APPENDIX G: REASONABLY AVAILABLE CONTROL MEASURE ANALYSIS

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1. INTRODUCTION

The Dallas-Fort Worth eight-hour ozone nonattainment area (DFW area) is currently classified as a serious nonattainment area for the United States Environmental Protection Agency (EPA) 1997 eight-hour ozone National Ambient Air Quality Standards (NAAQS) (75 FR 79302). Under the eight-hour ozone standard, the DFW area is required to meet the mandates of the Federal Clean Air Act (FCAA) under §§172(c)(1), 182(b)(2), and 182(f). Section 172(c)(1) of the FCAA requires states to provide for implementation of all reasonably available control measures (RACM) as expeditiously as practicable and to include RACM analyses in the state implementation plan (SIP). In the General Preamble for implementation of the FCAA Amendments published in the April 16, 1992, issue of the *Federal Register* (57 FR 13498), the EPA explains that it interprets FCAA, §172(c)(1) as a requirement that states incorporate into their SIP all RACM that would advance a region's attainment date. However, states are obligated to adopt only those measures that are reasonably available for implementation in light of local circumstances. In the general preamble, the EPA provided guidelines to help states determine which measures should be considered reasonably available:

> *If it can be shown that one or more measures are unreasonable because emissions from the sources affected are insignificant (i.e. de minimis), those measures may be excluded from further consideration... the resulting available control measures should then be evaluated for reasonableness, considering their*

technological feasibility and the cost of control in the area to which the SIP applies...In the case of public sector sources and control measures, this evaluation should consider the impact of the reasonableness of the measures on the municipal or other government entity that must bear the responsibility for their implementation.

On July 2, 2002, the United States Court of Appeals upheld the EPA's definition of RACM, including the consideration of economic and technological feasibility, ability to cause substantial widespread and long-term adverse impacts, collective ability of the measures to advance a region's attainment date, and whether an intensive or costly effort will be required to implement the measures.

2. CONTROL STRATEGY DEVELOPMENT PROCESS

2.1. Stationary Sources

The Texas Commission on Environmental Quality (TCEQ) used a two-step process to develop the list of potential stationary source control strategies evaluated during the RACM analysis. First, the TCEQ compiled a list of potential control strategy concepts based on an initial evaluation of the existing control strategies in the DFW area and existing sources of volatile organic compounds (VOC) and nitrogen oxides (NO_X) in the DFW area. The EPA allows states the option to consider control measures outside the ozone nonattainment area that can be shown to advance attainment; however, consideration of these sources is not a requirement of the FCAA. Sources of VOC within 100 kilometer (km) of the DFW area and sources of NO_X within 200 km of the DFW area were also considered for this initial evaluation. A draft list of potential control strategy concepts was developed from this initial evaluation. The draft list of potential control strategy concepts was presented to stakeholders for comment at stakeholder meetings held in the DFW area on June 24, 2010. The TCEQ requested comment on the potential control strategies and invited stakeholders to suggest any additional strategies that might help advance attainment of the DFW area. The final list of potential control strategy concepts for RACM analysis includes the strategies presented to stakeholders in June 2010 and the strategies suggested by stakeholders during the informal stakeholder comment process. Table G-1: *DFW Area Stationary Source RACM Analysis* presents the final list of potential control measures for stationary sources as well as the RACM determination for each measure.

2.2. On-Road and Non-Road Mobile Sources

The control strategy development process to identify potential control strategies for RACM analysis of on-road and non-road mobile sources was similar to the process used for the stationary sources. A draft list of potential control strategy concepts was presented to stakeholders for comment at stakeholder meetings held in the DFW area on June 24, 2010. The TCEQ requested comment on the potential control strategies and invited stakeholders to suggest any additional strategies that might help advance attainment in the DFW area. The final list of potential control strategy concepts for RACM analysis includes the strategies presented to stakeholders in June 2010 and the strategies suggested by stakeholders during the informal stakeholder comment process. Table G-2: *DFW Area On-Road and Non-Road Mobile Sources RACM Analysis* presents the final list of potential control measures for on-road and non-road mobile sources as well as the RACM determination for each measure.

