CDOT AIR QUALITY ANALYSIS AND DOCUMENTATION PROCEDURES

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Air Quality

Air quality discussions address the emissions of pollutants from transportation systems which can be harmful to human beings, the natural environment, and the integrity of man-made materials. Emissions may also contribute to regional haze, degrading visibility, and public health concerns. Some pollutants contribute to atmospheric alterations that deteriorate its protective capabilities such as the protective screening of the tropospheric ozone. In essence, the function of the Clean Air Act and its amendments of supporting regulations is to protect human health and that of our natural and man-made environments, and preserve visibility of scenic vistas, by preventing the degradation of air quality.

Air quality is regulated under the 1970 Clean Air Act (Clean Air Act, 42 United States Code (USC) 85), as amended in 1977 and 1990 and supported by conformity regulations 40 Code of Federal Regulations (CFR) 93. The purpose of the Clean Air Act is to protect and enhance air quality to promote public health, welfare, and the productive capacity of the nation. The Clean Air Act addresses criteria air pollutants (regulated through the National Ambient Air Quality Standards [NAAQS]), the Prevention of Significant Deterioration (PSD) program, as well as the Hazardous Air Pollutants (HAPs) added in the 1990 amendment. The US Environmental Protection Agency (EPA) promulgated regulations to address regional haze in 1999, and continually modifies the regional haze program, most recently in October 2006. Other air quality legislations include the Intermodal Surface Transportation Efficiency Act (known as ISTEA) (ISTEA, 23 USC § 1001 – 8005) and the more recent Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (known as SAFETEA-LU) (SAFETEA-LU, 23 USC § 1001 – 11167).

The two following sections provide guidance on the treatment of air quality for the Colorado Department of Transportation's (CDOT's) National Environmental Policy Act of 1969 (NEPA) projects. The first section discusses the evaluation of air quality conformity and CDOT's air quality analytical procedures. The second section discusses air quality information that should be included in each NEPA document. This information replaces CDOT's *Air Quality Analysis and Documentation Procedures* (CDOT, 2009).

Clean Air Act and Transportation Conformity Rule

- Ensures that transportation plans, programs, and projects conform to the state's air quality implementation plan and provide for attainment of the NAAQS
- Applicable to non-attainment and maintenance areas for regionally significant projects.
- Procedures and definitions of transportation conformity

The Plain English Guide to the Clean Air Act, 42 USC 85:

http://www.epa.gov/air/caa/peg/

Conformity Regulations 40CFR93:

http://www.access.gpo.gov/nara/cfr/waisidx_03/40cfr93_03.html

Reasons for Evaluation of Air Quality Under NEPA

The Colorado Department of Transportation (CDOT) conducts air quality evaluations for its projects for a variety of reasons, including the following:

- To protect the state's air quality and insure Federal regulatory compliance with the Clean Air Act and its amendments
- To comply with CDOT's environmental stewardship policy, which ensures the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner

Air Quality Evaluation Process

The CDOT Environmental Programs Branch (EPB) or Regional Air Quality Specialist evaluates the potential for air quality impacts from a proposed transportation project and then determines if coordination with the Colorado Department of Public Health and the Environment (CDPHE)-Air Pollution Control Division (APCD) is required. Coordination with APCD involves notifying them early in the scoping phase of the project, to discuss air quality concerns, and determine the appropriate level of analysis required to assess the air quality impacts of the project. Often a joint US Environmental Protection Agency (EPA)-APCD-Federal Highway Administration (FHWA) consultation is necessary for complex, large-scale capacity projects or projects involving particularly sensitive at-risk populations. This process is discussed further in the following sections. The regulations and website linkage applicable to air quality evaluations are summarized in the sidebar.

The attainment and non-attainment status of a region may change over time. The attainment/non-attainment status of the region where a project is located should be verified as an early action item for a new project (see CDPHE-APCD's website for current designations). http://www.cdphe.state.co.us/ap/attainmaintain.html

To identify current attainment and non-attainment designations, refer to CDPHE-APCD's website at:

http://emaps.dphe.state.co.us/APInv/viewer.htm

State Implementation Plan and Regional Conformity

Criteria pollutant emissions concentrations are measured through a statewide system of ambient air quality monitors installed and managed by APCD. When concentrations exceed prescribed NAAQS levels (Table 1), a violation occurs, instigating an evaluation of pollutant compliance, a designation of the non-attainment area, and development of a plan to reduce current emission concentrations to compliant levels. This process is referred to as the State Implementation Plan (SIP). Non-attainment areas are geographic areas where air quality does not meet NAAQS. The boundaries of a non-attainment area are ultimately defined by EPA after consultation with the state air quality agencies and planning organizations.

In order to demonstrate that the SIP will achieve the emission reductions necessary for compliance, limits are established on the amount of emissions that any one source category can emit. For the on-road mobile source category (i.e., transportation projects) this limit is referred to as the MVEB or "the budget". This budget is not a financial figure but rather an emissions limit. Metropolitan Planning Organizations (MPOs) are required to demonstrate that transportation plans and programs stay within these budgets. This is done in the transportation conformity process through a Memorandum of Agreement (MOA) between the APCD and CDOT.

Once an area has re-attained the standard, a maintenance plan must be prepared to demonstrate that the standard will be maintained in the future. After the maintenance plan is approved by EPA, the area is re-designated as an attainment/maintenance area.

Regional conformity synthesizes transportation demand analyses by MPOs such as Denver Regional Council of Governments, North Front Range MPO or Pikes Peak Area Council of Governments, and emissions modeling analyses by the lead air quality agency, typically APCD. The emissions inventory created by this modeling process is compared to the SIP pollutant emissions budget to assure that concentrations of modeled pollutants remain below the budget threshold and thus regionally, meet the NAAQS.

The MPO and US Department of Transportation (USDOT), through FHWA and the Federal Transit Administration (FTA), have a responsibility to ensure that the transportation plan and program within the metropolitan planning boundaries conform to the SIP. In metropolitan areas, the policy board of each MPO must formally make a conformity determination on its transportation plan and Transportation Improvement Program (TIP) prior to submitting them to the USDOT for an independent review and conformity determination. Coordination with FHWA and the MPO is part

of the overall project development process. Development of conformity determinations for projects outside of these MPO boundaries is the responsibility of CDOT.

