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COMPASS
COMMUNITY PLANNING ASSOCIATION
of Southwest Idaho

Conformity Demonstration of the FY2008-2012 Northern Ada County Transportation Improvement Program Amendment and the *Communities in Motion* Amendment

Report No. 04-2008
Adopted by the COMPASS Board on November 19, 2007
Resolution 02-2008

COMPASS
COMMUNITY PLANNING ASSOCIATION of Southwest Idaho

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RESOLUTION No. 02-2008

FOR THE PURPOSE OF APPROVING AN AMENDMENT TO THE FY2008-2012 TRANSPORTATION IMPROVEMENT PROGRAM FOR NORTHERN ADA COUNTY AND THE ASSOCIATED AIR QUALITY CONFORMITY DEMONSTRATION

WHEREAS, the Community Planning Association has been designated by the Governor of Idaho as the Metropolitan Planning Organization responsible for transportation planning in Northern Ada County and the Nampa Urbanized Area;

WHEREAS, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act – a Legacy for Users and 23 United States Code Section 134 require Metropolitan Planning Organizations to develop and approve a Transportation Improvement Program;

WHEREAS, the 1990 Clean Air Act Amendments require all transportation plans and programs in nonattainment areas demonstrate conformity to applicable state implementation plans and maintenance plans for air quality improvements;

WHEREAS, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act – a Legacy for Users and 23 United States Code Section 134 requires projects contained in the Transportation Improvement Program to be financially constrained;

WHEREAS, the public was invited to review the Eagle Road widening proposed project and provided one month to comment on the amendment to the Transportation Improvement Program;

WHEREAS, an open house was held to solicit public comments on the proposed amendment to the Transportation Improvement Program;

WHEREAS, the Community Planning Association desires to take timely action; and

WHEREAS, the Community Planning Association has developed this amendment to the FY2008-2012 Transportation Improvement Program for Northern Ada County in compliance with all applicable State and Federal regulations.

NOW, THEREFORE, BE IT RESOLVED, that the Community Planning Association Board of Directors adopts the proposed amendment to include the widening of Eagle Road from I-84 north for approximately two mile to the FY2008-2012 Transportation Improvement Program for Northern Ada County and the associated Air Quality Conformity Demonstration.

Dated this 19th day of November 2007.

APPROVED:

By: _____

Tom Dale, Chair
Community Planning Association Board

ATTEST:

By: _____

Matthew J. Stoll, Executive Director
Community Planning Association

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THIS DOCUMENT IS SUBMITTED TO THE U.S. DEPARTMENT OF TRANSPORTATION IN FULFILLMENT OF THE REQUIREMENTS OF THE 1990 CLEAN AIR ACT AMENDMENTS (CAAA), THE FEDERAL TRANSPORTATION AIR QUALITY CONFORMITY RULES (40CFR93), AND THE STATE OF IDAHO ADMINISTRATIVE CODE ON TRANSPORTATION CONFORMITY (IDAPA 58-01.01.563-574).

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FOREWORD

The federal government mandates that any transportation projects using federal funds or deemed to be "regionally significant" in nonattainment and maintenance areas cannot contribute to a degradation of air quality (40CFR93). Thus, transportation plans must "conform" to air quality plans. Transportation conformity is demonstrated when a nonattainment or maintenance area can show, within the applicable guidelines and regulations, that planned transportation projects listed in a transportation program or plan will not cause or contribute to exceedances of the Environmental Protection Agency's (EPA's) health based air quality standards. A finding of nonconformance would prevent the implementation of certain federally funded and/or regionally significant transportation projects.

Only EPA's criteria pollutants are subject to conformity analyses. One of two tests is used in a conformity demonstration:

> Build/No Build: Conceptually, this process is rather simple; estimate the amount of a given pollutant emitted in a region before the programmed projects are built (No Build Scenario) and after construction (Build Scenario). If the emissions from the Build Scenario are equal to or less than the emissions from the No Build Scenario, conformity has been demonstrated. This test is used for nonattainment or maintenance areas when motor vehicle emissions budgets are not established.
>
> Budget: State air quality implementation or maintenance plans for nonattainment or maintenance areas will often have maximum limits on the amounts of pollutants that transportation related sources emit. These maximum emissions limits on transportation related sources are known as "budgets". A transportation conformity budget test consists of a comparison between regional emissions estimates that include the impacts associated with planned transportation projects to the established budget. If the budget is not exceeded by the emissions estimate, then conformity has been demonstrated.

This document contains the information and analyses necessary for the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) to make a transportation conformity finding for the FY2008-2012 Northern Ada County Transportation Improvement Program Amendment (TIP).

SUMMARY

EPA's MOBILE6.2 emissions model and COMPASS' most current and approved travel demand model were used to estimate pollutant emissions from the transportation system outlined in the Northern Ada County FY2008-2012 Transportation Improvement Program Amendment (TIP) and the *Communities in Motion Amendment*. A TIP is a short-range (5-year) capital improvement document for the transportation system in a given urbanized area. The Northern Ada County Interagency Consultation Committee on Transportation Conformity (ICC) approved the modeling methodologies and assumptions used in the regional emissions analyses including the applicable transportation model networks. Growth and demographic assumptions from *Communities in Motion*, the region's long range transportation plan, are used in this demonstration.

The City of Meridian requested that a widening project on Eagle Road (SH 55) be added to *Communities in Motion* and the FY2008-2012 TIP. This amendment was approved by the COMPASS Board under Resolution 02-2008 on November 19, 2007. The project will add a third through lane in each direction from I-84 to ½ mile north of Fairview Avenue—approximately two miles in length. This amendment is needed since Eagle Road is a regionally significant facility, meeting the criteria for principal arterial status. The Eagle Road widening project also triggers the need to re-demonstrate air quality conformity.

The Northern Ada County PM_{10} SIP Maintenance Plan and Redesignation Request contain motor vehicle emissions budgets for three pollutants: coarse particulate matter (PM_{10}), oxides of nitrogen (NO_X), and volatile organic compounds (VOCs). Emissions budget tests, as required by 40CFR93.118, demonstrate conformity of the Northern Ada County FY2008-2012 TIP Amendment through the year 2030.

The *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area* [Carbon Monoxide (CO) Limited Maintenance Plan] does not contain any motor vehicle emissions budgets. This is because, per the Environmental Protection Agency (EPA), areas under a "limited maintenance plan" are not required to conduct regional emissions analyses to demonstrate conformity. However, COMPASS conducts a CO emissions analysis as requested by the Idaho Department of Environmental Quality (IDEQ) to aid in regional air quality planning. COMPASS is committed to working through the ICC to identify and implement mitigation measures that will counteract CO emissions increases resulting from anticipated improvements to the regional transportation system should they be requested by IDEQ.

I. INTRODUCTION

Community Planning Association

The Community Planning Association of Southwest Idaho (COMPASS) is an association of governments in Ada and Canyon Counties, Idaho. It provides transportation planning and a host of other planning and community services to its member agencies and the general public. Since 1977, COMPASS, formerly known as Ada Planning Association, has been designated as the Metropolitan Planning Organization (MPO) for Northern Ada County. In April of 2003, COMPASS was designated as the MPO for the Nampa Urbanized Area, l ocated in neighboring Canyon County. The agency's service area covers the cities of Boise, Caldwell, Eagle, Garden City, Kuna, Meridian, Middleton, Nampa, and Star.

Area's Designations

Coarse Particulate Matter (PM_{10})

Northern Ada County is designated as a maintenance area in attainment of the 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS) and an attainment area for the annual PM_{10} standard. Appendix A shows the extents of the maintenance area boundaries. The last non-agricultural based exceedance of the 24-hour PM_{10} NAAQS occurred in 1991. Prior to March 12, 1999, Northern Ada County was designated as a nonattainment area for PM_{10}. However, on that date the EPA Administrator signed a revocation of Northern Ada County's nonattainment designation based on changes made to the PM_{10} NAAQS. This ruling was challenged in the Ninth District Circuit Court. On January 31, 2001, the U.S. Department of Justice approved a settlement agreement for the Idaho Clean Air Force et al. v. EPA et al. lawsuit. A major component of the settlement agreement required the Idaho Department of Environmental Quality (IDEQ) to update Northern Ada County's PM_{10} State Implementation Plan (SIP). In September of 2003, the EPA approved the *Northern Ada County PM_{10} SIP Maintenance Plan and Redesignation Request*.

Commonly, past exceedances of the 24-hour PM_{10} NAAQS in Northern Ada County occur during sever wintertime air stagnation events. These events, known as atmospheric inversions, are caused when cold, stagnant air is held close to the valley floor by warmer air aloft. During these events, particulates form in the atmosphere out of such gaseous pollutants as NO_x and VOC. Thus, both NO_x and VOC are considered precursors of PM_{10}. As a result, the PM_{10} maintenance plan contains approved PM_{10}, NO_x, and VOC motor vehicle emissions budgets.

Carbon Monoxide (CO)

Additionally, Northern Ada County is designated as a maintenance area in attainment of the carbon monoxide (CO) NAAQS. This area has not experienced a violation of the CO NAAQS since 1987. The IDEQ submitted the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area* to EPA in December 2001. EPA approved the Limited Maintenance Plan and subsequently redesignated the area in December 2002. Maintenance areas under a limited maintenance plan are not required to demonstrate their transportation programs or long-range transportation plans conform through a regional emissions analysis. Therefore, there are no applicable CO motor vehicle emissions budgets established for Northern Ada County.

Rules

As described previously, the *Northern Ada County PM_{10} SIP Maintenance Plan and Redesignation Request* (PM_{10} Maintenance Plan) establishes motor vehicle emissions budgets for PM_{10}, NO_x and VOC. Therefore, to satisfy transportation conformity requirements established by 40CFR93.118, budget tests must be performed for the Northern Ada County FY2008-2012 TIP Amendment. Budget tests are satisfied when regional emissions estimates based on the transportation systems outlined in a TIP or transportation plan are less than or equal to "budgets" established by SIPs and/or air quality maintenance plans.

EPA guidance related to "limited maintenance plans" eliminates this requirement with regard to CO for Northern Ada County's conformity demonstrations:

> *"…in areas with approved limited maintenance plans, Federal actions requiring conformity determinations under the transportation conformity rule could be considered to satisfy the budget test required in section 93.118, 93.119, and 93.120 of the rule." 1*

Therefore CO motor vehicle emissions budget tests are not federally required for Northern Ada County. However, IDEQ requires COMPASS conduct a build/no build analysis of its programs and long-range plans in order to facilitate good air quality planning. If the results of this analysis show an unacceptable increase in CO emissions, IDEQ may choose to require

[1] Page 42 of the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area*

mitigation measures.

Interagency Consultation

Idaho Administrative Code (IDAPA 58.01.01.567) requires nonattainment and maintenance areas establish an interagency consultation committee on transportation conformity. The Northern Ada County Interagency Consultation Committee (ICC) approved the assumptions and methodologies employed in the development of the regional emissions analysis in this demonstration on April 11, 2007. The approved assumptions and methodologies are listed in Appendices D and E. The amendment to the roadway project list was approved by the ICC on September 27, 2007. A complete listing of the ICC requirements can be found in Idaho Administrative Code (IDAPA 58.01.01.563-574).

Budget Test

A budget test is a comparison of emissions estimates to an established limit (or budget) for motor vehicles. As per 40CFR93.118(b), budget tests must be preformed for:

> "...each year for which the applicable ... implementation plan specifically establishes motor vehicle emissions budget(s), for the last year of the transportation plan's forecast period, and for any intermediate years as necessary so that the years for which consistency is demonstrated are no more than ten years apart..."

The Northern Ada County PM_{10} Maintenance Plan established motor vehicle emissions budgets for the years 1999, 2010, and 2015. Thus, budget tests were preformed for:

- 2008 - Base year of the FY2008-2012 TIP Amendment
- 2010 - Budget year
- 2012 - Last year of the TIP Amendment
- 2015 - Budget year
- 2025 - Intermediate analysis year, as there can be no more than 10 years between analysis years
- 2030 - Long range plan (*Communities in Motion*) horizon year

Regionally Significant Projects

Regional emissions analyses, for the purposes of demonstrating transportation conformity of a TIP or long-range plan, must include all regionally significant and/or federally funded projects in the nonattainment or maintenance area.

40CFR93.101 defines a regionally significant project as:

> *"... a transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals as well as most terminals themselves) and would normally be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel."*

The State of Idaho Administrative Code (IDAPA 58.01.01.566) further defines a regionally significant project as:

> "A transportation project, other than an exempt project, that is on a facility which serves regional transportation needs... and would normally be included in the modeling of a metropolitan area's transportation network, including, at a minimum:
>
> a. All principal arterial highways;
> b. All fixed guideway transit facilities that offer an alternative to regional highway travel; and
> c. Any other facilities determined to be regionally significant through Section 570, interagency consultation."

Regionally Significant Roadway Project Definition
On January 30, 2002, the ICC developed the following definition of a "Regionally Significant" project:

"A transportation project in Ada County, Idaho is designated 'Regionally Significant' if:

(a) the project is for the improvement of either:
  (i) a principal arterial or higher functional classification; or
  (ii) a minor arterial which will have a twenty (20) year projected traffic volume of at least 45,000 vehicles a day after completion of the project; and

(b) the project will add at least one new continuous vehicular lane which either:
  (i) extends from one intersecting principal or minor arterial to another intersecting principal or minor arterial; or
  (ii) in the case of an interstate, extends from the on ramp of one interstate interchange to a point beyond the off ramp of the next adjacent interstate interchange.

Despite these definitions, the ICC maintains discretionary authority in interpreting and applying them to the area's transportation programs, plans, and projects. For the purposes of this conformity determination, all applicable roadway projects, despite their significance, were included in the travel demand model networks.

Regionally Significant Transit Project Definition
On August 31, 2005, the Northern Ada County Interagency Consultation Committee on Air Quality Conformity adopted the following definition of a "Regionally Significant" transit project:

"A transit project in Ada County, Idaho is designated 'Regionally Significant' if the transit project:

(a) Has the potential to change the vehicle demand of an existing roadway classified as a principal arterial or higher by 400 vehicles per hour, or 4,000 vehicles per weekday; and

(b) Is a transit service or facility that provides services to (or connects) at a minimum:
  (i) Two counties and;
  (ii) Three incorporated cities;

Exempt Projects:
Pursuant to 40CFR93.126 (Exempt Projects), certain projects listed in a long-range transportation plan or TIP may proceed even in the absence of a conformity finding/demonstration. Exempt projects include highway safety or mass transit projects, landscaping projects, roadway rehabilitation and repair, transportation enhancement projects, and transportation planning activities that do not lead directly to construction. However, the exempt projects listed in 40CFR93.126 are not considered exempt if the ICC concludes that they may have an adverse impact on air quality.

