



## **I-45 VRA-Required Air Quality Monitoring**

### *Analysis of One-Year Air Monitoring Data in Segment 3*

A requirement of the I-45 [Voluntary Resolution Agreement \(VRA\)](#) was that TxDOT must place one air monitor in each project Segment of the North Houston Highway Improvement Project (NHHIP) for one year before construction can begin on the corresponding Segment in order to create a baseline understanding of air pollution prior to NHHIP impacts..

The first air monitor was placed in August 2023, in Segment 3, at the southern tip of the entire project, at 2014 Cleburne Street as "Near Road Air Quality Monitoring Site (NR-AQM-01)." To date, TxDOT has made one year of data (August 2024) from the monitor [available to the public](#). *Below is our review of the monitor's results. Charts shown here have been created by Air Alliance Houston (AAH) using raw data from TxDOT.*

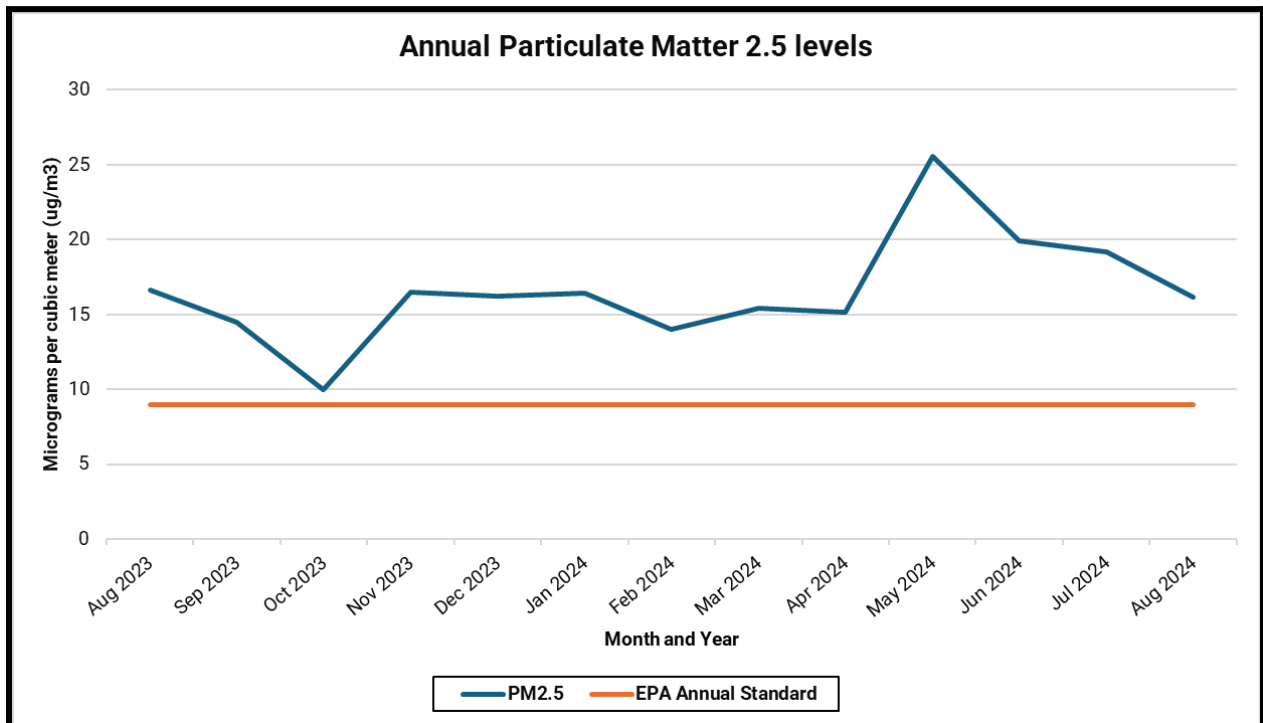
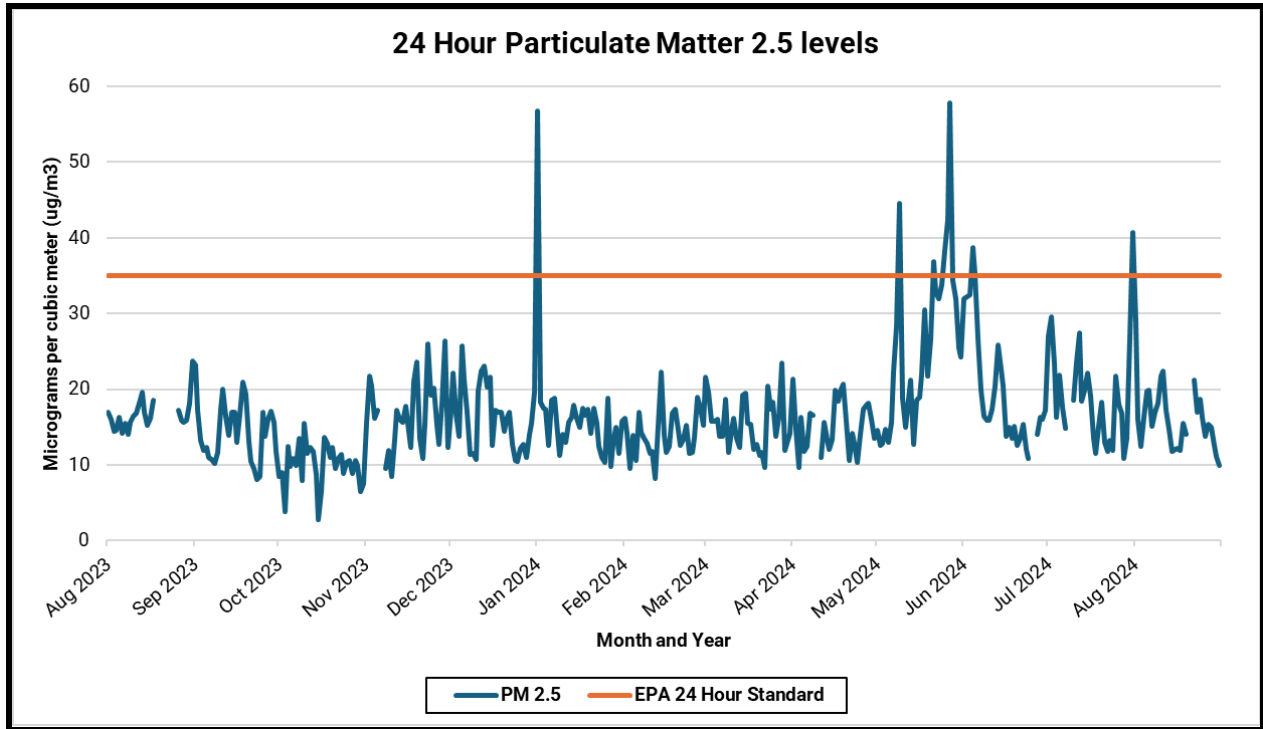
### **Particulate Matter in the Project Area**

Particulate Matter 2.5 (PM2.5) measurements are only presented as daily readings, and data at a more granular level are not presented or available for public viewing. While we do realize that daily averaging helps with comparison to the EPA's National Ambient Air Quality Standards (NAAQS) for PM2.5, which is a 24-hour standard, this averaging of measurements over an entire day glosses over any spikes in pollution that may have occurred over a shorter period, including at the hourly and sub-hourly level. Particle pollution occurring at these shorter-term levels still poses risks to human health.