Conformity determinations must be made at least every four years (or more often if changes occur) for Regional Transportation Plans (RTPs) and TIPs. Certain events, such as SIP revisions that establish or revise the transportation-related emissions budget, or add or delete TCMs, may trigger new conformity determinations.

If a conformity determination cannot be made within appropriate timeframes, a conformity lapse can occur and no new non-exempt projects may advance until a new determination for the plan and STIP can be made. This affects transit as well as highway projects. There are exceptions for specific categories of projects that are exempt from the conformity process (pursuant to 40 CFR Parts 93.126 and 93.128). A list of these exemptions is provided in Attachment 1. TCMs that are included in approved SIPs may proceed during a conformity lapse.

Only those projects that have received approval of Plans, Specifications, and Estimates (PS&E) and transit projects that have received a full funding grant agreement or equivalent approvals prior to the conformity lapse may proceed to construction during a conformity lapse. Project phases that were approved by FHWA prior to the lapse (such as acquisition of right-of–way (ROW)) can also proceed, although no subsequent phases can be approved. Environmental review activities can proceed, but FHWA cannot sign Findings of No Significant Impact (FONSIs), Records of Decision (ROD), or approve Categorical Exclusions (CatExs) for non-exempt projects.

Project-Level Conformity Process

Once the regional conformity process for the plan and STIP is successfully completed by the MPO and USDOT, certain projects are also subject to project-level conformity. Project-level conformity applies only to projects that are funded and/or approved by FHWA or FTA or are considered regionally significant. A conformity determination is not normally required for state and locally funded projects. The CDOT Project Manager should coordinate with the EPB or Regional Air Quality Specialist to determine if a project is exempt from either regional conformity pursuant to 40 CFR 93.126-128 or exempt from project-level conformity pursuant to 40 CFR 93.128 (See Attachment 2).

Remember that conformity analysis only applies to projects located within or overlapping a boundary of a nonattainment or attainment/maintenance area.

Evaluation of the potential air quality impacts of a transportation project must begin as soon as the design is sufficiently mature to determine if the project will be exempt from or require a project-level conformity analysis. For the case of a project which overlaps the boundary of a nonattainment or maintenance area, project-level conformity analysis only applies to that portion of the project lying within the affected SIP area.

CDOT conducts carbon monoxide and/or PM_{10} project-level conformity analysis in non-attainment or attainment/maintenance areas for proposed projects included in the Statewide Transportation Improvement Plan (STIP), unless the project is exempt. This analysis considers a limited area (such as the ROW) surrounding selected intersections. Larger, system-wide air quality assessments are conducted by the lead air quality planning organizations.

EMISSION SOURCES

Emission sources are typically tracked in five categories: point, area, on-road mobile, non-road (off-road) mobile, and biogenic. CDOT is responsible for addressing on-road mobile sources and non-road source dust emissions during construction activities.

Criteria Pollutants

Under the Clean Air Act, EPA sets limits on how much of a pollutant is allowed in the air anywhere in the United States (US). In the Clean Air Act, EPA identified six air pollutants (known as criteria pollutants) that can be harmful to public health and the environment. For each criteria pollutant, health-based, primary standards have been established to protect public health with an adequate margin of safety, and welfare-based, secondary standards have been established to protect the natural and man-made environment (e.g., crops, vegetation, wildlife, buildings and national monuments, and visibility) from adverse effects of air pollution.

Criteria Pollutants:

- Carbon Monoxide (CO)
- Lead (Pb)
- Nitrogen Dioxide (NO_2)
- Particulate Matter less than 10 microns and less than 2.5 microns (PM_{10} and $PM_{2.5}$)
- Ozone (O_3)
- Sulfur Dioxide (SO_2)

For the criteria pollutants listed in the sidebar, EPA has established NAAQS (Table 1), a maximum concentration for a specific averaging time above which adverse effects on human health may occur. These criteria pollutant exposures are not to be confused with Occupational Safety and Health Administration (OSHA) acute standards for occupational hazards exposure. Annual standards are set to recognize the cumulative effects of seasonal or long-term exposure.

The CDPHE-APCD has been delegated authority by the EPA to administer many of the requirements of the Clean Air Act for the state. CDPHE- APCD has adopted NAAQS, so there are no ambient air quality standards specific to Colorado.

Areas determined to be non-attainment are also given classifications based on the magnitude of the area's problem. Non-attainment classifications are used to specify certain regulatory requirements, establish deadlines for states to submit air quality plans, and determine when an area must be in compliance (attainment) with NAAQS.

For ozone, the non-attainment classifications are:

- Marginal
- Moderate
- Serious
- Severe
- Extreme

For carbon monoxide and particulate matter, the original non-attainment classifications were moderate and serious, however; there are currently no CO, PM_{10} or $PM_{2.5}$ non-attainment areas in Colorado.

As of the date of publication of this Manual, Colorado has one non-attainment (8-hour ozone) and 12 attainment/maintenance areas (CO, and PM_{10}).

Ozone

The EPA designated the Denver and North Front Range region (which includes most of Larimer and Weld counties) as non-attainment of the 8-hour ozone standard of 80 parts per billion (ppb) on Nov. 20, 2007.The non-attainment designation came about when a succession of 3 particularly hot, stagnant summers (2005-2007) resulted in ozone violations, culminating with the Rocky Flats ozone monitor exceedance of the 84 ppb NAAQS in July 2007. The Rocky Flats monitor is one of 15 ozone monitors along the Front Range.