In addition, 40CFR93.127 (Projects Exempt from Regional Emissions Analyses) considers projects, such as intersection signalization, changes in alignment, bus terminals, and transit transfer points, exempt from regional emissions analyses. However, these projects must demonstrate project-level conformity. As with the types of exempt projects listed in 40CFR93.126, the projects listed in 40CFR93.127 may not be considered exempted if the ICC concludes them to have an adverse impact on air quality.

Transportation Control Measures
As per 40CFR93.113(c), in order for a TIP or long range transportation plan to be conforming, it cannot interfere with the implementation of any transportation control measures (TCMs). There are no TCMs requiring implementation in either the *Northern Ada County PM_{10} SIP Maintenance Plan and Redesignation Request* or *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area*. Therefore, the Northern Ada County FY2008-2012 TIP Amendment meets the requirements of 40CFR93.113(c).

II. EMISSIONS ESTIMATION

Emissions Analysis Assumptions and Tools

This air quality conformity demonstration is based upon estimates of vehicle miles of travel (VMT) produced using COMPASS' travel demand model. Emissions factors are generated using the latest version of EPA's on-road emissions model (MOBILE 6.2). A regional emission analysis was conducted as described below.

COMPASS' Travel Demand Model

The travel demand model provides estimates of average weekday travel demand for each link of a given transportation network based on current and future demographic/growth assumptions. In addition to travel demand, the model produces daily VMT forecasts; congested network speeds, and other data relevant to regional emissions analyses. COMPASS utilizes Citilab's Cube Voyager software to run the regional model. COMPASS' travel demand model is regularly maintained and updated to include all completed roadway projects. Future-year model networks include anticipated widening and new roadway projects, regardless of significance or exemption status. Transportation network components include interstates, principal arterials, minor arterials, most collectors, and select local roads in Ada and Canyon Counties. For emissions analysis purposes only, future expressways are categorized as arterials or interstates, based on the amount of access anticipated. The ICC approves the used of the future-year model networks for inclusion in the regional emissions analyses.

COMPASS' travel demand modeling activities are performed under the review of the Transportation Model Advisory Committee (TMAC), a technical committee formed by the COMPASS Board of Directors. TMAC is made up of local experts, technical staff from COMPASS' member agencies, and local traffic engineers from both the public and private sectors. Along with COMPASS staff, TMAC works to periodically calibrate and validate the travel demand model to reflect the actual travel patterns and behaviors in the Treasure Valley. COMPASS' current travel demand model is calibrated and validated to 2002 conditions. Appendix C provides more information on COMPASS' travel demand model.

Demographic Data

The COMPASS Board adopts the official population and employment projections for the Treasure Valley based on a preferred growth scenario. COMPASS' Demographic Advisory Committee (DAC) is composed of demographers, developers, and representatives from local industries and governments. DAC develops the population and employment projections used by the travel demand model to generate ADT and VMT forecasts.

Demographic data for *Communities in Motion* were developed based on a COMPASS Board approved growth scenario. The scenario, "Community Choices" combines modest land use intensification/densification along transportation corridors with additional employment and population growth in outlying communities. Less suburban residential development is anticipated in this growth scenario. With more infill development (and thus increased densities) along existing transportation corridors, this scenario consumes less land by 2030 than the current development trend.

Data for the interim analysis years of 2010, 2015, and 2025 were developed using a 2005 base year estimate and the 2030 "Community Choices" growth scenario as endpoints. Professional judgment was then used to estimate and allocate the interim year growth to traffic analysis zones (TAZs). The DAC approved these interim year forecast and TAZ allocations on January 26, 2006. Forecasts for the years of 2008 and 2012 were interpolated from 2005 and 2030.

Roadway Network Assumptions

The projects used in the regional emissions analysis for the Northern Ada County FY2008-2012 TIP Amendment are derived from:

- The FY2008-2012 Northern Ada County TIP Amendment
- Ada County Highway District's (ACHD's) FY2006 Capital Improvement Plan (CIP) (FY2006-2027)
- ACHD's Five-Year Work Plan (FYWP) (FY2008-2012)
- *Communities in Motion* (CIM), the region's long range transportation plan
- Idaho Transportation Department's (ITD's) State Transportation Improvement Program (STIP) (FY2007-2011).

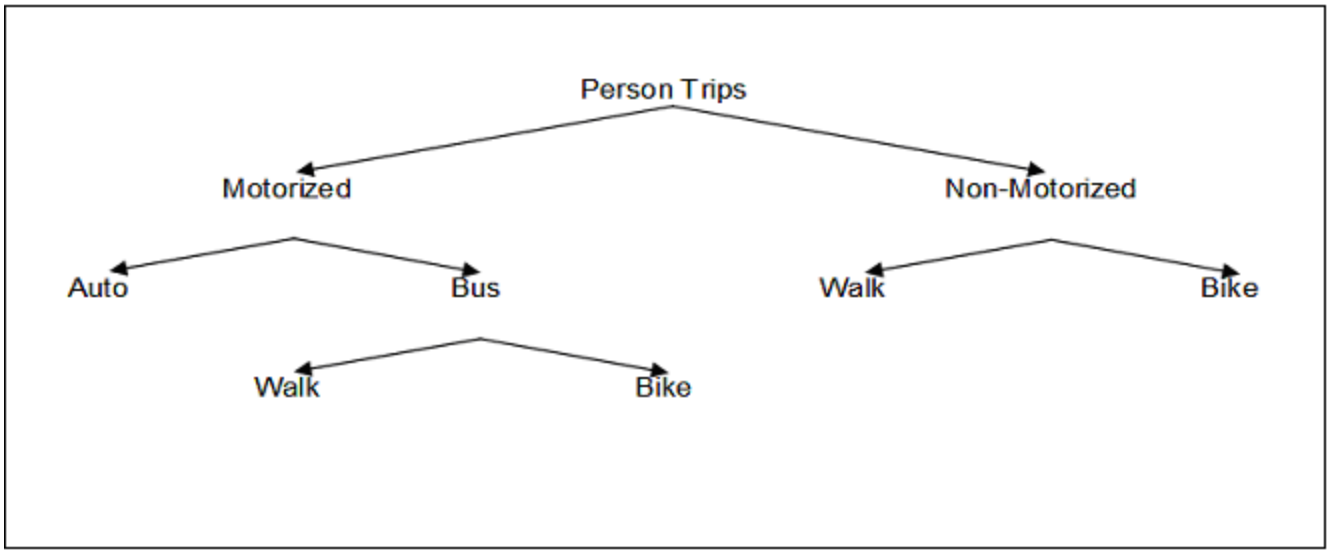
Roadway projects were placed into analysis (or budget) year networks based information contained in the above sources. In the event a project was given a construction date in multiple documents, the earliest date was assigned as given by the FYWP, followed by the TIP, STIP, CIP, and CIM. Most unfunded (UF) or preliminary development (PD) projects were treated as if they had an implied 2030 construction date attached.

Transit Service Assumptions

Regional impacts from access to the area's transit system were included in the emissions analysis. This was done within COMPASS' travel demand model using a "mode choice" model. A "mode choice" model is the third step in a traditional 4-

step travel demand model, such as the one maintained by COMPASS. It takes estimates of person trips and tries to predict the mode of travel the trip will use. Figure 1 shows the motorized modes available to the travel demand model for assignment. Transit trips are assigned to a transit network input into the travel demand model. Non-motorized trips are not assigned to a network.

Figure 1: COMPASS Model Travel Modes



Currently, no major system expansion is planned for the region's transit system in either the Northern Ada County FY2008-2012 TIP Amendment or CIM. Therefore, only the transit system as it exists today is included in the analysis through 2030. The current system includes:

- 15 routes and approximately 688 stops with headways between 30-60 minutes in the Boise/Garden City service area.
- Four Nampa and Caldwell routes with headways varying between 30 and 60 minutes.
- Three inter-county routes (between Ada and Canyon Counties) with 30-60 minute headways during the am/pm peak periods and 2-3 hour headways during off peak periods.

Communities in Motion's Chapter 3 contains more general information on the region's current transit system. For more specific info on the routes and schedules used to model the transit system, visit Valley Regional Transit's website: http://www.valleyride.org/BUSSERVICES/tabid/116/Default.aspx

Emissions Modeling

COMPASS uses EPA's MOBILE emissions model to estimate the air quality impacts associated with current and future roadway networks. MOBILE (version 6.2) is the most current emissions model approved by the EPA. The MOBILE model uses data input about the area's climate, elevation and vehicle emissions testing program(s) along with information on roadway network speeds to develop emission factors for specified air pollutants. These emission factors are applied to VMT forecasts from the travel demand model to develop motor vehicle emission estimates for regional emissions analyses. Most of the methodologies and assumptions used in this demonstration are consistent with those used for the PM_{10} Maintenance Plan Emissions Inventory. Thus, average weekday VMT were used to estimate PM_{10} emissions and average daily VMT (i.e., average VMT of weekday and weekend traffic volumes) were used to estimate CO, NO_x, and VOC emissions. Appendix D lists the MOBILE6.2 modeling assumption approved by ICC for use in this demonstration. Appendices F through J list the MOBILE6.2 model input and output files used to conduct the regional emissions analyses.

Specific emissions factors were developed to estimate the Canyon County vehicle contribution to Ada County's VMT. Emission factors for Canyon County vehicles are different than those for Ada County because of Ada's vehicle inspection and maintenance program. According to COMPASS' 2002 Household Travel Survey[2], 32.2% of Canyon County residents commute into Ada County for work. In order to accurately represent and forecast the emissions of the vehicle fleet that drives on Ada County roadways, total emissions were increased to account for the Canyon County vehicles. Appendix E demonstrates how this was accomplished.

Road Dust

[2] *2002 Treasure Valley Transportation Survey, Final Report*, February 2003. Compass Report #2003-2, Page 16, Figure 2.

Paved road dust makes up the vast majority of PM_{10} emissions from on-road transportation sources. Emissions factors for both paved road and unpaved road dust were calculated using the methodology developed in the *Treasure Valley Road Dust Study: Final Report*[3]. This methodology uses the roadway's setting (i.e., urban vs. rural), speed, and the time of year to develop an emissions factor. Emissions were calculated for each roadway link in COMPASS' travel demand model network. Appendix D demonstrates how the road dust emissions factors were calculated.

Particulate Matter (PM_{10}), Oxides of Nitrogen (NO_x), and Volatile Organic Compounds (VOC)

2008 Baseline Scenario

The baseline scenario uses 2008 population and employment estimates with the anticipated 2008 roadway network (the currently built roadway network and those applicable roadway projects expected to be open to the motoring public by December 31, 2008). The 2008 demographics were interpolated from the 2005 estimates used in *Communities in Motion*. The 2005 estimates were developed from census data, building permit data, preliminary plat data for both counties, and 2005 employment estimates. Table 1 provides a list of applicable roadway projects used in the 2008 baseline model network to estimate PM_{10}, NO_x, and VOC emissions. *Note: The numbers in the "No." column are for reference only.*

Table 1: Projects in 2008 Baseline Scenario

No.	Project	Location	Number of Lanes	Regionally Significant?	Federal Aid?	Exempt?	Key No.*
1.	Deer Flat Rd	Ten Mile Rd - SH 69	3	No	No	Yes - Safety (40CFR93.126)	RD125
2.	Eagle Rd	Victory Rd - Ridenbaugh Canal	5	Yes - Principal Arterial	No	No	RD203-07
3.	Eagle Rd Interchange Ramp	Extend the I-84 westbound off-ramp	N.A.	No	Yes - GARVEE	No	9980
4.	Floating Feather Rd	Eagle Rd - Edgewood Dr	3	No	No	Yes - Safety (40CFR93.126)	RD257
5.	I-84	Garrity IC - Meridian IC	6	Yes - Interstate	Yes - GARVEE	No	9815
6.	Maple Grove Rd	Franklin Rd - Fairview Ave	5	No	Yes	No	
7.	Maple Grove Rd	Fairview Ave - Goddard St	3	No	Yes	Yes - Safety (40CFR93.126)	RD222-01
8.	Overland Rd	Linder Rd - Meridian Rd	5	Yes*	No	No	RD290
9.	Ten Mile Rd	Franklin Rd - Cherry Ln	5	No	No	No	RD309
10.	Ustick Rd	Five Mile Rd - Cole Rd	5	No	No	No	RD222
11.	US 20/26	Cloverdale Rd - HP Main Entrance	5	Yes	Yes	No	7148

*Key No: ITD Key Numbers are from the Transportation Improvement Program and the STIP and are strictly numeric (i.e., 6299). ACHD GIS Numbers are alphanumeric identification numbers (i.e., RD169).

Table 2 shows the estimated VMT and PM_{10} emissions from the 2008 baseline scenario. Emissions estimates were developed using emissions factors from MOBILE6.2 and the *Treasure Valley Road Dust Study: Final Report*. The MOBILE6.2 input and output files for the 2008 scenario are listed in Appendix F.

Table 2: 2008 Paved Road PM_{10} Estimated Emissions

Road Type	Paved Average Weekday VMT	Paved Road Dust Emissions	Tailpipe, Tire, and Brakewear Emissions	Total Paved Road PM_{10} Emitted
	[VMT/day]	*[Tons/day]*	*[Tons/day]*	*[Tons/day]*

[3] Etyemezian et. all, Desert Research Institute; February 15, 2002

Interstate	2,225,705	15.00	0.12	15.12
Ramps	110,845	1.00	0.01	1.01
Principal Arterial	3,209,115	26.45	0.17	26.62
Minor Arterial	1,816,000	15.53	0.10	15.63
Collector	415,509	4.00	0.02	4.02
Local	14,791	0.24	0.00	0.24
Centroid Connectors	649,997	5.58	0.03	5.61
Totals	8,441,963	67.80	0.45	68.25

Table 3 shows the 2008 average daily VMT and VOC emissions estimates developed using MOBILE6.2 generated emissions factors. VOC emissions factors were adjusted so that refueling emissions are not included in the estimated emissions. This seems consistent with the methodology used to establish the VOC emissions budgets. Estimates of NOx emissions are given in Table 4.

Table 3: 2008 VOC Estimated Emissions

Road Type	Average Daily VMT	Ada County Vehicle VOC Emissions Factor	Canyon County Vehicle VOC Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	Estimated VOC Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	2,003,135	0.69	0.82	7.37	1.55
Ramps	99,761	1.00	1.19		0.11
Principal Arterials	2,888,204	1.08	1.29		3.50
Minor Arterials	1,634,400	1.05	1.24		1.92
Collectors	373,958	0.78	0.92		0.32
Local	13,312	0.83	0.98		0.01
Centroid Connectors	584,997	0.64	0.76		0.42
Totals	7,597,767	NA	NA	7.37	7.84

[1] A conversion factor of 907,184.74 grams per ton was used.

