Mobile Monitoring Team
Monitoring Data Summary
Laredo, TX – September 17-19, 2024

Introduction

The Texas Commission on Environmental Quality (TCEQ) Mobile Monitoring Team (MMT) conducted an ambient air monitoring project (LA2409) in Laredo, Texas, to support a Region 16 (R16) investigation of ethylene oxide (EtO) emissions from Midwest Sterilization (Regulated Entity No. RN103376901) – a sterilization facility permitted to emit EtO, volatile organic compounds (VOCs), total oxides of nitrogen (NOx), particulate matter (PM), and carbon monoxide (CO). EtO was the main compound of concern for this project.

Stationary monitoring and mobile surveys were conducted from September 17 - 19, 2024, in Laredo, Texas, around Midwest Sterilization and in surrounding neighborhoods. The monitoring strategy described in the LA2409 Monitoring Plan was used to map out monitoring routes during this effort, and measured concentrations were compared to mobile monitoring comparison values (MMCVs) developed by the TCEQ Toxicology, Risk Assessment, and Research Division. These values are health-based action levels to help inform decisions while conducting mobile monitoring. Refer to Attachment A for a table of MMCVs. Monitoring was conducted from early morning into early afternoon during optimal temperature, wind, and traffic conditions. Winds were generally less than five miles per hour (mph) and from the east/southeast (ESE).

Data were collected by two Strategic Mobile Air Reconnaissance Technology (SMART) vans, Van #0940 and Van #5416. Within each van, VOC data were collected by a Syft Voice200 Ultra Selected Ion Flow Tube Mass Spectrometer (SIFT-MS) to measure benzene, toluene, ethylbenzene+xylenes, styrene, and 1,3-butadiene (BTEX+), and EtO data were collected by a Picarro PI2920 Cavity Ringdown Spectrometer EtO Analyzer (EtO Picarro) with an attached Zero Reference Module (ZRM). In conjunction with the EtO Picarro, the ZRM uses a scrubber to remove EtO from ambient air and collect a zero average that is representative of ambient background noise. This zero average is then subtracted from the average EtO analyzer reading of ambient air and reported as a corrected EtO concentration. By correcting the EtO concentration for ambient background noise, the ZRM allows the analyst to obtain a lower limit of detection (LOD) and a lower limit of quantitation (LOQ) than with the EtO Picarro alone. Due to averaging times, the ZRM can only be used while stationary. The EtO Picarro is capable of monitoring EtO in three modes: stationary monitoring with the ZRM, stationary monitoring without the ZRM, and surveys without the ZRM. When conducting stationary monitoring with the ZRM, the ZRM uses a 12-minute cycle that includes a 5-minute sampling average, a 5-minute zeroing average, and two 1-minute instrument settling times. During surveys, the EtO Picarro is used without the ZRM and generates real-time concentrations. The EtO Picarro is used during stationary monitoring without the ZRM if EtO concentrations are greater than the EtO Picarro LOQ. Refer to Table 1 below for instrument LODs and LOQs. All concentrations below detection limits are considered non-detect. All concentrations between the LOD and LOQ are considered estimated. Analyte concentrations are reported in parts per billion by volume (ppbv).

Table 1: Instrument Detection and Quantitation Limits

Instrument Configuration	Definition	Analyte	LOD (ppbv)	LOQ (ppbv)
EtO Picarro	EtO Picarro without ZRM: Mobile Monitoring and Stationary Monitoring	EtO	1.00	3.00
EtO Picarro with ZRM – 5-min avg	EtO Picarro with ZRM: Stationary Monitoring only, using a 12 min cycle (1 min settling, 5 min zeroing, 1 min settling, and 5 min sampling)	EtO	0.08	0.20
SIFT-MS	SIFT-MS Mobile and Stationary Monitoring	Benzene	3.0	10.0
		1,3-butadiene	4.0	10.0
		Ethylbenzene + xylenes	10.0	40.0
		Styrene	4.0	10.0
		Toluene	4.0	10.0

avg - average
EtO – ethylene oxide
LOD – limit of detection
LOQ – limit of quantitation
min – minute
ppbv – parts per billion by volume
SIFT-MS –Selected Ion Flow Tube Mass Spectrometer
ZRM – Zero Reference Module

Stationary Monitoring and Mobile Surveys

Monitoring was conducted during three monitoring periods:

- Monitoring Period 1 (September 17, 2024, 0700 – 1530),
- Monitoring Period 2 (September 18, 2024, 0650 – 1500), and
- Monitoring Period 3 (September 19, 2024, 0450 – 1300).

Mobile surveys were conducted around Midwest Sterilization, and maximum instantaneous values observed during each distinct survey were used to determine the location of subsequent stationary monitoring conducted as a result of that survey, if warranted. EtO concentrations measured during surveys were not above the MMCV instantaneous baseline-derived investigation level (iBDIL) of 30 ppbv, therefore stationary monitoring was generally conducted in areas downwind of Midwest Sterilization when concentrations were higher than relative data collected during the same survey and/or timeframe. Surveys were also conducted in nearby neighborhoods. EtO concentrations in neighborhoods were not observed above the 3 ppbv LOQ of the instrument; therefore, EtO concentrations were not used to determine stationary monitoring locations in neighborhoods. Instead, stationary monitoring was generally conducted at locations with sufficient space to safely park the vehicle for long-term monitoring. Stationary monitoring was performed for a minimum of one hour, when possible. In areas where EtO concentrations were below the LOQ of the EtO Picarro without the ZRM, stationary monitoring was conducted with the ZRM to utilize the lower LOD and LOQ.

Stationary monitoring files are referred to as ST followed by a number (e.g., ST01) and mobile survey files are referred to as MA followed by a number (e.g., MA01). Stationary monitoring and mobile

surveys discussed in this report are depicted in Attachment B. Stationary monitoring and mobile surveys discussed in this report either depict the maximum EtO concentrations observed near Midwest Sterilization during each monitoring period or summarize monitoring completed in neighborhoods surrounding Midwest Sterilization during each monitoring period. For stationary monitoring, data may be represented as wind or pollution roses (i.e., pollution roses for this report are used to display the EtO concentrations associated with each wind direction). The length of each spoke on the rose indicates the frequency of wind blowing from that direction, with longer spokes signifying more frequent winds from that direction, while the color or intensity of the spoke signifies the wind speed or corresponding pollution level when the wind blows from that direction. For mobile surveys, the arrows are pointing in the direction that the wind is traveling.

Winds were often light and variable, which could affect the display of primary wind direction in the associated wind arrows, wind roses, and pollution roses.

Data summary tables for mobile surveys and stationary monitoring are included in Attachments C and D, respectively. Tables include date, time, survey or stationary ID, Global Positioning System (GPS) coordinates, average wind speed, average wind direction, minimum and maximum instantaneous analyte concentrations, and maximum 1-hour (1-hr) average analyte concentrations for BTEX+ and EtO. Other instantaneous SIFT-MS and EtO Picarro data are available upon request.

All BTEX+ concentrations were below their respective MMCVs and are not discussed further in this report.

Monitoring Period 1 – September 17, 2024

During Monitoring Period 1, winds were predominantly southeast (SE) and averaged less than five mph. Van #0940 conducted seven mobile surveys (MA01 through MA06, and MA08) and conducted stationary monitoring without the ZRM at two locations (ST01 and ST02) in neighborhoods northwest (NW) of Midwest Sterilization. Van #5416 conducted five mobile surveys (MA01 through MA05) and conducted stationary monitoring without the ZRM at three locations (ST01, ST02, and ST03) on roads immediately surrounding Midwest Sterilization. All instantaneous EtO concentrations during this monitoring period were below the iBDIL of 30 ppbv.

Van #0940

Mobile surveys were conducted by Van #0940 in the following neighborhoods downwind of the facility: MA01 and MA02 in the La Bota Ranch neighborhood, MA03 in the Indian Sunset neighborhood, MA04 and MA08 in the Deer Creek neighborhood, and MA05 and MA06 in the Green Ranch neighborhood (Attachment B, Figure 1). MA07 was recorded by accident and was not an actual survey. MA07 was not included in Attachment C. All instantaneous EtO concentrations were below the instrument LOQ of 3 ppbv.

Stationary monitoring was conducted without the ZRM at two locations (ST01 and ST02) by Van #0940 in the Deer Creek and Green Ranch neighborhoods, respectively. The maximum instantaneous EtO concentrations collected during ST01 and ST02 were below the instrument LOQ of 3 ppbv, and the maximum 1-hr average concentrations were below the instrument LOD of 1 ppbv. See Attachments C and D for survey and stationary data, respectively.

Van #5416

Two mobile surveys were conducted by Van #5416 on the roads surrounding the facility. The maximum instantaneous EtO concentration observed during these surveys was 17.93 ppbv on Killam Industrial Boulevard just north of the facility on the fenceline (MA02, Attachment B, Figure 2). Survey MA02 took a circular route around the facility and all other concentrations along the eastern, southern, and western portions of the route were below the LOQ of 3 ppbv (Attachment B, Figure 3).

Stationary monitoring was conducted without the ZRM in the area where the maximum survey concentration was observed. The maximum survey EtO concentration observed was 15.47 ppbv, and the maximum 1-hr average EtO concentration was 4.42 ppbv (ST01, Attachment B, Figure 4). In general, higher EtO concentrations were observed during surveys and stationary monitoring conducted earlier in the morning, and concentrations dissipated by early afternoon. See Attachments C and D for survey and stationary data, respectively.

