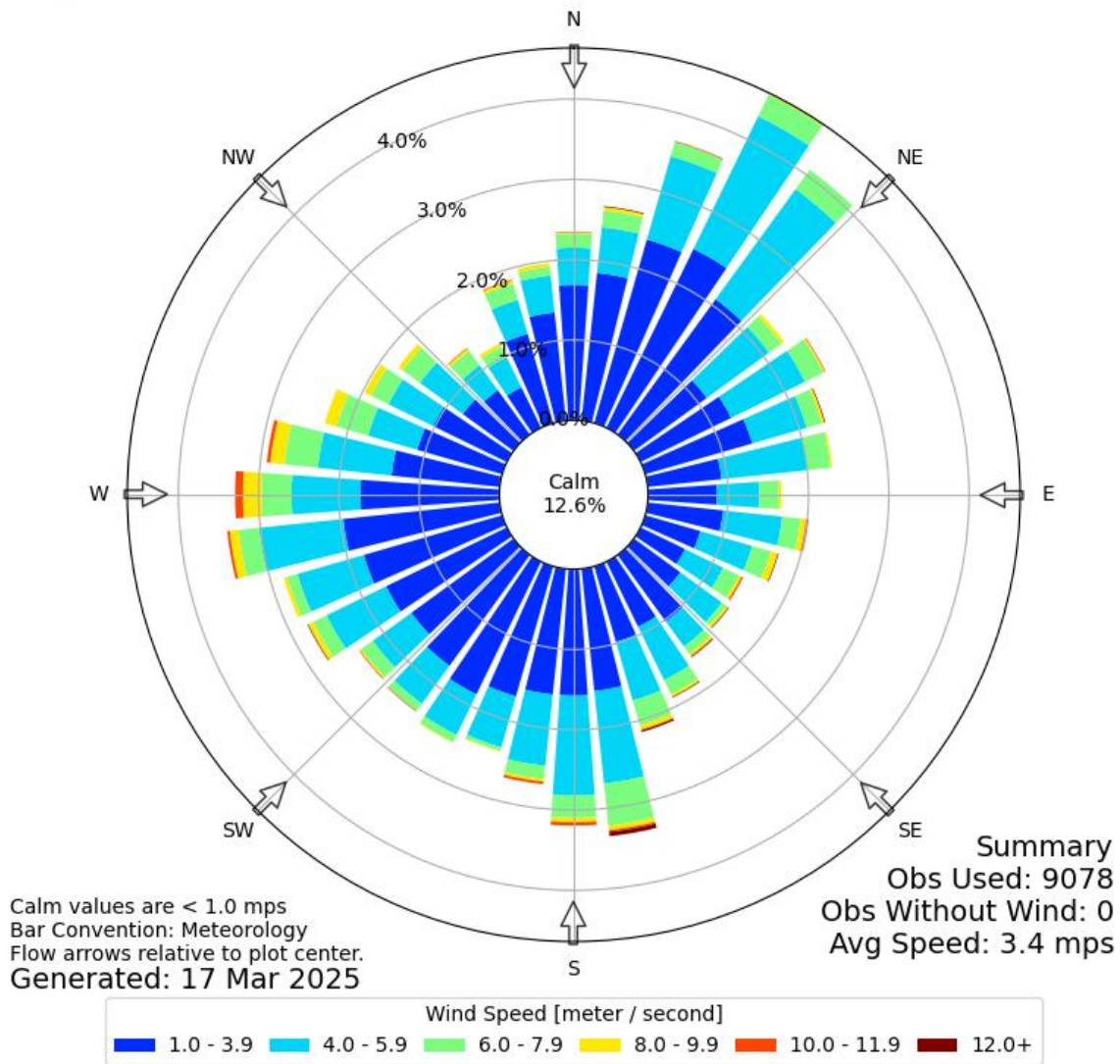


Figure 3. Windrose from the Savannah-Hilton Head International Airport, September 26, 2023, through October 19, 2024.

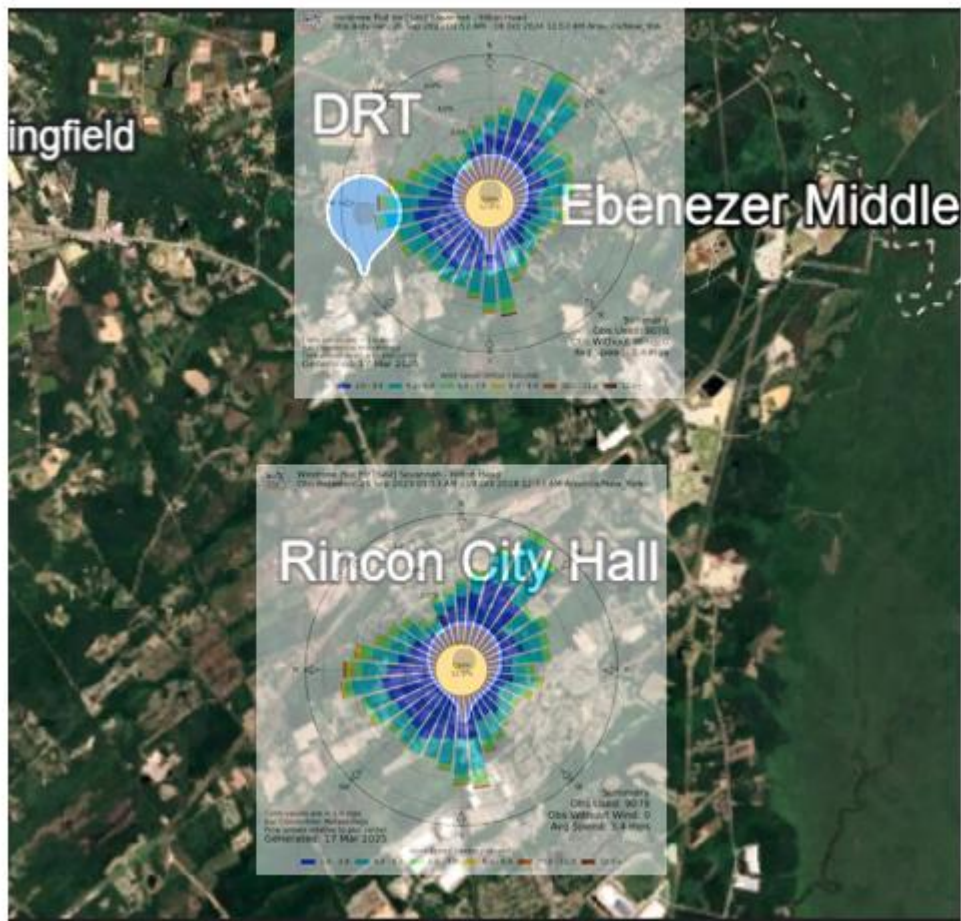


Figure 4. Windrose overlaying the location of the grab samples and the DRT facility.