[2] Refer to Appendix E for specific estimation methodologies.

Table 4: 2008 NO_x Estimated Emissions					
Road Type	Average Daily VMT	Ada County Vehicle NO_x Emissions Factor	Canyon County Vehicle NO_x Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	NO_x Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	2,003,135	1.72	1.86		3.82
Ramps	99,761	1.48	1.63		0.16
Principal Arterials	2,888,204	1.41	1.54		4.51
Minor Arterials	1,634,400	1.39	1.53	7.37	2.53
Collectors	373,958	1.40	1.54		0.58
Local	13,312	1.22	1.33		0.02
Centroid Connectors	584,997	1.66	1.81		1.08
Totals	7,597,767	NA	NA	7.37	12.70

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] Refer to Appendix E for specific estimation methodologies.

2010 Scenario

The 2010 scenario uses 2010 population and employment estimates with the 2008 roadway network and the projects given in Table 5 *(Note: The numbers in the "No." column are for reference only).* 2010 demographic projections and allocation to TAZs represents the "Community Choices" growth scenario in *Communities in Motion* endorsed by the COMPASS Board on December 19, 2005. COMPASS' DAC approved the 2010 demographic forecasts and allocations on January 26, 2006.

Table 5: Projects Added to the 2008 Network for the 2010 Scenario							
No.	Project	Location	Number of Lanes	Regionally Significant?	Federal Aid?	Exempt?	Key No.*
12.	36th St	Hill Rd - Cartwright Rd	3	No	No	Yes - Safety (40CFR93.126)	RD307
13.	Eagle Rd	I-84 – ½ mile north of Fairview	7	Yes	No	No	
14.	Franklin Rd	Eagle Rd - Five Mile Rd	5	Yes - Principal Arterial	Yes	No	RD282/ 8698
15.	Hill Rd Extension	State St - Horseshoe Bend Rd	3	No	No	No	RD308
16.	I-84	Cole IC - Vista IC	6	Yes - Interstate	Yes - GARVEE	No	9819
17.	Meridian Rd & Main St (Ph 1 of split corridor)	I-84 - Franklin	5	Yes*	No	No	RD205-06
18.	Orchard IC	Reconstruct - add new ramps and lanes	NA	Yes - Interstate	Yes - GARVEE	Yes - (40CFR93.127)	9817
19.	ParkCenter East Bridge	ParkCenter Blvd - Warm Springs Ave	4	Yes - Principal Arterial	No	No	MA203-02
20.	Ten Mile Rd	Cherry Ln - Ustick Rd	5	No	No	No	RD188

*Key No: ITD Key Numbers are from the Transportation Improvement Program and the STIP and are strictly numeric (i.e., 6299). ACHD GIS Numbers are alphanumeric identification numbers (i.e., RD169).

Table 6 shows estimated weekday VMT and PM_{10} emissions from the 2010 scenario. Emissions estimates were developed using emissions factors from MOBILE6.2 and the *Treasure Valley Road Dust Study: Final Report*. The MOBILE6.2 input and output files for 2010 are listed in Appendix G. Table 7 and Table 8 display the VOC and NO_x emissions estimates respectively. VOC emissions factors were adjusted so that refueling emissions are not included in the estimated emissions. This seems consistent with the methodology used to establish the VOC emissions budgets.

Table 6: 2010 Paved Road PM_{10} Estimated Emissions				
Road Type	Paved Average Weekday VMT	Paved Road Dust Emissions	Tailpipe, Tire, and Brakewear Emissions	Total Paved Road PM_{10} Emitted
	[VMT/day]	*[Tons/day]*	*[Tons/day]*	*[Tons/day]*
Interstate	2,343,773	15.80	0.11	15.91
Ramps	116,558	1.05	0.01	1.06
Principal Arterial	3,250,094	26.76	0.15	26.91
Minor Arterial	2,105,545	17.84	0.10	17.94
Collector	443,519	4.21	0.02	4.23
Local	18,222	0.31	0.00	0.31
Centroid Connectors	683,694	5.86	0.03	5.89
Totals	8,961,406	71.83	0.43	72.26

Table 7: 2010 VOC Estimated Emissions					
Road Type	Average Daily VMT	Ada County Vehicle VOC Emissions Factor	Canyon County Vehicle VOC Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	Estimated VOC Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	2,109,396	0.55	0.66		1.30
Ramps	104,903	0.65	0.79		0.08
Principal Arterials	2,925,085	0.59	0.71		1.92
Minor Arterials	1,894,991	0.59	0.72	7.45	1.26
Collectors	399,167	0.63	0.77		0.28
Local	16,400	0.62	0.75		0.01
Centroid Connectors	615,324	0.84	1.02		0.58
Totals	8,065,266	NA	NA	7.45	5.43

[1] A conversion factor of 907,184.74 grams per ton was used.

[2] Refer to Appendix E for specific estimation methodologies.

Table 8: 2010 NO_x Estimated Emissions					
Road Type	Average Daily VMT	Ada County Vehicle NO_x Emissions Factor	Canyon County Vehicle NO_x Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	NO_x Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	2,109,396	1.38	1.52	7.45	3.22
Ramps	104,903	1.19	1.35		0.14
Principal Arterials	2,925,085	1.13	1.28		3.69
Minor Arterials	1,894,991	1.12	1.26		2.37
Collectors	399,167	1.13	1.27		0.50
Local	16,400	0.99	1.11		0.02
Centroid Connectors	615,324	1.34	1.50		0.92
Totals	8,065,266	NA	NA	7.45	10.85

[1] A conversion factor of 907,184.74 grams per ton was used.

[2] Refer to Appendix E for specific estimation methodologies.

2012 Scenario

The 2012 scenario uses 2012 population and employment estimates with the 2010 roadway network and the projects given in Table 9 *(Note: The numbers in the "No." column are for reference only).* Demographic forecasts for 2010 were interpolated from the 2010 estimates used in *Communities in Motion*. COMPASS' DAC approved the 2010 demographic forecasts and allocations on January 26, 2006.

Table 9: Projects Added to the 2010 Network for the 2012 Scenario							
No.	Project	Location	Number of Lanes	Regionally Significant?	Federal Aid?	Exempt?	Key No.*
21.	Cloverdale Rd	Fairview Ave - Ustick Rd	5	No	No	No	RD202-09
22.	Fairview Ave	Cloverdale Rd - Five Mile Rd	7	Yes - Principal Arterial	No	No	RD202-14
23.	Fairview Ave	Five Mile Rd - Maple Grove Rd	7	Yes - Principal Arterial	No	No	RC0087
24.	Franklin Rd	Ten Mile Rd - Linder Rd	5	Yes*	Yes	No	RC0127
25.	Five Mile Rd	Franklin Rd - Fairview Ave	5	No	Yes	No	RC0131
26.	I-84	Garrity IC - Meridian IC	8	Yes - Interstate	Yes	No	RC0165/ 9504
27.	I-84	Cole / Overland IC - Broadway IC	8	Yes - Interstate	Yes	No	F038/ 7238
28.	Meridian Rd & Main St (Ph 2 of split corridor)	Franklin - Fairview Ave	5	Yes*	TBD	No	
29.	SH 16 River Crossing	Connect SH 16 from SH 44 to US 20/26	4	Yes - Principal Arterial	Yes - GARVEE	No	
30.	Ten Mile Rd IC	New Interchange at I-84 and Ten Mile Rd	NA	Yes - Interstate	Yes - GARVEE	No	RD205-07
31.	Vista IC	Reconstruct - add new ramps and lanes	NA	Yes - Interstate	Yes - GARVEE	Yes - (40CFR93.127)	
32.	Cloverdale Rd	Fairview Ave - Ustick Rd	5	No	No	No	9815
33.	Fairview Ave	Cloverdale Rd - Five Mile Rd	7	Yes - Principal Arterial	No	No	9818

*Key No: ITD Key Numbers are from the Transportation Improvement Program and the STIP and are strictly numeric (i.e., 6299). ACHD GIS Numbers are alphanumeric identification numbers (i.e., RD169).

Table 10 shows estimated weekday VMT and PM_{10} emissions from the 2012 scenario. Emissions estimates were developed using emissions factors from MOBILE6.2 and the *Treasure Valley Road Dust Study: Final Report*. The MOBILE6.2 input and output files for 2012 are listed in Appendix H. Table 11 and Table 12 display the VOC and NO_x emissions estimates respectively. VOC emissions factors were adjusted so that refueling emissions are not included in the estimated emissions. This seems consistent with the methodology used to establish the VOC emissions budgets.

Table 10: Table II-10: 2012 Paved Road PM_{10} Estimated Emissions

Road Type	Paved Average Weekday VMT	Paved Road Dust Emissions	Tailpipe, Tire, and Brakewear Emissions	Total Paved Road PM_{10} Emitted
	[VMT/day]	*[Tons/day]*	*[Tons/day]*	*[Tons/day]*
Interstate	2,644,016	17.76	0.11	17.87
Ramps	127,454	1.15	0.01	1.16
Principal Arterial	3,540,122	28.96	0.14	29.10
Minor Arterial	2,291,440	19.29	0.09	19.38
Collector	474,885	4.48	0.02	4.50
Local	20,221	0.34	0.00	0.34
Centroid Connectors	738,080	6.30	0.03	6.33
Totals	9,836,217	78.28	0.40	78.68

Table 11: 2012 VOC Estimated Emissions

Road Type	Average Daily VMT	Ada County Vehicle VOC Emissions Factor	Canyon County Vehicle VOC Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	Estimated VOC Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	2,379,614	0.46	0.57		1.24
Ramps	114,708	0.54	0.67		0.07
Principal Arterials	3,186,110	0.49	0.61		1.76
Minor Arterials	2,062,296	0.50	0.62	7.55	1.15
Collectors	427,396	0.52	0.65		0.25
Local	18,199	0.52	0.64		0.01
Centroid Connectors	664,272	0.70	0.87		0.52
Totals	8,852,595	NA	NA	7.55	5.00

[1] A conversion factor of 907,184.74 grams per ton was used.

[2] Refer to Appendix E for specific estimation methodologies.

Table 12: 2012 NOx Estimated Emissions					
Road Type	Average Daily VMT	Ada County Vehicle NOx Emissions Factor	Canyon County Vehicle NOx Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	NOx Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	2,379,614	1.06	1.21	7.55	2.82
Ramps	114,708	0.93	1.10		0.12
Principal Arterials	3,186,110	0.88	1.03		3.15
Minor Arterials	2,062,296	0.88	1.03		2.02
Collectors	427,396	0.88	1.03		0.42
Local	18,199	0.77	0.90		0.02
Centroid Connectors	664,272	1.04	1.21		0.77
Totals	8,852,595	NA	NA	7.55	9.32

[1] A conversion factor of 907,184.74 grams per ton was used.

[2] Refer to Appendix E for specific estimation methodologies.

2015 Scenario

The 2015 scenario uses 2015 population and employment estimates with the 2012 roadway network and the projects given in Table 13 *(Note: The numbers in the "No." column are for reference only)*. 2015 demographic projections and allocation to TAZs represents the "Community Choices" growth scenario in *Communities in Motion* endorsed by the COMPASS Board on December 19, 2005. COMPASS' DAC approved the 2015 demographic forecasts and allocations on January 26, 2006.

Table 13: Projects Added to the 2012 Network for the 2015 Scenario							
No.	Project	Location	Number of Lanes	Regionally Significant?	Federal Aid? **	Exempt?	Key No.*
34.	Cloverdale Rd	Columbia Rd - Franklin Rd	5	No	TBD	No	No
35.	Cloverdale Rd	Ustick Rd - US 20/26	5	No	TBD	No	No
36.	Cole Rd	Lake Hazel Rd - Victory Rd	5	Yes - Principal Arterial	TBD	No	Yes - Principal Arterial
37.	Cole Rd	I-84 WB ramps - Franklin Rd	5	Yes - Principal Arterial	TBD	No	Yes - Principal Arterial
38.	Fairview Ave	Maple Grove Rd - Cole Rd	7	Yes – Principal Arterial	No	No	Yes – Principal Arterial
39.	Five Mile Rd	Fairview Ave - Ustick Rd	5	No	No	No	No
40.	Franklin Rd	Black Cat Rd - Ten Mile Rd	5	Yes*	Yes	No	Yes*
41.	Glenwood St / Cole Rd couplet	Two way couplet - Mountain View Dr	3	Yes - Principal Arterial	TBD	No	Yes - Principal Arterial
42.	Linder Rd	Victory Rd - Overland Rd	5	No	TBD	Yes - Safety (40CFR93.126)	No
43.	Linder Rd	Cherry Ln - Ustick Rd	5	No	No	No	No
44.	Linder Rd	Ustick Rd - State St (4 lane bridge)	5	No	TBD	No	No
45.	Maple Grove Rd	Lake Hazel - Overland Rd	5	No	TBD	Yes - Safety (40CFR93.126)	No
46.	McMillan Rd	Locust Grove Rd - Eagle Rd	5	No	TBD	No	No
47.	Orchard St	Gowen Rd - I-84 EB on ramp	5	Yes - Principal Arterial	TBD	No	Yes - Principal Arterial

Table 13: Projects Added to the 2012 Network for the 2015 Scenario							
No.	Project	Location	Number of Lanes	Regionally Significant?	Federal Aid? **	Exempt?	Key No.*
48.	Overland Rd	Ten Mile Rd - Linder Rd	5	Yes - Principal Arterial	TBD	No	Yes - Principal Arterial
49.	Pine St – new	Locust Grove Rd - Eagle Rd (Developer Funded)	5	No	TBD	No	No
50.	Pine St	Eagle Rd - Colverdale Rd	5	No	TBD	No	No
51.	Ten Mile Rd	Victory Rd - Franklin Rd	5	Yes - Principal Arterial	TBD	No	Yes - Principal Arterial
52.	Ten Mile Rd	Ustick Rd - Chinden Blvd	5	No	TBD	No	No
53.	Ustick Rd	Meridian Rd - Eagle Rd	5	Yes*	TBD	No	Yes*
54.	Ustick Rd	Eagle Rd - Cloverdale Rd	5	No	TBD	No	No
55.	Ustick Rd	Cloverdale Rd - Five Mile Rd	5	No	No	No	No
56.	Ustick Rd	Cole Rd - Curtis Rd	5	No	TBD	No	No

*Key No: ITD Key Numbers are from the Transportation Improvement Program and the STIP and are strictly numeric (i.e., 6299).ACHD GIS Numbers are alphanumeric identification numbers (i.e., RD169). Blanks indicate an ITD Key or ACHD GIS number has yet to be assigned.