3. RACM EVALUATION APPROACH

Each control measure identified through the control strategy development process was evaluated to determine if the measure would meet established criteria to be considered reasonably available. The TCEQ used the general criteria specified by the EPA in the recent proposed approval of the New Jersey RACM analysis published in the January 16, 2009, issue of the *Federal Register* (74 FR 2945):

> *RACM is defined by the EPA as any potential control measure for application to point, area, on-road and non-road emission source categories that meets the following criteria:*
>
> - *The control measure is technologically feasible*
> - *The control measure is economically feasible*
> - *The control measure does not cause "substantial widespread and long-term adverse impacts"*
> - *The control measure is not "absurd, unenforceable, or impracticable"*
> - *The control measure can advance the attainment date by at least one year.*

The EPA did not provide guidance in the *Federal Register* on how to interpret the criteria "advance the attainment date by at least one year." Because modeling all possible year scenarios for potential control measures is not practical, the TCEQ has historically evaluated whether a potential control measure would help the DFW area make progress toward attainment of the NAAQS based on potential eight-hour ozone reduction benefit in terms of parts per billion (ppb) using modeling sensitivity runs. However, a control measure must be implemented by the beginning of ozone season the year prior to the attainment date. Considering the June 15, 2013, attainment date for this attainment demonstration and 2012 as the attainment year, the TCEQ evaluated this aspect of RACM based on advancing the deadline for implementing control measures by one year.

The TCEQ also considered whether the potential control measure could be implemented before and reduce emissions prior to the beginning of the ozone season immediately before the attainment date. The attainment date for the 1997 eight-hour ozone NAAQS for the DFW area is June 15, 2013, so suggested control measures that could not be implemented by March 1, 2012, were not considered RACM because the measures would not advance attainment. However, the DFW area must make progress toward attainment of 1997 eight-hour ozone NAAQS as expeditiously as practicable. Therefore, if control measures can be implemented earlier than March 1, 2012, and will help the area make progress toward attainment of the NAAQS earlier than the attainment year, the measure should be implemented as early as feasible.

The TCEQ also considered whether the control measure was similar or identical to control measures already in place in the DFW area. If the suggested control measure would not provide substantive and quantifiable benefit over the existing control measure, then the suggested control measure was not considered RACM because reasonable controls were already in place.

4. STATIONARY SOURCE RACM DETERMINATION AND DISCUSSION

4.1. General Discussion

Based on the RACM analysis, the TCEQ determined that no potential control measures met the criteria to be considered RACM. All potential control measures evaluated for stationary sources were determined to not be RACM due to technological or economic feasibility, enforceability, adverse impacts, or ability of the measure to advance attainment of the NAAQS. In general, the inability to advance attainment is the primary determining factor in the RACM analyses. As discussed in Chapter 3 of this SIP revision, modeling shows that the DFW area will be substantially below the 1997 eight-hour ozone NAAQS and additional control measures are not necessary for the area to demonstrate attainment by the attainment date. Furthermore, a control measure would have to be in place by March 1, 2011, in order for the measure to advance the attainment date; therefore, it is not possible for the TCEQ to implement any control measures that would provide for earlier attainment of the NAAQS. The complete list of stationary source potential control measures and additional details on the specific RACM determinations for each control measure are included in Table G-1: *DFW Area Stationary Source RACM Analysis* of this appendix.

4.2. NO_X RACM Analysis

Additional NO_X control measures are not necessary for demonstrating attainment with the 1997 eight-hour ozone NAAQS and it is not possible to implement any control measure early enough to advance attainment. For this reason and for the others reasons identified in Table G-1 of this appendix, no NO_X control measures are proposed as RACM for this SIP revision.

4.3. VOC RACM Analysis

As discussed in Section 4.1 of this appendix, additional VOC control measures are not necessary for demonstrating attainment with the 1997 eight-hour ozone NAAQS and it is not possible to implement any control measure early enough to advance attainment. For this reason and for the others reasons identified in Table G-1 of this appendix, no VOC control measures are proposed as RACM for this SIP revision.

Concurrent with this SIP revision, the commission is adopting rulemaking to implement FCAA reasonably available control technology (RACT) requirements for certain coatings, adhesives, cleaning solutions and storage tanks (Rule Project Numbers 2010-016-115-EN and 2010-025-115-EN). These control measures are not being adopted for RACM purposes. Additional detail on these rulemakings can be found in Chapter 4: *Control Strategies and Required Elements* and in Appendix F: *Reasonably Available Control Technology Analysis* of this SIP revision.

4.4. RACM Analysis of Control Measures Outside the DFW Area

The EPA allows states the option to consider control measures outside the ozone nonattainment area that can be shown to advance attainment. Sources of VOC within 100 kilometer (km) of the DFW area and sources of NO_X within 200 km of the DFW area were therefore considered for the initial evaluation. The TCEQ determined that no potential control measure outside of the DFW area met the criteria to be considered RACM due to technological or economic feasibility, enforceability, adverse impacts, or ability of the measure to advance attainment of the NAAQS.