Monitoring Period 2 – September 18, 2024

During Monitoring Period 2, winds were predominantly SE and averaged less than five mph. Van #0940 conducted one mobile survey (MA01) and conducted stationary monitoring with the ZRM at five locations (ST01 through ST05) around Midwest Sterilization and neighborhoods NW of Midwest Sterilization. Van #5416 conducted two mobile surveys (MA01 and MA02) and conducted stationary monitoring without the ZRM at one location (ST01) on roads immediately surrounding Midwest Sterilization. Optical Gas Image Camera (OGIC) footage captured in the morning during this monitoring period depicted some emissions from the Midwest Sterilization Stack. OGIC footage is available upon request.

Van #0940

Van #0940 conducted one mobile survey around Midwest Sterilization. The maximum instantaneous EtO concentration observed during this survey was 12.96 ppbv on Killam Industrial Boulevard on the north fenceline of the facility, below the iBDIL of 30 ppbv.

Van #0940 conducted stationary monitoring at the above location (ST01; Killam Industrial Boulevard) while collocated with Van #5416. This collocation of Van #0940 and Van #5416 was conducted to compare the EtO Picarro *with* ZRM concentrations to the EtO Picarro *without* ZRM concentrations. The maximum EtO 12-min cycle was 14.89 ppbv. The maximum 1-hr average EtO concentration was 9.76 ppbv. Stationary monitoring with the ZRM was performed at four locations in three neighborhoods downwind (west and NW) of the facility: La Bota Ranch, Deer Creek, and Green Ranch. The maximum 12-min cycle concentration of EtO detected among these monitoring locations was 0.10 ppbv during ST03 in the Deer Creek neighborhood. The maximum 1-hr average concentration of EtO detected among these monitoring locations was 0.04 ppbv, also collected during ST03 in the Deer Creek neighborhood. All instantaneous EtO concentrations were below the iBDIL of 30 ppbv. See Attachment B, Figure 5 for stationary monitoring locations and Attachments C and D for survey and stationary data, respectively.

Van #5416

Mobile surveys were conducted by Van #5416 on the roads surrounding the facility. The maximum instantaneous EtO concentration observed during these surveys was 14.05 ppbv on Killam Industrial Boulevard on the north fenceline of the facility, below the iBDIL of 30 ppbv.

Stationary monitoring was conducted without the ZRM (ST01) for 6 hours; this stationary monitoring was conducted in the area where the maximum instantaneous survey concentration was observed. The maximum instantaneous EtO concentration observed was 35.99 ppbv, above the iBDIL of 30 ppbv but below the instantaneous health-protective investigation level (iHPIL) of 910 ppbv. The maximum 1-hr average EtO concentration was 12.45 ppbv, below the one-hour exposure mitigation health-based action level ($^{EM}HBAL_{1hr}$) of 1,820 ppbv. See Attachment B, Figure 6 for the location of this stationary monitoring and Attachments C and D for survey and stationary data, respectively.

Monitoring Period 3 – September 19, 2024

During Monitoring Period 3, winds were predominantly east shifting to SE and averaged less than five mph. Van #0940 conducted two mobile surveys (MA01 and MA02) around Midwest Sterilization and conducted stationary monitoring with the ZRM at five locations (ST01 through ST05) in neighborhoods east, south, and west of Midwest Sterilization. Van #5416 conducted five mobile surveys (MA01 through MA05) and conducted stationary monitoring without the ZRM at three locations (ST01 through ST03) on roads immediately surrounding Midwest Sterilization and neighborhoods SE and west of Midwest Sterilization.

Van #0940

Van #0940 conducted two mobile surveys around Midwest Sterilization. Survey MA01 was not recorded on the datalogger software due to a software malfunction. The MA01 data was not recovered from the instrument since the same general survey route was repeated as MA02. The datalogger software issue is discussed further in the MMT Quality Control section.

The maximum instantaneous EtO concentration observed during survey MA02 was 9.49 ppbv on Killam Industrial Boulevard on the north fenceline of the facility, below the iBDIL of 30 ppbv.

Van #0940 conducted stationary monitoring with the ZRM at five locations in three neighborhoods surrounding the facility: La Bota, San Agustin, and San Isidro. The maximum 12-min cycle concentration of EtO detected among these monitoring locations was 0.09 ppbv during ST03 in the San Isidro neighborhood. All maximum 1-hr average concentrations of EtO were below the LOD of 0.08 ppbv. All instantaneous EtO concentrations were below the iBDIL of 30 ppbv. See Attachment B, Figure 7 for these stationary monitoring locations and Attachments C and D for more detailed survey and stationary data, respectively.

Van #5416

Van #5416 conducted mobile surveys MA01 through MA04 on the roads surrounding the facility. The maximum instantaneous EtO concentration observed during these surveys was 17.18 ppbv on Killam Industrial Boulevard on the north fenceline of the facility (MA02, Attachment B, Figure 8). Mobile survey MA05 was conducted in the Indian Sunset neighborhood. All instantaneous EtO concentrations in this survey were below the instrument LOQ of 3 ppbv.

Stationary monitoring was conducted without the ZRM at three locations: two in the general area where the maximum survey concentrations were observed and one in the San Isidro neighborhood. The maximum instantaneous EtO concentration observed across these stationary monitoring locations was 38.84 ppbv during ST02, above the iBDIL of 30 ppbv but below the iHPIL of 910 ppbv. The maximum 1-hr average EtO concentration was 10.72 ppbv during ST02, below the $^{EM}HBAL_{1hr}$ of 1,820 ppbv (Attachment B, Figure 9). Additional maximum instantaneous and 1-hr average concentrations from the other monitoring locations are included in Attachments C and D, respectively.

MMT Quality Control

Daily Quality Control (QC) checks consisted of a blank, calibration verification standard (CVS), and calibration verification standard duplicate (CVSD) performed on the EtO Picarro, EtO Picarro with the ZRM, and the SIFT-MS in both vans before and after the trip, as well as every 24 hours during the trip with the following exceptions:

- The ZRM was not used in Van #5416 due to mechanical issues with the ZRM; therefore, QC was not performed on the EtO Picarro with the ZRM in this van.

- Opening QC on the SIFT-MS in Van #5416 on September 16, 2024, was above the 20% accuracy data quality objectives (DQO) for BTEX+ and greater than 40%, indicating an issue with the SIFT-MS. Therefore, the SIFT-MS was not used during Monitoring Period 1, however, a successful field calibration was performed prior to Monitoring Period 2.

For stationary monitoring with the ZRM, instantaneous EtO data were not reported in Attachment D and were qualified using [X]. The instantaneous data captured during the two 1-minute instrument settling periods are invalid because when the ZRM shifts from zeroing to sampling and vice versa during settling periods, the transition between valves causes large spikes of EtO that are not indicative of ambient conditions. Additionally, some instantaneous EtO data includes zeroing data, which are also not indicative of ambient conditions.

All daily QC checks passed accuracy, precision, and baseline DQOs for each instrument with the following exceptions:

- On September 18, 2024, 1,3-butadiene, ethylbenzene+xylenes, and styrene failed the 20% accuracy DQO on the SIFT-MS in Van #5416. All 1,3-butadiene, ethylbenzene+xylenes, and styrene data collected on September 18 and 19, 2024 in Van #5416 may be biased low. The data were qualified on the data summary tables using [A1].
- On September 16, 18, and 19, 2024, EtO failed the 20% accuracy DQO on the EtO Picarro with the ZRM in Van #0940. All corrected EtO data collected using the ZRM may be biased low. The data were qualified on the data summary tables using [A1].
- On September 19, 2024, EtO failed the 20% precision DQO on the EtO Picarro with the ZRM in Van #0940. All corrected EtO data collected using the ZRM on September 19, 2024, are considered estimated. The data were qualified on the data summary tables using [P].
- In Van #5416, the LOQ verification and the lowest point on the linearity check failed the 20% and 10% accuracy DQO, respectively, for 1,3-butadiene and styrene on the SIFT-MS. All 1,3-butadiene and styrene data below 180 ppbv may be biased high. The data were qualified on the data summary tables using [A2].

All 1,3-butadiene, benzene, toluene, and styrene concentrations collected by the SIFT-MS below the LOQ of 10 ppbv and all ethylbenzene+xylenes concentrations collected by the SIFT-MS below the LOQ of 40 ppbv are considered estimated. All EtO concentrations collected by the EtO Picarro without the ZRM below the LOQ of 3 ppbv are considered estimated. All EtO concentrations collected by the EtO Picarro with the ZRM below the LOQ of 0.20 ppbv are considered estimated. All data below these limits were qualified on the data summary tables using [L].

Due to analyst oversight, EtO data from survey MA01 on September 17, 2024, in Van #5416 is invalid. The analyst mistakenly left zero air running through the sampling system during the survey and was not sampling ambient air. The analyst discovered the issue after the survey, turned off the zero air, and repeated the survey (MA02). The EtO data for survey MA01 were qualified in Attachment C using [AO].

In Van #0940, survey file MA07 on September 17, 2024, was accidentally recorded by the analyst. This survey file does not correspond with a survey and is not included in Attachment C.

The datalogging software used to combine instrument data streams and record project data files for all stationary monitoring and mobile surveys (Mobile Emissions Monitoring Software [MEMS]) malfunctioned during the project. A new version had been installed prior to this monitoring trip, and during monitoring, staff noticed a time lag on the MEMS real-time data visualizer that increased with the length of time that MEMS was open. Post project, it was determined that the time lag delayed the logging of some mobile survey and stationary monitoring data files. For stationary files, this resulted in mobile data recorded at the beginning of the stationary files and loss of the final few minutes of stationary data needed for 1-hr average calculations. For mobile surveys, this resulted in recorded mobile data travelling to survey locations at the beginning of the file, and loss of the final few minutes of the survey.