** The fiscal constraints of a long-range plan are more flexible than those of a TIP. Therefore, TBD means To Be Determined, as a specific funding source (or sources) has not been identified.

Table 14 shows estimated weekday VMT and PM_{10} emissions for the 2015 scenario. Emissions estimates were developed using emissions factors from MOBILE 6.2 and the *Treasure Valley Road Dust Study: Final Report*. The MOBILE 6.2 input and output files for 2015 are listed in the Appendix I. Table 15 and Table 16 display the VOC and NO_x emissions estimates respectively. VOC emissions factors were adjusted so that refueling emissions are not included in the estimated emissions. This seems consistent with the methodology used to establish the VOC emissions budgets.

Table 14: 2015 Paved Road PM_{10} Estimated Emissions				
Road Type	Paved Average Weekday VMT	Paved Road Dust Emissions	Tailpipe, Tire, and Brakewear Emissions	Total Paved Road PM_{10} Emitted
	[VMT/day]	*[Tons/day]*	*[Tons/day]*	*[Tons/day]*
Interstate	2,752,223	18.91	0.10	19.01
Ramps	130,036	1.17	0.00	1.17
Principal Arterial	3,955,596	33.37	0.14	33.51
Minor Arterial	2,399,263	20.99	0.08	21.07
Collector	466,902	4.50	0.02	4.52
Local	23,210	0.41	0.00	0.41
Centroid Connectors	789,982	6.72	0.03	6.75
Totals	10,517,211	86.07	0.37	86.44

Table 15: 2015 VOC Estimated Emissions					
Road Type	Average Daily VMT	Ada County Vehicle VOC Emissions Factor	Canyon County Vehicle VOC Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	Estimated VOC Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	2,477,001	0.38	0.49	7.58	1.06
Ramps	117,032	0.43	0.56		0.06
Principal Arterial	3,560,036	0.40	0.52		1.60
Minor Arterial	2,159,337	0.40	0.52		0.98
Collector	420,212	0.43	0.55		0.20
Local	20,889	0.42	0.55		0.01
Centroid Connectors	710,984	0.57	0.73		0.46
Totals	9,465,490	NA	NA	7.58	4.37

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] Refer to Appendix E for specific estimation methodologies.

Table 16: 2015 NOx Estimated Emissions					
Road Type	Average Daily VMT	Ada County Vehicle NOx Emissions Factor	Canyon County Vehicle NOx Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	NOx Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	2,477,001	0.72	0.88	7.58	2.01
Ramps	117,032	0.64	0.82		0.08
Principal Arterial	3,560,036	0.61	0.76		2.44
Minor Arterial	2,159,337	0.61	0.76		1.47
Collector	420,212	0.61	0.77		0.29
Local	20,889	0.61	0.66		0.01
Centroid Connectors	710,984	0.72	0.90		0.57
Totals	9,465,490	NA	NA	7.58	6.88

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] Refer to Appendix E for specific estimation methodologies.

2025 Scenario

The 2025 scenario uses 2025 population and employment estimates with the 2015 roadway network and the projects given in Table 17 *(Note: The numbers in the "No." column are for reference only).* 2025 demographic projections and allocation to TAZs represents the "Community Choices" growth scenario in Communities in Motion endorsed by the COMPASS Board on December 19, 2005. COMPASS' DAC approved the 2025 demographic forecasts and allocations on January 26, 2006.

Table 17: Projects Added to the 2015 network for the 2025 Scenario

No.	Project	Location	Number of Lanes	Regionally Significant?	Federal Aid?**	Exempt?	Key No.*
57.	36th St	Extend 36th St from existing to Cartwright Rd and Bogus Basin Rd	3	No	No	No	RD202-04
58.	Fairview Ave	Meridian Rd or Main St - Eagle Rd	7	Yes - Principal Arterial	TBD	No	RC0135
59.	Fairview Ave	Eagle Rd - Cloverdale Rd	7	Yes - Principal Arterial	TBD	No	RC0130
60.	Five Mile Rd	Lake Hazel Rd - Victory Rd	5	No	TBD	No	
61.	Five Mile Rd Overpass	Overland Rd - Franklin Rd	5	No*	TBD	No	
62.	Hill Rd	Castle Dr - 36th St	3	No	TBD	Yes - Safety (40CFR93.126)	
63.	Linder Rd	Overland Rd - Franklin Rd (includes overpass)	5	No	TBD	No	
64.	Linder Rd	Franklin Rd - Cherry Ln	5	No	No	No	RD077
65.	Meridian Rd IC	Improvement: cloverleaf ramp for WB I-84 - SB SH 69 (Kuna-Meridian Rd)	NA	Yes - Interstate	Yes	Yes - Safety (40CFR 93.126)	
66.	SH 16 Expressway	Ada Co. Line - I-84 (Urban ICs at Chaparral, Beacon Light, SH 44, US 20/26, and Ustick)	4	Yes - Principal Arterial	Yes	No	
67.	SH 16 IC	I-84 - Vicinity of McDermott		Yes - Interstate	Yes	No	

*Key No: ITD Key Numbers are from the Transportation Improvement Program and the STIP and are strictly numeric (i.e., 6299). ACHD GIS Numbers are alphanumeric identification numbers (i.e., RD169). Blanks indicate an ITD Key or ACHD GIS number has yet to be assigned.

** The fiscal constraints of a long-range plan are more flexible than those of a TIP. Therefore, TBD means To Be Determined, as a funding source has not been identified.

Table 18 shows estimated weekday VMT and PM_{10} emissions for the 2025 scenario. Emissions estimates were developed using MOBILE6.2 generated emissions factors and the *Treasure Valley Road Dust Study: Final Report*. The MOBILE 6.2 input and output files for 2025 are listed in the Appendix J. Table 19 and Table 20 display the VOC and NO_x emissions estimates respectively.

Table 18: 2025 Paved Road PM_{10} Estimated Emissions				
Road Type	Paved Average Weekday VMT	Paved Road Dust Emissions	Tailpipe, Tire, and Brakewear Emissions	Total Paved Road PM_{10} Emitted
	[VMT/day]	*[Tons/day]*	*[Tons/day]*	*[Tons/day]*
Interstate	3,656,817	24.69	0.11	24.80
Ramps	177,571	1.51	0.01	1.52
Principal Arterial	4,567,745	38.81	0.14	38.95
Minor Arterial	3,350,468	28.51	0.10	28.61
Collector	599,590	5.66	0.02	5.68
Local	36,385	0.69	0.00	0.69
Centroid Connectors	933,141	7.88	0.03	7.91
Totals	13,321,716	107.75	0.41	108.16

Table 19: 2025 VOC Estimated Emissions					
Road Type	Average Daily VMT	Ada County Vehicle VOC Emissions Factor	Canyon County Vehicle VOC Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	Estimated VOC Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	3,291,135	0.23	0.35		0.88
Ramps	159,814	0.26	0.39		0.05
Principal Arterials	4,110,971	0.25	0.37		1.18
Minor Arterials	3,015,421	0.25	0.37	7.95	0.85
Collectors	539,631	0.27	0.39		0.16
Local	32,746	0.25	0.37		0.01
Centroid Connectors	839,827	0.37	0.53		0.36
Totals	11,989,544	NA	NA	7.95	3.49

[1] A conversion factor of 907,184.74 grams per ton was used.

[2] Refer to Appendix E for specific estimation methodologies.

Table 20: 2025 NO_x Estimated Emissions					
Road Type	Average Daily VMT	Ada County Vehicle NO_x Emissions Factor	Canyon County Vehicle NO_x Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	NO_x Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	3,291,135	0.27	0.44		1.04
Ramps	159,814	0.29	0.48		0.05
Principal Arterials	4,110,971	0.26	0.42		1.22
Minor Arterials	3,015,421	0.26	0.42	7.95	0.90
Collectors	539,631	0.26	0.43		0.16
Local	32,746	0.22	0.35		0.01
Centroid Connectors	839,827	0.31	0.50		0.30
Totals	11,989,544	NA	NA	7.95	3.68

[1] A conversion factor of 907,184.74 grams per ton was used.

[2] Refer to Appendix E for specific estimation methodologies.

2030 Scenario

The 2030 growth scenario, "Community Choices," was developed as part of *Communities in Motion* and endorsed by the COMPASS Board December 19, 2005. The population and employment estimates developed as part of the "Community Choices" growth scenario were analyzed with a 2030 roadway network. The 2030 network is comprised of the 2025 travel demand model network and the projects listed in Table 21.

Table 21: Projects Added to the 2025 network for the 2030 Scenario

No.	Project	Location	Number of Lanes	Regionally Significant?	Federal Aid?**	Exempt?	Key No.*
68.	Adams St	Chinden Blvd - Veteran's Memorial Parkway includes new connection 36th to 37th St	3	No	No	Yes	
69.	Amity Rd	McDermott Rd -Meridian Rd	3	Yes - Principal Arterial	TBD	No	
70.	Amity Rd	Meridian Rd - Eagle Rd	5	No	TBD	No	
71.	Amity Rd	Federal Way - Holcomb Rd	5	No	No	No	RD202-11
72.	Avalon Rd (Kuna Rd)	Linder Rd - Orchard St	5	No	TBD	No	
73.	Beacon Light Rd	Extend Beacon Light Rd from Ada Co. Line - SH 16	2	No	TBD	No	
74.	Beacon Light Rd	SH 16 - Park Ln	5	No	TBD	No	
75.	Beacon Light Rd	Park Ln - Eagle Rd	3	No	TBD	No	
76.	Black Cat Rd	Amity Rd - Cherry Ln	3	No	TBD	No	
77.	Black Cat Rd	Cherry Ln - Chinden Blvd	5	No	TBD	No	
78.	Broadway IC	Reconstruct - add new ramps and lanes	N.A.	Yes - Interstate	Yes	Yes - (40CFR93.127)	9821
79.	Cherry Ln	McDermott Rd - Black Cat Rd	5	Yes*	TBD	No	
80.	Cherry Ln	Linder Rd - Meridian Rd	7	Yes - Principal Arterial	TBD	No	
81.	Eagle Rd	Lake Hazel Rd - Victory Rd	5	Yes - Principal Arterial	TBD	Yes - Safety (40CFR93.126)	
82.	Emerald St	Five Mile Rd - Orchard St	5	Yes - +45K ADT	TBD	No	
83.	Executive St / Presidential	Cloverdale Rd - Five Mile Rd (3 ln couplet with Presidential)	5	No	TBD	No	
84.	Fairview Ave	Cole Rd - Orchard St (or e/o Curtis Rd)	7	Yes – Principal Arterial	No	No	
85.	Federal Way	S/o SH 21 - Isaac Canyon IC	5	No	Developer Funded	No	
86.	Five Mile Rd	Ustick Rd - McMillan Rd	5	No	TBD	No	
87.	Franklin Rd	McDermott Rd - Black Cat Rd	5	Yes*	TBD	No	RC0161
88.	Franklin Rd	Eagle Rd - Milwaukee St	7	Yes - Principal Arterial	TBD	No	
89.	Gowen IC	Reconstruct	NA	Yes - Interstate	Yes	Yes - (40CFR93.127)	9822
90.	I-84	Broadway IC - Isaacs Canyon IC	8	Yes - Interstate	Yes	No	K307/ K301
91.	Lake Hazel Rd	McDermott Rd - SH 69	5	Yes*	TBD	No	
92.	Lake Hazel Rd	SH 69 - Cole Rd	5	Yes*	TBD	No	
93.	Lake Hazel Rd Extension	Cole Rd - Pleasant Valley Rd	5	Yes*	TBD	No	
94.	Lake Hazel Rd (Gowen Rd Realignment)	Gowen Rd - Eisenman Rd	4-5	Yes*	TBD	No	
95.	Linder Rd	Kuna Mora Rd - Victory Rd	5	No	TBD	No	
96.	Linder Rd	State St - Beacon Light Rd	5	No	TBD	No	
97.	Locust Grove Rd	Fairview Ave - McMillan Rd	5	No	TBD	No	
98.	Maple Grove Rd	Fairview Ave - McMillan Rd	5	No	TBD	No	

Table 21: Projects Added to the 2025 network for the 2030 Scenario							
No.	Project	Location	Number of Lanes	Regionally Significant?	Federal Aid?**	Exempt?	Key No.*
99.	McDermott Rd	Lake Hazel Rd - I84	5	Yes - Principal Arterial	TBD	No	
100.	McMillan Rd	McDermott Rd - Locust Grove Rd	3	No	TBD	Yes - Safety (40CFR93.126)	
101.	McMillan Rd	Cloverdale Rd - Five Mile Rd	5	No	TBD	No	
102.	McMillan Rd	Five Mile Rd - Maple Grove Rd	3	No	TBD	Yes - Safety (40CFR93.126)	
103.	Meridian Rd	Cherry Ln -Chinden Blvd	5	No	TBD	No	
104.	Overland Rd	Meridian Rd - Maple Grove Rd	7	Yes - Principal Arterial	TBD	No	
105.	Overland Rd	Vista Ave - Federal Way	3	No	TBD	Yes - Safety (40CFR93.126)	
106.	SH 44	Ada Co. Line - Ballantyne Rd	4	Yes - Principal Arterial	Yes	No	
107.	SH 55	Beacon Light Rd - Brookside Ln	4	Yes - Principal Arterial	TBD	No	
108.	SH 69 Connection	Kuna Mora Rd - Kuna Rd	2	No	TBD	No	
109.	State St	Glenwood St - 27th St	7	Yes - Principal	TBD	No	
110.	Ten Mile Rd	Lake Hazel - Victory Rd	5	Yes*	TBD	No	
111.	Ten Mile Rd	Victory Rd - US 20/26	5	No	TBD	No	
112.	Three City's River Crossing (new road & bridge)	Chinden Blvd - State St	5	Yes - Principal Arterial	Yes	No	9189
113.	US 20/26 Expressway	Can Ada Rd - Eagle Rd	4	Yes - Principal Arterial	Yes	No	
114.	Ustick Rd	Star Rd - Meridian Rd	5	Yes*	TBD	No	
115.	Victory Rd	Eagle Rd - Cloverdale Rd	3	No	TBD	Yes - Safety (40CFR93.126)	
116.	Victory Rd	Cloverdale Rd - Cole Rd	5	No	TBD	No	

*Key No: ITD Key Numbers are from the Transportation Improvement Program and the STIP and are strictly numeric (i.e., 6299). ACHD GIS Numbers are alphanumeric identification numbers (i.e., RD169). Blanks indicate an ITD Key or ACHD GIS number has yet to be assigned.