Table 1 - National Ambient Air Quality Standards

	Primary Standards		Secondary Standards	
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour (1)	None	
	35 ppm (40 mg/m^3)	1-hour (1)		
Lead	0.15 $\mu g/m^3$ (2)	Rolling 3-Month Average	Same as Primary	
	1.5 $\mu g/m^3$	Quarterly Average	Same as Primary	
Nitrogen Dioxide	53 ppb (3)	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour (4)	None	
Particulate Matter (PM_{10})	150 $\mu g/m^3$	24-hour (5)	Same as Primary	
Particulate Matter ($PM_{2.5}$)	15.0 $\mu g/m^3$	Annual (6) (Arithmetic Average)	Same as Primary	
	35 $\mu g/m^3$	24-hour (7)	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour (8)	Same as Primary	
	0.08 ppm (1997 std)	8-hour (9)	Same as Primary	
	0.12 ppm	1-hour (10)	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Average)	0.5 ppm	3-hour (1)
	0.14 ppm	24-hour (1)		
	75 ppb (11)	1-hour	None	

$\mu g/m^3$ = micrograms per cubic meter ppm = parts per million ppb = parts per billion

(1) Not to be exceeded more than once per year.
(2) Final rule signed October 15, 2008.
(3) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard
(4) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).
(5) Not to be exceeded more than once per year on average over 3 years.
(6) To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.
(7) 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 35 µg/m3 (effective December 17, 2006).
(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)
(9) (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(c) EPA is in the process of reconsidering these standards (set in March 2008).
(10) (a) EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").

(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.
(11) (a) Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb. Annual and 24-hour standards will be revoked.

Since the designation of the non-attainment area, the MPO air quality planning agencies and the Regional Air Quality Council (RAQC) have developed a SIP for 8-hour ozone outlining strategies for reducing ground-level ozone levels. The air quality agencies used the expertise of CDPHE-APCD. The SIP was adopted by the Air Quality Control Commission on Dec. 11, 2008. In 2008, the EPA revised the 8-hour ozone NAAQS to 0.075 ppm, initiating a revision to the ozone SIP. The emissions budget for the revised SIP was approved by the EPA in March 2010.

The NAAQS will be further revised to between 0.070 and 0.060 ppm in August 2010, and a subsequent re-designation of the non-attainment area will be forthcoming by August 2011. The revised SIP and all the ozone reduction control measures and strategies will need to be approved and implemented by December 2013.

Mobile Source Air Toxics (MSATs)

The Clean Air Act amendments of 1990 listed 189 pollutants known or suspected to cause serious health problems, and directed EPA to establish emission limits for them. The Clean Air Act also provided a mechanism for amending the original list of pollutants, based on new information about health and environmental effects. There are now 188 Hazardous Air Pollutants (HAPs), which also are known as toxic air pollutants or air toxics. Monitoring of ambient concentrations of HAPs is not mandated by the Clean Air Act. While monitoring under the Clean Air Act is not the norm, some monitoring of selected HAPs, mobile source air toxics or MSATs, is performed in areas where relatively high expected emissions may occur. The monitoring of diesel particulate matter (DPM), one of the 21 MSATs and one of the several priority MSATs, may be of importance to certain kinds of transportation projects in locations affecting at-risk populations, sensitive to respiratory aggravation or illness. Detailed analysis of potential concentrations of MSATs are not useful because they cannot be related to applicable health risk standards.

Collection and Evaluation of Baseline Information

Collection of Baseline Information

Air quality information needed for a NEPA document includes both general and project-specific information that is required to evaluate compliance with the regulatory standards discussed above. This information can be found through the National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS), CDPHE-APCD, and the EPA.

National Weather Service website at:

http://www.nws.noaa.gov/

General information includes:

- Air quality conformity status and TCM information. This information is needed to characterize the general project setting with an emphasis on aspects that are likely to be impacted by the project.
- Historical meteorological data. Information includes wind direction, frequency or diurnal, altitudinal, or seasonal variations that affect dispersion, as it pertains to identifying and characterizing impacts or in developing mitigation measures. This includes germane topographic and terrain features influencing air flow, dispersal and weather patterns.
- Historical air monitoring data. Information should display trends in pollutant concentrations in the project vicinity, air basin and/or the air quality region, as it pertains to any potential project emissions that could result in concentrations that exceed NAAQS.

Evaluation of Baseline Information

The evaluation of air quality impacts is dictated by federal and state law. The most significant federal air quality regulation (40 CFR 93) that applies to transportation projects is the transportation conformity rule. This rule is implemented in Colorado by the Air Quality Control Commission Regulation 10 (5 Code of Colorado Regulations (CCR) 1001–12). The purpose of this rule is to implement Section 176 of the Clean Air Act, which requires all transportation plans, transportation improvement programs, and transportation projects to:

- Conform to an implementation plan's (SIP) purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards.
- Ensure that these transportation activities will not cause or contribute to any new violation of any standard (NAAQS), increase the frequency or severity of existing violations of any standard, or delay timely attainment of any standard or any required interim emissions reductions.

The Denver Area Council of Governments website contains the RTP and TIP information:

http://www.drcog.org/index.cfm?page=Transportation

A prescribed air quality clearance process must be used to evaluate potential impacts that may result from construction of transportation projects. All federal projects in non-attainment or attainment/maintenance areas must have a project-level conformity determination unless they fit into one of the exempt categories described in Attachment 2. In either case, air quality issues must be addressed as part of the project environmental clearance process. The level of analysis and documentation for the air quality clearance will vary depending upon the scope of the project and the type of NEPA document being prepared.

Project-Level Conformity Determination

The first step in the air quality clearance process is to determine if the project is exempt from an air quality conformity determination. Conformity is a way to ensure that federal funding and approval are given to those transportation activities that are consistent with air quality goals. It ensures that emissions attributed to transportation activities do not worsen air quality or interfere with the purpose of the SIP, which is to meet the EPA standards for air quality. FHWA has issued a *Transportation Conformity Reference Guide* (FHWA, 2006a) to assist in the conformity process.

In non-attainment and attainment/maintenance areas, FHWA and FTA projects must be found to conform before they are adopted, accepted, approved, or funded and before a NEPA decision document can be signed. With some exceptions (e.g., safety, landscaping, and other projects with neutral or minimal emissions impacts), transportation projects must meet the following criteria:

- They must be included in a conforming RTP and Transportation Improvement Program (TIP)
- The design concept and scope of the project that was in place at the time of the RTP and TIP conformity finding must be maintained through implementation

The project design concept and scope must be sufficiently defined to ascertain emissions at the time of the conformity determination. Areas that have CO or particulate matter problems must also show that new localized violations of those pollutants will not result from project implementation, and that any existing violations will not be worsened.

At the local scale or "project-level", CDOT is primarily concerned with carbon monoxide (CO) and particulate matter, which may be present in either of two sizes: less than less than 10 microns (PM_{10}) and a subset of smaller particulates less than 2.5 microns ($PM_{2.5}$).