5. ON-ROAD AND NON-ROAD MOBILE SOURCE RACM DETERMINATION AND DISCUSSION

Based on the RACM analysis, the TCEQ determined that no potential on-road or non-road mobile source control measures met the criteria to be considered RACM. All potential control measures evaluated for mobile sources were determined to not be RACM due to technological or

economic feasibility, enforceability, adverse impacts, or ability of the measure to advance attainment of the NAAQS. As discussed in Section 4.1 of this appendix, the inability to advance attainment is the primary determining factor in the RACM analyses. Additional control measures are not necessary for the area to demonstrate attainment by the attainment date and it is not possible for the TCEQ to implement any control measures that would provide for earlier attainment of the NAAQS. The complete list of on-road and non-road mobile source potential control measures and the specific details for each RACM determination are included in Table G-2: *DFW Area On-Road and Non-Road Mobile Source RACM Analysis* of this appendix.

Table G-1: DFW Area Stationary Source RACM Analysis

Control Measure	Pollutant	Point or Area Source	RACM	RACM Analysis and Justification
TCEQ Initial Control Strategy Concepts for DFW 9-County Region Controls				
Establish nitrogen oxides (NO_X) emission specifications for replacement boilers rated greater than 2.0 million British thermal units per hour (MMBtu/hr) at minor sources.	NO_X	Area	No	Will not advance attainment in the time provided.
Establish NO_X emission specifications for any sources categories at major sources not included in 2006/2007 rulemaking (e.g., new unit classes such as wood-fired boilers).	NO_X	Point	No	Will not advance attainment in the time provided.
More stringent major source industrial, commercial, and institutional gas-fired boiler NO_X emission specifications.	NO_X	Point	No	Will not advance attainment in the time provided.
Establish NO_X emission specifications for replacement process heaters greater than 2 MMBtu/hr at minor sources.	NO_X	Area	No	Will not advance attainment in the time provided.
Additional NO_X controls for cement kilns.	NO_X	Point	No	Will not advance attainment in the time provided.
Reduce NO_X emissions from utility electric generation sources by establishing more stringent emission specifications, revoking exemptions, or establishing source or system caps.	NO_X	Point	No	Will not advance attainment in the time provided.
Reduce NO_X emissions from natural gas-fired turbines at independent power producers and industrial power producers.	NO_X	Point	No	Will not advance attainment in the time provided.
Establish more stringent NO_X emission specifications for stationary diesel engines with high annual operating hours.	NO_X	Area and Point	No	Will not advance attainment in the time provided.
Establish controls for portable engines, such as portable generators, and other engines considered non-stationary due to temporary service.	NO_X	Area	No	Will not advance attainment in the time provided.

Control Measure	Pollutant	Point or Area Source	RACM	RACM Analysis and Justification
Establish an emission cap and trade program similar to the mass emission cap and trade program in the HGB area in combination with additional control requirements to require emission reductions.	NO_X or VOC	Area and Point	No	Will not advance attainment in the time provided.
Reduce emissions from volatile organic compounds (VOC) storage vessels due to flash emissions and roof landings by establishing more stringent control requirements similar to HGB rules; eliminating certain storage tank exemptions; or requiring storage tank design improvements such as hanging roof in lieu of roof supported by legs.	VOC	Point	No	Will not advance attainment in the time provided. Note: The commission is concurrently adopting a rule (Rule Project Number 2010-025-115-EN) similar to this control measure but not for RACM purposes.
Establish more stringent VOC vent gas control requirements or expand the applicability of the existing rules to include additional sources.	VOC	Area and Point	No	Will not advance attainment in the time provided.
Reduce VOC emissions from bakeries by establishing more stringent control requirements or lowering the threshold for requiring controls.	VOC	Point	No	Will not advance attainment in the time provided.
Require additional VOC controls for industrial wastewater systems; expand the rule applicability to include additional sources; or establish emission control requirements for publicly owned wastewater treatment facilities.	VOC	Area and Point	No	Will not advance attainment in the time provided.
Establish more stringent VOC control requirements for municipal solid waste landfills.	VOC	Area	No	Will not advance attainment in the time provided.
Increase the stringency of the VOC control requirements for loading and unloading operations.	VOC	Point	No	Will not advance attainment in the time provided.