When reducing the raw data files, data not associated with the respective survey or stationary file were not included in the reduced files. In multiple cases, the end of a mobile survey was captured by the subsequent stationary monitoring file, and this data could be appended to the reduced mobile survey file. When missing survey or stationary data could not be appended from subsequent files, the raw data were manually recovered from the EtO Picarro and included in the reduced file. Surveys and stationary files affected by this time lag are qualified with [EM1], [EM2], and [EM3], and data additions are described in the comments and footnotes for these data qualifiers. Magellan weather and GPS data could not be manually recovered. SIFT-MS data were not manually recovered as no concentrations were observed above MMCVs and this data was not the primary focus of the project. Only reduced data files were altered; the original raw data files were not edited and are available upon request.

Due to electronic noise, negative numbers may occur when concentrations are below the LOD. Any concentration below the LOD is considered non-detect.

Attachment A

Mobile Monitoring Comparison Values for Instantaneous Data

for field use with instruments that cannot average data in real-time or for in-motion measurements

Chemical(s) DUVAS COLOR	UNITS	iBDIL ORANGE	iHPIL RED	iHBAL PURPLE	$^{EM}HBAL_{1sec}$ N/A
Acetylene	ppb	80	25,000	75,000	150,000
Ammonia	ppb	--	850	2,550	5,100
Benzene	ppb	80	180	540	1,080
1,3-Butadiene	ppb	40	1,700	5,100	10,200
1-Butene	ppb	110	27,000	81,000	162,000
C3-C4 Saturated	ppb	960	--	--	--
Chlorine	ppb	--	70	210	420
Cyclohexane	ppb	120	1,000	3,000	6,000
Ethylbenzene	ppb	350	20,000	60,000	120,000
Ethylene Dichloride	ppb	--	540	1,620	3,240
Ethylene Glycol	ppb	--	1,900	5,700	11,400
Ethylene Oxide	ppb	30	910	2,730	5,460
n-Hexane	ppb	340	5,400	16,200	32,400
Hydrochloric Acid	ppb	--	440	1,320	2,640
Hydrogen Sulfide	ppb	--	70	210	420
Isobutane	ppb	280	33,000	99,000	198,000
n-Octane	ppb	160	4,100	12,300	24,600
Propane [a]	ppb	540	--	--	--
Propylene [a]	ppb	--	--	--	--
Sodium Hydroxide	ppb	--	5	15	30

Chemical(s) DUVAS COLOR	UNITS	iBDIL ORANGE	iHPIL RED	iHBAL PURPLE	$^{EM}HBAL_{1sec}$ N/A
Styrene	ppb	60	5,100	15,300	30,600
Sulfur Dioxide	ppb	80	--	--	--
Sulfuric Acid	ppb	--	30	90	180
Toluene	ppb	70	4,000	12,000	24,000
Vinyl Chloride	ppb	--	72,000	216,000	432,000
Xylenes + Ethylbenzene	ppb	60	5,000 [b]	15,000 [b]	30,000 [b]
Xylenes	ppb	--	5,000	15,000	30,000
$PM_{2.5}$	$\mu g/m^3$	--	105	--	--
PM_{10}	$\mu g/m^3$	--	450	--	--
Associated Actions		Conduct source investigation/ characterization	Consider stationary monitoring	Consider stationary monitoring & evaluation for ^{EM}HBAL levels	Consider exposure mitigation if 1 sec value > level

[a] Simple asphyxiant, non-toxic in ambient air; [b] Values are based on xylenes; "--"no value available; ND – not determined; ppb – parts per billion; N/A – not applicable

***iBDIL** – instantaneous baseline-derived investigation level;*
***iHPIL** – instantaneous health-protective investigation level;*
***iHBAL** – instantaneous health-based action level;*
***$^{EM}HBAL_{1sec}$** – 1-second exposure mitigation health-based action level*

***Special Note for Nephelometer:** The nephelometers may be used to provide $PM_{2.5}$ and PM_{10} estimates during fires, smoke events, and/or emissions events resulting from incidents where PM-related air quality impacts are expected. The nephelometers are not intended for use to assess nuisance complaints. $PM_{2.5}$ and PM_{10} are NAAQS compounds; instantaneous and exposure mitigation HBAL levels could not be derived for these compounds.*

Note: If a value does not exist and one is needed for screening, please contact the Toxicology Division for a trip-specific value at TOX@tceq.texas.gov or 512-239-1795.

Exposure Mitigation Health-Based Action Levels for Averaged Data

for field use with instruments that provide real-time averaging of data while stationary

These values should not be directly compared to instantaneous data

Chemical(s)	$^{EM}HBAL_{10min}$ (ppb)	$^{EM}HBAL_{1hr}$ (ppb)
Acetylene	75,000	50,000
Ammonia	2,550	1,700
Benzene	500 [b]	360
1,3-Butadiene	2,500 [b]	3,400
1-Butene	81,000	54,000
C3-C4 Saturated	--	--
Chlorine	200 [b]	140
Cyclohexane	3,000	2,000
Ethylbenzene	60,000	40,000
Ethylene Dichloride	1,000 [b]	1,080
Ethylene Glycol	5,700	3,800
Ethylene Oxide	2,500 [b]	1,820
n-Hexane	16,200	10,800
Hydrochloric Acid	1,000 [c]	880
Hydrogen Sulfide	210	140
Isobutane	99,000	66,000
n-Octane	12,300	8,200

Chemical(s)	$^{EM}HBAL_{10min}$ (ppb)	$^{EM}HBAL_{1hr}$ (ppb)
Propane [a]	--	--
Propylene [a]	--	--
Sodium Hydroxide	15	10
Styrene	10,000 [b]	10,200
Sulfur Dioxide	--	--
Sulfuric Acid	90	60
Toluene	12,000	8,000
Vinyl Chloride	216,000	144,000
Xylenes + Ethylbenzene	15,000 [d]	10,000 [d]
Xylenes	15,000	10,000
Associated Actions	Consider exposure mitigation if 5-10 min avg > level	Consider exposure mitigation if 30+ min avg > level

[a] Simple asphyxiant, non-toxic in ambient air; [b] Based on ½ occupational short-term exposure level (STEL); [c] Based on ½ occupational ceiling value;
[d] Values are based on acute health-based comparison values (AHBCV) for xylenes; "--"no value available; ppb – parts per billion;
***$^{EM}HBAL_{10min}$** – 10-minute exposure mitigation health-based action level;*
***$^{EM}HBAL_{1hr}$** – 1-hour exposure mitigation health-based action level*

Note: If a value does not exist and one is needed for screening, please contact the Toxicology Division for a trip-specific value at TOX@tceq.texas.gov or 512-239-1795.

Basis of instantaneous mobile monitoring comparison values and recommended actions if exceeded:

Comparison Value (Acronym)	DUVAS Caterpillar Color [a]	Basis	Recommended Actions with Exceedance
Concentrations below instantaneous comparison values	**GREEN**	N/A	No associated action
Instantaneous baseline-derived investigation level (iBDIL)	**ORANGE**	10× baseline level	Source investigation/characterization
Instantaneous health-protective investigation level (iHPIL)	**RED**	1× selected AHBCV	• Stationary monitoring or canister sample (30-min to 1-hour) • Source investigation/characterization
Instantaneous health-based action level (iHBAL)	**PURPLE**	3× selected AHBCV	• Increased vigilance for exceedance of an exposure mitigation value • Stationary monitoring (5-10 min) • Stationary monitoring or canister sample (30-min to 1-hour) • Source investigation/characterization

[a] *Colors represent values that are ≥ the appropriate comparison value; AHBCV – acute health-based comparison value; DUVAS – Differential Ultra-Violet Absorption Spectrometer; N/A – not applicable*

Basis of exposure mitigation values and recommended actions if exceeded:

Comparison Value (Acronym)	Basis	Recommended Actions
10-min health-based action level for exposure mitigation ($^{EM}HBAL_{10min}$)	Lower of 3×AHBCV [a], ½ STEL [b], or ½ C [c]	Consider exposure mitigation for staff
1-hour health-based action level for exposure mitigation ($^{EM}HBAL_{1hr}$)	2×AHBCV	Consider exposure mitigation for staff
1-sec health-based action level for exposure mitigation ($^{EM}HBAL_{1sec}$)	3×$^{EM}HBAL_{1hr}$	Consider exposure mitigation for staff

AHBCV – acute health-based comparison value; C – occupational ceiling value; STEL – 15-minute short-term occupational exposure limit