As shown in Figure 4, the prevailing wind blows from the west towards Ebenezer Middle School, and less frequent winds are coming from the northwest towards the Rincon City Hall.

The Georgia EPD Ambient Monitoring Program (AMP) routinely (once every 6 days) collects VOC samples at the National Air Toxics Trends Station (NATTS), which is located on the southeast side of Atlanta in DeKalb County, Georgia. The primary purpose of the National Air Toxics Trends Station is tracking the trends in ambient air toxics levels with the purpose of understanding whether long-term exposure to specific air toxics in ambient air could be harmful to human health.

The concentrations of the 24-hour NATTS samples were compared to canister grab sample concentrations collected in Rincon for the same time period to evaluate potential elevated concentrations near the facility compared to typical urban background concentrations. There were approximately 14 days when the NATTS samples were collected on the same day as the canister grab samples. The pollutants that were compared are listed in Table 1.

Table 1. Pollutants measured near the DRT facility.

Pollutant Name	Pollutant Name
1,1-trichloroethane	chloroethane
1,1,2,2-tetrachloroethane	chloroethene
1,1,2-trichloroethane	chloroform
1,1-dichloroethane	chloromethane
1,1-dichloroethylene	cis-1,2-dichloroethylene
1,2,4-trichlorobenzene	cis-1,3-dichloropropene
1,2,4-trimethylbenzene	cyclohexane
1,2-dibromoethane	dichlorodifluoromethane
1,2-dichlorobenzene	ethylbenzene
1,2-dichloroethane	freon-11
1,2-dichloropropane	freon-113
1,3,5-trimethylbenzene	freon-114
1,3-butadiene	hexachlorobutadiene
1,3-dichlorobenzene	<i>m,p</i> -xylene
1,4-dichlorobenzene	methylene chloride
4-ethyltoluene	<i>o</i> -xylene
acrolein	styrene
benzene	tetrachloroethylene
benzyl chloride	toluene
bromomethane	trans-1,3-dichloropropene
carbon tetrachloride	trichloroethylene
chlorobenzene	

Figure 5 shows sample result averages below 0.05 parts per billion and Figure 6 shows sample result averages above 0.05 parts per billion. The ambient air canister grab samples collected at Ebenezer Middle School (red) and Rincon City Hall (green) only identified one VOC pollutant (tetrachloroethylene) that was more than 50% higher than the pollutant concentrations measured at the NATTS site (purple). However, several VOC pollutants (chlorobenzene, 1,1-dichloroethylene, cyclohexane, 4-ethyltoluene, ethylbenzene, chloroform, and toluene) at the DRT facility (blue) were more than 50% higher than the pollutant concentrations measured at the NATTS site.

Additionally, the analytical laboratory screened all samples for the possible presence of Tentatively Identified or Estimated (TIE) compounds, which included alpha pinene, beta pinene, camphene, gamma terpinene, methyl sulfide, and pinene. However, these compounds were not quantitatively assessed for cancer risk or hazard quotient since they could not be positively identified, as the laboratory equipment is not calibrated to quantify these compounds.

VOC sample values were provided in units of parts per billion by volume (ppbv) and were converted to units of micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) using the following formula:

$$\frac{\text{MW} \times \text{ppbv}}{24.45}$$

Where:

- MW = Molecular weight of air toxic
- ppbv = Air toxic concentration, in parts per billion by volume
- 24.45 = Constant¹

¹ United States Environmental Protection Agency (USEPA). 2004. *Air Toxics Risk Assessment Reference Library: Volume 1 Technical Resource Manual*. EPA-453-K-04-001A. Research Triangle Park, NC.: United States Environmental Protection Agency, Office of Air Quality Planning and Standards.