** The fiscal constraints of a long-range plan are more flexible than those of a TIP. Therefore, TBD means To Be Determined, as a funding source has not been identified.

Table 22 shows estimated weekday VMT and PM_{10} emissions for the 2030 "Community Choices" scenario. Emissions estimates were developed using MOBILE6.2 generated emissions factors and the *Treasure Valley Road Dust Study: Final Report*. The MOBILE6.2 input and output files for 2030 are listed in the Appendix K. Table 23 and Table 24 display the VOC and NO_x emissions estimates respectively.

Table 22: 2030 Paved Road PM_{10} Estimated Emissions				
Road Type	Paved Average Weekday VMT	Paved Road Dust Emissions	Tailpipe, Tire, and Brakewear Emissions	Total Paved Road PM_{10} Emitted
	[VMT/day]	*[Tons/day]*	*[Tons/day]*	*[Tons/day]*
Interstate	3,846,894	25.83	0.12	25.95
Ramps	190,797	1.61	0.01	1.62
Principal Arterial	5,401,817	45.52	0.16	45.68
Minor Arterial	3,269,559	28.26	0.10	28.36
Collector	573,223	5.47	0.02	5.49
Local	25,661	0.43	0.00	0.43
Centroid Connectors	977,728	8.48	0.03	8.51
Totals	14,285,679	115.60	0.43	116.03

Table 23: 2030 VOC Estimated Emissions					
Road Type	Average Daily VMT	Ada County Vehicle VOC Emissions Factor	Canyon County Vehicle VOC Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	Estimated VOC Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	3,462,204	0.22	0.33		0.88
Ramps	171,718	0.25	0.38		0.05
Principal Arterials	4,861,635	0.24	0.35		1.31
Minor Arterials	2,942,603	0.24	0.35	7.91	0.79
Collectors	515,901	0.26	0.38		0.15
Local	23,095	0.27	0.39		0.01
Centroid Connectors	879,955	0.36	0.52		0.36
Totals	12,857,112	NA	NA	7.91	3.56

[1] A conversion factor of 907,184.74 grams per ton was used.

[2] Refer to Appendix E for specific estimation methodologies.

Table 24: 2030 NO_x Estimated Emissions					
Road Type	Average Daily VMT	Ada County Vehicle NOx Emissions Factor	Canyon County Vehicle NOx Emissions Factor	% Of Ada VMT by Canyon County Vehicles[2]	NOx Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Tons/day]*
Interstate	3,462,204	0.23	0.39		0.91
Ramps	171,718	0.24	0.43		0.05
Principal Arterials	4,861,635	0.21	0.37		1.19
Minor Arterials	2,942,603	0.21	0.37	7.91	0.72
Collectors	515,901	0.21	0.38		0.13
Local	23,095	0.18	0.32		0.00
Centroid Connectors	879,955	0.25	0.44		0.26
Totals	12,857,112	NA	NA	7.91	3.26

[1] A conversion factor of 907,184.74 grams per ton was used.

[2] Refer to Appendix E for specific estimation methodologies.

"Community Choices" vs. "Trend" Growth Scenarios

The 2030 transportation system outlined in *Communities in Motion* was tested with a "Trend" growth scenario to determine what role growth assumptions would play in regional emissions analyses of Northern Ada County. "Trend" growth follows common patterns of historical and current residential densities, much of which is low-density suburban-style housing, resulting in growth extending well beyond all areas of impact. "Trend" is based on the amount of vacant land, community redevelopment assumptions, current comprehensive plans, and existing densities. Overall, the "Trend" growth scenario represents a continuation of the current land use, employment, and population trends.

Table 25 shows the changes in the regional emissions analysis resulting from the use of the "Community Choices" growth scenario verses the "Trend" for the same 2030 transportation system. Higher density developments along existing transportation corridors tend to reduce trip lengths and promote alternative modes of travel. Thus, the VMT estimates for a "Community Choices" growth scenario are lower than those for a "Trend" scenario. A reduction in VMT results in a reduction of emissions.

Table 25: 2030 Estimated Vehicle Emissions

Roadway Type	PM_{10} [tons/day]		NOx [tons/day]		VOC [tons/day]	
	Trend	Community Choices	Trend	Community Choices	Trend	Community Choices
Interstate	26.31	25.95	0.92	0.91	0.89	0.88
Ramps	1.75	1.62	0.05	0.05	0.05	0.05
Principal Arterials	49.53	45.68	1.27	1.19	1.43	1.31
Minor Arterials	35.84	28.36	0.91	0.72	1.02	0.79
Collectors	6.64	5.49	0.15	0.13	0.18	0.15
Local Roads	0.50	0.43	0.01	0.00	0.01	0.01
Centroid Connectors	10.44	8.51	0.32	0.26	0.45	0.36
Total	131.00	116.03	3.62	3.26	4.03	3.56

Unpaved Road Dust

Because unpaved roads are not included in any of COMPASS' model networks, the *Treasure Valley Road Dust Study: Final Report* assumed unpaved roadways are traveled at an average speed of 25 miles per hour. This assumption results in a constant emissions factor of approximately 0.315 pounds road dust emissions per vehicle mile traveled on unpaved roadways. Table 26 displays the information used to estimate the PM_{10} emissions from unpaved roads. Average daily trips on unpaved roadways in Ada County were assumed, as in past demonstrations, to be 120 vehicles per day.

Table 26: Unpaved Road Dust PM_{10} Emissions

Analysis Year*	ADT	Unpaved Roads *[Miles]*	Unpaved VMT *[VMT/day]*	Unpaved Road Dust Emissions *[Tons/day]*
2008	120	76.88	9,226	1.36
2010	120	73.76	8,851	1.30
2012	120	70.64	8,477	1.25
2015	120	65.96	7,915	1.16
2025	120	50.36	6,043	0.89
2030	120	42.56	5,107	0.75

Note: In 1999, the Total Unpaved Roads = 106.38 miles, including 65.07 miles of roads and 41.31 miles of alleys.

Assume 120 trips/day on unpaved roads (ICF Kaiser PM-10 Report 10/97)

Future unpaved road inventory decreases due to ACHD commitment to an ongoing program of paving unpaved roads.

** 2005 Unpaved Road = 80.0 miles, based on information from ACHD staff Summer2004. Future Year Unpaved Roads based on interpolated road paving rate of 1.95% per year from 2005.*

Carbon Monoxide Emissions

To satisfy IDEQ requirements, a regional CO emissions analysis was conducted using EPA's MOBILE emissions factor model and the COMPASS travel demand model. Specific information on the models and their inputs can be found in previous sections of this document. "Build" emissions were estimated and compared to "no build" emissions estimates. A "build" scenario estimates emissions for a given analysis year assuming the appropriate programmed/planned roadway/transit projects have been constructed. Conversely, a "no build" scenario estimates emissions for a given analysis year using the transportation system as it exists in the base year (e.g. before programmed or planned projects are built). Both the "build" and "no build" scenarios are based on the "Community Choices" growth assumptions. This comparison provides the CO emissions impacts to the region from the planned transportation system.

As a supplement to the "build/no build" analysis, CO "build" emissions are compared to emissions forecasts published in both the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area* and the *Northern Ada County PM_{10} SIP Maintenance Plan and Redesignation Request*. This information is intended to aid air quality planning efforts when determining the need for CO mitigation measures.

2008 (Baseline) Scenario

The same baseline scenario used to estimate PM_{10}, NOx, and VOC emissions was also used to estimate CO emissions. It includes 2008 population and employment estimates with an anticipated 2008 roadway network. Table 1 provides a list of applicable roadway projects used in the 2008 baseline model network. Table 27 shows estimated VMT and CO emissions from the 2008 baseline scenario. Appendix F lists the MOBILE6.2 input and output files for the 2008 scenario.

Table 27: 2008 CO Estimated Emissions

Road Type	Average Daily VMT	Ada County Composite Vehicle CO Emissions Factor[2]	Canyon County Composite Vehicle CO Emissions Factor[2]	% Of Canyon County Vehicles VMT in Ada[3]	Estimated CO Emitted[1]
	[VMT/day]	*[g/mile]*	*[g/mile]*		*[Ton/day]*
Interstate	2,003,135	14.75	17.90		33.08
Ramps	99,761	17.32	20.74		1.93
Principal Arterials	2,888,204	13.60	16.46		43.97
Minor Arterials	1,634,400	13.41	16.22	7.37	24.53
Collector	373,958	13.32	16.14		5.58
Local	13,312	11.74	14.23		0.17
Centroid Connectors	584,997	14.84	18.44		9.74
Total	7,597,767	NA	NA	7.37	119.01

[1] A conversion factor of 907,184.74 grams per ton was used.

[2] CO emissions factors used are 2007-winter. Refer to the PM_{10} Maintenance Plan, Appendix A, pg 4-5.

[3] Refer to Appendix E for specific estimation methodologies.

Build Scenarios

The "build" scenarios use transportation networks and demographic assumption specific to the analysis year. These are the same scenarios used to estimate PM_{10}, NO_x, and VOC emissions. Table 1, Table 5, Table 9, Table 13, Table 17 and Table 21 provide more detailed information on the roadway projects used to develop the "build" scenario networks. Table **28** gives the "build" CO emissions estimates for 2010, 2012, 2015, 2025, and 2030.

Table 28: "Build" Scenario Average Daily VMT and CO Emissions

	Year				
	2010	2012	2015	2025	2030
Average Daily "Build" VMT	8,065,266	8,852,595	9,465,490	11,989,544	12,857,112
"Build" CO Emissions (*Ton/day)*	112.14	111.34	107.05	113.72	120.70

No Build Scenarios

The "no build" scenarios use the 2008 (baseline) transportation network with the demographic assumption specific to the analysis year. Table 1 provides more detailed information on the roadway projects included in the 2008 transportation network. Table 29 gives the "no build" CO emissions estimates for 2010, 2012, 2015, 2025, and 2030.

Table 29: "No Build" Scenario Average Daily VMT and CO Emissions

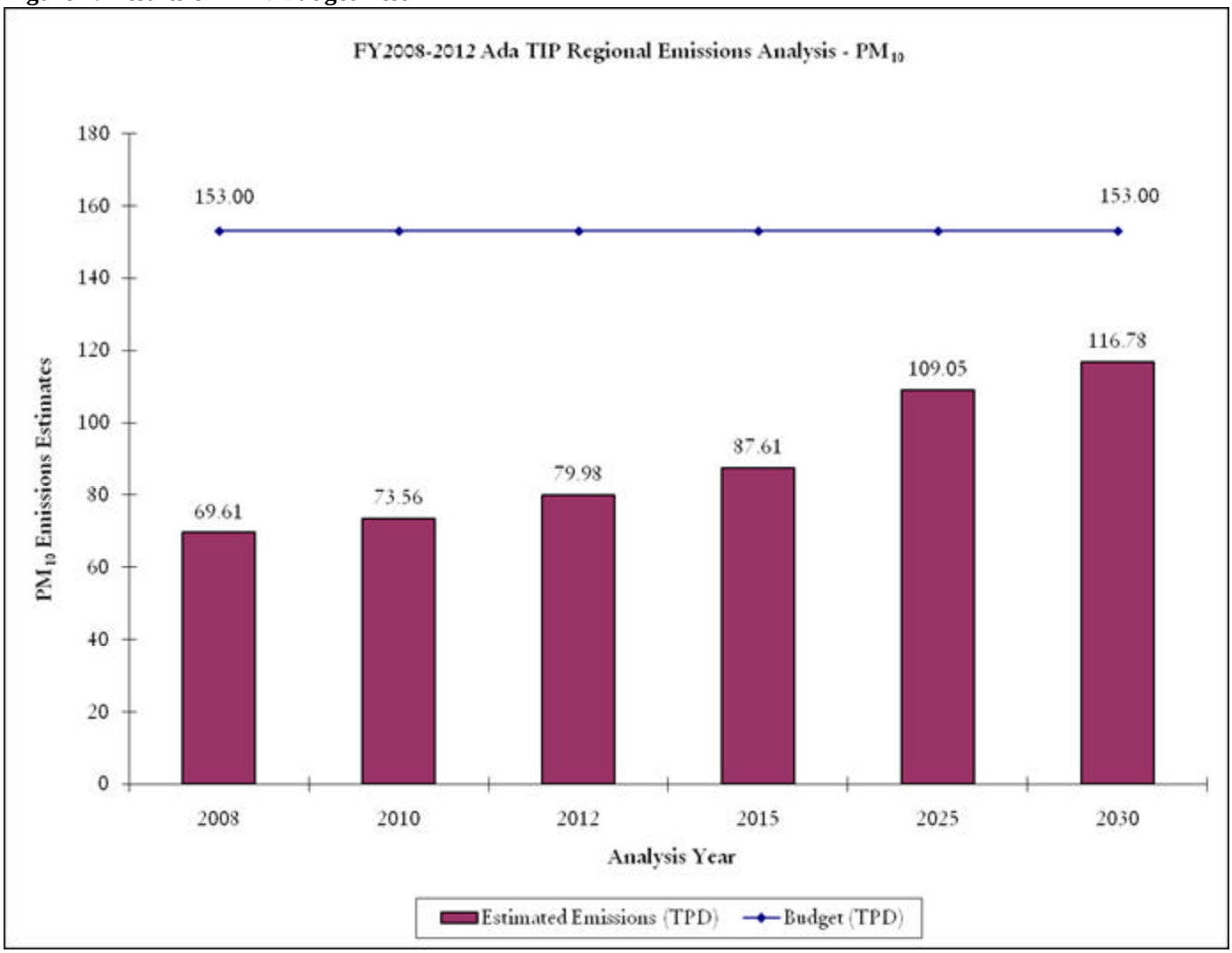
	Year				
	2010	2012	2015	2025	2030
Average Daily "No Build" VMT	8,080,115	8,786,853	9,423,281	11,988,534	12,845,524
"No Build" CO Emissions (*Ton/day)*	112.09	109.72	105.36	112.78	117.90

III. CONCLUSIONS

PM_{10} Budget Test

Figure 2 shows the results of the PM_{10} budget test for the Northern Ada County FY2008-2012 TIP Amendment.