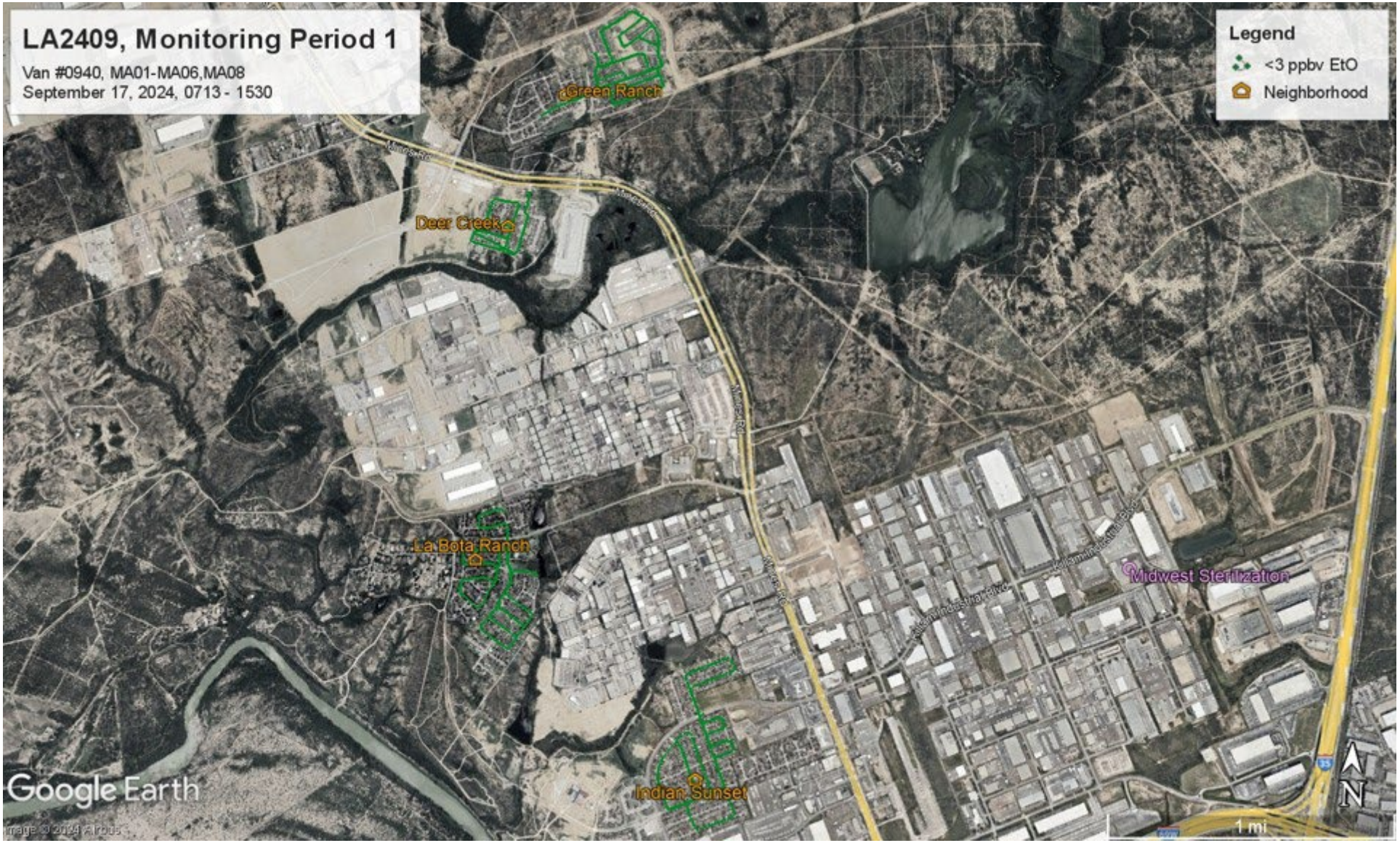

Figure 1: Map of survey routes taken by Van #0940 on September 17, 2024, in Laredo, Texas. All ethylene oxide concentrations were below the limit of quantitation of 3 parts per billion by volume. *This map was generated by the Air Monitoring Division of the Texas Commission on Environmental Quality. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Air Monitoring Division at 512-239-1716.*

Figure 2: Van #5416 MA02 survey on September 17, 2024, in Laredo, Texas. Maximum ethylene oxide concentration of 17.93 parts per billion by volume (ppbv) measured on Killam Industrial Boulevard just north of Midwest Sterilization. *This map was generated by the Air Monitoring Division of the Texas Commission on Environmental Quality. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Air Monitoring Division at 512-239-1716.*

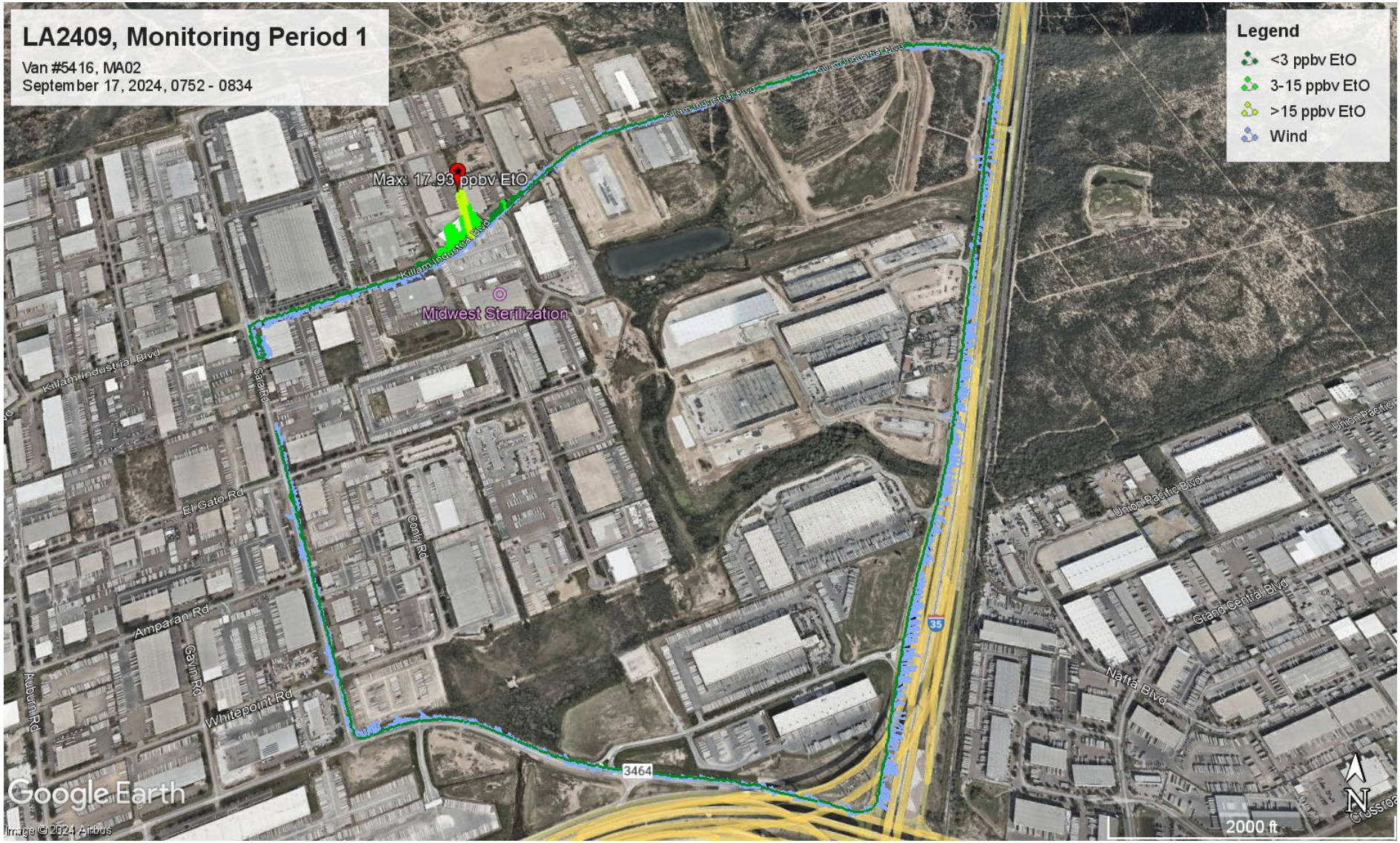

Figure 3: Van #5416 MA02 survey full view on September 17, 2024, in Laredo, Texas. Maximum ethylene oxide concentration of 17.93 parts per billion by volume (ppbv) measured on Killam Industrial Boulevard just north of Midwest Sterilization. Ethylene oxide concentrations east, south, and west of Midwest Sterilization were less than the 3 ppbv limit of quantitation. *This map was generated by the Air Monitoring Division of the Texas Commission on Environmental Quality. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Air Monitoring Division at 512-239-1716.*

Figure 4: Van #5416 ST01 stationary monitoring run with pollution rose on September 17, 2024, on Killam Industrial Boulevard north of Midwest Sterilization in Laredo, Texas. Maximum instantaneous ethylene oxide concentration of 15.47 parts per billion by volume (ppbv) and maximum 1-hour average ethylene oxide concentration of 4.42 ppbv. *This map was generated by the Air Monitoring Division of the Texas Commission on Environmental Quality. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Air Monitoring Division at 512-239-1716.*