TxDOT's disclaimer on their webpage states that *"the NR-AQM-01 is not a regulatory monitor that TCEQ/EPA uses for regional reporting...Therefore, although criteria pollutants (i.e., PM2.5, NO2, and CO) may be approaching or exceeding the NAAQS at this site, they should not be construed as an immediate health concern or as actual exceedance of the NAAQS."* This statement is misleading as currently worded, implying that any high pollutant levels recorded by these monitors do not pose any threat to public health and human welfare, when we know that state and federal [regulatory monitors themselves routinely fail to record high levels of pollution](#), as opposed to community air monitors which have demonstrated a higher level of sensitivity to pollution events. **Given these inadequacies even within regulatory monitors, every pollutant that approaches or exceeds the NAAQS at this site should be rigorously investigated, contrary to TxDOT's disclaimer.**

Moreover, this disclaimer gives us another reason why data should not be averaged but rather presented as raw measurements at their most granular, so that the public may view the pollution captured by monitors continuously, in real-time.

The lack of PM10 measurements from the monitor also represents a gap in air monitoring, as vehicular traffic is a significant source of PM10 pollution. Collecting only PM2.5 data fails to capture the true extent of particle pollution in the project area. Similar to how the Nitrogen Oxides (NOx) data presented includes concentrations from all subsets of NOx (i.e., NO2 and NO), the PM data should also include all subsets of particle air pollution (i.e., PM2.5 and PM10).



**Comments on PM<sub>2.5</sub> levels**

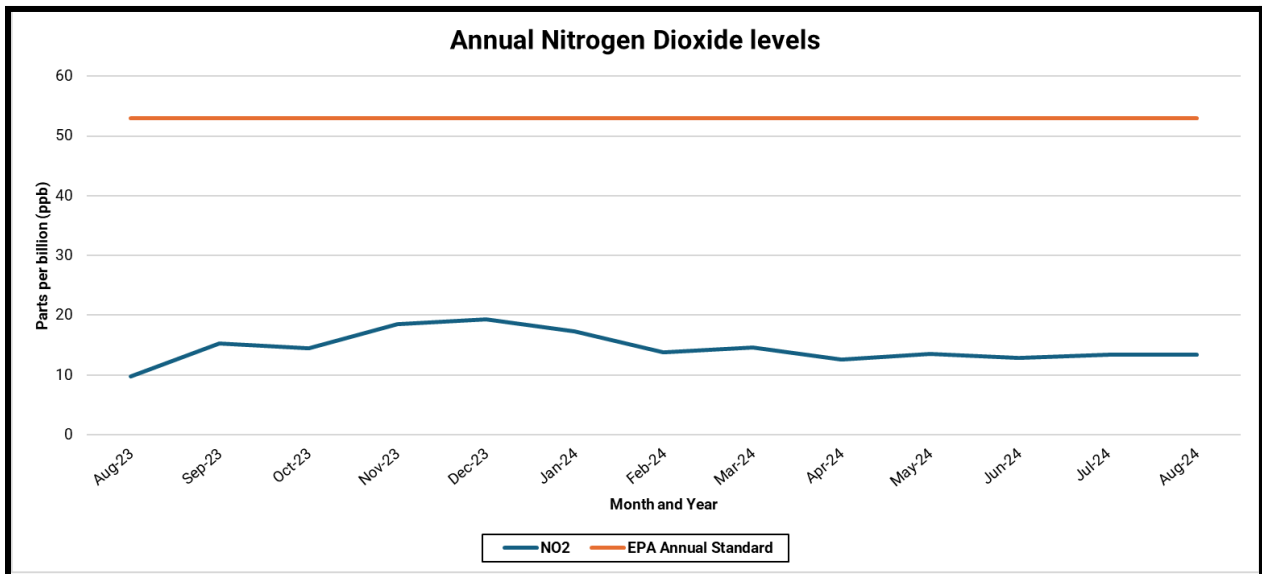
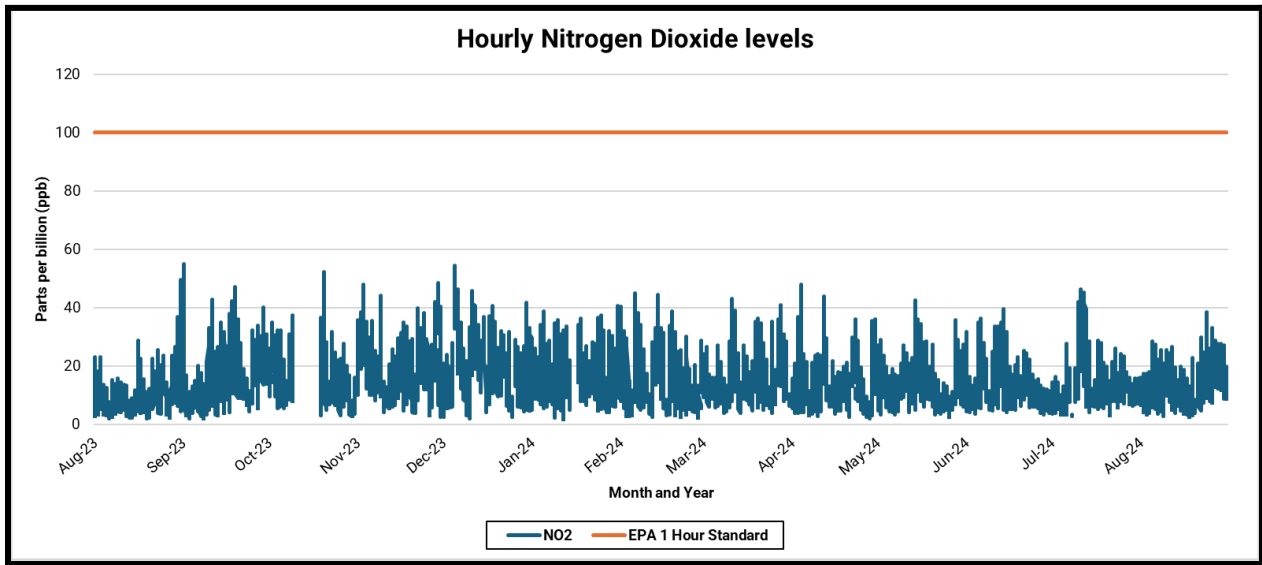
- Annual PM<sub>2.5</sub> levels measured by the monitor exceeded the EPA annual standard of 9 ug/m<sup>3</sup> for the entire monitoring timeline, ranging from 10 ug/m<sup>3</sup> to as high as over 25 ug/m<sup>3</sup> in May.

