

Vibration

Because there are no significant sources of existing vibration along the proposed DART Rail to Rowlett Corridor, vibration measurements for this project focused on characterizing the vibration propagation properties of the soil at representative locations along the corridor. Two vibration testing sites, at the locations shown in **Figure 2-29**, were selected to represent the range of soil conditions in areas along the corridor that include a significant number of vibration-sensitive receptors. At each of these sites, ground-borne vibration propagation tests were conducted by impacting the ground and measuring the input force and corresponding ground vibration response at various distances. The resulting force-response transfer function can be combined with the known input force characteristics of the DART LRV to predict future vibration levels at locations along the proposed DART Rail to Rowlett Alignment. The two vibration testing sites are described below.

- **Site V-1: Mt. Hebron Baptist Church:** This site was located in the parking lot of Mt. Hebron Baptist Church. The vibration measurement at this site is representative of the portion of the proposed DART Rail to Rowlett Alignment in Garland.
- **Site V-2: DART Rowlett Park & Ride Lot:** This site was located in the DART Rowlett Park & Ride lot on Industrial Street. The vibration measurement at this site is representative of the portion of the proposed DART Rail to Rowlett Alignment in Rowlett.

2.9 Air Quality

This section describes existing air quality conditions and associated regulatory requirements and criteria. The DART Rail to Rowlett is subject to compliance with the Clean Air Act (CAA) Amendments of 1990 (42 U.S. Code [USC], Sections 7401-7671, et seq., as amended). Section 110 of the CAA requires states to develop State Implementation Plans (SIPs) that identify how the state will attain and maintain National Ambient Air Quality Standards (NAAQS) and other federal air quality regulations.

2.9.1 State and Regional Air Quality Strategies

The DFW Metropolitan Area is currently in attainment for all criteria pollutants except O₃, a pollutant formed by photochemical reactions involving volatile organic compounds (VOCs) and nitrogen oxides (NO_x) emissions from vehicles in the presence of sunlight. On April 15, 2004, the EPA designated nine North Central Texas Counties (including Dallas County) as “moderate” O₃ nonattainment for the 8-hour O₃ standard in accordance with NAAQS. Dallas County was formally in nonattainment for the 1-hour O₃ standard, but as of June 15, 2005 is no longer subject to the 1-hour standard.

2.9.2 Air Quality Criteria

The EPA has established NAAQS to limit levels of pollutants in the air pursuant to Section 109 of the CAA for criteria pollutants, including the following:



- O₃
- Carbon Monoxide (CO)
- Nitrogen Dioxide (NO₂)
- Sulfur Dioxide
- Particulate matter equal to or less than ten micrometers in diameter (PM₁₀)
- Particulate matter equal to or less than 2.5 micrometers in diameter (PM_{2.5})
- Lead (Pb)

The NAAQS defines levels of air quality by the EPA with an adequate margin of safety to protect public health (primary NAAQS), or that the EPA assesses are necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant (secondary NAAQS). The CAA requires that all states attain compliance through adherence to the NAAQS, as demonstrated by the comparison of measured pollutant concentrations with the NAAQS. **Table 2-30** shows the NAAQS for criteria pollutants.

Table 2-30: National Ambient Air Quality Standards

Pollutant	Primary Standards	Averaging Times	Secondary Standards
CO	9 ppm (10 mg/m ³)	8-hour ¹	None
	35 ppm (40 mg/m ³)	1-hour ¹	None
Pb	1.5 µg/m ³	Quarterly Average	Same as Primary
NO ₂	0.053 ppm (100 µg/m ³)	Annual (Arith. Mean)	Same as Primary
PM ₁₀	50 µg/m ³	Annual ² (Arith. Mean)	Same as Primary
	150 µg/m ³	24-hour ¹	
PM _{2.5}	15.0 µg/m ³	Annual ³ (Arith. Mean)	Same as Primary
	65 µg/m ³	24-hour ⁴	
O ₃	0.08 ppm	8-hour ⁵	Same as primary
SO _x	0.03 ppm	Annual (Arith. Mean)	-----
	0.14 ppm	24-hour ¹	-----
	-----	3-hour ¹	0.5 ppm (1300 µg/m ³)

Source: EPA, 2006 (<http://www.epa.gov/air/criteria.html>)

Notes: ¹ Not to be exceeded more than once per year.

² To attain this standard, the 3-year average of the weighted annual mean PM₁₀ concentration at each monitor within an area must not exceed 50 µg/m³.

³ To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.

⁴ To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 µg/m³.