CO is emitted in tailpipe exhaust from motor vehicles; concentrations of CO are higher in the immediate vicinity of roadways and intersections where prone to congestion or idling vehicles.

Sources of PM_{10} associated with motor vehicles include tailpipe exhaust, brake and tire wear, re-entrained or "fugitive" road dust (which is especially associated with wintertime street sanding), ground disturbance during construction, and agricultural activities. $PM_{2.5}$ is associated with diesel exhaust and is believed to pose greater health risks than PM_{10}.

Although ground-level ozone is not directly emitted by motor vehicles, motor vehicle emissions of Oxides of Nitrogen (NOx) and vaporous hydrocarbons called Volatile Organic Compounds (VOCs) contribute to ozone formation. Ozone is created by the reaction of intense sunlight with NOx and VOCs. This reaction takes place over several hours, which allows for mixing and dispersion in the atmosphere; therefore, ozone is considered a regional, rather than localized, pollutant. In the Front Range, diurnal winds transport and concentrate precursors and ozone along the mountain front causing the highest ozone readings west of the urban centers. This condition is usually associated with hot summer days but high ozone conditions during the winter do occur where ozone and precursors concentrate within thermal inversions common to air basins of the Colorado Front Range.

Since ozone is a regional pollutant and cannot be analyzed in the vicinity of a particular roadway, a project-level analysis is not required for ozone. A regional ozone analysis is conducted as part of the air quality conformity determination for the Denver Metro and Northern Front Range ozone non-attainment area.

CO Project-Level Analyses

If a project is located within a non-attainment or attainment/maintenance area and is not exempt, the EPB or Regional Air Quality Specialist determines which roadways and intersections in the project area will be evaluated for localized air quality impacts. Intersections that will be constructed, reconstructed, or modified as part of the project are normally evaluated. If the project will result in an increase in traffic at nearby intersections, these intersections should also be evaluated. To determine which intersections should be evaluated, the CDOT Project Manager should provide an analysis of traffic and Level of Service (LOS) to the EPB or Regional Air Quality Specialist. The traffic and LOS analysis should evaluate existing and future (20-year) conditions at all intersections affected by the project for the morning (AM) and afternoon (PM) peak hour periods for all project alternatives, including the No-Action Alternative.

The traffic and LOS analysis serves as a screening method to determine if a CO hot spot analysis is needed. EPA hot spot modeling guidance indicates the following:

- Intersections operating at LOS C or better are not likely to cause a violation of CO standards and therefore do not need to be modeled. For individual projects, if the LOS for the Preferred Alternative is C or better at all signalized intersections affected by the project for all years and peak hours analyzed, then hot spot modeling is not required. However, the conformity rule still requires a qualitative analysis of likely CO impacts.
- A deficient future LOS of D, E or F or a degraded LOS from an existing LOS C or better to a deficient LOS, should be included in the screening process.

Specific data necessary to complete a CO hotspot analysis include:

- *Project design plans or sketches*: The intersection striping plan is usually the best plan sheet to use because it shows all traffic lanes and alignments. AutoCAD or MicroStation plans are probably the best and easiest to work with for design. Modelers who use AutoCAD or MicroStation can obtain link and receptor coordinates directly from the plans and use these numbers in one of the transportation air quality dispersion model (CAL3QHC or CALView interface tool) input files.

- *Traffic volumes*: Peak hour traffic volumes and turning movements for existing and future conditions are included on the level of service (LOS) summary sheets used in the screening analysis.

- *Traffic signal information*: The analyst can use either the existing signal timing or the timing used in the LOS analysis. Another reasonable approach is to assign the percent of traffic signal green time based on each link's proportion of total approach volume, i.e., if a link has 30 percent of the total approach volume, it could be assigned 30 percent of the green time. Minor adjustments in green time may be necessary so that the total green time does not exceed the signal cycle length.

- *Emission factors*: Both free-flow and idle motor vehicle emission factors for existing, interim, and future years are needed to run CAL3QHC. These factors are provided by APCD using the EPA MOBILE6.2 or the MOVES2010 emission factor models. By January 2012 emission factors will be based exclusively on the MOVES model for air quality planning and conformity analyses. Background concentrations would also be acquired from APCD for any analyzed pollutant, to be used in final formulae for hotspot concentration calculations.

- *Other modeling parameters*: CDOT default values for other model parameters including mixing height, surface roughness, settling and deposition velocities, stability class, saturation flow rate, and traffic signal characteristics are listed in the CAL3QHC User's Manual which can be found at http://www.weblakes.com/products/-calroads/resources/docs/CAL3QHC.pdf.

The new EPA emissions modeling system Motor Vehicle Emission Simulator known as MOVES2010 replaces MOBILE 6.2 for air quality analysis. http://www.epa.gov/otaq/models/moves/index.htm

CO Hot Spot Modeling

If the project does not pass the LOS screening test discussed in the previous section, hot spot modeling is required. Hot spot modeling is a procedure for calculating CO concentrations along roadways and near intersections. The purpose of hot spot modeling is to determine whether or not the project will cause or contribute to a violation of federal CO standards.

Hot spot modeling is required at intersections where the LOS is D or worse. For projects with deficient LOS that affect more than five or six intersections, a screening procedure based on traffic volumes and severity of congestion, that is, volume-to-capacity ratio greater or equal to 0.85, can be used to select the three or four worst-case intersections for hot spot modeling. It is assumed that if model results for the worst-case intersections do not exceed the NAAQS, lower volume intersections would also pass the hot spot test. The screening procedure reduces the amount of modeling required, yet still complies with the intent of the transportation conformity rule.

CDOT Hotspot Emissions Data Form provides a template for requesting emissions factor and background concentrations for CO and PM_{10} project-level hot spot analyses. If this form is used, the request can be directly submitted to APCD and copied to EPB. If the template is not used, requests must be made through the EPB AQ Specialist.