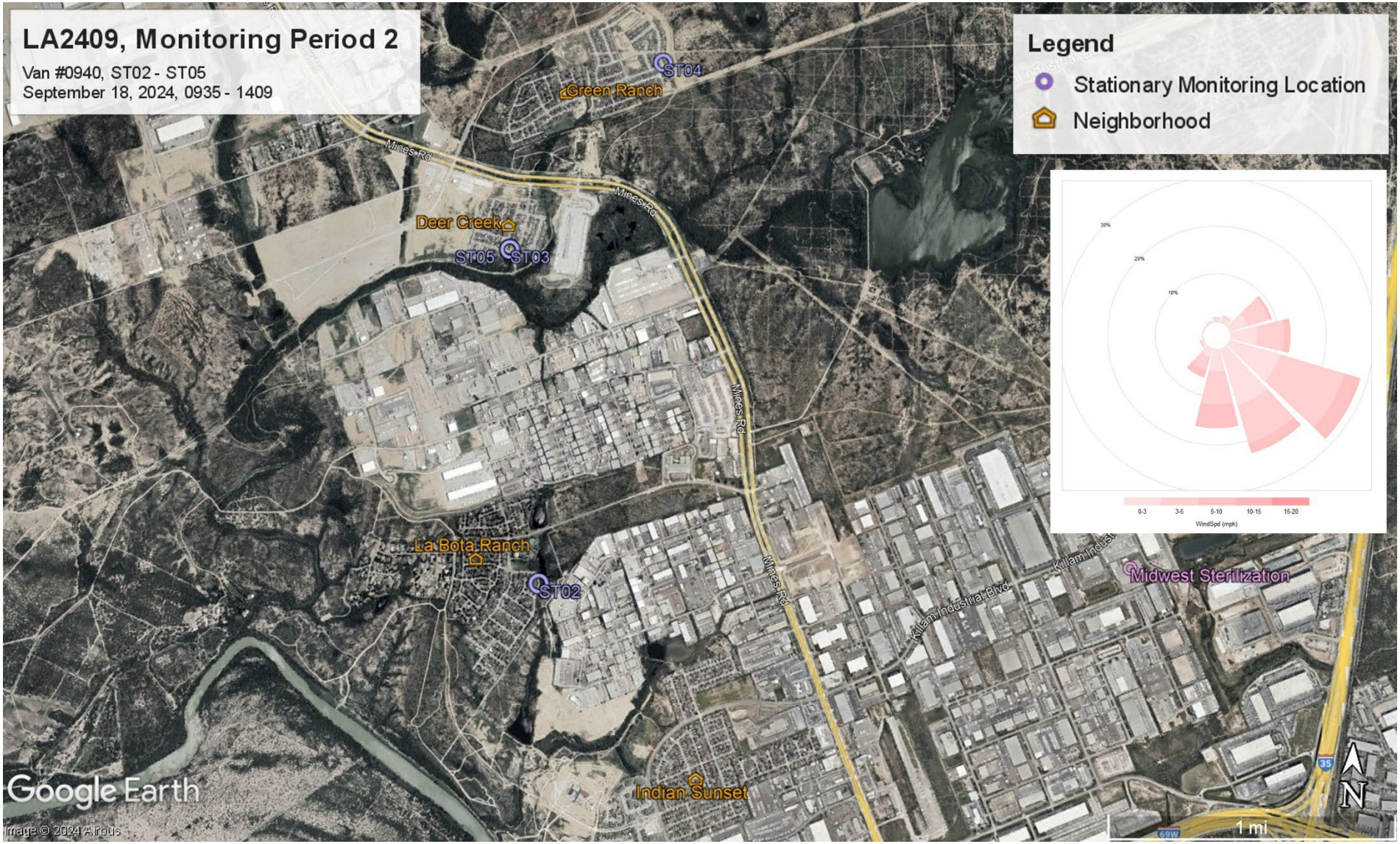

Figure 5: Map of Van #0940 ST02 through ST05 stationary monitoring runs with combined wind rose on September 18, 2024, in Laredo, Texas. All 12-minute cycle ethylene oxide concentrations were below the limit of quantitation of 0.20 parts per billion by volume (ppbv), and all 1-hour average ethylene oxide concentrations were below the limit of detection of 0.08 ppbv. *This map was generated by the Air Monitoring Division of the Texas Commission on Environmental Quality. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Air Monitoring Division at 512-239-1716.*

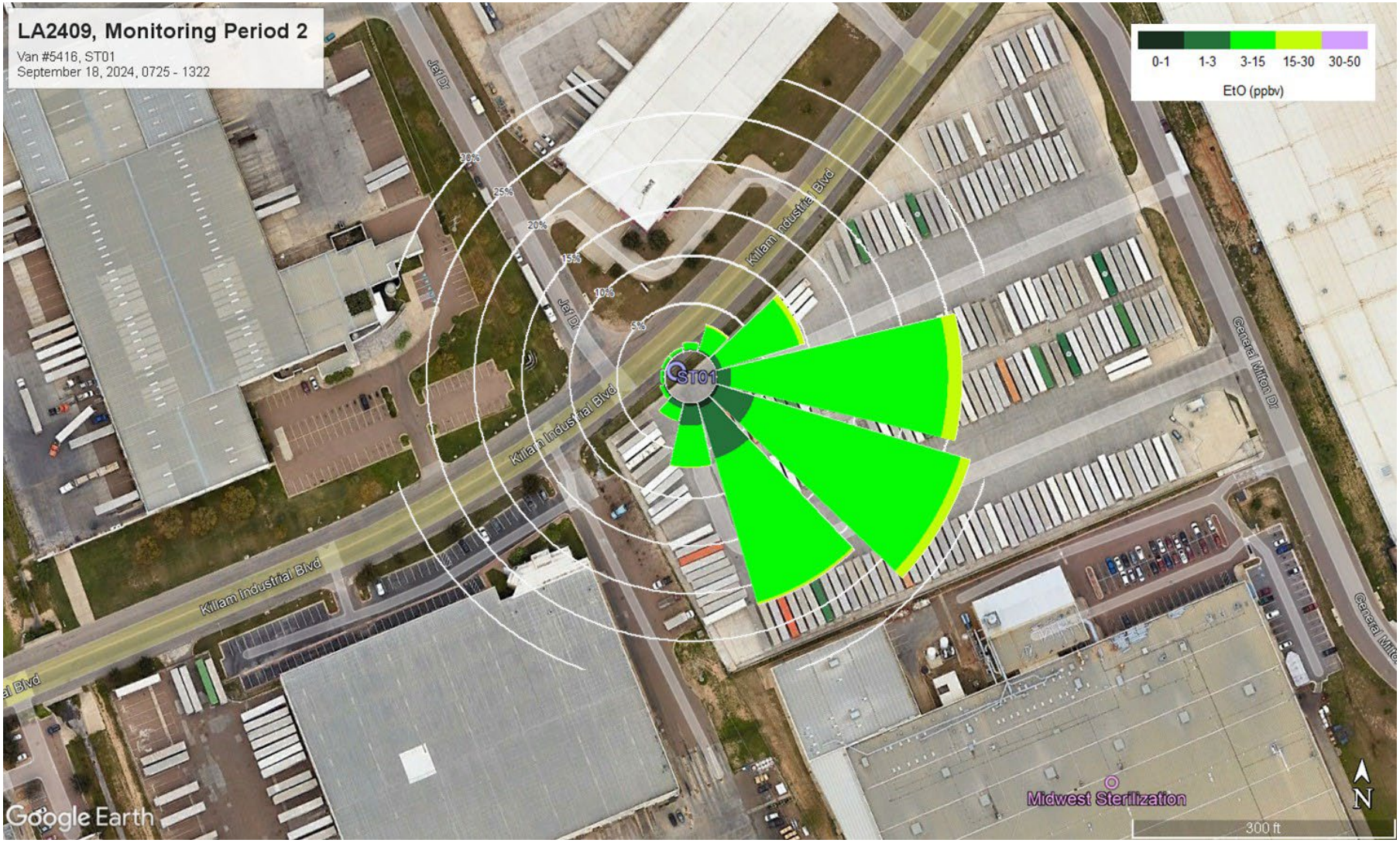

Figure 6: Van #5416 ST01 stationary monitoring run with pollution rose on September 18, 2024, on Killam Industrial Boulevard just north of Midwest Sterilization in Laredo, Texas. Maximum instantaneous ethylene oxide concentration of 35.99 parts per billion by volume (ppbv) and maximum 1-hour average ethylene oxide concentration of 12.45 ppbv. Ethylene oxide concentrations above 30 ppbv represented 0.1% of all concentrations measured during ST01; therefore, purple is not visible on the pollution rose. *This map was generated by the Air Monitoring Division of the Texas Commission on Environmental Quality. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Air Monitoring Division at 512-239-1716.*

Figure 7: Map of Van #0940 ST01 through ST05 stationary monitoring runs with combined wind rose on September 19, 2024, in Laredo, Texas. All 12-minute cycle ethylene oxide concentrations were below the limit of quantitation of 0.20 parts per billion by volume (ppbv), and all 1-hour average ethylene oxide concentrations were below the limit of detection of 0.08 ppbv. *This map was generated by the Air Monitoring Division of the Texas Commission on Environmental Quality. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Air Monitoring Division at 512-239-1716.*