Control Measure	Pollutant	Point or Area Source	RACM	RACM Analysis and Justification
Establish more stringent VOC fugitive emission control requirements in petroleum refining, natural gas processing, and petrochemical processes. Options may include: establishing more stringent leak monitoring requirements (similar to HRVOC monitoring); lowering the detection limits for equipment leaks; or requiring instrument monitoring of connectors for equipment leaks.	VOC	Area	No	Will not advance attainment in the time provided.
Establish more stringent VOC content limits and control requirements for degreasing processes.	VOC	Area	No	Will not advance attainment in the time provided.
Establish more stringent VOC control requirements for cutback asphalt.	VOC	Area	No	Will not advance attainment in the time provided.
Establish more stringent VOC control requirements for the degassing or cleaning of stationary and transport vessels or expand existing rules to include all 9 counties in the DFW area.	VOC	Area and Point	No	Will not advance attainment in the time provided.
Establish more stringent VOC controls for upstream oil and gas operations. Options may include: installing condensers; controls on glycol dehydrators; replacement of high-bleed pneumatic devices; or fugitive emissions monitoring and leak repair programs.	VOC	Area and Point	No	Will not advance attainment in the time provided.
Reduce VOC emissions from breweries by implementing work practice standards or requiring the use of add-on control devices.	VOC	Point	No	Will not advance attainment in the time provided.
Implement best management practices via agreed orders or other mechanisms.	NO_X and VOC	Area and Point	No	Will not advance attainment in the time provided.
Set expiration dates for discrete emission credits.	NO_X and VOC	Area and Point	No	Will not advance attainment in the time provided.

Control Measure	Pollutant	Point or Area Source	RACM	RACM Analysis and Justification
TCEQ Initial Control Strategy Concepts for Transport Controls (Outside DFW)				
Establish NO_X control requirements for selected source categories within 200 kilometer (km) of the DFW area.	NO_X	Area and Point	No	Will not advance attainment in the time provided.
Reduce NO_X emissions from East and Central Texas utility electric generation sources by establishing more stringent emission specifications, revoking exemptions, or establishing source or system caps.	NO_X	Area and Point	No	Will not advance attainment in the time provided.
Reduce NO_X emissions from stationary gas-fired engines by increasing the stringency of the existing East Texas combustion rules; establishing emission specifications for lean burn engines in the East Texas area; or expanding the applicability of the existing rule to include sources located in more counties within 200 km of the DFW area.	NO_X	Area	No	Will not advance attainment in the time provided.
Extend the control requirements for VOC storage vessels to include sources located within 100 km of the DFW area.	VOC	Area	No	Will not advance attainment in the time provided.
Extend the VOC control requirements for the degassing or cleaning of stationary and transport vessels to include sources located within 100 km of the DFW area.	VOC	Area	No	Will not advance attainment in the time provided.
Establish VOC controls for upstream oil and gas operations located within 100 km of the DFW area. Options may include: installing condensers; controls on glycol dehydrators; replacement of high-bleed pneumatic devices; or fugitive emissions monitoring and leak repair programs.	VOC	Area and Point	No	Will not advance attainment in the time provided.
Potential Control Strategy Concepts Suggested by Stakeholders				

Control Measure	Pollutant	Point or Area Source	RACM	RACM Analysis and Justification
Create long-term emissions control strategies in preparation of the EPA's new 2010 ozone standard.	NO_X and VOC	Area and Point	No	This is not a control measure that can be evaluated as RACM for purposes of the 1997 eight-hour ozone NAAQS. Control measures potentially needed for the 2010 eight-hour ozone NAAQS will not advance attainment for the 1997 eight-hour ozone NAAQS.
Major polluters should be punished and any facility out of compliance should be shut down.	NO_X and VOC	Area and Point	No	Will not advance attainment in the time provided. Does not provide surplus reductions beyond current requirements.
Establish a working relationship and consult with other cities to set-up programs that helped those cities clean up the air.	NO_X and VOC	Area and Point	No	Will not advance attainment in the time provided. Not enforceable and not quantifiable.
Establish control strategies focused on pollution control in Tarrant, Denton, Wise, and Parker Counties.	NO_X and VOC	Area or Point	No	Will not advance attainment in the time provided.
Implement solar and wind power as a viable source of alternate energy.	NO_X and VOC	Area	No	Will not advance attainment in the time provided. Not quantifiable and not enforceable.
Establish a more stringent enforcement mechanism for polluters.	NO_X and VOC	Area or Point	No	Will not advance attainment in the time provided. Not quantifiable. Does not provide surplus reductions beyond current requirements.
Establish criteria to stop permitting new coal-fired power plants.	NO_X	Point	No	Will not advance attainment in the time provided. Not enforceable: the commission cannot unilaterally deny permits as control measure.
Establish RACT requirements for coal-fired power plants and cement kilns.	NO_X	Point	No	Will not advance attainment in the time provided. RACT is already implemented for on the cement kilns in Ellis County via mandatory source cap requirements in 30 Texas Administrative Code §117.3123. There are no coal-fired power plants in the DFW and RACT does not apply in attainment counties.