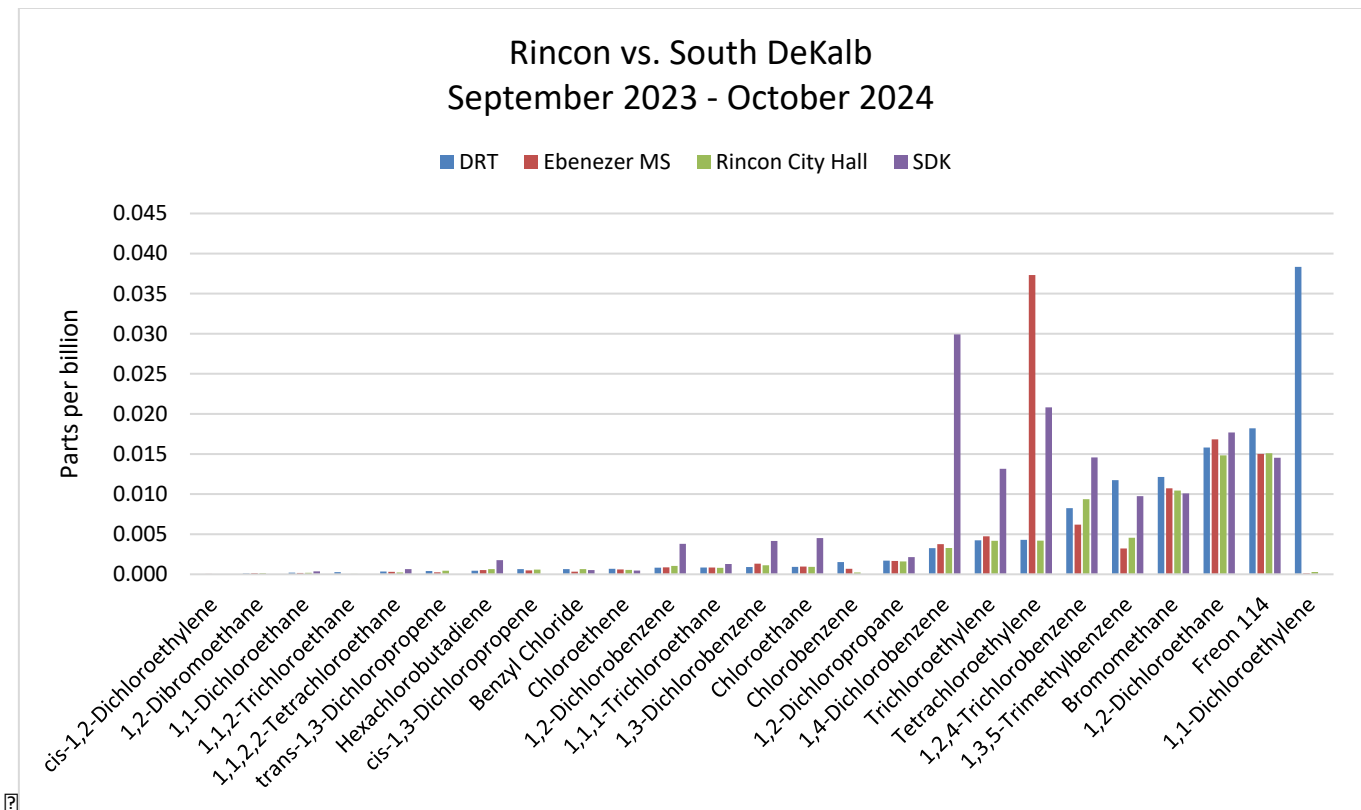


Figure 5. Rincon canister grab samples and South DeKalb 24-hour sample result averages below 0.05 parts per billion from September 2023 through October 2024.

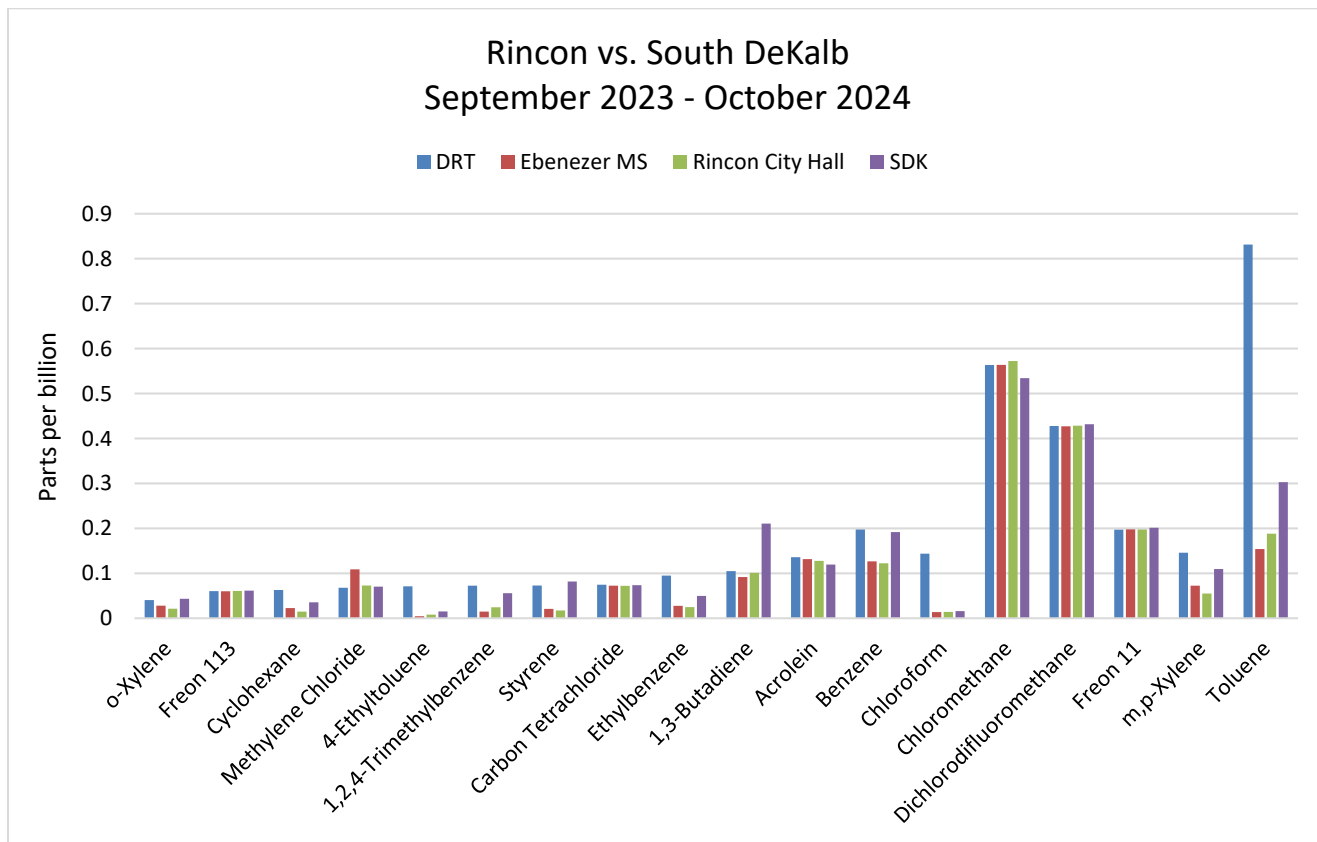


Figure 6. Rincon ambient air canister grab samples and South DeKalb 24-hour sample result averages above 0.05 parts per billion from September 2023 through October 2024.