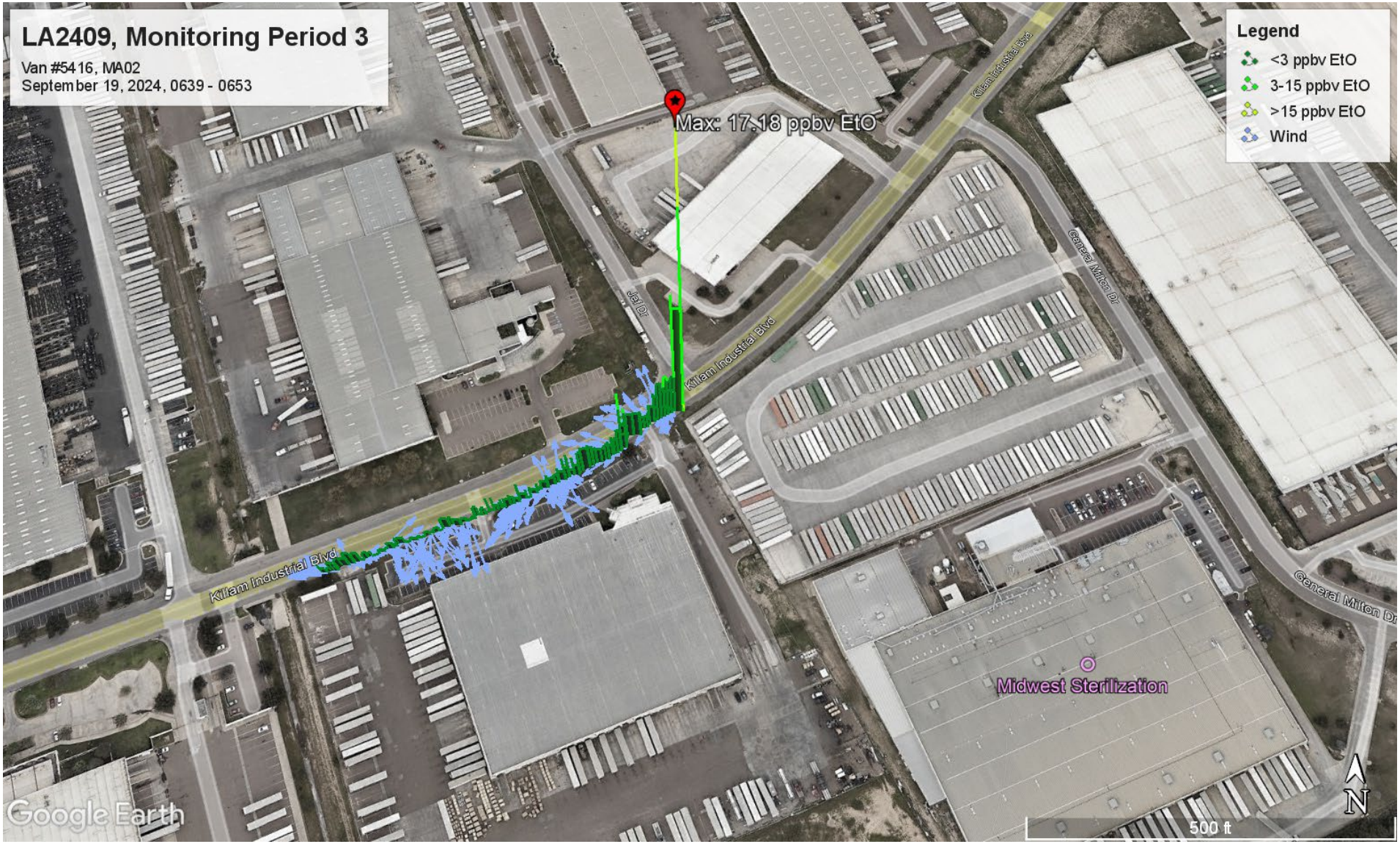

Figure 8: Van #5416 MA02 survey on September 19, 2024, in Laredo, Texas. Maximum ethylene oxide concentration of 17.18 parts per billion by volume on Killam Industrial Boulevard, just north of Midwest Sterilization. *This map was generated by the Air Monitoring Division of the Texas Commission on Environmental Quality. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Air Monitoring Division at 512-239-1716.*

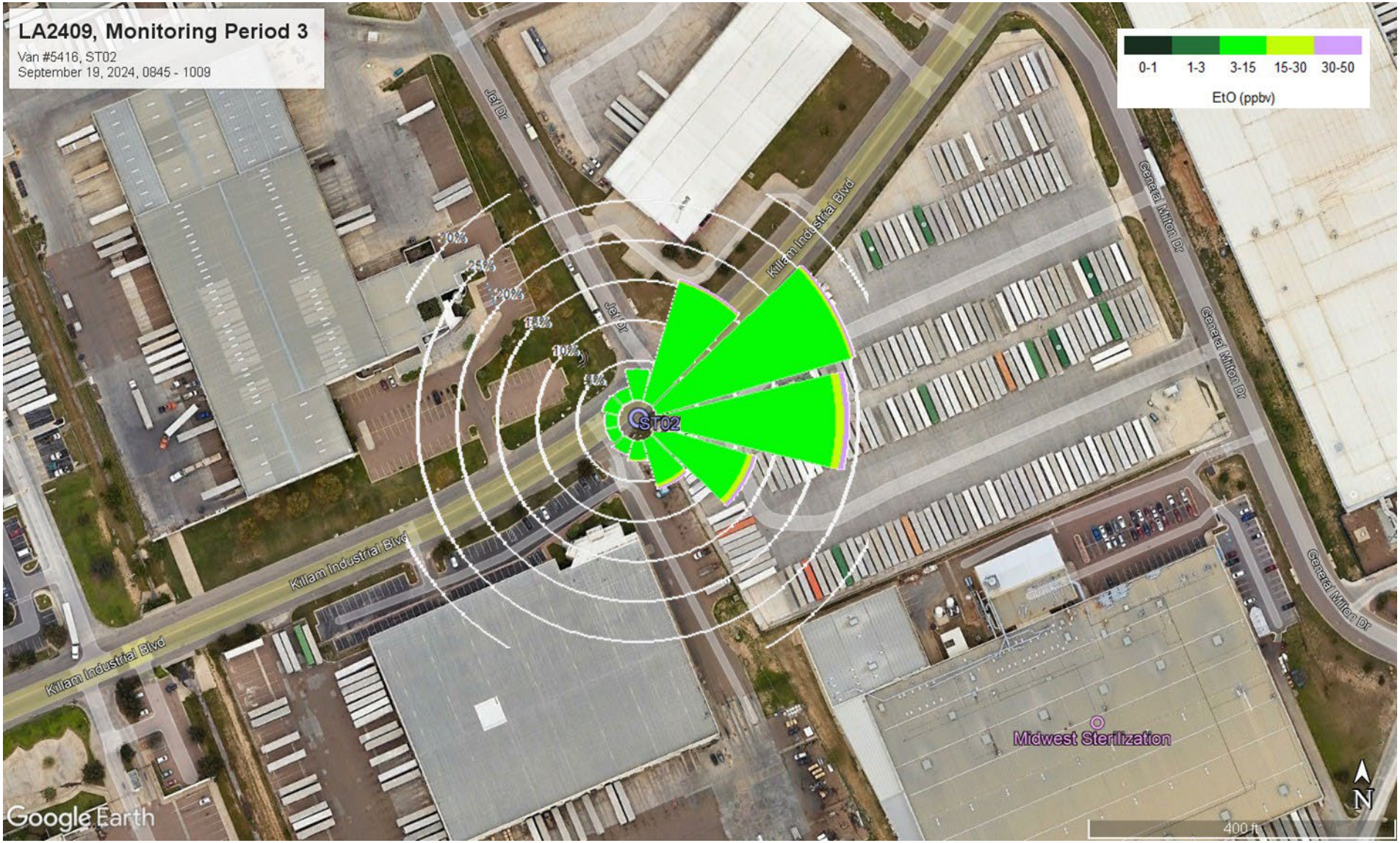

Figure 9: Van #5416 ST02 stationary monitoring run with pollution rose on September 19, 2024, on Killam Industrial Boulevard just north of Midwest Sterilization in Laredo, Texas. Maximum instantaneous ethylene oxide concentration of 38.84 parts per billion by volume (ppbv) and maximum 1-hour average ethylene oxide concentration of 10.72 ppbv. *This map was generated by the Air Monitoring Division of the Texas Commission on Environmental Quality. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Air Monitoring Division at 512-239-1716.*

