

**AIR QUALITY / TRANSPORTATION PLAN CO CONFORMITY
FAIRBANKS MAINTENANCE AREA
2010 LRTP/TIP**

14 June, 2010

The Fairbanks Metropolitan Area Transportation System (FMATS) has completed its 2010 Long Range Transportation Plan (LRTP) for the Fairbanks Metropolitan Planning Area. The LRTP is a nearly thirty year look at transportation needs and potential solutions through FFY 2035. Concurrent with completion of the LRTP, FMATS has also updated its Transportation Improvement Program (TIP) for Federal Fiscal Years (FFY) 2010-13.

A portion of the Fairbanks/North Pole area is a designated Carbon Monoxide (CO) Maintenance Area. Therefore, prior to approval of projects in the maintenance area, the State must demonstrate that the projects listed in the LRTP and TIP conform to the requirements and objectives of the most recent State Air Quality Implementation Plan (SIP).

CONFORMITY

The transportation conformity analysis is intended to demonstrate that local transportation plans, programs, and proposed projects for a maintenance area:

- Will support the attainment and maintenance of National Ambient Air Quality Standards (NAAQS) for Carbon Monoxide.
- Will not cause or contribute to any new violations of the NAAQS.
- Will not contribute to an increase in the number or severity of violations of National Ambient Air Quality Standards (NAAQS) for Carbon Monoxide.
- Will provide for expeditious implementation of Transportation Control Measures (TCM's), if any, contained in the State Implementation Plan.
- Will not in any way contradict recommendations of the State Implementation Plan.

STATUS – ATTAINMENT PROGRESS

The U.S. Environmental Protection Agency (EPA) originally designated a portion of the Fairbanks North Star Borough as a "Moderate Non-Attainment Area" for carbon monoxide (CO). This was based on an 8-hour average design value of 10.4 parts per million (ppm) of CO. Fairbanks failed to reach attainment by the end of 1995, and effective March 30, 1998, EPA formally reclassified Fairbanks to a "Serious CO Non-Attainment Area", as mandated by the 1990 Clean Air Act Amendments. Effective April 5, 2002, EPA made a determination that the Fairbanks area had attained the NAAQS for carbon monoxide. The State submitted an Air Quality Maintenance Plan on June 21, 2004 and EPA made a formal "CO Maintenance Area" designation approving this plan on September 27, 2004. Fairbanks has not recorded an

exceedance of the ambient CO standard since 2000. The Maintenance Plan has been amended several times since the 2004 submission. The most recent revisions were adopted by the State on April 4, 2008.¹ Those revisions included a decision to terminate the Fairbanks I/M Program at the end of 2009. On March 22, 2010, EPA approved² this revised version of the Maintenance Plan. Thus, it represents the source of the latest motor vehicle emission budgets for the CO conformity determination.

Carbon monoxide is the only applicable pollutant. In December of 2007, EPA designated Fairbanks as a PM_{2.5} nonattainment area. The Federal Register Notice announcing that decision was published³ on November 13, 2009 and became effective on December 14, 2009. Since the conformity requirements do not become effective until one year after the announcement is published (i.e., December 14, 2010); the PM_{2.5} designation is not applicable to this LRTP/TIP conformity determination.

BACKGROUND

Air Quality Planning Authority – The Fairbanks North Star Borough is the designated lead agency that is responsible for development and implementation of an air quality plan for the Fairbanks area. The Borough also oversees the Motor Vehicle Emissions Inspection and Maintenance (I/M) Program, which was suspended in 2010. A 2010 Memorandum of Understanding between the Borough and the Alaska Department of Environmental Conservation (DEC) outlines joint responsibilities to address air pollution in the Fairbanks area.

Transportation Planning Agreement – Based on the results of the 2000 Census, a portion of the Fairbanks and North Pole area was designated as an urbanized area (meets density requirements with total population of 50,000 or more). The U.S. Department of Commerce, Bureau of the Census made this designation effective May 1, 2002. Therefore, the community now falls under the requirements of USC Title 23, Section 34, which required the formation of a Metropolitan Planning Organization (MPO).

On April 14, 2003, the Governor of Alaska, formally designated the Fairbanks Metropolitan Area Transportation System (FMATS) as an MPO. FMATS completed an Inter-Governmental Operating Agreement and a Memorandum of Understanding for Transportation & Air Quality Planning.

FMATS members include the Fairbanks North Star Borough, the City of Fairbanks, the City of North Pole, the Alaska Department of Transportation & Public Facilities (DOT&PF) and the Alaska Department of Environmental Conservation. The Fairbanks North Star Borough is the lead agency for developing and implementing the local Air Quality Attainment Plan. FMATS members provide technical support and review of the transportation elements of the air quality plan. The FMATS structure fulfills the Clean Air Act requirements for local government and state agencies to provide a coordinated or "consultation" process to review the air quality attainment plan and the conformity analysis.