Risk Assessment

To determine if further investigation is warranted, results from all canister grab samples collected near the facility were compared to risk-based screening levels (Table A-1 of Appendix A) from EPA's November 2024 Regional Screening Levels (RSL)² which are set at a cancer risk of 1×10^{-6} and a hazard quotient of 0.1. In some cases, when an EPA RSL was not available, the Michigan Department of Environment, Great Lakes, and Energy - Air Quality Division List of Screening Levels³ was utilized. For the air toxics evaluated at each site, the maximum detected concentration (MDC) of the air toxic was compared to its respective Screening Level. If the MDC exceeded the Screening Level, the air toxic was selected as a chemical of potential concern (COPC) and was evaluated further in the risk assessment. All screening results are provided in Table A-1 of Appendix A, and the COPCs are highlighted with **bold red** in the table. Table 2 contains COPCs that were further evaluated in the risk assessment:

Table 2. Chemicals of potential concern that were further evaluated in the risk assessment.

DRT Facility	Ebenezer Middle School	Rincon City Hall
Acrolein	Acrolein	Acrolein
Benzene	Benzene	Benzene
Benzyl Chloride	Benzyl Chloride	Benzyl Chloride
Bromomethane	1,3-Butadiene	1,3-Butadiene
1,3-Butadiene	Carbon Tetrachloride	Carbon Tetrachloride
Carbon Tetrachloride	Chloroform	Chloroform
Chloroform	1,2-Dibromoethane	1,2-Dibromoethane
1,2-Dibromoethane	1,4-Dichlorobenzene	1,4-Dichlorobenzene
1,2-Dichloroethane	1,2-Dichloroethane	Hexachlorobutadiene
1,1-Dichloroethylene	Ethylbenzene	1,2,4-Trichlorobenzene
Ethylbenzene	Hexachlorobutadiene	
Hexachlorobutadiene	1,1,2,2-Tetrachloroethane	
1,1,2,2-Tetrachloroethane	Tetrachloroethylene	
1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzene	
1,1,2-Trichloroethane	Trichloroethylene	
	Total Xylenes	

Risk assessments are used to characterize the nature and magnitude of risks to human health for various populations. Two kinds of toxicity values are used to evaluate inhalation: the inhalation unit risk (IUR) and the reference concentration (RfC).

- Inhalation Unit Risk (IUR) is defined as the potential upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of $1 \mu\text{g}/\text{m}^3$ in air.⁴ The Cancer Risk calculation utilizes the IUR to estimate the probability of contracting cancer over the course of a lifetime, assuming continuous exposure (i.e., 24 hours a day for 70 years). Cancer Risk values for individual toxics are summed to provide a cumulative cancer risk for all toxics evaluated in the risk assessment. According to EPA, a cumulative cancer risk exceeding 1×10^{-4} (1-in-10,000) is not acceptable.
- The RfC *“is defined as an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious noncarcinogenic health effects during a*

² <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>

³ <https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Programs/AOD/toxics/screening-levels-alphabetical.pdf>

⁴ United States, Environmental Protection Agency (USEPA). 2009. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)*. EPA-540-R-070-002. Washington, D.C.: United States Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation.

*lifetime*⁵. Noncancer Hazard Quotient (HQ) refers to the ratio of a single substance exposure level over a specified time period to a reference value (e.g., an RfC) for that substance derived from a similar exposure period.⁶ A HQ exceeding 1 suggests that the potential for adverse health effects from exposure to a chemical may be higher than what is considered safe. The Hazard Index (HI) represents the cumulative noncancer hazard and is the sum of all HQs for the individual toxics evaluated in the risk assessment. A Hazard Index (HI) above 1 indicates a potential increased health risk, meaning that the cumulative exposure to multiple noncancer substances is exceeding the acceptable level.

To determine the cancer risk and/or hazard quotient for each COPC, an exposure concentration (EC) must be estimated for each COPC. The EC is estimated as a time-weighted contaminant concentration in air which considers the frequency, duration, and time of exposure as well as the time over which the exposure is averaged⁷. To obtain an EC, EPA recommends¹ deriving the 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL) of all valid ambient air sample results collected over 12 months then using the 95% UCL as an estimate of the EC⁵. The 95% UCL is intended to be an estimate of the true annual average of all valid ambient air sample results collected over the 12 months since a “*simple arithmetic mean of sampling results may underestimate, approach, or overestimate the true annual average*”¹. The most current version of EPA’s ProUCL (Version 5.2.0) statistical software⁸ was used to determine the 95% UCL. The sample results for each COPC were inputted into ProUCL. Based on the size, distribution, and skewness of the sample results comprising the dataset for each COPC, ProUCL recommends an appropriate 95% UCL or indicates that the 95% UCL cannot be derived. The ProUCL-recommended 95% UCL was selected as an estimate of the EC. A list of ECs for each COPC is provided in Table A-2 in Appendix A. All ProUCL inputs and outputs are available upon request.

The cancer risk and noncancer hazard quotient for each air toxic was calculated using EPA’s Regional Screening Level (RSL) calculator. The EC was inputted into the calculator with the resident receptor scenario selected. The cumulative cancer risk was determined by summing the cancer risk of individual COPCs, which assumes response addition, and HI was determined by summing the HQs, which assumes concentration addition⁹. The outputs from the RSL calculator are available upon request. Table 3 summarizes the cumulative cancer risk and hazard index for each site monitored. All risk and hazard values have been expressed with one significant figure per EPA guidance. A detailed breakdown of the cumulative cancer risk and hazard index for each site monitored is provided in Table A-3 in Appendix A.

The reference concentration (RfC) for acrolein was used in deriving the acrolein noncancer regional screening level (RSL) and used to calculate the acrolein hazard quotient (HQ) for the samples collected. The RfC for acrolein from EPA’s Integrated Risk Information System (IRIS) is 0.00002 mg/m³ (0.02 µg/m³) and was last updated in 2003. However, EPA’s Office of Air Quality Planning and Support

⁵ United States Environmental Protection Agency (USEPA). 1994. *Methods For Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry*. EPA-600-8-90-066F. Research Triangle Park, NC: United States Environmental Protection Agency, Environmental Criteria and Assessment Office

⁶ United States Environmental Protection Agency (USEPA). 2004. *Air Toxics Risk Assessment Reference Library: Volume 1 Technical Resource Manual*. EPA-453-K-04-001A. Research Triangle Park, NC.: United States Environmental Protection Agency, Office of Air Quality Planning and Standards.