- Alarming short-term spikes were also recorded, especially in May, June, and July where short-term levels reached as high as 58 ug/m<sup>3</sup> - far above the 24-hour EPA standard of 35 ug/m<sup>3</sup>.

---

## Nitrogen Dioxide (NO<sub>2</sub>)

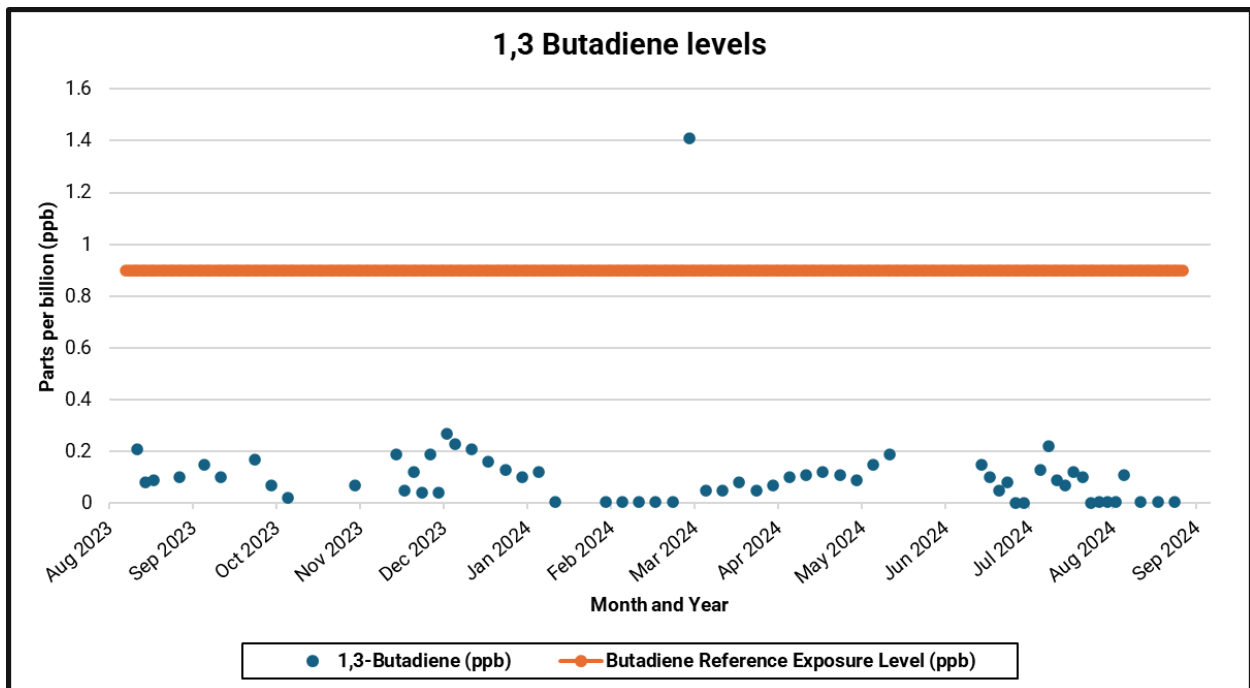
Nitrogen Dioxide (NO<sub>2</sub>) concentrations were generally within the regulatory limits.