¹ <http://www.dec.state.ak.us/air/sip.htm>

² Federal Register, Vol. 75, No. 54, March 22, 2010.

³ Federal Register, Vol. 74, No. 218, November 13, 2009.

As an MPO, FMATS is required to update the previous TIP and LRTP this year. The conformity analysis included in this report evaluates the air quality impacts from the projects included in the TIP and the LRTP (through 2035).

State Implementation Plan / Vehicle Emissions Budget – The Fairbanks component of the State Implementation Plan (SIP) approved in March 2010 includes motor vehicle emission budgets for 2006, 2010 and 2015. Transportation Control Measures (TCM's) included in the Implementation Plan focus on an episodic woodstove burning ban, an oxygen sensor replacement program, OBD-I/M inspections of heavy-duty gas vehicles (which disappear after termination of the I/M program at the end of 2009), and other measures (e.g., transit).

TRAVEL DEMAND MODEL

The travel demand model is the primary planning tool used to develop and compare area wide roadway travel that results from both increased travel demand and roadway improvements. FMATS travel forecasts were based on the TransCAD regional travel demand model. Dr. Ming Lee of UAF was commissioned to prepare a 2008 baseline update, which includes more recent employment data, demographic statistics, and traffic volume counts. The TransCAD model was set up to perform time-of-day specific modeling that produces AM peak, PM peak and off-peak traffic volume forecasts. With assistance from Kittleson and Associates, Dr. Lee also performed a calibration of the baseline TransCAD model performance using 2008 traffic volume measurements collected at “screenline” counters within the FMATS modeling area. Dr. Lee was also commissioned to prepare a forecast of the 2035 traffic levels for the LRTP. The calibrated base year travel and horizon year forecasts prepared by Dr. Lee are used in this analysis and documented in separate memos^{4,5}

EMISSIONS ANALYSIS

The winter on-road mobile source emissions for the urban nonattainment area of Fairbanks were computed by combining the estimates of warm-up idling and plug-in benefits from AKMOBILE6 with the traveling emission factors from MOBILE6. Both models were used to establish the attainment demonstration and emissions budgets contained in the approved Maintenance Plan.⁶ The years to be analyzed in this analysis were established via interagency consultation between representatives of FMATS, City of Fairbanks, EPA, FHWA, FTA, DEC, and DOT&PF,^{7, 8} and include calendar years 2008, 2015, 2025 and 2035. With the exception of the estimates of nonattainment area VMT and average area speeds contained in the new LRTP and updated TIP, all the fleet and fuel characteristics employed in the Maintenance Plan were used in this analysis. Similarly, emissions were estimated using the soak time and initial idling

⁴ Memo to FMATS from Dr. Ming Lee, UAF, Revised FMATS Travel Demand Model Baseline Calibration Report for 2035 LRTP, October 18, 2009.

⁵ Memo to FMATS from Dr. Ming Lee, UAF, Revised FMATS 2035 Long Range Transportation Plan Traffic Projection Report, June 10, 2010.

⁶ AKMOBILE6 version 1.10 dated January 26, 2004 and MOBILE version 6.2 .03 dated September 24, 2003

⁷ Memo to Bob Dulla, Sierra Research, Inc. from Donna Gardino, FMATS, Draft Summary of FMATS Interagency Conformity Consultation for the 2010-2013 TIP and 2035 LRTP, June 2, 2010.

⁸ FNSB staff was unavailable for the consultation, but was subsequently contacted for their input and approval of the approach adopted.

time by trip type (home/work, home/other, and other/other) and the trip type distributions used in the Maintenance Plan.

As noted above, the travel forecasts for the TIP and LRTP were obtained from FMATS for 2008 and 2035. Estimates for the intervening years were developed using interpolation, which showed an annualized growth rate of 0.6%. The total average daily vehicle trips and VMT used in the analysis are shown in Table 1, both for the entire FMATS modeling area (which extends beyond the CO Maintenance Area) and the Maintenance Area.

Calendar Year	Entire FMATS Modeling Area		CO Maintenance Area	
	Vehicle Trips	VMT	Vehicle Trips	VMT
2008	236,194	1,821,587	123,610	953,310
2015	246,061	1,879,481	130,069	993,504
2025	260,493	1,962,187	139,517	1,050,924
2035	275,335	2,044,894	149,233	1,108,344

The CO Maintenance Plan is based on winter season-adjusted travel. The winter season VMT adjustment factor used in the Maintenance Plan and this conformity analysis was 94.6% (of annual average daily VMT) based on estimates developed by DOT&PF.⁹ A comparison of the winter season-adjusted travel estimates used in the applicable Maintenance Plan and new estimates for the LRTP/TIP within the CO Maintenance Area are shown by analysis year in Table 2. As can be seen, the new 2008 baseline VMT estimates are in fairly close agreement to those in the recent Maintenance Plan for the same year. However over time, forecasted VMT in the LRTP is noticeably lower than that in the Maintenance Plan. This is most likely due to lower long-term growth forecasted within this LRTP compared to estimates used in the earlier Maintenance Plan (the latter which were developed prior to the 2008 economic recession.)