⁷ United States, Environmental Protection Agency (USEPA). 2009. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)*. EPA-540-R-070-002. Washington, D.C.: United States Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation

⁸ United States Environmental Protection Agency (USEPA). 2022a. *ProUCL Version 5.2.0 User Guide*. Atlanta, GA.: United States Environmental Protection Agency, Office of Research and Development Site Characterization and Monitoring Technical Support Center

⁹ United States Environmental Protection Agency (USEPA). 2000. *Supplementary Guidance for Conducting Health Risk Assessment of Chemical Mixtures*. EPA/630/R-00/002. Washington, D.C.: U.S. Environmental Protection Agency, Risk Assessment Forum

(OAQPS) does not recommend the use of the acrolein IRIS RfC for air risk assessments and instead recommends using an RfC of 0.00035 mg/m³ (0.35 µg/m³) which is an “inhalation reference exposure level finalized by CalEPA in 2008, providing the most recent peer-reviewed assessment based on the most recent data”.

Table 3. Cancer risk and noncancer hazard index for each site.

Site	Cumulative Excess Lifetime Cancer Risk	Hazard Index
DRT Facility	2E-05	2
Ebenezer Middle School	8E-06	1
Rincon City Hall	7E-06	1

For Ebenezer Middle School and Rincon City Hall, the cumulative cancer risk and hazard index is within EPA’s acceptable risk range. At the DRT Facility, the hazard index falls outside the EPA acceptable risk range. The chemicals contributing the most to cancer risk and hazard index at the DRT Facility are benzene, 1,3-butadiene, chloroform, and acrolein.

- Benzene is a product of combustion and is released into the air from fossil fuel combustion, gasoline service stations, and motor vehicle exhaust.¹⁰
- 1,3-Butadiene is a product of combustion and is released into the air from motor vehicle exhaust, forest fire combustion, and manufacturing and processing facilities for rubber and plastics.¹¹
- Chloroform may be released to the air as a result of its formation in the chlorination of drinking water, wastewater, and swimming pools. Other sources include pulp and paper mills, hazardous waste sites, and sanitary landfills.¹²
- Acrolein can be formed from the breakdown of certain pollutants in the outdoor air, the burning of organic matter such as tobacco, or the burning of fuels such as gasoline and oil. Acrolein can also be used as a biocide.¹³

Conclusion

Results of the canister grab samples indicate that the most VOC pollutant concentrations measured at Ebenezer Middle School and Rincon City Hall were comparable (lower in most cases) to the pollutant concentrations measured at the NATTS site. However, several pollutant concentrations at the DRT facility were more than 50% higher than the pollutant concentrations measured at the NATTS site and at Ebenezer Middle School and Rincon City Hall. As shown in Table A-3 in the Appendix, the cumulative cancer risk falls below EPA’s acceptable cancer risk of 1×10^{-4} at Ebenezer Middle School, Rincon City Hall, and the DRT facility. For Ebenezer Middle School and Rincon City Hall, the hazard index did not exceed EPA’s acceptable threshold value of 1 (both were right at 1). At the DRT facility, the hazard index exceeded EPA’s acceptable threshold value of 1. Since the concentrations of air pollutants collected at the DRT facility were above the EPA acceptable threshold for noncancer adverse effects and the concentrations of air pollutants collected at the Ebenezer Middle School and Rincon City Hall were close to the EPA acceptable threshold for noncancer adverse effects, we recommend that a more robust data study be conducted to better understand the spatial and temporal patterns of air pollutant concentrations measured in the vicinity of the DRT facility and the potential health risks associated with those measurements.

¹⁰ U.S. EPA Health Effects Notebook for Hazardous Air Pollutants – Benzene:

<https://www.epa.gov/sites/default/files/2016-09/documents/benzene.pdf>

¹¹ U.S. EPA Health Effects Notebook for Hazardous Air Pollutants – 1,3-Butadiene:

<https://www.epa.gov/sites/default/files/2016-08/documents/13-butadiene.pdf>

¹² U.S. EPA Health Effects Notebook for Hazardous Air Pollutants – 1,3-Butadiene:

<https://www.epa.gov/sites/default/files/2016-09/documents/chloroform.pdf>

¹³ U.S. EPA Health Effects Notebook for Hazardous Air Pollutants – Acrolein:

<https://www.epa.gov/sites/default/files/2016-08/documents/acrolein.pdf>

APPENDIX A

Table A-1: Canister grab sample results compared to EPA’s November 2024 and EPD derived Regional Screening Levels at the DRT Facility, Ebenezer Middle School, and Rincon City Hall.