Attachment C - Survey Minimum and Maximum Instantaneous Concentrations

							Magellan		Picarro PI2920		SIFT-MS											
									Ethylene Oxide (ppbv)		1,3-Butadiene (ppbv)		Benzene (ppbv)		Toluene (ppbv)		Ethylbenzene + Xylenes (ppbv)		Styrene (ppbv)		
Van ID	Date	Survey ID	Start Time	End Time	Start Location	End Location	Avg Wind Speed (mph)	Avg Wind Direction (degrees)	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Comments
Van #0940	9/17/2024	MA01	7:13:26 AM	7:38:07 AM	Green Jay Lane and Hummingbird Boulevard (27.621766, -99.541248)	Nightingale Bend and Wrenpoint (27.617034, -99.542736)	2.0	145.4	1.84 L	-1.28 L	1.3 L	0.0 L	5.2 L	0.0 L	11.4	0.0 L	10.7 L	0.0 L	1.5 L	0.0 L	
	9/17/2024	MA02	7:44:37 AM	8:06:53 AM	Grosbeak Street and Finch Lane (27.617816, -99.54172)	Starling Creek Loop and Pipit Pass Drive (27.618404, -99.538976)	2.1	151.8	1.44 L	-0.78 L	0.6 L	0.0 L	2.2 L	0.0 L	3.0 L	0.0 L	1.5 L	0.0 L	0.9 L	0.0 L	
	9/17/2024	MA03	8:33:00 AM	9:04:01 AM	Arapahoe Drive and Hopi Drive (27.611564, -99.529056)	Fawn Drive and Red Cloud Drive (27.607234, -99.530696)	3.3	160.6	1.31 L	-0.92 L	2.5 L	0.0 L	8.6 L	0.0 L	47.1	0.0 L	38.2 L	0.0 L	1.1 L	0.0 L	
	9/17/2024	MA04	10:04:32 AM	10:16:32 AM	Mines Road and Game Creek (27.63962, -99.541128)	Pheaseant Street and Indian River Avenue (27.636206, -99.54284)	2.8 EM1	156.5 EM1	1.52 EM1, L	-0.92 EM1, L	0.6 EM1,L	0.0 EM1,L	1.6 EM1, L	0.0 EM1, L	2.1 EM1, L	0.0 EM1,L	1.1 EM1,L	0.0 EM1,L	0.8 EM1,L	0.0 EM1,L	Appended data from 10:09:17 to 10:10:52 from raw Picarro data and 10:10:53 - 10:16:32 from ST01
	9/17/2024	MA05	12:09:19 PM	12:44:58 PM	Peoples Boulevard and Port Seattle Drive (27.644032, -99.54084)	Peoples Boulevard and Port Texas Drive (27.647376, -99.533248)	3.4 EM1	197.6 EM1	1.15 EM1, L	-1.10 EM1, L	0.8 EM1,L	0.0 EM1,L	1.6 EM1, L	0.0 EM1, L	9.0 EM1, L	0.0 EM1,L	5.4 EM1,L	0.0 EM1,L	0.9 EM1,L	0.0 EM1,L	Appended data from 12:36:24 to 12:37:29 from raw Picarro data and 12:37:30 - 12:44:58 from ST02
	9/17/2024	MA06	2:24:22 PM	2:47:08 PM	Peoples Boulevard and Port Texas Drive (27.647356, -99.533272)	Peoples Boulevard and Port Isabel Drive (27.645158, -99.538704)	2.5	330.0	1.13 L	-1.49 L	0.8 L	0.0 L	1.6 L	0.0 L	2.2 L	0.0 L	1.0 L	0.0 L	0.8 L	0.0 L	
	9/17/2024	MA08	3:23:59 PM	3:30:04 PM	Pheaseant Street and Indian River Avenue (27.636076, -99.542304)	Wildflower Avenue and Indian River Avenue (27.638956, -99.542568)	2.1	100.9	0.82 L	-1.27 L	0.3 L	0.0 L	1.6 L	0.0 L	1.9 L	0.0 L	0.8 L	0.0 L	0.7 L	0.0 L	
	9/18/2024	MA01	6:50:26 AM	7:32:33 AM	Killam Industrial Boulevard and North Lamar Drive (27.614706, -99.519112)	Killam Industrial Boulevard and Jef Drive (27.620458, -99.507728)	3.5	114.4	12.96	-0.98 L	0.8 L	0.0 L	1.9 L	0.0 L	2.8 L	0.0 L	5.0 L	0.0 L	2.6 L	0.0 L	
	9/19/2024	MA01	4:52:00 AM	5:04:00 AM	Killam Industrial Boulevard and North Lamar Drive (27.614782, -99.519144)	9010 Killam Industrial Road (27.625834, -99.501432)	NA EM3	NA EM3	NA EM3	NA EM3	NA EM3	NA EM3	NA EM3	NA EM3	NA EM3	NA EM3	NA EM3	NA EM3	NA EM3	NA EM3	MEMS malfunction
	9/19/2024	MA02	5:08:07 AM	5:15:30 AM	Killam Industrial Boulevard and Interstate 35 (27.625834, -99.501432)	Sara Road and Killam Industrial Boulevard (27.619758, -99.509896)	3.4	132.9	9.49	-0.61 L	0.4 L	0.0 L	1.3 L	0.0 L	2.1 L	0.0 L	1.2 L	0.0 L	0.9 L	0.0 L	
Van #5416	9/17/2024	MA01	7:12:52 AM	7:46:09 AM	West end of Killam Industrial Boulevard (27.614444, -99.5182)	Sara Road and Killam Industrial Boulevard (27.616972, -99.509808)	4.0	341.9	NA AO	NA AO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SIFT-MS not used 9/17/24
	9/17/2024	MA02	7:52:03 AM	8:34:52 AM	Killam Industrial Boulevard and Sara Road (27.618742, -99.510456)	Killam Industrial Boulevard and Sara Road (27.61639, -99.50952)	3.2	90.5	17.93	-2.42 L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SIFT-MS not used 9/17/24
	9/17/2024	MA03	8:41:28 AM	8:57:18 AM	Killam Industrial Boulevard and Sara Road (27.618774, -99.510496)	Killam Industrial Boulevard east of General Milton Drive (27.625488, -99.502056)	3.0	164.1	17.69	-1.68 L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SIFT-MS not used 9/17/24
	9/17/2024	MA04	12:00:17 PM	1:00:56 PM	Killam Industrial Boulevard and North Lamar Drive (27.613892, -99.519688)	Killam Industrial Boulevard and General Milton Drive (27.62264, -99.504768)	3.6	227.3	7.92	-3.01 L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SIFT-MS not used 9/17/24
	9/17/2024	MA05	2:32:35 PM	2:55:09 PM	Killam Industrial Boulevard and North Lamar Drive (27.614526, -99.517792)	Killam Industrial Boulevard east of General Milton Drive (27.625822, -99.501224)	4.2	261.7	1.78 L	-2.15 L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SIFT-MS not used 9/17/24
	9/18/2024	MA01	6:53:30 AM	7:13:25 AM	Killam Industrial Boulevard Boulevard and North Lamar Drive (27.614522, -99.51784)	Killam Industrial Boulevard east of General Milton Drive (27.62644, -99.500648)	3.2	189.2	14.05	-3.60 L	0.8 A1,A2,L	0.0 A1,A2,L	0.8 L	0.0 L	2.3 L	0.1 L	3.6 A1,L	0.2 A1,L	2.0 A1,A2,L	0.2 A1,A2,L	
	9/18/2024	MA02	2:13:48 PM	2:47:12 PM	North Lamar Drive north of Killam Industrial Boulevard (27.619546, -99.521472)	Killam Industrial Boulevard and Sara Road (27.61947, -99.510568)	4.2	189.2	6.06	-2.97 L	0.5 A1,A2,L	0.0 A1,A2,L	1.4 L	0.0 L	2.6 L	0.1 L	1.5 A1,L	0.0 A1,L	0.6 A1,A2,L	0.0 A1,A2,L	
	9/19/2024	MA01	5:31:25 AM	6:14:47 AM	Killam Industrial Boulevard and North Lamar Drive (27.614514, -99.517808)	Sara Road and Amparan Road (27.613012, -99.508104)	3.4	64.4	12.79	-3.18 L	0.5 A1,A2,L	0.0 A1,A2,L	1.3 L	0.0 L	2.6 L	0.1 L	1.8 A1,L	0.0 A1,L	1.6 A1,A2,L	0.0 A1,A2,L	
	9/19/2024	MA02	6:39:49 AM	6:53:04 AM	Killam Industrial Boulevard west of Midwest Sterilization (27.62048, -99.50764)	Killam Industrial Boulevard and Jef Drive (27.621232, -99.506016)	3.2	64.4	17.18	-0.37 L	0.6 A1,A2,L	0.0 A1,A2,L	1.2 L	0.0 L	2.8 L	0.6 L	2.2 A1,L	0.6 A1,L	1.0 A1,A2,L	0.0 A1,A2,L	
	9/19/2024	MA03	8:03:59 AM	8:21:08 AM	Killam Industrial Boulevard and Jef Drive (27.62126, -99.506016)	Killam Industrial Boulevard east of General Milton Drive (27.624748, -99.502848)	2.8	93.0	15.93	-0.66 L	0.2 A1,A2,L	0.0 A1,A2,L	0.8 L	0.0 L	1.7 L	0.1 L	1.0 A1,L	0.0 A1,L	0.7 A1,A2,L	0.0 A1,A2,L	
	9/19/2024	MA04	8:33:33 AM	8:45:00 AM	Killam Industrial Boulevard and Sara Road (27.618786, -99.510544)	Killam Industrial Boulevard and Jef Drive (27.621224, -99.506056)	2.8 EM1	85.5 EM1	14.75 EM1	-1.55 EM1, L	0.9 A1,A2,EM1,L	0.0 A1,A2,EM1,L	2.6 EM1, L	0.0 EM1, L	11.8 EM1	0.1 A1,EM1,L	6.7 A1,EM1,L	0.0 A1,EM1,L	0.6 A1,A2,EM1,L	0.0 A1,A2,EM1,L	Appended data from 8:41:35 to 8:41:42 from Picarro raw data and 8:41:43 to 8:45:00 from ST02
	9/19/2024	MA05	12:20:51 PM	12:41:51 PM	Red Cloud Circle and Houma Drive (27.607282, -99.53024)	Fawn Drive and Desert Chief Drive (27.609952, -99.529168)	3.3	258.9	2.94 L	-2.54 L	0.3 A1,A2,L	0.0 A1,A2,L	0.9 L	0.0 L	2.0 L	0.1 L	1.9 A1,L	0.0 A1,L	2.5 A1,A2,L	0.1 A1,A2,L	

EtO - ethylene oxide

MEMS - Mobile Emissions Monitoring Software

mph - miles per hour

NA - not applicable

ppbv - parts per billion by volume

SIFT-MS - selected ion flow tube mass spectrometer

A1 - Associated QC data did not meet the accuracy specifications and had a relative percent error/recovery above the DQO but less than 40%. Data may be biased low.

A2 - Associated QC data did not meet the accuracy specifications and had a relative percent error/recovery above the DQO but less than 40%. Concentrations below 180 ppbv may be biased high.

AO - Survey invalid due to analyst oversight. Survey repeated by MMT staff, see Survey ID MA02 on 09/17/24.

EM1 - MEMS malfuction; last 3 to 8 minutes of survey data not recorded in MEMS. MEMS data recovered from subsequent stationary monitoring MEMS files and gaps in EtO data filled from EtO data manually recovered from instruments. See comments for details. SIFT-MS and Magellan data were not recovered.

EM3 - MEMS malfunction, majority of survey data not recorded. Survey repeated by MMT staff, see Survey ID MA02 on 09/19/24.

L - Reported concentration is less than the limit of quantitation.