⁵ To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average O₃ concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

mg/m³ = milligrams per cubic meter µg/m³ = micrograms per cubic meter

ppm = parts per million SO_x = sulfur oxides



Primary standards under NAAQS focus on preventing any adverse impacts on human health. Secondary standards set limits to protect public welfare including “protection against visibility impairment, damage to animals, crops, vegetation and buildings.” (EPA 2006)

Conformity

Transportation conformity is governed by a regulation issued by the EPA (40 CFR 93). Transportation conformity under the CAA requires mass transit projects conform to the applicable SIP and require that transportation activities would not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. Transportation conformity applies to all EPA-designated non-attainment areas for transportation-related criteria pollutants. Conformity is determined on estimating regional emissions based on projected motor vehicle travel on existing and planned highways and transit facilities that are consistent with an area’s transportation plan and Transportation Improvement Program (TIP). These projected emissions cannot exceed the emission limits or emission budgets established by the SIP. The Metropolitan Planning Organization (MPO) must also demonstrate that Transportation Control Measures (TCMs) (in EPA-approved SIPs) are implemented in a timely manner.

Transportation conformity for the DFW nonattainment area is outlined in the Transportation Conformity Determination for the DFW nonattainment area that includes *Mobility 2025—Metropolitan Transportation Plan, Amended April 2005* and the *2006-2008 TIP* as required under Section 176(c)(4) of the CAA Amendments of 1990.

Several local and federal agencies are responsible for conformity determination and include the MPO, DOT, Federal Highway Administration (FHWA), and the FTA. The process for determining conformity is outlined in the following:

- The MPO Regional Transportation Council (RTC) makes the initial transportation conformity determination at the local level. The DOT, FHWA and FTA ensure that transportation plans and programs within the metropolitan boundaries conform to SIP and make the final determination.
- NCTCOG serves as the MPO and is responsible for conducting transportation conformity for the metropolitan planning area and the RTC oversees planning and policies for the MPO. A formal consultation process is required to develop SIP, transportation plans, TIP, and making conformity determinations. This process includes the EPA, FHWA, FTA, state and local transportation and air quality agencies. TCMs are measures (projects or programs) that are designed to reduce emissions from transportation sources. TCEQ is responsible for submitting emission data and pollution control measures for the SIP to the EPA.

2.9.3 Existing Monitored Air Quality Levels

The DFW Metropolitan Area represents the air basin or air quality control region for the DART Rail to Rowlett Study Area. The DFW Metroplex is located in North Central Texas, approximately 250 miles north of the Gulf of Mexico. It is near the headwaters of the Trinity



River, which lie in the upper margins of the Coastal Plain. The rolling hills in the area range from 500 to 800 feet in elevation (National Weather Service 2006).

The CAA Amendments of 1990 (42 USC, Sections 7401-7671, et seq., as amended) establish federal policy to protect and enhance the quality of the nation's air resources to protect human health and the environment. The CAA requires that adequate steps be taken to control the release of air pollutants and prevent significant deterioration in air quality. The 1990 amendments to the CAA require federal agencies to determine the conformity of proposed actions with respect to the SIP for attainment of air quality goals.

According to the *Mobility 2025—Metropolitan Transportation Plan, Amended April 2005*, approximately 33 percent of VOCs and 50 percent of NO_xs that cause O₃ pollution are produced by on-road mobile sources including cars, trucks, buses, motorcycles, and other vehicles. An average SOV produces an estimated 2.09 grams/passenger-mile of hydrocarbons and 0.20 grams for bus transit. Vanpools and carpools produce 0.36 and 0.70 grams/passenger-mile of hydrocarbons (Transportation Research Board 1996). In comparison, a study on rail transit showed that electric rail produces 0.3 grams of NO_x per seat-mile, 0.007 grams of VOCs, 0.03 of PM₁₀ and 0.06 of CO (Messa 2006).

TCEQ DFW Regional Office and the City of Dallas operate air-monitoring stations in the proposed DART Rail to Rowlett Corridor. Currently, there are no air-monitoring stations within the immediate DART Rail to Rowlett Study Area. There are two stations in the regional area within 10-15 miles of the proposed DART Rail to Rowlett Alignment. CAMS 197 at 409 Forrest Gate in Garland was deactivated on March 4, 2003. This station only monitored meteorological parameters. The CAMS 63 station in North Dallas monitors NO_x and O₃ and had the highest 8-hour O₃ concentration measuring 0.119 parts per million during the years 2002 through 2005. CAMS 60 is the other regional station and monitors CO, NO₂, and O₃.

Air pollution impacts are considered not only on a regional and local basis, but also on a project-by-project basis. In identifying microscale (project-related) concerns, the FHWA requires a microscale CO analysis be done for any impacts that would violate the 1-hour or 8-hour CO standards. Any mitigation treatments should be developed between the FHWA, EPA, and appropriate state and local highway and air quality agencies.