Site	Pollutant	Maximum Detected Concentration (ppbV)	Maximum Detected Concentration (µg/m ³)	Screening Value (µg/m ³)
DRT	1,1,1-Trichloroethane	0.0023	0.013	521
	1,1,2,2-Tetrachloroethane	0.0137	0.0941	0.0484
	1,1,2-Trichloroethane	0.023	0.13	0.0209
	1,1-Dichloroethane	0.0023	0.0093	1.75
	1,1-Dichloroethylene	1.215	4.817	0.413
	1,2,4-Trichlorobenzene	0.229	1.69	0.209
	1,2,4-Trimethylbenzene	0.792	3.894	6.26
	1,2-Dibromoethane	0.0061	0.047	0.00468
	1,2-Dichlorobenzene	0.0265	0.159	20.9
	1,2-Dichloroethane	0.0335	0.136	0.108
	1,2-Dichloropropane	0.0197	0.091	0.417
	1,3,5-Trimethylbenzene	0.16	0.79	6.26
	1,3-Butadiene	0.699	1.55	0.0936
	1,3-Dichlorobenzene	0.0239	0.144	83.4
	1,4-Dichlorobenzene	0.0344	0.207	0.255
	4-Ethyltoluene	2.645	13	350
	Acrolein	1.974	4.526	0.00209
	Alpha Pinene*	5818	32,419	1,120
	Benzene	2.564	8.192	0.36
	Benzyl Chloride	0.0475	0.246	0.0573
	Beta Pinene*	1400	7801	1,120
	Bromomethane	0.196	0.761	0.521
	Camphene*	1700	9,473	80
	Carbon Tetrachloride	0.146	0.919	0.468
	Chlorobenzene	0.0995	0.458	5.21
	Chloroethane	0.0143	0.0377	417
	Chloroethene	0.0277	0.0708	0.168
	Chloroform	2.946	14.4	0.122
	Chloromethane	0.862	1.78	9.39
	cis-1,2-Dichloroethylene	0	0	4.17
	cis-1,3-Dichloropropene	0.0159	0.0722	2.09
	Cyclohexane	1.473	5.070	626
	Dichlorodifluoromethane	0.583	2.88	10.4
	Ethylbenzene	3.03	13.2	1.12
	Freon 11	0.256	1.44	73
	Freon 113	0.0759	0.582	521
	Freon 114	0.342	2.39	69,000
	Gamma Terpinene*	1,200	6,686	N/A
	Hexachlorobutadiene	0.0132	0.141	0.128
	Methyl Sulfide*	96	244	0.0209
	Methylene Chloride	0.179	0.622	62.6
	Pinene*	38	212	1120
	Styrene	2.807	11.96	104
Tetrachloroethylene	0.0227	0.154	4.17	
Toluene	17.28	65.12	521	
trans-1,3-Dichloropropene	0.0096	0.044	2.09	
Trichloroethylene	0.0068	0.037	0.209	
Xylenes	2.365	10.27	10.4	

*TIE compounds: It should be noted these compounds are not quantitatively assessed for cancer risk or hazard quotient since they could not be positively identified, as the laboratory equipment is not calibrated to quantify the compounds.

Site	Pollutant	Maximum Detected Concentration (ppbV)	Maximum Detected Concentration (µg/m ³)	Screening Value (µg/m ³)
Ebenezer Middle School	1,1,1-Trichloroethane	0.0024	0.013	521
	1,1,2,2-Tetrachloroethane	0.014	0.096	0.0484
	1,1,2-Trichloroethane	0	0	0.0209
	1,1-Dichloroethane	0.0021	0.0085	1.75
	1,1-Dichloroethylene	0.0097	0.038	0.413
	1,2,4-Trichlorobenzene	0.18	1.3	0.209
	1,2,4-Trimethylbenzene	0.547	2.69	6.26
	1,2-Dibromoethane	0.0102	0.0784	0.00468
	1,2-Dichlorobenzene	0.0242	0.145	20.9
	1,2-Dichloroethane	0.163	0.660	0.108
	1,2-Dichloropropane	0.0148	0.0684	0.417
	1,3,5-Trimethylbenzene	0.137	0.674	6.26
	1,3-Butadiene	1.029	2.277	0.0936
	1,3-Dichlorobenzene	0.0271	0.163	83.4
	1,4-Dichlorobenzene	0.066	0.40	0.255
	4-Ethyltoluene	0.136	0.668	350
	Acrolein	2.395	5.491	0.00209
	Alpha Pinene*	0.349	1.94	1,120
	Benzene	1.115	3.562	0.36
	Benzyl Chloride	0.0222	0.115	0.0573
	Beta Pinene*	0	0	1,120
	Bromomethane	0.0976	0.379	0.521
	Camphene*	0	0	80
	Carbon Tetrachloride	0.0937	0.589	0.468
	Chlorobenzene	0.0192	0.0884	5.21
	Chloroethane	0.0143	0.0377	417
	Chloroethene	0.0209	0.0534	0.168
	Chloroform	0.252	1.23	0.122
	Chloromethane	0.849	1.75	9.39
	cis-1,2-Dichloroethylene	0.0047	0.019	4.17
	cis-1,3-Dichloropropene	0.0128	0.0581	2.09
	Cyclohexane	0.695	2.39	626
	Dichlorodifluoromethane	0.519	2.57	10.4
	Ethylbenzene	1.022	4.4379	1.12
	Freon 11	0.247	1.39	73
	Freon 113	0.0724	0.555	521
	Freon 114	0.0181	0.127	69,000
	Gamma Terpinene*	0	0	N/A
	Hexachlorobutadiene	0.0121	0.129	0.128
	Methyl Sulfide*	0	0	0.0209
	Methylene Chloride	3.907	13.57	62.6
Pinene*	2	11	1120	
Styrene	1.163	4.954	104	
Tetrachloroethylene	2.925	19.84	4.17	
Toluene	3.588	13.52	521	
trans-1,3-Dichloropropene	0.0062	0.028	2.09	
Trichloroethylene	0.0412	0.221	0.209	
Xylenes	4.781	20.76	10.4	

*TIE compounds: It should be noted these compounds are not quantitatively assessed for cancer risk or hazard quotient since they could not be positively identified, as the laboratory equipment is not calibrated to quantify the compounds.