In Colorado, a worse-case analyses is often used for project-level CO analysis, which simulates the worst air quality conditions that could occur during the evaluation timeframe of existing, interim and future years. This analysis utilizes the worse emissions rates occurring within that interval, generally assumed to be the existing year emissions rates, and pairs them in the dispersion model with the worse traffic volumes expected over that same timeframe, the future year traffic. The results are coupled with background concentrations to provide the worse anticipated air quality hotspot conformity results, and are reported as such in NEPA alternative comparisons.

The EPA-approved hot spot model is the CAL3QHC, which predicts CO concentrations in the vicinity of intersections affected by project related traffic operations. The specific information required for CAL3QHC and the modeling process is discussed in the CAL3QHC User's Manual. CO running emissions (grams/mile) and idling emissions (grams/hour) for analyses years and facility classification, and background 1-hour and 8-hour CO concentrations for the analysis area should be requested from the EPB Air Quality Specialist. EPB shall act as the clearing house for all APCD emissions data requests.

Phased NEPA Project Interim Conformity

In addition to project-level hot spot analysis discussed above, large NEPA projects are often subdivided into logical, buildable project phases, which have identified funding. Each project phase must meet regional conformity by being accurately described in the most recent RTP, have undergone conformity modeling and be programmed in the current TIP. Project-level analysis of any phase of a project must reflect the unmodified, interim traffic operating conditions of the un-built portion of the full (completely built-out) NEPA project. Under a phased project scenario, hot spot screening and evaluation of the built phase intersections is conducted, and additional hot spot screening and analysis is conducted for the interim traffic operating conditions resulting at remaining intersection operations that will be built and/or affected in the later phases. Consultation with EPB and APCD is recommended to confirm that adequate interim hot spot modeling coverage is identified and conducted.

Conformity modeling includes fiscally constrained projects from the Regional Transportation Plan to assess the emissions generated and air quality benefits derived from transportation projects as they are proposed and constructed. Typically, projects are constructed over a period of years. Projects are divided into identifiable construction segments and are assigned a "staging year" usually at 5 or 10 year increments, to accommodate this sequential construction. These staging years allow the model to assign air quality benefits to the partial projects, such as an interchange or a roadway segment, prior to completion of the larger, whole project.

Special Conformity Conditions

Limited funding opportunities during difficult economic conditions may necessitate that projects position themselves for priority short-term funding from government programs such as the American Recovery and Reinvestment Act of 2009 (ARRA) by accelerating NEPA decision document approval. Under extraordinary circumstances, projects may reach final NEPA project authorization without securing appropriate funding. Conformity requirements outlined in 40 CFR 93 and modified by ISTEA and SAFETEA-LU transportation authorization legislation, require that a project be accurately described in the fiscally constrained RTP, undergo conformity modeling analysis to identify net air quality benefits, and include project funding in the current TIP.

In the context of NEPA approvals and regional transportation conformity, CDPHE-APCD has taken the position that regional conformity concurrence decisions necessary for advancement of NEPA decision documents, for unfunded projects, will be handled on a case-by-case basis. Under these special consideration conditions, the project at a minimum must (1) be accurately described in the RTP and have undergone conformity analysis, (2) must insure adequate TIP funding will be in place in a timeframe that allows the project to be constructed and operational consistent with staging year analyses of the project conformity modeling, and (3) demonstrate an air quality benefit. By not delaying the project, the air quality benefit attributed to that project is accelerated, thus improving air quality sooner. Under these special conditions, waiting until the later full TIP funding is available to provide a conformity concurrence decision to complete NEPA approval would not be in the best interest of improved air quality.

Particulate Matter Hot Spot Analysis

Hot spot assessments are also required for PM_{10} and $PM_{2.5}$. In January 2010 the EPA MOVES2010 emissions model was designated as the federally approved emissions model for transportation emissions analyses in all states except California. A proposed EPA quantitative guidance for analysis of particulate matter was published in May 2010. This quantitative analysis guidance incorporates the robust modeling capabilities of MOVES2010 to be used with the air quality dispersion models CAL3QHC-R and AERMOD for particulate matter projects of concern. Details of the quantitative hot spot methodology will be appended when the guidance becomes final.

In the Denver area, PM_{10} hotspot assessments rely on air quality modeling performed for the PM_{10} maintenance plan. In other areas, factors such as changes in traffic, emissions, receptor distances, and other elements that can impact concentrations are discussed.

Projects of air quality concern are certain highway and transit projects that involve significant levels of diesel vehicle traffic, or any other project that is identified in a $PM_{2.5}$ or PM_{10} SIP as a localized air quality concern. Pursuant to 40 CFR 93.123(b)(2) particulate matter hot spot analyses are required for projects of air quality concern within non-attainment or attainment/maintenance areas. However, for metropolitan Denver, the last PM_{10} Maintenance SIP was approved by EPA in December 2005. The following clarification regarding on how the PM_{10} guidance is applied.

Since a new Denver area conformity SIP has not been approved by EPA, the older 2005 SIP governs *applicability* of the PM hotspot requirements. The list of "projects of air quality concern" didn't exist when that older SIP was developed, so the criteria from the prior national conformity rule apply. Those criteria are:

(b) PM10 hot-spot analysis. (1) The hot-spot demonstration required by §93.116 must be based on quantitative analysis methods for the following types of projects:
(i) Projects which are located at sites at which violations have been verified by monitoring;
(ii) Projects which are located at sites which have vehicle and roadway emission and dispersion characteristics that are essentially identical to those of sites with verified violations (including sites near one at which a violation has been monitored); and
(iii) New or expanded bus and rail terminals and transfer points which increase the number of diesel vehicles congregating at a single location.

The 2010 proposed PM_{10} and $PM_{2.5}$ Project Level Analysis Guidance:

http://www.epa.gov/otaq/stateresources/transconf/policy/420p10001.pdf

EPA's 2006 PM guidance, as well as the 2010 draft guidance, do not change the list of projects that require analysis. These guidance documents spell out the *methodology* to be used, if a hot spot analysis is required. The 2006 guidance for qualitative analysis will apply until the 2-year transitional grace period assigned to this guidance by EPA will expire, and the 2010 PM_{10} and $PM_{2.5}$ Project Level Analysis Guidance will be the required methodology for PM hot spot analysis.