Control Measure	Pollutant	Point or Area Source	RACM	RACM Analysis and Justification
Require the installation of Selective Catalytic Reduction Technology (SCR) on coal-fired power plants.	NO_X	Point	No	Will not advance attainment in the time provided.
Establish the requirement to conduct pilot-testing of SCR or hybrid SCR- Selective Non-catalytic Reduction (SNCR) technology on cement kilns.	NO_X	Point	No	Will not advance attainment in the time provided. Pilot testing does not provide permanent reductions.
Require the installation of SNCR on all cement kilns in Ellis County.	NO_X	Point	No	Will not advance attainment in the time provided. The SNCR control level is already implemented on the cement kilns in Ellis County via mandatory source cap requirements in 30 Texas Administrative Code §117.3123.
Establish a requirement to shut down cement kilns if out of compliance.	NO_X	Point	No	Will not advance attainment in the time provided. Does not provide surplus reductions beyond current requirements.
Require RACT for oil and gas production.	NO_X and VOC	Area	No	Will not advance attainment in the time provided. Note: The commission is concurrently adopting a rule (Rule Project Number 2010-025-115-EN) to reduce VOC emissions from condensate and crude oil storage tanks at oil and gas production sites in the DFW area, but not for RACM purposes.
Require extensive VOC and NO_X controls on all aspects of natural gas development in the Barnett Shale counties.	NO_X and VOC	Area	No	Will not advance attainment in the time provided.
Establish procedures to shut down oil and gas wells if out of compliance.	NO_X and VOC	Area	No	Will not advance attainment in the time provided. Does not provide surplus reductions beyond current requirements.
Require a cap on new gas drilling until there are vapor recovery systems on the existing wells.	NO_X and VOC	Area	No	Will not advance attainment in the time provided.
Establish a requirement in the permitting process which requires cities to make vapor recovery systems mandatory in their oil and gas permitting process.	NO_X	Area	No	Will not advance attainment in the time provided.

Control Measure	Pollutant	Point or Area Source	RACM	RACM Analysis and Justification
Require drilling companies to join EPA's Natural Gas Star Program.	VOC	Area and Point	No	Will not advance attainment in the time provided.
Adopt Drill Right TX best practices and procedures.	NO_X and VOC	Area	No	Will not advance attainment in the time provided.
Reduce the use of natural gas-fired compressors in the Barnett Shale and replace them with electric compressors.	NO_X	Area	No	Will not advance attainment in the time provided.
Require NO_X emission reductions of 90% from current levels across the entire natural gas compressor engine fleet in DFW and east and central Texas.	NO_X	Area	No	Will not advance attainment in the time provided.
Require controls on oil and condensate tanks in the Barnett Shale, such as vapor recovery units or enclosed flares.	VOC	Point	No	Will not advance attainment in the time provided. Note: The commission is concurrently adopting a rule (Rule Project Number 2010-025-115-EN) to reduce VOC emissions from condensate and crude oil storage tanks at oil and gas production sites in the DFW area, but not for RACM purposes.
Establish procedures for green well completions that will reduce emissions, as gases and liquids are brought to the surface during the completion process.	NO_X and VOC	Area	No	Will not advance attainment in the time provided.
Replace natural gas actuated pneumatic valves with actuated compressed air.	VOC	Area and Point	No	Will not advance attainment in the time provided.
Require companies to establish procedures to transport salt water from gas wells via pipelines.	VOC	Area and Point	No	Will not advance attainment in the time provided.
Require all major generating units in East and Central Texas meet fuel-specific emission requirements comparable to those in place in the DFW and HGB nonattainment areas.	NO_X	Area	No	Will not advance attainment in the time provided.

Control Measure	Pollutant	Point or Area Source	RACM	RACM Analysis and Justification
Establish a "Preference in Purchasing Policy" which rewards or gives special consideration to companies operating kilns with the lowest NO_X emission levels.	NO_X	Point	No	Will not advance attainment in the time provided. Not enforceable and not quantifiable.
Require kiln owners to have a pilot test conducted for LoTox or SCR technologies, assuming that the technologies prove to be cost effective in achieving emission reductions.	NO_X	Point	No	Will not advance attainment in the time provided. Pilot testing does not provide permanent reductions.
Establish a statewide portable equipment registration program.	NO_X	Area	No	Will not advance attainment in the time provided.
Establish various efficiency measures. Options may include: appliance efficiency standards by rule for residential and commercial products; implement energy conservation measures under Section 388.005 of H&SC; update building efficiency codes; and to create a specific energy rating program for new and remodeled existing homes in Texas.	NO_X	Area	No	Not enforceable. TCEQ has no authority to implement. Any legislative funding for such incentive programs is not permanent; therefore, incentive programs do not meet criteria to be SIP creditable or RACM. Not quantifiable.