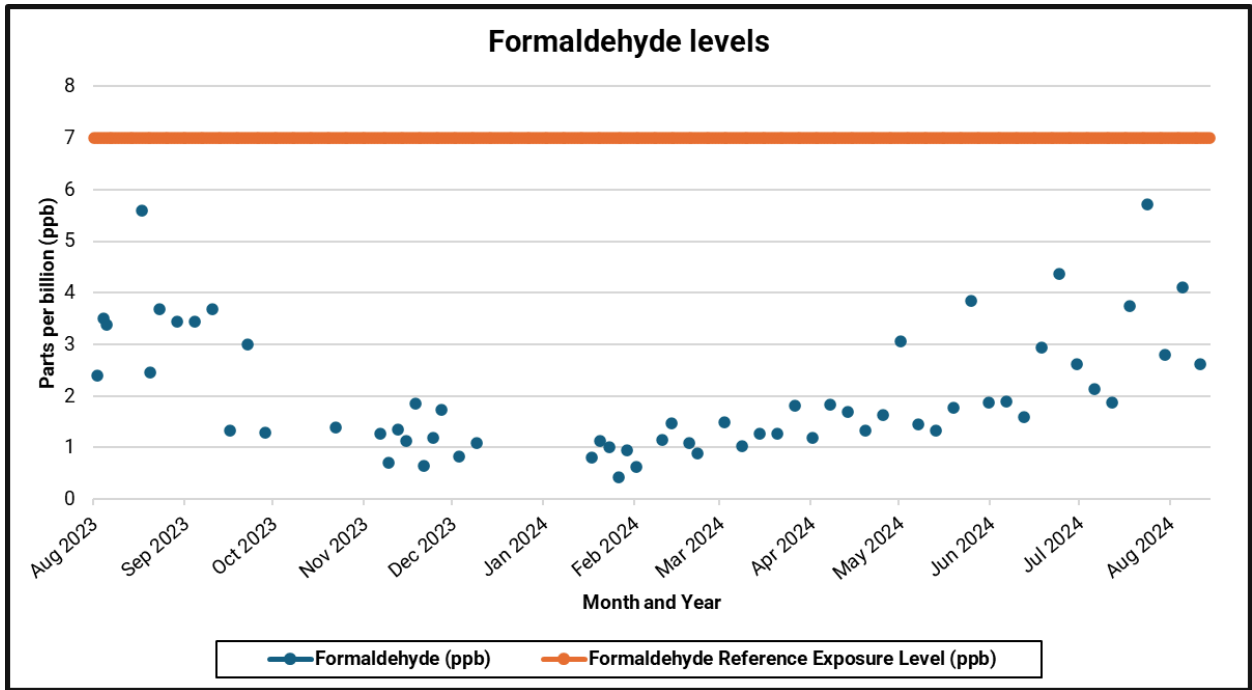
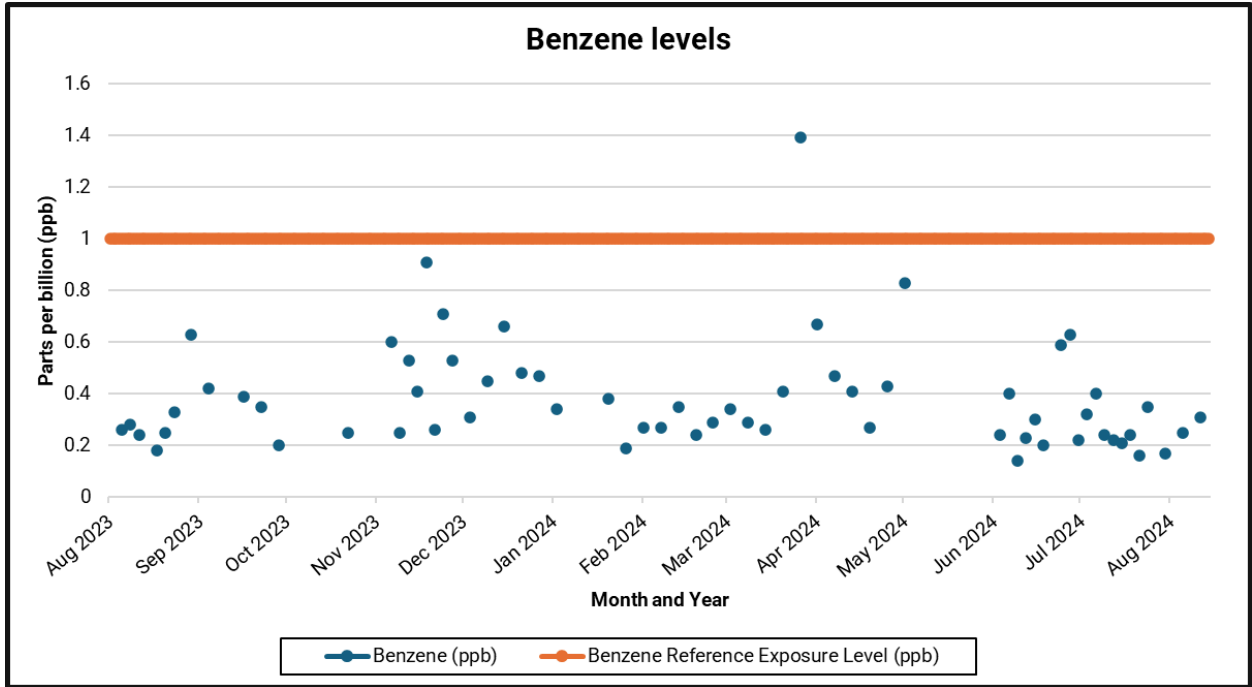