In March 2006, EPA published and updated rules for determining which transportation projects must be analyzed for local air quality impacts. EPA specified that projects of air quality concern include certain highway and transit projects that involve significant levels of diesel vehicle traffic, or any other project that is identified in the PM_{10} SIP as a localized air quality concern:

- New or expanded highway projects that have a significant number of or significant increase in diesel vehicles

- Projects affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project
- New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location
- Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location
- Projects in or affecting locations, areas, or categories of sites which are identified in the PM_{10} SIP as sites of violation or possible violation

This list of projects of air quality concern will become applicable to PM Attainment/Maintenance areas when EPA approves the updated conformity SIP .

Particulate matter analyses must be based on the latest planning assumptions. The requirements include:

- The total emissions burden of direct particulate matter emissions which may result from the implementation of the projects summed together with the background and fugitive dust concentrations
- Analyzing the entire transportation project, after the identification of major design features which will significantly impact local concentrations
- Using consistent assumptions with those used in regional emissions analyses for inputs that are required for both analyses (e.g., temperature, humidity)

The following is a summary of documentation to be included for $PM_{2.5}$ and/or PM_{10} hot spot analysis. Refer to the conformity rule and the March 2006 EPA/FHWA guidance for a full description of the applicable requirements.

- Description of project (location, design and scope, date project is expected to be open)
- Description of type of emissions considered in the analysis (road dust? construction emissions?)
- Contributing factors
- Current air quality conditions and conformity status
- Transportation and traffic conditions
- Built and natural environment
- Meteorology, climate and seasonal data
- Adopted emissions control measures
- Consider full time frame of area's Long Range Transportation Plan (LRTP)
- Description of existing conditions
- Description of changes resulting from project
- Description of analysis method chosen
- Description of analysis years
- Examine year or years in which emissions are expected to peak, and both for $PM_{2.5}$, both forms of the standard (24 hour and annual)
- Professional judgment of impact
- Discussion of any mitigation measures
- Written commitments for mitigation
- Conclusion on how project meets 40 CFR 93.116 and 93.123

Conformity Clearance Procedures

Project air quality conformity clearances are documented according to one of the procedures discussed below. The results of the regional and project-level conformity analysis are incorporated into the NEPA document, at which point EPA and FHWA review the conformity determination. EPA must approve the final conformity determination.

CDOT has entered into a MOA with the APCD delegating project-level procedures for determining project-level conformity. The purpose of the MOA is to identify procedures for project-level analyses that ensure compliance of federally funded transportation projects with the federal transportation conformity requirements and NEPA. The consultation process results in an Air Quality Conformity Concurrence Letter, signed by APCD.

Exempt project - The EPB or Region Air Quality Specialist sends a brief memo or email to the CDOT Project Manager stating that the project is exempt from a conformity determination according to the conformity regulation.

CatEx projects that pass the LOS screening test - The EPB or Region Air Quality Specialist writes a memo to the project file stating that all intersections affected by the project will operate at LOS C or better during both the opening and future years, and hot spot modeling is not required. The project must be included in a conforming RTP and appropriate funding included in the TIP before the clearance can be finalized and before the project can be advertised for construction. A copy of the memo should be sent to the CDOT Project Manager. Coordination/concurrence with APCD is not required.

Modeled CatEx projects - The EPB or Region Air Quality Specialist writes a memo to the project file summarizing the results of the hot spot analysis and stating that the project will not cause or contribute to a violation of air quality standards. An air quality clearance cannot be issued if the hot spot analysis shows that there would be an exceedance of the 8-hour CO standard. The project must be included in a conforming RTP and appropriate funding included in the TIP. A copy of the memo should be sent to the CDOT Project Manager. Coordination/concurrence with APCD is required to obtain emissions factors and background CO values.

EA/EIS projects that pass the LOS screening test - All EA/EIS projects in non-attainment and attainment/maintenance areas require coordination with APCD. If the project passes the LOS screening test, the EPB or Region Air Quality Specialist sends a letter to APCD stating this fact and requests concurrence that the project complies with the conformity provisions of the Clean Air Act. The project must be included in a conforming RTP and appropriate funding included in the TIP.

Modeled EA/EIS projects - For EA/EIS projects in non-attainment and attainment/maintenance areas having intersections that do not pass the LOS screening test, CDOT and APCD will jointly determine the appropriate level of hot spot modeling and other analyses needed through interagency consultation with APCD, FHWA and EPA. The EPB or Region Air Quality Specialist or project consultant, as appropriate, prepares a technical report describing the project and summarizing the results of the hot spot modeling and other analyses. The technical report and a letter requesting concurrence are sent to APCD. The project must be included in a conforming RTP and appropriate funding included in the TIP.

Mobile Source Air Toxics (MSATs) Evaluation

The EPA has not established regulatory concentration targets for the several relevant MSAT pollutants appropriate for use in the project development process. Therefore, there is no regional- or project-level conformity requirement at this time specifically for priority MSATs.

FHWA has issued various memoranda regarding interim guidance on air toxic analysis in NEPA documents , most recently updated in September 2009 (http://www.fhwa.dot.gov/environment/airtoxic/100109guidmem.htm). FHWA has standard language that should be used in CDOT NEPA documents located at the above referenced FHWA air toxic website.

The FHWA has developed a three-tiered approach for analyzing MSATs in NEPA documents:

FHWA interim guidance on MSAT analysis in NEPA documents:

http://www.fhwa.dot.gov/environment/airtoxic/100109guidmem.htm

1. For projects that are categorically excluded under 23 CFR 771.117(c), or are exempt from conformity requirements under the Clean Air Act pursuant to 40 CFR 93.126, no analysis or discussion of MSATs is necessary.

- Documentation sufficient to demonstrate that the project qualifies as a categorical exclusion and/or exempt project will suffice.
- For other projects with no or negligible traffic impacts, regardless of the class of NEPA environmental document, no MSAT analysis is required.
- FHWA suggested language can be found in Appendix A of the air toxic website guidance.

2. Qualitative analysis for projects with low potential MSAT effects.

- Projects that serve to improve operations of highway, transit or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions.
- Includes most projects that don't fall within the categorically excluded projects or the large projects that require quantitative analyses.
- FHWA suggested language can be found in Appendices B and C of the air toxic website guidance.

3. Rigorous quantitative analysis to differentiate alternatives for projects with meaningful differences in MSAT effects among alternatives.