Calendar Year	Maintenance Plan	2010 LRTP	% Difference
2008	889,529	901,831	+1.4%
2015	989,950	939,855	-5.1%
2025	1,153,406	994,174	-13.8%
2035	Not available	1,048,494	NA

⁹ Paul Prusak, DOT&PF, VMT.Forecast.2.02.xls, February 12, 2002.

Estimates of speeds, trip length and VMT by roadway link for 2008 and 2035 were also obtained from FMATS. As the analysis was based on trip types and not facility type, an average network speed was computed by weighting link specific speeds by their travel fractions for each of the analysis years. Average trip lengths were computed by averaging across the distribution of trips lengths generated for each of the analysis years. The average areawide speeds and trip lengths for 2015 and 2025 were then estimated by interpolating between the 2008 and 2035 values. This is an improvement over the Maintenance Plan where only one average network speed (35.7 mph) was available to characterize activity for each of the calendar years analyzed.

The interpolation between the 2008 and 2035 speed data from FMATS resulted in the areawide average speeds and trip lengths shown in Table 3. Each calendar year model run reflected the average speed and trip length shown in the table.

Calendar Year	Average Speed (mph)	Average Trip Length (miles)
2008	41.5	7.71
2015	41.4	7.64
2025	41.3	7.53
2035	41.2	7.43

The AKMOBILE6 runs for 2008 reflect the current I/M Program with a 4-year exemption that was implemented in calendar year 2006. The runs for the remainder of the years reflect the Borough's decision to terminate the I/M Program at the end of 2009. A summary of the resulting on-road CO emission inventories, along with the adjustments for local controls estimated outside of the models is shown in Table 4. The control measures and related emission benefit estimates are the same as those employed in the most recent Maintenance Plan and include: heavy-duty gasoline vehicle (HDGV) OBD I/M (prior to 2010), oxygen sensor replacement and other (transit). As can be seen, however, the benefits of these measures are projected to fall off rapidly in future years.

Source Component	CO Emissions by Calendar Year (tons/day)			
	2008	2015	2025	2035
Extended Idle Emissions	2.51	1.94	1.60	1.71
Travel Emissions	15.09	13.96	13.17	13.65
Total Emissions	17.60	15.90	14.77	15.37
Additional Local Controls*	0.33	0.03	0.03	0.03
Total CO Inventory	17.27	15.87	14.74	15.34

* Includes HDGV OBD I/M, oxygen sensor replacement and other (transit).

FINDING OF CONFORMITY

A comparison of the emission estimates for the 2010 LRTP/TIP with the emission budgets established in the Maintenance Plan is presented in Table 5. It shows that emissions for the LRTP/TIP are lower than the applicable Maintenance Plan budgets for all of the analysis years. The analysis presented is conservative because the travel estimates were not adjusted to account for the reduction in travel that occurs during winter months. If this reduction was applied, the LRTP/TIP forecasts would be even farther below the budgets.

Since no budget was established for calendar year 2008, a value was established by interpolating between the budgets established for 2006 and 2010 (values of 24.62 and 24.01 respectively).

Emissions Estimate	Analysis Year			
	2008	2015	2025	2035
Budget	24.32	23.61	23.61	23.61
LRTP/TIP Emissions	17.27	15.87	14.74	15.34
Surplus (+) or Shortfall (-)	+7.05	+7.74	+8.87	+8.27
Conformity Finding	Yes	Yes	Yes	Yes

As shown in Table 5, there is a substantial surplus between the budgets set in the recently adopted and EPA-approved Maintenance Plan and the vehicle emission estimates for this LRTP/TIP. This results from differences in average vehicle speeds and trip lengths in the travel modeling, both of which reduce emissions relative to the Maintenance Plan budgets. The vehicle speeds and trip lengths contained in the 2010 LRTP/TIP reflect the latest planning assumptions and current travel model estimates.

Based on these findings, Fairbanks demonstrates the conformity of its transportation program in accordance with Sections 93.109 – 93.118 of the Final Conformity Rule and parallel State of Alaska requirements in the Air Quality Control Plan and the Alaska Administrative Code Title 18, Chapter 50. This conformity determination uses the latest planning assumptions for current and future population, employment, travel and congestion. The final conformity determination is made according to the consultation procedures set out in the State regulations and federal guidelines.

This conformity analysis was performed within a series of spreadsheet calculations contained in an accompanying electronic file, *FMATS_LRTP_CO_Conformity_Final.xls*.

The travel activity data and modeling used to support this conformity determination should be considered in determining which projects are subject to hot-spot modeling analysis