Site	Pollutant	Maximum Detected Concentration (ppbV)	Maximum Detected Concentration (µg/m ³)	Screening Value (µg/m ³)
Rincon City Hall	1,1,1-Trichloroethane	0.002	0.011	521
	1,1,2,2-Tetrachloroethane	0.0065	0.044	0.0484
	1,1,2-Trichloroethane	0.0037	0.020	0.0209
	1,1-Dichloroethane	0.0019	0.0077	1.75
	1,1-Dichloroethylene	0.0132	0.0523	0.413
	1,2,4-Trichlorobenzene	0.486	3.61	0.209
	1,2,4-Trimethylbenzene	0.339	1.67	6.26
	1,2-Dibromoethane	0.0102	0.0784	0.00468
	1,2-Dichlorobenzene	0.0485	0.292	20.9
	1,2-Dichloroethane	0.0229	0.0927	0.108
	1,2-Dichloropropane	0.0167	0.0772	0.417
	1,3,5-Trimethylbenzene	0.0582	0.286	6.26
	1,3-Butadiene	0.573	1.27	0.0936
	1,3-Dichlorobenzene	0.0428	0.257	83.4
	1,4-Dichlorobenzene	0.0632	0.380	0.255
	4-Ethyltoluene	0.0929	0.456	350
	Acrolein	1.42	3.26	0.00209
	Alpha Pinene*	1.1	6.1	1,120
	Benzene	0.451	1.44	0.36
	Benzyl Chloride	0.0451	0.234	0.0573
	Beta Pinene*	0	0	1,120
	Bromomethane	0.0624	0.242	0.521
	Camphene*	0	0	80
	Carbon Tetrachloride	0.0946	0.595	0.468
	Chlorobenzene	0.0096	0.044	5.21
	Chloroethane	0.0251	0.0662	417
	Chloroethene	0.0239	0.0611	0.168
	Chloroform	0.0606	0.296	0.122
	Chloromethane	0.782	1.61	9.39
	cis-1,2-Dichloroethylene	0	0	4.17
	cis-1,3-Dichloropropene	0.0145	0.0658	2.09
	Cyclohexane	0.178	0.613	626
	Dichlorodifluoromethane	0.557	2.75	10.4
	Ethylbenzene	0.201	0.873	1.12
	Freon 11	0.262	1.47	73
	Freon 113	0.0795	0.609	521
	Freon 114	0.0226	0.158	69,000
	Gamma Terpinene*	0	0	N/A
	Hexachlorobutadiene	0.0269	0.287	0.128
	Methyl Sulfide*	0	0	0.0209
	Methylene Chloride	0.435	1.51	62.6
Pinene*	3.141	17.50	1120	
Styrene	0.744	3.17	104	
Tetrachloroethylene	0.0081	0.055	4.17	
Toluene	1.143	4.307	521	
trans-1,3-Dichloropropene	0.0111	0.0504	2.09	
Trichloroethylene	0.0075	0.040	0.209	
Xylenes	0.859	3.73	10.4	

*TIE compounds: It should be noted these compounds are not quantitatively assessed for cancer risk or hazard quotient since they could not be positively identified, as the laboratory equipment is not calibrated to quantify the compounds.

Table A-2: Exposure Concentration (EC) derivation of air toxic concentration in air for chemicals of potential concern collected at DRT Facility, Ebenezer Middle School, and Rincon City Hall.

DRT Facility: Chemicals of Potential Concern (COPC)	EC based upon the 95% Upper Confidence Level (UCL) on the mean ($\mu\text{g}/\text{m}^3$)	Statistical Method used to derive 95% Upper Confidence Level (UCL)
Acrolein	0.415	95% Student's-t UCL
Benzene	0.805	95% KM (t) UCL
Benzyl Chloride	0.00942	95% KM (t) UCL
Bromomethane	0.0598	95% KM (t) UCL
1,3-Butadiene	0.283	95% KM (t) UCL
Carbon Tetrachloride	0.489	95% KM (t) UCL
Chloroform	1	95% KM (t) UCL
1,2-Dibromoethane	0.00229	95% KM (t) UCL
1,2-Dichloroethane	0.0676	95% KM (t) UCL
1,1-Dichloroethylene	0.262	95% KM (t) UCL
Ethylbenzene	0.677	95% KM (t) UCL
Hexachlorobutadiene	0.00766	95% KM (t) UCL
1,1,2,2-Tetrachloroethane	0.00435	95% KM (t) UCL
1,2,4-Trichlorobenzene	0.0994	95% KM (t) UCL
1,1,2-Trichloroethane	0.00395	95% KM (t) UCL

Ebenezer Middle School: Chemicals of Potential Concern (COPC)	EC based upon the 95% Upper Confidence Level (UCL) on the mean ($\mu\text{g}/\text{m}^3$)	Statistical Method used to derive 95% Upper Confidence Level (UCL)
Acrolein	0.417	95% Student's-t UCL
Benzene	0.489	95% KM Approximate Gamma UCL
Benzyl Chloride	0.00725	95% KM Approximate Gamma UCL
1,3-Butadiene	0.254	95% KM (t) UCL
Carbon Tetrachloride	0.474	95% KM (t) UCL
Chloroform	0.0889	95% KM (t) UCL
1,2-Dibromoethane	0.00313	95% KM (t) UCL
1,4-Dichlorobenzene	0.0358	95% KM Approximate Gamma UCL
1,2-Dichloroethane	0.0789	95% KM (t) UCL
Ethylbenzene	0.102	95% H-UCL
Hexachlorobutadiene	0.00868	95% KM (t) UCL
1,1,2,2-Tetrachloroethane	0.00426	95% KM (t) UCL
Tetrachloroethylene	0.6	95% KM (t) UCL
1,2,4-Trichlorobenzene	0.0764	95% KM (t) UCL
Trichloroethylene	0.0291	95% KM (t) UCL
Total Xylenes	0.799	95% Student's-t UCL

Rincon City Hall: Chemicals of Potential Concern (COPC)	EC based upon the 95% Upper Confidence Level (UCL) on the mean ($\mu\text{g}/\text{m}^3$)	Statistical Method used to derive 95% Upper Confidence Level (UCL)
Acrolein	0.378	95% Student's-t UCL
Benzene	0.428	95% KM (t) UCL
Benzyl Chloride	0.014	95% KM Approximate Gamma UCL
1,3-Butadiene	0.279	95% KM (t) UCL
Carbon Tetrachloride	0.471	95% KM (t) UCL
Chloroform	0.0796	95% KM (t) UCL
1,2-Dibromoethane	0.00308	95% KM Approximate Gamma UCL
1,4-Dichlorobenzene	0.0287	95% H-UCL
Hexachlorobutadiene	0.0125	95% KM (t) UCL
1,2,4-Trichlorobenzene	0.131	95% KM (t) UCL

Table A-3: Risk and Hazard Calculations for chemicals of potential concern (COPCs) based on air toxics data collected from the DRT Facility, Ebenezer Middle School, and Rincon City Hall.