The need for a hot-spot analysis of intersections is based on the following criteria (40 CFR 93.123):

- The project affects locations identified in the SIP as sites of actual or potential violations of the CO NAAQS
- The project intersection is or would be at LOS D, E, or F
- The project intersection is one of the top three in the SIP with respect to traffic volume or worst LOS

The proposed DART Rail to Rowlett air quality analysis presents a quantitative discussion of the potential for localized CO impacts resulting from vehicular delays and congestion at LRT station areas and at LRT at-grade crossings. The closest air monitoring site (approximately 10 miles



from DART Rail to Rowlett Study Area) is the CAMS 63 North Dallas site located at 12532 Nuestra Drive in Dallas.

Existing monitored O₃ and NO₂ levels have been collected over several years, and several exceedances of O₃ have occurred in the last ten years at the site with no exceedances of NO₂. The second closest CO monitoring station is the CAMS 60 located at 1415 Hinton Street in Dallas, approximately 15 miles from the DART Rail to Rowlett Study Area. No CO exceedances have occurred in the last ten years. The site also measures O₃ and NO_x. Several exceedances of O₃ have occurred over the last ten years and no exceedances of NO_x have occurred at the site. **Table 2-31** identifies these monitoring stations and 2005 ambient pollutant concentrations.

Table 2-31: Measured Ambient Pollutant Concentrations (2005)

Pollutant	Nearest Representative Monitoring Station	Averaging Period	Measured Concentration	NAAQS
CO	CAMS 60 ¹	1-hour	4.2	35 ppm ²
		8-hour	3.7	9 ppm
NO ₂	CAMS 63 ³	1-hour	0.060	--
		Annual	0.013	0.053 ppm
	CAMS 60 ¹	1-hour	0.070	--
		Annual	0.017	0.053 ppm
O ₃	CAMS 63 ³	1-hour	0.120	--
		8-hour	0.099	0.08 ppm
	CAMS 60 ¹	1-hour	0.117	--
		8-hour	0.104	0.08 ppm

Source: TCEQ, 2006

- Notes: ¹CAMS 60 =1415 Hinton Street
²ppm = parts per million
³CAMS 63 =12532 ½ Nuestra Drive

Table 2-32 shows 2001 area source emissions for Dallas County. Only vehicle, railroad, and aircraft emissions are identified for criteria pollutants. The table shows the annual emissions for each mode of travel and the percentage each contributes to regional emissions.



Table 2-32: Existing Mobile Source Emissions in Dallas County (tons per year)

Pollutant	Mode of Travel	Annual Emissions	Percent
CO	Highway Vehicles	397,183	99.7%
	Rail	63.7	0%
	Air	1,500	0.3%
Totals		487,252	100%
NOx	Highway Vehicles	53,902	98.3%
	Rail	639	1.7%
	Air	498	0%
Totals		55,039	100%
VOCs	Highway Vehicles	36,978	99.7%
	Rail	26.2	0%
	Air	124	0.3%
Totals		37,128	100%

Source: EPA Airsdatan, 2001 and 2006

2.9.4 Air Toxics

Under the CAA, 188 air toxics or hazardous air pollutants were identified as pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. Under Section 202 of the CAA, the EPA issued a final rule for Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17235) on March 9, 2001. This rule identifies 21 Mobile Source Air Toxics (MSAT) labeled as the six priority MSATs. These include benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene. MSAT emissions should be qualitatively and quantitatively analyzed for transportation projects that may have meaningful, low potential, or high potential MSAT effects.

2.10 Hazardous and Regulated Materials

This section presents findings related to existing hazardous and regulated materials sites in the DART Rail to Rowlett Study Area. A database search was performed using American Society for Testing and Materials standards for databases and search distances, in order to identify locations where hazardous or regulated materials were sold, stored, used, generated, or had been spilled. The database search noted 169 sites containing hazardous and/or regulated substance. Three State sites were identified greater than a half-mile from the proposed DART Rail to Rowlett Alignment. However, they are not included in the analysis because, according to the database notation, the sites were investigated and the clean up was completed. The remaining 166 sites were all within a half mile-radius of the proposed DART Rail to Rowlett Alignment. Therefore, the analysis in Section 3.12 only considers a half-mile buffer.

A summary of the primary state and federal databases that were searched is provided below:

- **National Priority List (NPL):** This database lists NPL sites that fall under the EPA's Superfund program established to fund cleanup of contaminated sites that pose a risk to human health and the environment. This database was searched to a 1-mile radius from the proposed centerline; no sites were discovered.