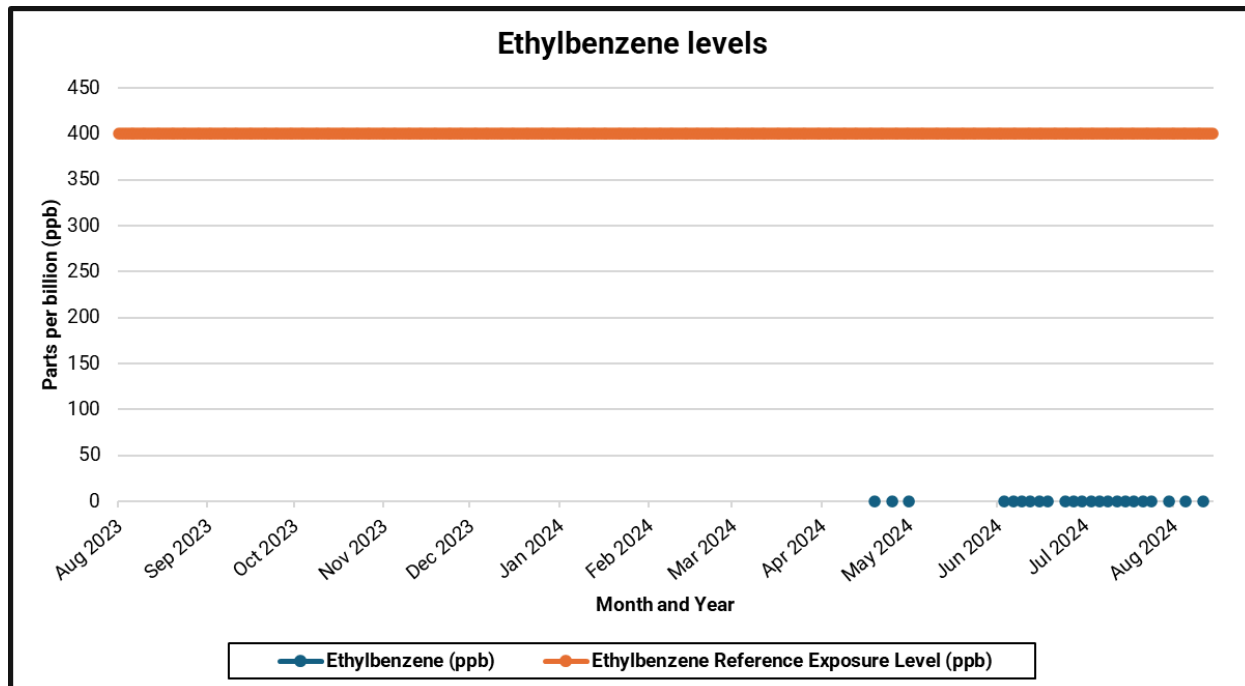
## Volatile Organic Compounds (VOC)

The Volatile Organic Compounds (VOC) measured by the TxDOT monitor include 1,3 butadiene, Benzene, formaldehyde, and ethylbenzene. The data for these VOCs should be available more consistently than every three days. This monitoring cadence once again glosses over high pollution levels that may have occurred over a shorter period, which still poses risks to human health, especially when dealing with extremely hazardous air pollutants like Benzene and 1,3-butadiene, which are known carcinogens.

Furthermore, the data presented should be visualized like other pollutants, with horizontal lines indicating their respective thresholds and readings from each VOC present on separate graphs. Inserting every measured VOC onto a single graph when each possesses its own health-based Air Monitoring Comparison Values (AMCV) makes it challenging to understand the results.







**Comments**

- Though all the VOC concentrations were mostly below the reference exposure level, 1,3-butadiene and Benzene recorded outliers far above the chronic reference exposure levels in March and April respectively.
- Benzene concentrations measured were at levels ranging from 20% to 80% of the chronic reference exposure level throughout the monitoring timespan.
- Formaldehyde levels are rising as the project continues, reaching levels close to the chronic reference exposure level in the summer months.
- Ethylbenzene measurements are inadequate and were only available for two months over the entire year.
- All monitors possess significant gaps in data ranging from a few weeks to several months; thereby lacking in continuity. For example, VOCs were recorded only three times over the entire month of October. No explanations for these gaps are given.

---

**Wind Speed and Direction Hourly Measurements**

These data should be presented geographically, utilizing wind roses on a map alongside monitor locations, so the public may more easily identify sources and destinations of prevailing winds and where the pollutant concentrations recorded and presented are being picked up. While *technically* valuable in their present form, they are difficult for the *public* to understand since it is much harder to visualize wind direction in compass degrees without a wind rose.