Table G-2: DFW Area Mobile Sources RACM Analysis

Control Measure Description	Pollutant	On-Road or Non-Road	RACM	RACM Analysis
TCEQ Initial Control Strategy Concepts				
DFW Controls				
Ban Segways from use on sidewalks and hike/bike trails	NO_X and VOC	On-Road	N	Not quantifiable/not enforceable

Safer bike routes with better signs marking lanes and routes	NO_X and VOC	On-Road	N	Not quantifiable
Inclusion of bicycle lanes on state/federal funded thoroughfare projects	NO_X and VOC	On-Road	N	Not quantifiable
Bicycle route signalization	NO_X and VOC	On-Road	N	Not quantifiable
Bicycle lanes on every arterial/frontage road	NO_X and VOC	On-Road	N	Not quantifiable
Bicycle lane/path repaving	NO_X and VOC	On-Road	N	Not quantifiable
Bicycle route lighting	NO_X and VOC	On-Road	N	Not quantifiable
Increased bicycle/pedestrian outreach to immigrant communities	NO_X and VOC	On-Road	N	Not quantifiable
Media coverage/promotion of bicycle facilities	NO_X and VOC	On-Road	N	Not quantifiable
Bicycle education	NO_X and VOC	On-Road	N	Not quantifiable
Region-wide mandatory bicycle racks at work sites	NO_X and VOC	On-Road	N	Not quantifiable/not enforceable
Address security concerns of pedestrians/cyclists	NO_X and VOC	On-Road	N	Not quantifiable

Showers and clothing lockers	NO_X and VOC	On-Road	N	Not quantifiable
Bicycle lockers, rack, and other storage facilities	NO_X and VOC	On-Road	N	Not quantifiable
Biking/hiking patrols to ensure safety	NO_X and VOC	On-Road	N	Not quantifiable
Integration of bicycle/pedestrian facilities with transit	NO_X and VOC	On-Road	N	Not quantifiable
Permit bicycles on rail transit	NO_X and VOC	On-Road	N	Not quantifiable
Bicycle racks on buses	NO_X and VOC	On-Road	N	Not quantifiable
Street level shops	NO_X and VOC	On-Road	N	Not quantifiable
Give bicyclists/pedestrians the right-of-way	NO_X and VOC	On-Road	N	Not quantifiable
Cyclist/pedestrian sidewalk furniture	NO_X and VOC	On-Road	N	Not quantifiable
Sidewalks and walkways	NO_X and VOC	On-Road	N	Not quantifiable
Crosswalks	NO_X and VOC	On-Road	N	Not quantifiable

Additional pedestrian access and circulation	NO_X and VOC	On-Road	N	Not quantifiable
Pedestrian signals	NO_X and VOC	On-Road	N	Not quantifiable
Connected street system and pedestrian pass-throughs	NO_X and VOC	On-Road	N	Not quantifiable
Pedestrian design improvements	NO_X and VOC	On-Road	N	Not quantifiable
Mid-block pedestrian connections	NO_X and VOC	On-Road	N	Not quantifiable
Wide, unobstructed sidewalks on both sides of all arterials, major roads, and other streets	NO_X and VOC	On-Road	N	Not quantifiable
Fuel cell school buses	NO_X	On-Road	N	Technology is not readily available and is cost prohibitive
Airports use Ultra Low Emitting Vehicle (ULEV) or electric vehicles instead of diesel for ground transportation	NO_X and VOC	On-Road	N	Measure is being voluntarily implemented through memorandums of agreement (MOAs) in the region
Propane school buses	NO_X	On-Road	N	Reductions too small to advance attainment and implementation could actually increase NOX
Use solar cells to run air conditioning and other electrical equipment on Metro buses	NO_X	On-Road	N	Local measure and would require legislative action to implement

Locate hazardous freeway areas for possible improvements, sharp turns, clover leafs, etc	NO_X and VOC	On-Road	N	Measure is being voluntarily implemented through MOAs in the region
Limit road and highway improvements to those benefiting transit and high occupancy vehicle lanes	NO_X and VOC	On-Road	N	Local action required to mandate
Shift highway funds to transit	NO_X and VOC	On-Road	N	Local action required to mandate
No new peripheral highways or loops	NO_X and VOC	On-Road	N	Local action required to mandate
California diesel fuel	NO_X	On-Road	N	Texas Low Emission Diesel (TxLED) is an enforceable rule under Texas' State Implementation Plan (SIP) and is similar to California diesel fuel
Reformulated fuels for off-road vehicles	NO_X	On-Road	N	Federal Reformulated Gas is already required in the DFW nonattainment area
Educate public about fuel savings from properly inflated tires, regular tune-ups, and driving speed	NO_X and VOC	On-Road	N	Not quantifiable / not enforceable
Celebrity volunteers for ozone alert announcements	NO_X and VOC	On-Road	N	Not quantifiable / not enforceable
Air quality public outreach	NO_X and VOC	On-Road	N	Not quantifiable / not enforceable
Designated truck routes	NO_X and VOC	On-Road	N	Local action required to mandate