Figure 2: Results of PM_{10} Budget Test

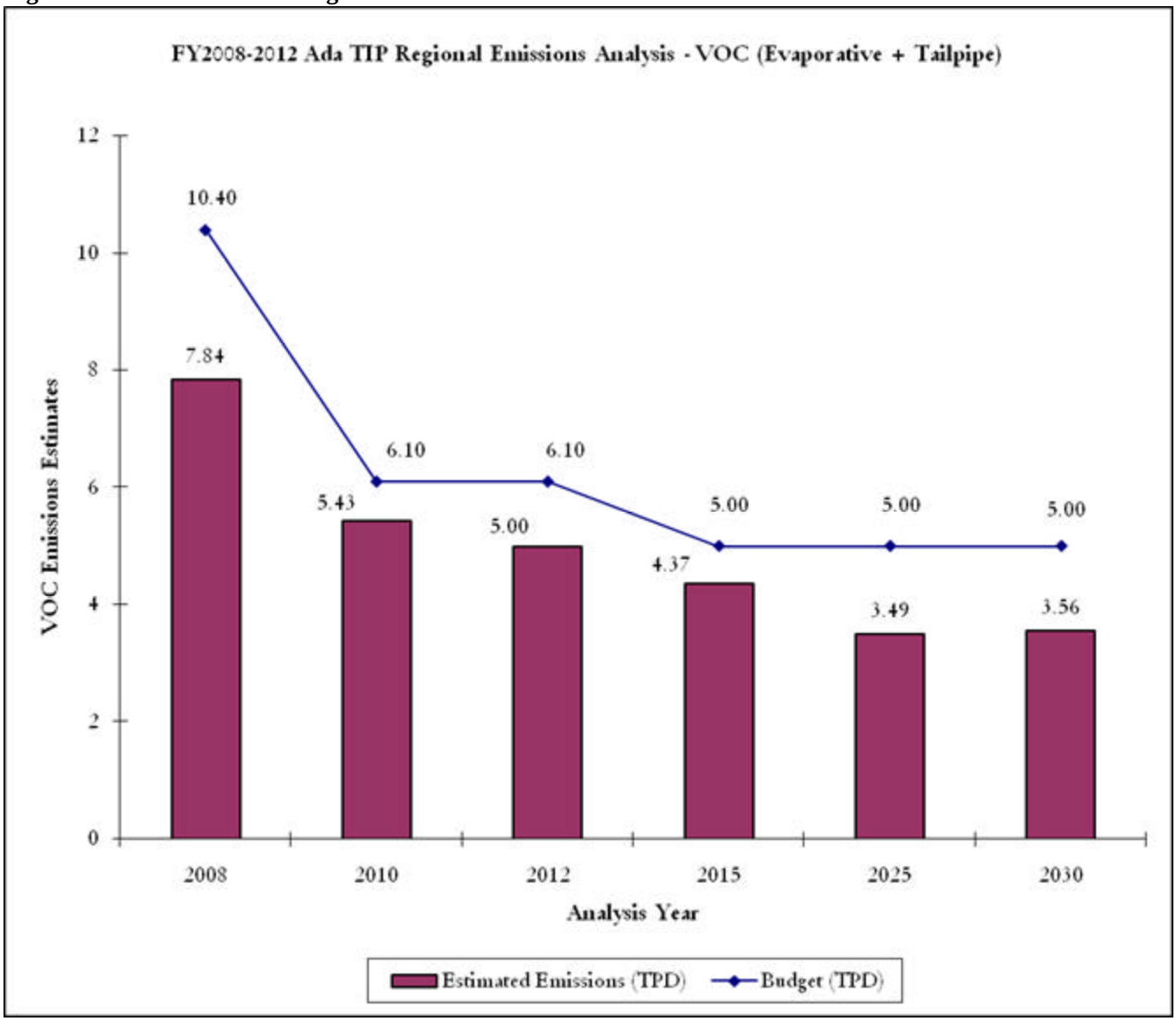


The results of the budget test show that the emissions impacts associated with the planned improvements to the Northern Ada County transportation system (projects listed in Table 1, Table 5, Table 9, Table 13, Table 17, and Table 21) will not exceed the PM_{10} emissions budgets established by the Northern Ada County PM_{10} SIP Maintenance Plan.

VOC Budget Test

Figure 3 shows the results of the VOC budget test for the Northern Ada County FY2008-2012 TIP Amendment.

Figure 3: Results of VOC Budget Test

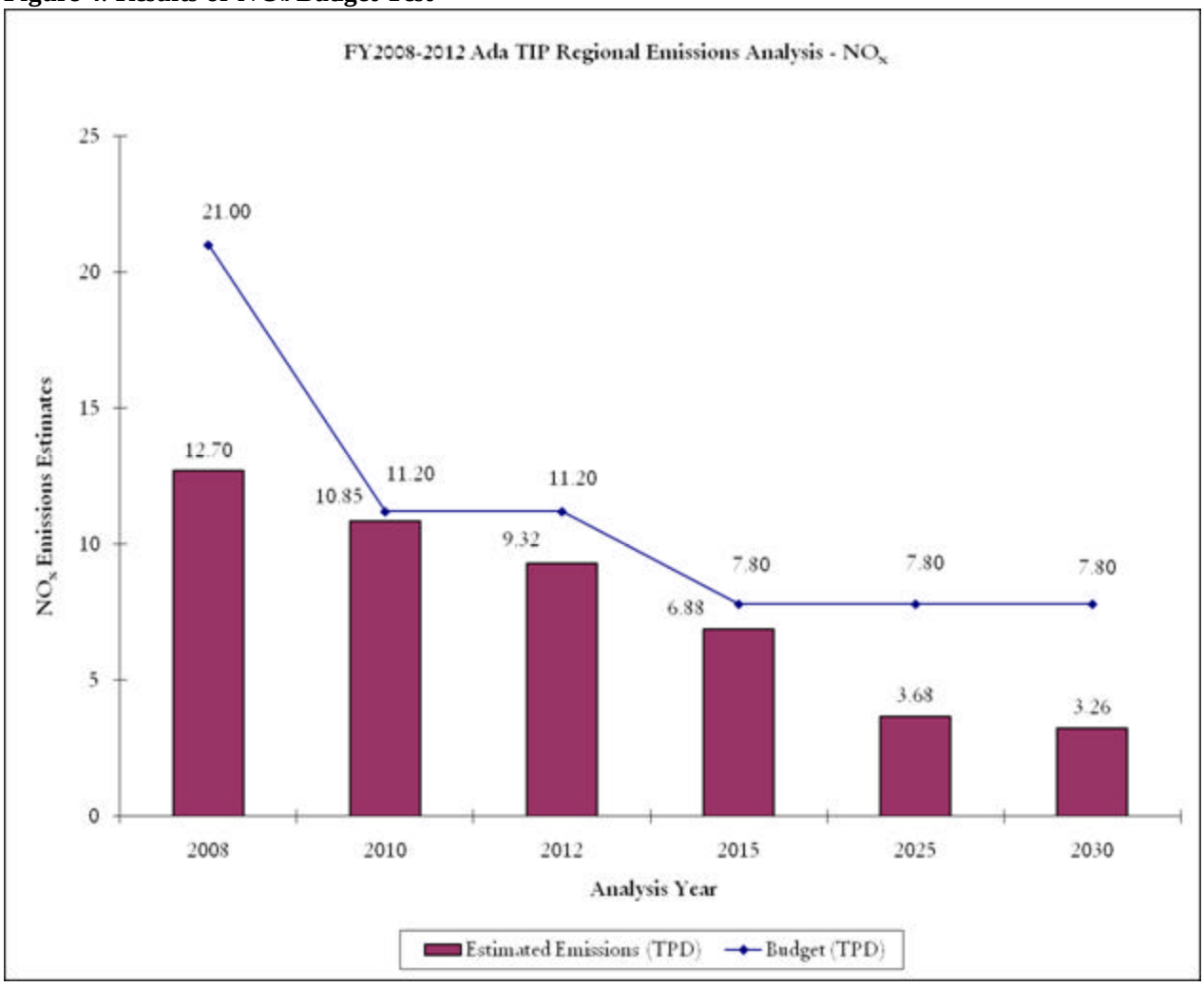


The results of the budget test shows that the emissions impacts associated with the planned improvements to the Northern Ada County transportation system (projects listed in Table 1, Table 5, Table 9, Table 13, Table 17, and Table 21) will not exceed the VOC emissions budgets established by the Northern Ada County PM_{10} SIP Maintenance Plan.

NO_x Budget Test

Figure 4 shows the results of the NO_x budget test for the Northern Ada County FY2008-2012 TIP Amendment.

Figure 4: Results of NO_x Budget Test

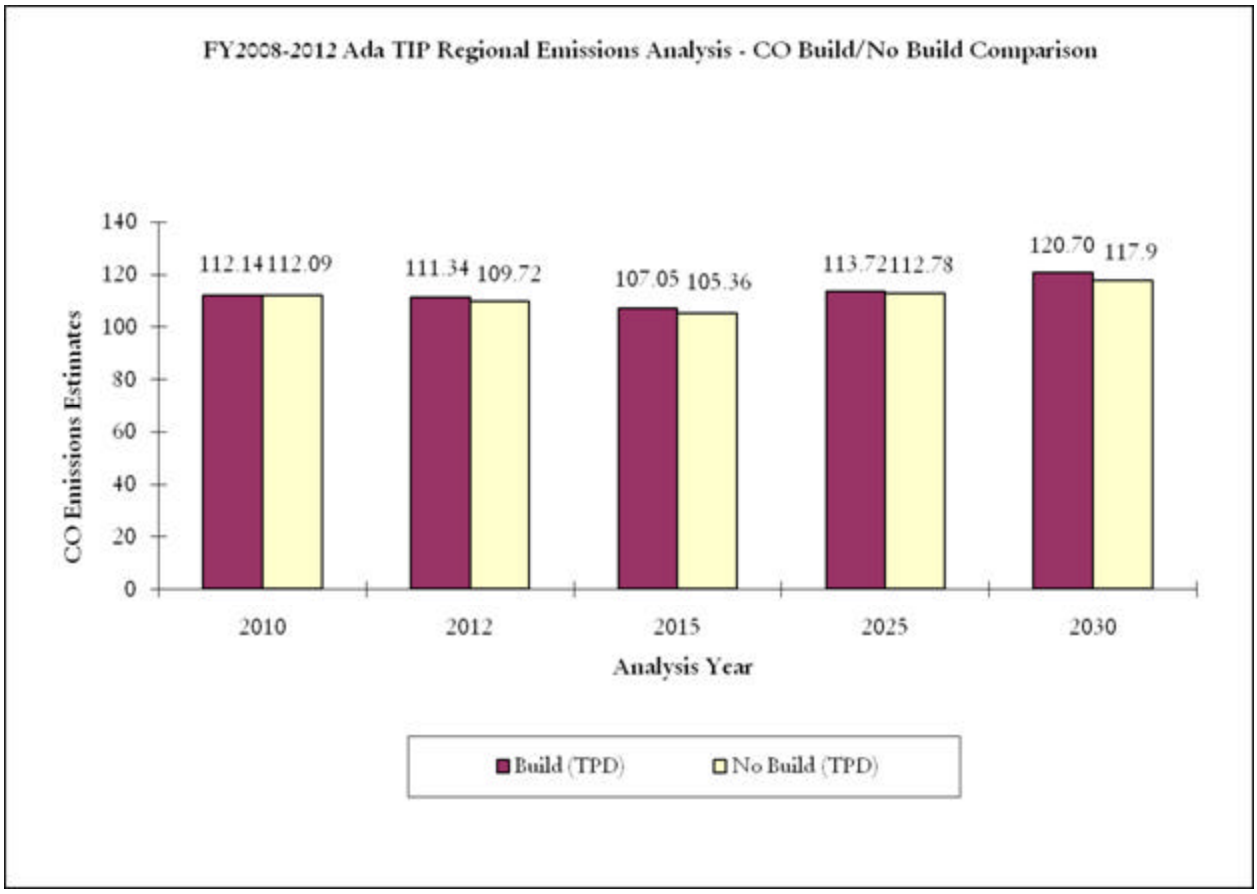


The results of the budget test shows that the emissions impacts associated with the planned improvements to the Northern Ada County transportation system (projects listed in Table 1, Table 5, Table 9, Table 13, Table 17, and Table 21) will not exceed the NO_x emissions budgets established by the Northern Ada County PM_{10} SIP Maintenance Plan.

CO Planning Analyses

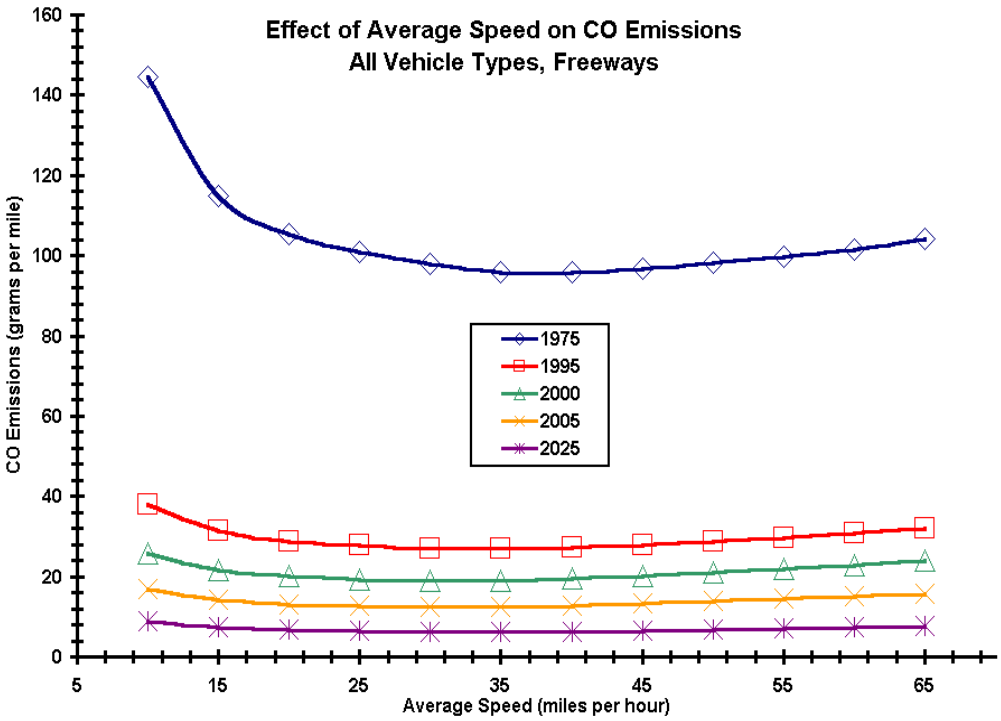
Build/No Build Emissions Comparison:
Figure 5 shows the comparison between the "build" and "no build" emissions scenarios for each analysis year. Again, the purpose of these comparisons is not to demonstrate conformity to the CO Limited Maintenance Plan, but rather to facilitate good air quality planning in Northern Ada County.