---

## Final Thoughts

- Hazardous air pollutants, as measured by this air monitor, are already present in Segment 3. PM lodges in the lungs and bloodstream, causing respiratory and cardiac events, while exposure to VOCs like Benzene and 1,3-butadiene is linked to cancer. Even short-term exposures to pollutants such as NOx are consistently linked to respiratory diseases. It is essential for public health that these pollutants be monitored before and during the NHHIP and that best practice measures are taken to minimize the additional pollution that will stem directly from the NHHIP.
- As discussed in the [VRA Progress Report: Summary and Analysis](#) released by partners on December 6, 2023, the location of this first and only air monitor for Segment 3 is insufficient to assess true background level air pollution and the impact on people's air quality for Segment 3 since the monitor is located far from Downtown and surrounding neighborhoods where a majority of Segment 3 construction will occur and where people live, work, learn, and play.
- While the current data is more complete than the dataset released earlier this year, it still possesses multiple notable gaps. The closest regulatory air monitors are too far from the project site to provide additional local insights and do not measure all pollutants of concern. No explanation for the data gaps or an analysis of any of the results has been provided by TxDOT or its air monitoring consultant to help the impacted public better understand the impact of the NHHIP on air quality.
- Furthermore, without a thorough modeling of the air pollution to be generated by Segment 3 construction in the short-term, and its increased car volume in the long term, these air monitoring data cannot accurately predict the change in air pollution that the project will cause except that by all reasonable accounts, it will increase. Current levels shown near or above established standards will increase with the addition of a major pollution source like the NHHIP, not decrease. Moreover, acceptable levels of increased pollution have not been established by TxDOT, TCEQ, or the VRA. Certainly, Segment 3 and the entire NHHIP will negatively impact the region's air quality and its attainment of NAAQS. We are currently in severe nonattainment for ozone, which VOC and NOx emissions contribute to, and will soon be in nonattainment for PM2.5. This alone is cause for concern about the project.

###

## About Air Alliance Houston

Air Alliance Houston is a non-profit advocacy organization working to reduce the public health impacts of air pollution and advance environmental justice through applied research, education, and advocacy. For more information and resources, please visit [www.airalliancehouston.org](http://www.airalliancehouston.org).

Compiled Standards for Relevant Volatile Organic Compounds				
Pollutant	Chronic Reference Exposure Level (cREL)	Sources		
Butadiene	0.9 - 1 ppb	<a href="https://www.atsdr.cdc.gov/toxprofiles/tp28-c8.pdf">https://www.atsdr.cdc.gov/toxprofiles/tp28-c8.pdf</a>	<a href="https://wwwn.cdc.gov/TSP/PHS/PHS.aspx?phsid=457&amp;toxid=81">https://wwwn.cdc.gov/TSP/PHS/PHS.aspx?phsid=457&amp;toxid=81</a>	<a href="https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary">https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary</a>
Benzene	1 ppb	<a href="https://oehha.ca.gov/media/downloads/cnr/benzenerefsjune2014.pdf">https://oehha.ca.gov/media/downloads/cnr/benzenerefsjune2014.pdf</a>		<a href="https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary">https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary</a>
Acetaldehyde	77 ppb	<a href="https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary">https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary</a>	<a href="https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary">https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary</a>	
Formaldehyde	7 ppb	<a href="https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary">https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary</a>		
Ethylbenzene	400 ppb	<a href="https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary">https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary</a>	<a href="https://oehha.ca.gov/media/downloads/air/report/ethylbenzenefinal110607.pdf">https://oehha.ca.gov/media/downloads/air/report/ethylbenzenefinal110607.pdf</a>	

Table 1: Chronic Reference Exposure Levels for pertinent VOCs as established by various government agencies. References in this table were compiled by AAH