Dedicate truck lanes	NO_X and VOC	On-Road	N	Local action required to mandate
Require short-haul trucks to use alternative fuels	NO_X	On-Road	N	Reductions too small to advance attainment
Ban the use of High Occupancy Vehicle (HOV) lanes by trucks	NO_X and VOC	On-Road	N	Legislative action required to mandate
More aggressive HOV enforcement	NO_X and VOC	On-Road	N	Would require legislative action to implement
HOV service on all freeways with increased access	NO_X and VOC	On-Road	N	Would require legislative action to implement
Focus on finding extreme high emitters with emphasis on finding and replacing, not penalizing	NO_X and VOC	On-Road	N	Reductions too small to advance attainment
Roadside pullovers				
Portable inspection/maintenance measures	NO_X and VOC	On-Road	N	Reductions too small to advance attainment
High-emitting vehicle repair assistance	NO_X and VOC	On-Road	N	Reductions too small to advance attainment
Accelerated vehicle retirement program	NO_X and VOC	On-Road	N	The Drive a Clean Machine Program is available in ozone nonattainment and near-nonattainment areas in Texas/reductions do not advance attainment
Dedicated funding for school bus replacement				

This should require alternative fueled vehicles	NO_X	On-Road	N	Measure is being voluntarily implemented through a MOA in the region
Buy vehicles older than model year 1975 to retire from use	NO_X and VOC	On-Road	N	The Drive a Clean Machine Program is available in ozone nonattainement and near-nonattainment areas in Texas /reductions do not advance attainment
Expanded repair and replacement assistance program	NO_X and VOC	On-Road	N	The Drive a Clean Machine Program is available in ozone nonattainement and near-nonattainment areas in Texas/reductions do not advance attainment/expansion of the program would require legislative action to implement
New vehicle discounts for old vehicle trade-ins	NO_X and VOC	On¬-Road	N	The Drive a Clean Machine Program is available in ozone nonattainment and near-nonattainment areas in Texas /reductions do not advance attainment
Transit passes/credit in exchange for old vehicle scrappage	NO_X and VOC	On-Road	N	Not quantifiable
Ban sale of high-emitting vehicles	NO_X and VOC	On-Road	N	Would require legislative action to implement
Deny registration to vehicles with repeated emission failures	NO_X and VOC	On-Road	N	The TCEQ's Vehicle Registration Denial program does not allow motorists to register vehicles in ozone nonattainment areas if the vehicle failed an emissions test and has not passed a retest during the last twelve months

Increase parking at transit centers or stops	NO_X and VOC	On-Road	N	Local action required to mandate
Provide parking at all major transit stations	NO_X and VOC	On-Road	N	Local action required to mandate
Cheaper gasoline prices during evening hours	VOC	On-Road	N	Would require legislative action to implement
Discourage people to have multiple cars	NO_X and VOC	On-Road	N	Would require legislative action to implement
State and local exemptions for pooling/transit subsidies	NO_X and VOC	On-Road	N	Local action required to mandate
No tolls for buses and vanpools	NO_X and VOC	On-Road	N	Local action required to mandate
Manage location of new growth to limit additional sprawl	NO_X and VOC	On-Road	N	Local action required to mandate
Mixed use development ordinance and zones	NO_X and VOC	On-Road	N	Local action required to mandate
Encourage or require complementary uses in close proximity in all developments or development areas	NO_X and VOC	On-Road	N	Local action required to mandate
Stop freeway bottleneck improvements that add lanes instead of focusing on transit	NO_X and VOC	On-Road	N	Local action required to mandate
Prohibit truck use of right lanes for loading on bus and bike routes	NO_X and VOC	On-Road	N	Local action required to mandate

Pedestrian mall route diversion	NO_X and VOC	On-Road	N	Local action required to mandate
Require two or more occupants per vehicle to enter designated congested activity centers during am and pm peak traffic periods	NO_X and VOC	On-Road	N	Local action required to mandate
More transit access near universities and airports	NO_X and VOC	On-Road	N	Local action required to mandate
Light rail	NO_X and VOC	On-Road	N	Local action required to mandate
Commuter rail	NO_X and VOC	On-Road	N	Local action required to mandate
High-speed rail	NO_X and VOC	On-Road	N	Local action required to mandate
Encourage the use of jitneys	NO_X and VOC	On-Road	N	Local action required to mandate
Encourage putting DART and other public buses on propane or other lower polluting fuels	NO_X	On-Road	N	Local action required to mandate
Subsidize transit service	NO_X and VOC	On-Road	N	Local action required to mandate
Implement seamless public transit, connectivity	NO_X and VOC	On-Road	N	Local action required to mandate
Mandatory employer trip reduction programs for all employers who employ 20 or more people	NO_X and VOC	On-Road	N	Local action required to mandate