Figure 5: Results of CO Build/No Build Comparison



Every comparison, with the exception of 2010, shows an increase in CO emissions for the "build" scenarios. These increases in CO emission estimates are due to a reduction in roadway congestion, which increased network speeds in the COMPASS model. CO emissions factors are very sensitive to speed. As Figure 6 shows, MOBILE6.2 CO emissions factors decreases as speed increases until approximately 35 miles per hour. However, when speeds increase above 40 miles per hour, MOBILE6.2 CO emissions factors begin to increase.

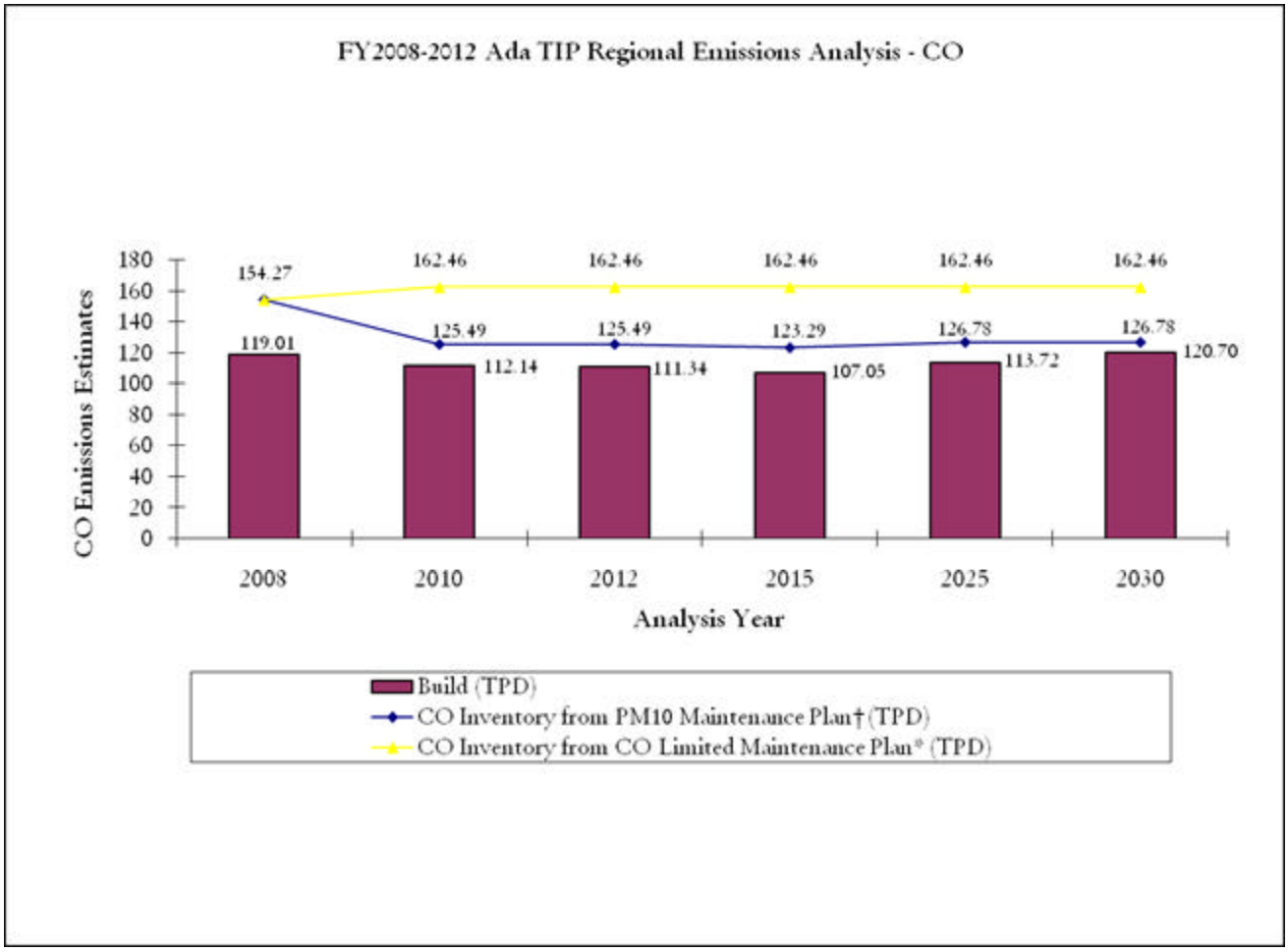
Figure 6: Effect of Average Speed on CO Emissions for Freeway Facility types (adapted from Figure 28 of EPA's Sensitivity Analysis of MOBILE6, EPA420-R-02-035, December 2002)



As a result of this analysis, IDEQ may choose to require CO mitigation measures. However, COMPASS' past work with several local governments to mitigate open burning impacts may be considered more than adequate to offset the CO emissions increases forecasted in "build" scenarios.

Emissions Inventory Comparisons:
To aid in the evaluation of the CO impacts related to the Northern Ada County FY2008-2012 TIP Amendment, "build" emissions are compared to the on-road mobile portions of two relevant IDEQ emissions inventories in Figure 7. On-road mobile CO emissions estimates were developed by IDEQ for both the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area* and the *Northern Ada County PM$_{10}$ SIP Maintenance Plan and Redesignation Request*.

Figure 7: Comparison of the CO "Build" Scenario to the CO and PM$_{10}$ Inventories



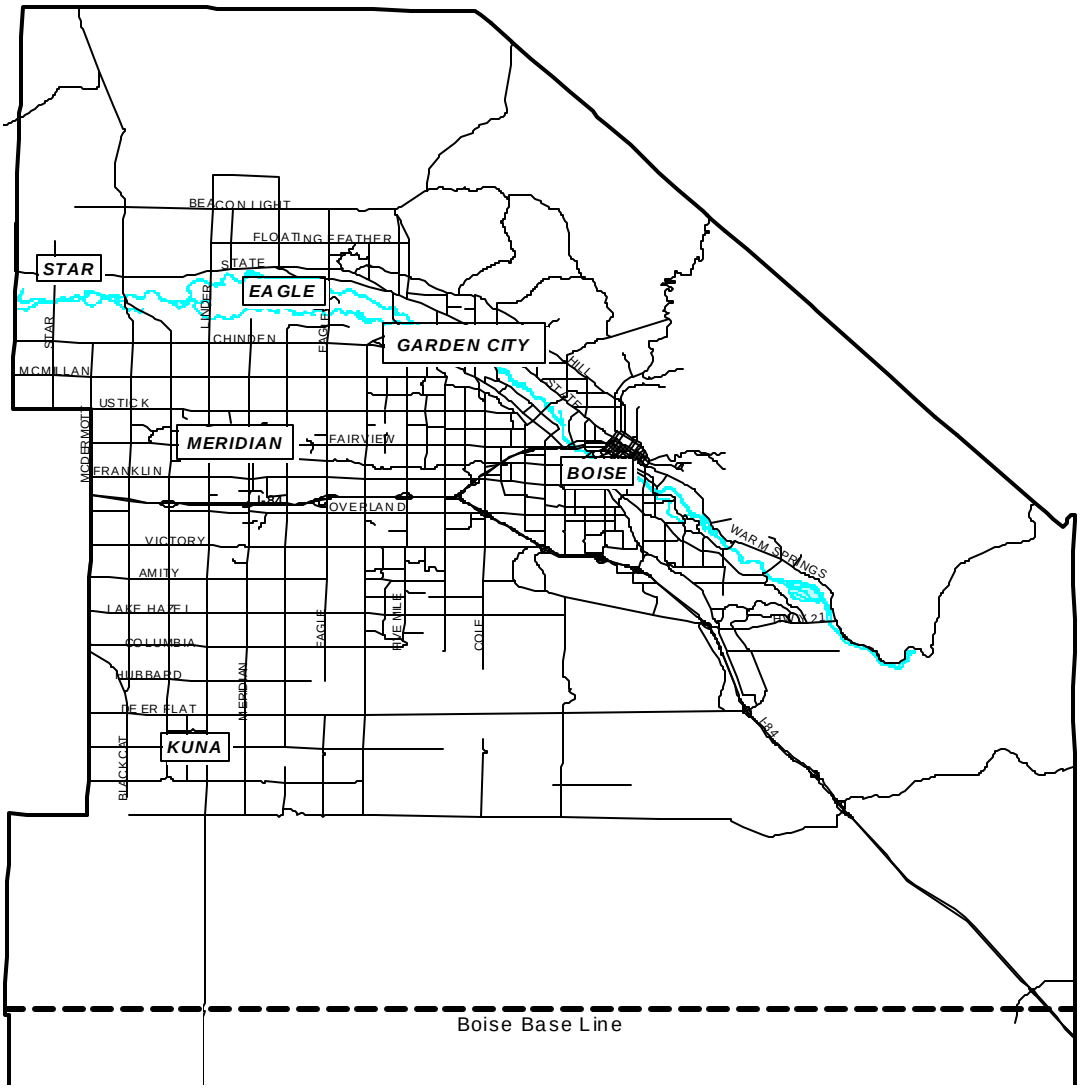
*From Table VI.H-4 in Appendix A of the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area*. Inventory forecasts for 2000 are used to compare to 2008. Inventory forecasts for 2010 are used to compare to 2012, 2015, 2025, and 2030.

†Emissions estimates from Tables 4-3, 9-1, 9-2, and 9-3 in Appendix A of the *Northern Ada County PM$_{10}$ SIP Maintenance Plan and Redesignation Request*. Inventory forecasts for 1999 are used to compare to 2008. Inventory forecasts for 2010 are used to compare to 2010 and 2012. Inventory forecasts for 2015 are used to compare to 2015. Inventory forecasts for 2020 are used to compare to 2025 and 2030.

These comparisons show that, despite the results of the build/no-build comparisons, the planned transportation system in Northern Ada County will not increase CO emissions above levels already anticipated by IDEQ.

APPENDICES

Appendix A: Northern Ada County PM_{10} and CO Maintenance Area



Appendix B: Glossary of Acronyms

ACHD		Ada County Highway District
ADT		Average Daily Traffic
AQB		Air Quality Board
CAAA		Clean Air Act Amendment
CIM		*Communities in Motion*
CMAQ		Congestion Mitigation and Air Quality, a federal funding source for air quality
CO		Carbon Monoxide
COMPASS		Community Planning Association of Southwest Idaho
DAC		Demographic Advisory Committee
DOT		US. Department of Transportation
EPA		US. Environmental Protection Agency
FHWA		Federal Highway Administration
FTA		Federal Transit Administration
g		Grams
IDEQ		Idaho Department of Environmental Quality
I/M		(Vehicle) Inspection and Maintenance Program
ITD		Idaho Transportation Department
kg		Kilograms
MPO		Metropolitan Planning Organization
NAAQS		National Ambient Air Quality Standards
NHS		National Highway System
NO_x		Oxides of Nitrogen
NRS		Not Regionally Significant
PM_{10}		Particulate Matter with a diameter less than 10 micrometers (i.e. $1x10^{-6}$)
SH		State Highway
SIP		State Implementation Plan
STIP		State Transportation Improvement Program
TCM		Transportation Control Measure
TDM		Travel Demand Model
TIP		Transportation Improvement Program
TMAC		Transportation Modeling Advisory Committee
TPD		Tons per day
VKT		Vehicle Kilometers of Travel
VMT		Vehicle Miles of Travel
VOC		Volatile Organic Compounds

Appendix C: COMPASS' Travel Demand Forecast Model

Introduction

Regional transportation planning is a complicated process that requires looking 20 years into the future. The Community Planning Association (COMPASS) uses a computer model to forecast traffic conditions and identify transportation system impacts for specific years in the future. The model uses forecasted conditions including the planned improvements to the roadway network as well as land-use assumptions about where growth will occur.

COMPASS' Transportation Model Advisory Committee (TMAC) guides COMPASS staff in the research, development and review of the model as well as recommending improvements and/or enhancements to the model and its input data. TMAC is made up of representatives from COMPASS' many member agencies and appointed transportation/land use/air quality professionals who serve on a voluntary basis.

COMPASS' current travel demand forecast model was calibrated and validated for 2002 conditions. It was calibrated with data from a household travel characteristics study performed and completed in 2002. This survey obtained information about the number of trips, travel time, and trip purpose by travel mode and time-of-day from more than 2,600 Treasure Valley households. It was validated with traffic count data for 2002/2003. TMAC approved the use of the 2002 calibrated travel demand model on June 29, 2004.

Shortly after the 2002 model was developed, COMPASS began developing a mode choice model for inclusion into the overall four-step travel demand model. The main purpose for the development of this tool was to support the transit planning component of *Communities in Motion*, the new long range transportation plan for a six-county area including Ada and Canyon Counties. The 2002 model, with the inclusion of the mode choice tool was approved for use by TMAC on May 2, 2006.

How the Model Works

COMPASS' travel demand model estimates regional travel patters based on where trips are likely to start and end. This is done using a four-step modeling process (see Figure C-1). Travel estimates are adjusted to account for roadway capacities, the availability of alternate routes, and changes in travel time due to congestion. When all routes have approximately the same travel time and there are no longer advantages associated with alternative routes, equilibrium is reached. Forecasts of traffic volumes, vehicle miles of travel, and travel speeds are produced.

Model Assumptions

Travel Characteristics:

COMPASS surveyed Treasure Valley residents' travel habits. This survey was part of a major effort to analyze the valley's present and future transportation needs. It began in August of 2002 with the goal of gathering travel information from 2,400 households. The survey was completed in early 2003. Data was collected from 2,582 households. Final data sets from the survey were submitted to COMPASS that provided trip rates (by trip type by household classification) for each county in the modeling domain, auto occupancy factors by trip type, and the number of trips per duration of time. The final household survey can be accessed at: http://www.compassidaho.org/prodserv/traveldemand.htm.

Trip Types:

The current travel demand forecast model uses six internal trip types. Five of these have one end of the round-trip at home. They are home–based work, home-based shopping, home-based social, home-based school, and home-based other. The sixth trip type does not involve travel either to or from home. Therefore, it is called a non-home-based trip. The characteristics for these trip types are developed from travel surveys completed by random households throughout the Treasure Valley as well as nationally developed data. The model also includes three external trip types: internal-to-external (IX), external-to-external (pass through) (X2X), and external-to-internal (XI).

Demographic Data Forecasts:

COMPASS' Demographic Advisory Committee develops area-wide demographic forecasts on population, households and employment. Forecasts are first developed for large demographic sub areas of the Treasure Valley. Then the forecasts are allocated to individual Traffic Analysis Zones (TAZ). TAZ boundaries are based on a combination of census boundaries and local geographic features such as roads and waterways and range in size from a few blocks to one or more square miles. COMPASS' TAZ boundaries are reviewed every 10 years, based on the results of the U.S. Census. This process maintains the integrity of the previous years of data while updating the boundaries of the zones based on major changes such as new roads or significant changes in development.