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of DPM in a single location
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the average annual daily traffic (AADT) is projected to be in the range of 140,000 to 150,000 or greater by the design year
- The project is proposed to be located in proximity to populated areas or in rural areas and/or in proximity to concentrations of vulnerable populations (e.g., schools, nursing homes, hospitals)
- FHWA suggested uncertainty language can be found in Appendix C of the air toxic website guidance
- Mitigation options should be identified and considered. See FHWA suggested language in Appendix E of the air toxic website guidance
- FHWA recommends that the CDOT Project Manager and designated Air Quality Specialist should consult with Colorado Division or the Office of Natural and Human Environment (HEPN) and the Office of Project Development and Environmental Review (HEPE) in FHWA Headquarters for assistance in developing a specific approach for assessing impacts

Other Issues to Consider

Under current FHWA guidance, greenhouse gases are discussed under the topic of air quality cumulative effects using template language and analysis. The prescribed language is appended as Attachment 2.

NEPA Document Sections

The content of the sections on air quality in the Affected Environment and Environmental Consequences chapter is discussed below.

AFFECTED ENVIRONMENT

Documentation needs for the Affected Environment section of EAs and EISs are discussed in this section. The level of detail will vary with the importance of the air shed that the project affects. At a minimum, the Affected Environment discussion should contain a discussion of the following three elements:

General Project Setting – Identify the general setting of the project with respect to air quality. For example, is the project located in an urban versus rural or a light industry versus heavy industry area, and what are the major sources of emissions generated from those settings?

Climate and Meteorological Parameters – Parameters such as maximum, minimum, and average temperatures and precipitation; annual distribution of temperature and precipitation; wind speed, direction, and seasonal distribution; likelihood of inversion and dispersion; and nearest PSD Class I areas (if relevant to the project) should be analyzed in order to determine how air quality will be impacted by the project actions.

Status of the Air Quality Region – Determine whether the project is located in a non-attainment or attainment/maintenance area. Identify the attainment status for criteria pollutants and how the project will affect those limits. Describe the regional air quality trends and outlook. Determine whether the project is in a conforming RTP and TIP.

ENVIRONMENTAL CONSEQUENCES

Documentation needs for the Environmental Consequences section of EAs and EISs are discussed in this section. The level of detail will vary with the scope of the project, the non-attainment or maintenance area it is located in (if any), and the number of pollutants for which analysis is required. At a minimum, the Environmental Consequences discussion should compare the effects of the No Action Alternative and each alternative carried forward for detailed analysis in the following categories:

- Summarize the impact analysis performed
- State whether or not the air quality concentrations will remain under the EPA limits
- Discuss predicted future trends in these concentrations for each of the project alternatives
- Summarize any MSAT emissions monitoring or modeling

Include the following documentation in the impact analysis section of NEPA documents:

- General description of interagency scoping process and analytical methodology
- EA/EIS projects that pass the LOS screening test
- EA/EIS projects with project-level modeling or analyses
- Project impacts on mobile sourced criteria pollutants, CO, NOx, ozone, $PM_{10,}$ and $PM_{2.5}$ concentrations in the project vicinity - For large corridor projects, include a discussion and summary table of the corridor area (total burden) criteria pollutants emissions for all project alternatives.
- Any impacts (or no impact) on regional ozone concentrations - For large corridor projects, include a discussion and summary table of the corridor area (total burden) emissions of VOCs and NO_X.

- Project impacts on MSATs - Include the results of the qualitative and/or quantitative MSAT analysis if required by FHWA guidance (FHWA, 2006b). For large corridor projects, include a discussion and summary table of the corridor area (total burden) emissions of the seven priority MSATs.
- Project greenhouse gas emissions – Include FHWA preferred cumulative effects of GHG language regarding greenhouse gas emissions including calculation of the percentage VMT for the project related to 2005 statewide VMT levels (Attachment 2).

The air quality mitigation discussion focuses on mitigation measures available during the construction and operation phases, such as:

- Dust suppression during construction
- Sand sweeping as part of winter maintenance practices
- Equipment typically installed to reduce emissions from construction vehicles and vehicles using a project roadway
- Construction efficiency plans to better organize diesel equipment utilization and control equipment and small engine idling practices

Other types of mitigation that should be incorporated to improve air quality include TCMs. TCMs include any measure that is specifically identified to reduce emissions or concentrations of air pollutants from transportation sources. TCMs are typically targeted at reducing vehicle use or changing traffic flow or congestion conditions. Examples include:

- Traffic signal optimization projects designed to improve traffic flow
- Transportation demand management options such as HOV lanes
- Multimodal transportation options and programs to encourage their use
- Agreements with major corporations for promotion of flexible work schedules
- Fringe and transportation corridor parking facilities serving multiple-occupancy vehicle programs or transit service
- Any actions intended to reduce the number of vehicles on the roads or improve the LOS by spreading peak time traffic over a longer time span

Some of these mitigation approaches may be incorporated into the project alternatives at the time of their design, while others, such as the transportation system management mitigation options (signal coordination, access control, and intersection improvement), may be added as post-design mitigation or during project operation.

ATTACHMENT 1

40 CFR 93.126 - 93.128 CONFORMITY EXEMPTIONS

SAFETY

Railroad/highway crossing.
Hazard elimination program.
Safer non-Federal-aid system roads.
Shoulder improvements.
Increasing sight distance.
Safety improvement program.
Traffic control devices and operating assistance other than signalization projects.
Railroad/highway crossing warning devices.
Guardrails, median barriers, crash cushions.
Pavement resurfacing and/or rehabilitation.
Pavement marking demonstration.
Emergency relief (23 U.S.C. 125).
Fencing.
Skid treatments.
Safety roadside rest areas.
Adding medians.
Truck climbing lanes outside the urbanized area.
Lighting improvements.
Widening narrow pavements or reconstructing bridges (no additional travel lanes).
Emergency truck pullovers.

MASS TRANSIT

Operating assistance to transit agencies.

Purchase of support vehicles.
Rehabilitation of transit vehicles[1].
Purchase of office, shop, and operating equipment for existing facilities.
Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts, etc.).
Construction or renovation of power, signal, and communications systems.
Construction of small passenger shelters and information kiosks.
Reconstruction or renovation of transit buildings and structures (e.g., rail or bus buildings, storage and maintenance facilities, stations, terminals, and ancillary structures).