Attachment D - Stationary Maximum Instantaneous and 1 Hr. Average Concentrations

						Magellan		Picarro PI2920		Picarro PI2920 with ZRM		SIFT-MS											
								Ethylene Oxide (ppbv)		Corrected Ethylene Oxide (ppbv)		1,3-Butadiene (ppbv)		Benzene (ppbv)		Toluene (ppbv)		Ethylbenzene + Xylenes (ppbv)		Styrene (ppbv)		
Van ID	Date	Survey ID	Start Time	End Time	Location	Avg Wind Speed (mph)	Avg Wind Direction (degrees)	Max Inst.	Max 1 Hr. Avg.	Max Cycle	Max 1 Hr. Avg.	Max Inst.	Max 1 Hr. Avg.	Max Inst.	Max 1 Hr. Avg.	Max Inst.	Max 1 Hr. Avg.	Max Inst.	Max 1 Hr. Avg.	Max Inst.	Max 1 Hr. Avg.	Comments
Van #0940	9/17/2024	ST01	10:16:33 AM	11:52:13 AM	Pheasant Street and Indian River Avenue (27.636206, -99.542856)	3.7	149.5	1.26 L	0.12 L	NA	NA	0.8 L	0.1 L	1.8 L	0.6 L	2.6 L	0.8 L	12.6 L	1.7 L	1.3 L	0.2 L	ZRM not used
	9/17/2024	ST02	12:36:24 PM	2:13:48 PM	Peoples Boulevard and Port Texas Drive (27.647376, -99.533248)	2.1	127.9	1.30 L	0.12 L	NA	NA	1.0 L	0.0 L	2.4 L	0.5 L	5.7 L	0.7 L	2.6 L	0.3 L	1.0 L	0.2 L	ZRM not used
	9/18/2024	ST01	7:34:25 AM	9:03:57 AM	Killam Industrial Boulevard and Jef Drive (27.621362, -99.505856)	4.4	112.0	NA X	NA X	14.89 A1	9.76 A1	1.1 L	0.1 L	2.8 L	0.5 L	4.6 L	0.8 L	2.0 L	0.4 L	1.2 L	0.3 L	ZRM used. Collocated with Van #5416 ST01.
	9/18/2024	ST02	9:35:16 AM	10:29:08 AM	Starling Creek Loop and Pulpit Pass Drive (27.617988, -99.538904)	3.0 EM2	162.8 EM2	NA X	NA X	0.01 A1,EM2,L	0.00 A1,EM2,L	0.7 EM2,L	NA EM2	1.9 EM2,L	NA EM2	6.3 EM2,L	NA EM2	1.2 EM2,L	NA EM2	0.9 EM2,L	NA EM2	ZRM used.
	9/18/2024	ST03	10:57:19 AM	11:50:08 AM	Pheasant Street and Indian River Avenue (27.636026, -99.542064)	3.6 EM2	158.3 EM2	NA X	NA X	0.10 A1,EM2,L	0.04 A1,EM2,L	0.8 EM2,L	NA EM2	1.5 EM2,L	NA EM2	2.0 EM2,L	NA EM2	10.7 EM2,L	NA EM2	0.8 EM2,L	NA EM2	ZRM used.
	9/18/2024	ST04	12:07:21 PM	1:27:49 PM	Port Texas Drive and Peoples Boulevard (27.647376, -99.5332)	4.0	137.3	NA X	NA X	0.04 A1,L	0.02 A1,L	0.4 L	0.0 L	1.8 L	0.4 L	2.5 L	0.6 L	1.5 L	0.3 L	1.0 L	0.2 L	ZRM used.
	9/18/2024	ST05	1:44:38 PM	2:09:32 PM	Pheasant Street and Indian River Avenue (27.636026, -99.542088)	3.4	183.3	NA X	NA X	0.09 A1,L	NA	0.6 L	NA	1.9 L	NA	1.9 L	NA	10.1 L	NA	1.0 L	NA	ZRM used. Monitoring was not conducted for a full hour; therefore, hourly averages were not calculated
	9/19/2024	ST01	5:44:47 AM	6:58:05 AM	Starling Creek Loop and Pipit Pass Drive (27.61797, -99.538904)	2.5	140.7	NA X	NA X	0.03 A1,L,P	-0.02 A1,L,P	0.7 L	0.1 L	1.9 L	0.5 L	2.4 L	0.7 L	1.2 L	0.3 L	0.8 L	0.2 L	ZRM used.
	9/19/2024	ST02	7:19:45 AM	8:19:31 AM	Chanlan Drive and Barrileros Drive (27.595312, -99.518312)	3.2 EM2	78.7 EM2	NA X	NA X	-0.02 A1,EM2,L,P	-0.03 A1,EM2,L,P	1.0 EM2,L	NA EM2	2.0 EM2,L	NA EM2	4.3 EM2,L	NA EM2	5.2 EM2,L	NA EM2	1.1 EM2,L	NA EM2	ZRM used.
	9/19/2024	ST03	8:33:22 AM	9:37:25 AM	Key Deer Drive and Sambar Loop (27.60118, -99.49348)	3.9	120.6	NA X	NA X	0.09 A1,L,P	-0.01 A1,L,P	0.7 L	0.1 L	1.8 L	0.5 L	2.7 L	0.8 L	2.3 L	0.3 L	0.8 L	0.2 L	ZRM used.
	9/19/2024	ST04	9:54:43 AM	11:33:16 AM	9350 Amber Avenue (27.59751, -99.489544)	4.3	161.6	NA X	NA X	0.03 A1,L,P	0.00 A1,L,P	0.6 L	0.0 L	1.8 L	0.4 L	2.2 L	0.7 L	1.6 L	0.2 L	0.8 L	0.2 L	ZRM used. Collocated with Van #5416 ST03.
	9/19/2024	ST05	11:56:17 AM	12:52:52 PM	United Avenue (27.627324, -99.467384)	2.7 EM2	147.8 EM2	NA X	NA X	0.06 A1,EM2,L,P	0.02 A1,EM2,L,P	0.6 EM2,L	NA EM2	1.4 EM2,L	NA EM2	2.1 EM2,L	NA EM2	1.0 EM2,L	NA EM2	0.8 EM2,L	NA EM2	ZRM used.
Van #5416	9/17/2024	ST01	9:06:13 AM	10:28:33 AM	Killam Industrial Boulevard and General Milton Drive (27.62264, -99.504752)	2.8	88.1	15.47	4.42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ZRM and SIFT-MS not used.
	9/17/2024	ST02	10:33:02 AM	11:33:03 AM	Killam Industrial Boulevard and General Milton Drive (27.623004, -99.504392)	4.2	135.4	7.60	1.26 L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ZRM and SIFT-MS not used.
	9/17/2024	ST03	1:05:33 PM	2:17:24 PM	Killam Industrial Boulevard approx. 1000 ft east of General Milton Drive (27.62592, -99.500944)	3.2	155.9	1.35 L	0.02 L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ZRM and SIFT-MS not used.
	9/18/2024	ST01	7:25:23 AM	1:22:43 PM	Killam Industrial Boulevard and Jef Drive (27.62141, -99.50576)	4.4	112.0	35.99	12.45	NA	NA	0.7 A1,A2,L	0.0 A1,A2,L	1.4 L	0.2 L	11.9	1.0 L	9.0 A1,L	0.4 A1,L	1.0 A1,A2,L	0.3 A1,A2,L	ZRM not used. Collocated with Van #0940 ST01.
	9/19/2024	ST01	6:55:45 AM	7:57:03 AM	Killam Industrial Boulevard and Jef Drive (27.621248, -99.506008)	2.5	73.8	18.74	9.65	NA	NA	0.4 A1,A2,L	0.0 A1,A2,L	1.0 L	0.2 L	2.8 L	1.0 L	1.9 A1,L	0.6 A1,L	0.8 A1,A2,L	0.3 A1,A2,L	ZRM not used.
	9/19/2024	ST02	8:45:01 AM	10:09:51 AM	Killam Industrial Boulevard and Jef Drive (27.621224, -99.506056)	2.5	76.2	38.84	10.72	NA	NA	0.7 A1,A2,L	0.0 A1,A2,L	1.7 L	0.2 L	5.3 L	0.8 L	2.9 A1,L	0.4 A1,L	0.7 A1,A2,L	0.2 A1,A2,L	ZRM not used.
	9/19/2024	ST03	10:36:26 AM	11:36:26 AM	9350 Amber Avenue (27.597456, -99.489632)	3.9 EM2	128.1 EM2	1.41 EM2,L	0.06 EM2,L	NA	NA	0.2 A1,A2,EM2,L	NA EM2	0.4 EM2,L	NA EM2	0.5 EM2,L	NA EM2	0.4 A1,EM2,L	NA EM2	0.2 A1,A2,EM2,L	NA EM2	ZRM not used. Collocated with Van #0940 ST04.

Avg. - average

Cycle - 12 minute ZRM cycle

EtO - ethylene oxide

Hr. - hour

Inst. - Instantaneous

MEMS - Mobile Emissions Monitoring Software

mph - miles per hour

NA - not applicable

ppbv - parts per billion by volume

SIFT-MS - selected ion flow tube mass spectrometer

ZRM - zero reference module

A1 - Associated QC data did not meet the accuracy specifications and had a relative percent error above the DQO but less than 40%. Data may be biased low.

A2 - Associated QC data did not meet the accuracy specifications and had a relative percent error/recovery above the DQO but less than 40%. Concentrations below 180 ppbv may be biased high.

EM2 - MEMS malfuction, last 1 to 8 minutes of stationary data not recorded in MEMS. EtO data manually recovered from instrument. SIFT-MS and Magellan data were not recovered and 1-hour average calculations were not completed for SIFT-MS data.

L - Reported concentration is less than the limit of quantitation.

P - Associated QC data did not meet the precision specifications. Data are considered estimated.

X - When the ZRM is used, uncorrected EtO concentrations are invalid due to EtO spikes caused by transition from zeroing to sampling modes in ZRM