DRT Facility						
Substance	CAS	Concentration ($\mu\text{g}/\text{m}^3$)	Cancer Risk	Hazard Quotient	IUR ($\mu\text{g}/\text{m}^3$) ⁻¹	Chronic RfC (mg/m^3)
Acrolein	107-02-8	4.15E-01	-	1	-	3.50E-04
Benzene	71-43-2	8.05E-01	2.00E-06	0.03	7.80E-06	3.00E-02
Benzyl Chloride	100-44-7	9.42E-03	2.00E-07	0.009	4.90E-05	1.00E-03
Bromomethane	74-83-9	5.98E-02	-	0.01	-	5.00E-03
1,3-Butadiene	106-99-0	2.83E-01	3.00E-06	0.1	3.00E-05	2.00E-03
Carbon Tetrachloride	56-23-5	4.89E-01	1.00E-06	0.005	6.00E-06	1.00E-01
Chloroform	67-66-3	1.00E+00	8.00E-06	0.5	2.30E-05	1.95E-03
1,2-Dibromoethane	106-93-4	2.29E-03	5.00E-07	0.0002	6.00E-04	9.00E-03
1,2-Dichloroethane	107-06-2	6.76E-02	6.00E-07	0.009	2.60E-05	7.00E-03
1,1-Dichloroethylene	75-35-4	2.62E-01	-	0.06	-	3.96E-03
Ethylbenzene	100-41-4	6.77E-01	6.00E-07	0.0006	2.50E-06	1.00E+00
Hexachlorobutadiene	87-68-3	7.66E-03	6.00E-08	-	2.20E-05	-
1,1,2,2-Tetrachloroethane	79-34-5	4.35E-03	9.00E-08	-	5.80E-05	-
1,2,4-Trichlorobenzene	120-82-1	9.94E-02	-	0.05	-	2.00E-03
1,1,2-Trichloroethane	79-00-5	3.95E-03	2.00E-08	0.02	1.60E-05	2.00E-04
<i>Sum:</i>			<i>1.66E-05</i>	<i>1.96</i>		
<i>Rounded to 1 significant figure per EPA guidance:</i>			<i>2E-05</i>	<i>2</i>		

Ebenezer Middle School						
Substance	CAS	Concentration ($\mu\text{g}/\text{m}^3$)	Cancer Risk	Hazard Quotient	IUR ($\mu\text{g}/\text{m}^3$) ⁻¹	Chronic RfC (mg/m^3)
Acrolein	107-02-8	4.17E-01	-	1	-	3.50E-04
Benzene	71-43-2	4.89E-01	1.00E-06	0.02	7.80E-06	3.00E-02
Benzyl Chloride	100-44-7	7.25E-03	1.00E-07	0.007	4.90E-05	1.00E-03
1,3-Butadiene	106-99-0	2.54E-01	3.00E-06	0.1	3.00E-05	2.00E-03
Carbon Tetrachloride	56-23-5	4.74E-01	1.00E-06	0.005	6.00E-06	1.00E-01
Chloroform	67-66-3	8.89E-02	7.00E-07	0.04	2.30E-05	1.95E-03
1,2-Dibromoethane	106-93-4	3.13E-03	7.00E-07	0.0003	6.00E-04	9.00E-03
1,4-Dichlorobenzene	106-46-7	3.58E-02	1.00E-07	0.00004	1.10E-05	8.00E-01
1,2-Dichloroethane	107-06-2	7.89E-02	7.00E-07	0.01	2.60E-05	7.00E-03
Ethylbenzene	100-41-4	1.02E-01	9.00E-08	0.0001	2.50E-06	1.00E+00
Hexachlorobutadiene	87-68-3	8.68E-03	7.00E-08	-	2.20E-05	-
1,1,2,2-Tetrachloroethane	79-34-5	4.26E-03	9.00E-08	-	5.80E-05	-
Tetrachloroethylene	127-18-4	6.00E-01	6.00E-08	0.01	2.60E-07	4.00E-02
1,2,4-Trichlorobenzene	120-82-1	7.64E-02	-	0.04	-	2.00E-03
Trichloroethylene	79-01-6	2.91E-02	6.00E-08	0.01	4.10E-06	2.00E-03
Total Xylenes	1330-20-7	7.98E-01	-	0.008	-	1.00E-01
<i>Sum:</i>			<i>7.84E-06</i>	<i>1.417</i>		
<i>Rounded to 1 significant figure per EPA guidance:</i>			<i>8E-06</i>	<i>1</i>		

Rincon City Hall

Substance	CAS	Concentration ($\mu\text{g}/\text{m}^3$)	Cancer Risk	Hazard Quotient	IUR ($\mu\text{g}/\text{m}^3$) ⁻¹	Chronic RfC (mg/m^3)
Acrolein	107-02-8	3.78E-01	-	1	-	3.50E-04
Benzene	71-43-2	4.28E-01	1.00E-06	0.01	7.80E-06	3.00E-02
Benzyl Chloride	100-44-7	1.40E-02	2.00E-07	0.01	4.90E-05	1.00E-03
1,3-Butadiene	106-99-0	2.79E-01	3.00E-06	0.1	3.00E-05	2.00E-03
Carbon Tetrachloride	56-23-5	4.71E-01	1.00E-06	0.005	6.00E-06	1.00E-01
Chloroform	67-66-3	7.96E-02	7.00E-07	0.04	2.30E-05	1.95E-03
1,2-Dibromoethane	106-93-4	3.08E-03	7.00E-07	0.0003	6.00E-04	9.00E-03
1,4-Dichlorobenzene	106-46-7	2.87E-02	1.00E-07	0.00003	1.10E-05	8.00E-01
Hexachlorobutadiene	87-68-3	1.25E-02	1.00E-07	-	2.20E-05	-
1,2,4-Trichlorobenzene	120-82-1	1.31E-01	-	0.06	-	2.00E-03

Sum:

6.94E-06

1.3

Rounded to 1 significant figure per EPA guidance:

7E-06

1