Restrict student drivers to high schools	NO_X and VOC	On-Road	N	Would require legislative action to implement
Engine software upgrade (DHV4) or low NOX software upgrade	NO_X	On-Road	N	TCEQ follows the U.S. Environmental Protection Agency's guidance/no new NOX benefit
School bus idling Airborne Toxic Control Measure	NO_X	On-Road	N	Not quantifiable
Statewide emissions testing	NO_X and VOC	On-Road	N	State cannot mandate emissions testing and would require the counties consent and legislative action to implement
Centralized IM-240 test with repairs done separately	NO_X and VOC	On-Road	N	Texas utilizes Onboard Diagnostic testing which is more effective than IM-240 testing / no new NOX benefit
Raise the driving age	NO_X and VOC	On-Road	N	Would require legislative action to implement
Close loopholes in the Texas Clean Fleet Program making fewer exemptions for fleets				
Tier 2 light-duty and 2007 heavy-duty vehicle emissions standards have superceded the original proposal	NO_X	On-Road	N	Senate Bill 1032, 79th Texas Legislature, 2005, Regular Session, repealed the Texas Clean Fleet Program in its entirety
Electric vehicles	NO_X and VOC	On-Road	N	Measure is being voluntarily implemented through MOAs in the region
Cleaner diesel fuel				
Some diesel fuels have improved performance beyond TxLED	NO_X	On-Road	N	Measure is being voluntarily implemented through MOAs in the region

Permit HOV lane use by qualifying low emission vehicles				
	NO_X	On-Road	N	Local action required to mandate
Single Occupant Vehicles (SOV) access to HOV and transit stations				
Provide direct freeway access to adjoining HOV or transit park-and-ride facilities to encourage use and expedite access	NO_X	On-Road	N	Local action required to mandate
Managed lanes to accommodate some SOVs in HOV lanes				
Permit limited use of HOV lanes by SOV using tolls or other limiting technique in highly congested corridors where speeds are below 20 miles per hour	NO_X	On-Road	N	Local action required to mandate
Rewards for reporting smoking or high emitting vehicles	NO_X	On-Road	N	Reductions too small to accelerate attainment
Enforce smoking vehicle reports and require repairs				
Require vehicle to be retested	NO_X	On-Road	N	The Drive a Clean Machine Program offers financial assistance to repair vehicles that fail the emissions test / reductions too small to accelerate attainment
Low-interest financing for low income and/or old vehicle trade-ins				
Financing made available to vehicle owners not eligible for Drive a Clean Machine replacement option	NO_X and VOC	On-Road	N	Would require legislative action to implement

Aggressive driving enforcement	NO_X and VOC	On-Road	N	Local action required to mandate
Incentive for infill and redevelopment				
Incentives for master planned communities planned around lower vehicle travel	NO_X and VOC	On-Road	N	Measures are being implemented through a MOA in the region
Reduce transit fares	NO_X and VOC	On-Road	N	Reductions too small to accelerate attainment
Accelerate rail expansion	NO_X and VOC	On-Road	N	Economically infeasible
Share hybrid vehicles	NO_X and VOC	On-Road	N	Local action required to mandate
Enhanced enforcement for Smoking Vehicle Program				
Vehicle impounding for violators	NO_X	On-Road	N	The Local Initiative Project provides funding to counties to implement smoking vehicle programs in ozone nonattainment and near nonattainment areas / reductions too small to accelerate attainment
Idling Reduction	NO_X	On-Road	N	Local action required to mandate
Disincentives such as fines if caught mowing during Ozone Alerts	VOC	Non-Road	N	Modeling indicates general VOC reductions will not advance attainment / not quantifiable / not enforceable

Ban equipment such as two-stroke engines	VOC	Non-Road	N	Modeling indicates general VOC reductions will not advance attainment and not quantifiable / not enforceable
Electrification of rail	NO_X	Non-Road	N	Not quantifiable / not enforceable
Aircraft vapor recovery	VOC	Non-Road	N	Modeling indicates general VOC reductions will not advance attainment
Use liquefied natural gas and compressed natural engines for locomotives	NO_X	Non-Road	N	Locomotive engine standards already exist in Federal Regulations
Selective catalytic reduction for locomotives	NO_X	Non-Road	N	Locomotive engine standards already exist in Federal Regulations
Texas Emissions Reduction Plan (TERP)	NO_X	On-Road and Non-Road	N	TERP offers financial assistance to help replace heavy-duty equipment