Rehabilitation or reconstruction of track structures, track, and trackbed in existing rights-of-way.
Purchase of new buses and rail cars to replace existing vehicles or for minor expansions of the fleet[1].
Construction of new bus or rail storage/maintenance facilities categorically excluded in 23 CFR part 771.

AIR QUALITY

Continuation of ride-sharing and van-pooling promotion activities at current levels.
Bicycle and pedestrian facilities.

OTHER

Specific activities which do not involve or lead directly to construction, such as:

Planning and technical studies.

Grants for training and research programs.
Planning activities conducted pursuant to titles 23 and 49 U.S.C.
Federal-aid systems revisions.
Engineering to assess social, economic, and environmental effects of the proposed action or alternatives to that action.
Noise attenuation.
Emergency or hardship advance land acquisitions (23 CFR 710.503).
Acquisition of scenic easements.
Plantings, landscaping, etc.
Sign removal.
Directional and informational signs.
Transportation enhancement activities (except rehabilitation and operation of historic transportation buildings, structures, or facilities).
Repair of damage caused by natural disasters, civil unrest, or terrorist acts, except projects involving substantial functional, location or capacity changes.

Note: [1]In PM10 nonattainment or maintenance areas, such projects are exempt only if they are in compliance with control measures in the applicable implementation plan.

ATTACHMENT 2

FHWA TEMPLATE CLIMATE CHANGE LANGUAGE

Global Climate Change Cumulative Effects Discussion

The issue of global climate change is an important national and global concern that is being addressed in several ways by the Federal government. The transportation sector is the second largest source of total greenhouse gases (GHGs) in the U.S., and the greatest source of carbon dioxide (CO_2) emissions – the predominant GHG. In 2004, the transportation sector was responsible for 31 percent of all U.S. CO_2 emissions. The principal anthropogenic (human-made) source of carbon emissions is the combustion of fossil fuels, which account for approximately 80 percent of anthropogenic emissions of carbon worldwide. Almost all (98 percent) of transportation-sector emissions result from the consumption of petroleum products such as gasoline, diesel fuel, and aviation fuel.

Recognizing this concern, FHWA is working nationally with other modal administrations through the DOT Center for Climate Change and Environmental Forecasting to develop strategies to reduce transportation's contribution to greenhouse gases - particularly CO_2 emissions - and to assess the risks to transportation systems and services from climate changes.

At the state level, there are also several programs underway in Colorado to address transportation GHGs. The Governor's Climate Action Plan, adopted in November 2007, includes measures to adopt vehicle CO_2 emissions standards and to reduce vehicle travel through transit, flex time, telecommuting, ridesharing, and broadband communications. CDOT is working with a number of agencies to prepare a Memorandum of Agreement (MOA) titled "Memorandum of Agreement for Interagency Collaboration to Address Mobile Source Air Toxics and Greenhouse Gas Emissions Affecting the State of Colorado." The purpose of this MOA is to establish a collaborative, working relationship among the State of Colorado's Department of Public Health and Environment (CDPHE), the U.S. Environmental Protection Agency (EPA), the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the Denver Regional Transportation District (RTD), the Denver Regional Air Quality Council (RAQC), and the Colorado Department of Transportation (CDOT) to address unregulated mobile source air toxics (MSAT) and greenhouse gases (GHG) produced from Colorado's state highways, interstates, and construction activities. CDOT's commitments would include:

1. Develop truck routes/restrictions with the goal of limiting truck traffic in proximity to facilities, including schools, with sensitive receptor populations.
2. Continue researching pavement durability opportunities with the goal of reducing the frequency of resurfacing and/or reconstruction projects.
3. Develop air quality educational materials, specific to transportation issues, for citizens, elected officials, and schools.
4. Offer outreach to communities to integrate land use and transportation decisions to reduce growth in vehicle miles traveled (VMT), such as smart growth techniques, buffer zones, transit-oriented development, walkable communities, access management plans, etc.
5. Commit to research additional concrete additives that would reduce the demand for cement.
6. Expand Transportation Demand Management (TDM) efforts statewide to better utilize the existing transportation mobility network.
7. Continue to diversify the CDOT fleet by retrofitting diesel vehicles, specifying the types of vehicles and equipment contractors may use, purchasing low-emission vehicles, such as hybrids, and purchasing cleaner burning fuels through bidding incentives where feasible. Incentivizing is the likely vehicle for this.
8. Explore congestion and/or right-lane only restrictions for motor carriers.
9. Fund truck parking electrification (note: mostly via exploring external grant opportunities)
10. Research additional ways to improve freight movement and efficiency statewide.
11. Commit to incorporating ultra-low sulfur diesel (ULSD) for non-road equipment statewide before June 2010 – likely using incentives during bidding.
12. Develop a low-VOC emitting tree landscaping specification.

Because climate change is a global issue, and the emissions changes due to project alternatives are very small compared to global totals, the GHG emissions associated with the alternatives were not calculated. Because GHGs are directly related to energy use, the changes in GHG emissions would be similar to the changes in energy consumption presented in section _____ of this [EA/EIS]. The relationship of current and projected Colorado highway emissions to total global CO_2 emissions is presented in the table below. Colorado highway emissions are expected to increase by 4.7% between now and 2035. The benefits of the fuel economy and renewable fuels programs in the 2007 Energy Bill are offset by growth in VMT; the draft 2035 statewide transportation plan predicts that Colorado VMT will double between 2000 and 2035. This table also illustrates the size of the project corridor relative to total Colorado travel activity.

Global CO_2 emissions, 2005, million metric tons (MMT)[1]	Colorado highway CO_2 emissions, 2005, MMT[2]	Projected Colorado 2035 highway CO_2 emissions, MMT[2]	Colorado highway emissions, % of global total (2005)[2]	Project corridor VMT, % of statewide VMT (2005)[3]
27,700	29.9	31.3	0.108%	---------

1) EIA, International Energy Outlook 2007
2) Calculated by FHWA Resource Center
3) 2005 Statewide Annualized VMT use 48,640,000,000mi