Base year (or current year) demographics are estimated using the most recent U.S. census data (2000 Census) and building permits data. Employment estimates are obtained for the Department of Labor and Commerce.

Horizon year demographics are developed as part of the long range transportation planning process. A regional growth control total for the horizon year is used as the starting point. Population and employment adjustments are made to the various demographic areas in the region so that the control total is met, but not exceeded.

Communities in Motion, the region's long range transportation plan, has a horizon year of 2030. Adjustments to the demographic areas (and the TAZs within those areas) were made to produce two distinct 2030 growth forecasts for the plan; a "Trend" growth scenario and "Community Choices" growth scenario. Both use the same two county (Ada and Canyon) population control total for 2030 of 825,000.

The goal of the "Trend" forecast was to allocate future growth based on prevailing residential patterns and densities using estimates of vacant and redevelopable land. Ada and Canyon County Assessors' files were used to develop an inventory of vacant and redevelopable land. Criteria for redevelopable land were created and reviewed with COMPASS' Demographic Advisory Committee.

In contrast, "Community Choices" combines modest land use intensification/densification along transportation corridors with additional employment and population growth in outlying communities. Less suburban residential development is anticipated in this growth scenario, as compared with the Trend. With more infill development (and thus increased densities) in the corridor areas, this scenario consumes less land than the "Trend."

Interim year estimates of regional households and employment are interpolated using the base year estimate and the 2030 "Community Choices" growth scenario as endpoints. Professional judgment is used to allocate this growth to TAZs. For specific information on how many jobs and households were added to demographic areas and/or TAZs in the interim years visit http://www.compassidaho.org/prodserv/demo-forecasts.htm.

Roadway Networks:

In order to forecast travel demand, a representation of the functionally classified roadway network and transit system is input to the model for each analysis year. The functionally classified roadways represented in the model include: interstates, principal arterials, minor arterials, and collectors. Some local roads are included in model roadway networks for the purposes of connectivity and model validation. However residential roadways are not specifically considered in the model. Instead they are abstractly represented as centroid connectors. Centroid connectors are connections in the model made between classified roadways and TAZs. Future year roadway networks are developed using existing facilities with roadway projects planned for completion by a certain date.

The capacity of a roadway is defined as the number of vehicles a particular road can manage before congestion occurs. Capacities for model networks are based on a level of service (LOS) "D" threshold and vary according to the functional classification of the roadway and its location (e.g. urban vs. rural).

Posted speed limits are put into COMPASS' travel demand model as the maximum travel speed on the network.

Mode Choice Model:

"Mode Choice" is the third step in a traditional 4-step travel demand model (see Figure C-1). It takes person trips estimated using the demographic input data and splits them into travel mode specific trips. It sorts trips into one of either two motorized (bus or auto) or two non-motorized (walk or bike) mode choices. Transit (bus) trips are assigned to the transit network, while vehicle trips are assigned to the roadway network. A mode choice model was added to the COMPASS travel demand model to support the analysis needs of *Communities in Motion*. It is based on the mode choice model utilized by the Salt Lake City regional MPO (Wasatch Front Regional Council).

The transit network is input independent of the roadway network. In addition to such characteristics as direction and speed, information on fares, transfers, "headways" (max time between transit vehicles), and stop location need to be input as network characteristics. The transit network used for conformity purposes is the "fixed stop" system being implemented by Valley Regional Transit. For more information on the transit system in Ada and Canyon Counties, visit http://www.valleyregionaltransit.org/.

Peak-Hour Model:

COMPASS' peak-hour model estimates travel demand during the afternoon rush hour (5 to 6 p.m.). It operates identical to COMPASS' 24-hour travel demand model and uses the same types of data inputs. Forecasted traffic volumes from peak hour models are primarily used in traffic studies to aid in the design of intersections. The peak-hour model was not used in this regional emissions analysis.

Model Calibration and Validation:
The latest calibration of COMPASS' two-county travel demand model was completed in April of 2004. 2002 was chosen as the model's demographic and land use "calibration year" to coincide with COMPASS' most recent household travel survey. Parcel data from both counties were obtained and each parcel was identified with its current use, status (built, vacant, re-developable, or exempt) and comprehensive plan use. The U.S. census data was allocated and adjusted to 2002 using the parcel data for each of the cities and counties. Employment data was purchased from a third party vendor and input into the model for 2002. Existing roadway network characteristics (e.g. number of lanes, posted speed) were also verified. Roadway capacities in the model were evaluated and updated as appropriate per the Highway Capacity Manual – 2000 update.

As per federal guidance, the 2002 calibration of the COMPASS travel demand model was validated to traffic count data. Traffic count data for 2002/2003 were collected from the Idaho Transportation Department, Ada County Highway District, and various Canyon County transportation agencies. The guidance suggests a model is validated when predicted volumes for the calibration year are within a certain percentage of the measured volumes. Federal validation guidelines are:

- Freeways/Interstates: Less than 7% deviation
- Principal Arterials: Less than 10% deviation
- Minor Arterials: Less than 15% deviation
- Collectors: Less than 25% deviation

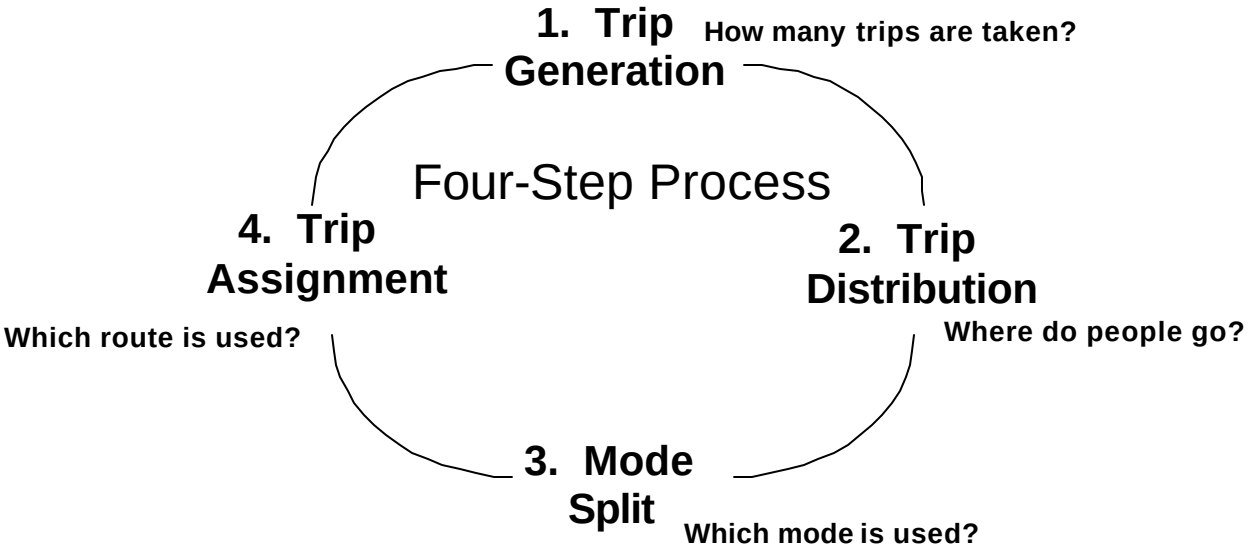
Additionally, staff validated the 2002 calibration of the COMPASS model to California Transportation Department (CALTrans) standards. CALTrans standards are more stringent the federal guidelines. The travel demand model was also put through a sensitivity analysis. This involves testing the model's response to changes made to its inputs. The results of this validation exercise met expectations. TMAC reviewed the validation statistics and approved the use of the 2002 model calibration without the mode choice model in May of 2004. For more information on the calibration and validation of the COMPASS model, visit http://www.compassidaho.org/prodserv/traveldemand.htm.

The mode choice model (transit system) could not be validated to the same level as the roadway network. This is due to the fact Valley Regional Transit made substantial changes to the system in 2004/2005. However, modeled ridership was consistent on a regional basis with actual ridership data. Thus, the mode choice model was approved for use in the 2002 model by TMAC May 2, 2006.

Model Data Uses
COMPASS' travel demand model produces forecasts of average weekday traffic volumes (ADT), average traffic speeds, vehicle miles of travel (VMT), and the level of service for each roadway in the model network. These forecasts are used for a variety of purposes, including:

- Traffic Impact Studies – These studies determine traffic impacts of new developments such as a new retail mall.
- Roadway Network Deficiency Analyses - These highlight potential future roadway inefficiencies and/or needs as a result of additional growth or other network modifications.
- Regional Emissions Analyses – Regional emissions analyses are required to demonstrate planned transportation projects will conform to the state implementation plans in nonattainment and/or maintenance areas as part of "transportation conformity".

Figure 8 : The Four-Step Model



INPUTS:

Census and/or Home Interviews (Surveys)

Traffic Counts

Roadway Characteristics

Demographic/Land Use Data

MODEL USED TO FORECAST:

Travel Demand Estimation

How many vehicles may travel a particular route in the future?

Development Impacts

How will a proposed development impact the existing roads?

Roadway Deficiencies

Which roads may be overloaded and by how much?

Air Quality Conformity Determinations

Will air quality improve or worsen?

Decision Support

Where do we invest to best serve the future community needs?

Appendix D: Approved Modeling Assumptions and Emissions Estimation Methodologies

Table 30: Northern Ada County FY2008-2012 TIP Amendment MOBILE Model Input Assumptions

Parameter	ICC Approved FY2008-2012 TIP	Previously Presented	Note
Fleet Mix	EPA MOBILE6.2 defaults. Based on national fleet mix data	Same	COMPASS will continue working with IDEQ and ITD develop local fleet characteristics for use in Treasure Valley emissions modeling.
I/M Program	Two Annual programs: One is a two speed test (idle and 2500 RPM) for only pre 1996 vehicles, the other is an OBDII Test for 1996 and newer vehicles. 2500 RPM: Waiver Rates = 1%, 1%; Stringency = 27%. OBD: Waiver Rates = 0.0% and 1%. Compliance Rate = 98% for both programs.	Same	Data acquired from/confirmed by Denis Turner, Air Quality Board, on 3-1-2007.
Anti-Tamper Program	Annual check for gasoline vehicles. Model years 1981 and newer are checked for tampering with: Air Pump, Catalyst, fuel inlet restrictor, EGR, and the gas cap. Compliance rate is 98%.	Same	Data acquired from/confirmed by Denis Turner, Air Quality Board, on 3-1-2007.
Min/Max Temp.	Winter = 28.95 / 47.46 F Summer = 49.29 / 78.18	Winter = 31.25 / 48.20 F Summer = 46.77 / 73.22	Although these temperatures are different from the ones used in the PM_{10} Maintenance Plan, they have been used for conformity since at least 2004. ITD's PLAQ uses different temperatures for project screening purposes.
Fuel Reid Vapor Pressure (RVP)	Winter = 15; Summer = 8.6	Same	
Diesel Fuel Sulfur Content	500 ppm until 2010; 15 ppm after 2010	Same	Diesel fuel sulfur content will be reduced to 15 ppm by 2010 as per federal fuel standards.
Facility Speeds	Based on the weighted average model speeds for Interstates, Interstate Ramps, Principle and Minor Arterials, Collectors, Local Roads, and Centroid Connectors.	Same	Per PM_{10} Maintenance Plan Methodology.
Fuel Program	3 = Conventional Gasoline West	Same	Applies one of two phase-in schedules for the Tier 2 sulfur fuel standards for years after 1999.
Absolute Humidity	Winter = 24.87% Summer = 43.05%	Winter = 26.39% Summer = 37.62%	Although these values are different from the ones used in the PM_{10} Maintenance Plan, they have been used for conformity since at least 2004.
Seasonal Evaluation	Average of Winter and Summer emissions factors.	Same	Winter emissions will be for years 2009, 2011, 2013, 2016, 2026, and 2031. This will allow us to take credit for some fleet turnover in November and December.

Summary of the Northern Ada County Regional Emissions Analysis Methodologies

Budget Tests: A Budget Test was used to demonstrate conformity of the Northern Ada County FY2008-2012 TIP Amendment for NO_x, VOC, and PM_{10}. The test used the PM_{10} Maintenance Plan's annual emissions estimation methodology. This method developed an annual average emissions factor by averaging summer and winter emissions factors for each pollutant. These annual average emissions factors were then used with forecasted VMT from the travel demand model to calculate annual average emissions in tons per day (TPD).

CO Analysis: "Build" and "no build" emissions were estimated using winter emissions factors for CO and average daily VMT as per the emissions inventory in the CO Limited Maintenance Plan.

VOC Emissions Adjustment: Refueling emissions were not included in the VOC analyses. The supporting on-road emissions inventory calculations for the PM_{10} Maintenance Plan removed more than refueling emissions from VOC estimates. However, this was done inconsistently and COMPASS staff is unable to determine exactly how VOC emissions were calculated. Therefore, all evaporative VOC emissions, excluding refueling emissions, were included in the VOC emissions estimates. This was done by calculating the seasonal VOC emissions factors using MOBILE6.2 and the following equation:

$$EF_{adj} = \sum_{X=1}^{27} \{(EF_X - RE_X) * F_x\}$$

Where:
EF_{adj} = Adjusted VOC emissions factor (in grams VOC/mile) for a given roadway type
X = MOBILE6.2 vehicle classification (27 classifications based on gross vehicle weight and fuel type)
EF_x = Total VOC emission factor (tailpipe + evaporative, in grams VOC/mile) for a specific vehicle class on a given roadway type
RE_X = Refueling VOC emissions factor for a specific vehicle class (in grams VOC/mile)
F_x = Fraction of vehicle class X in total fleet

The adjusted emissions factors were then used to produce the VOC emissions estimates.

PM Emissions: PM_{10} emissions were calculated using average weekday VMT, not average daily VMT, per the Northern Ada County PM_{10} Maintenance Plan.

CO Planning Analysis: A "build/no build" test was conducted using winter emissions factors for CO instead of annual average. Average daily VMT was used to calculate CO emissions. In addition, CO emissions estimates were compared to those in the CO Limited Maintenance Plan emissions inventory and the PM_{10} Maintenance Plan. A CO planning analysis is not required by FHWA, but is a requirement of the CO Limited Maintenance Plan.

Methodology for Determining MOBILE Model Facility Speeds: First, speeds for each link in the travel demand model are VMT weighted by multiplying the congested speed of the link by its corresponding distance and daily volume:

$$SW_L = S_L * VMT_L$$

Where:

SW_L = VMT weights containing speed for each link ($miles^2$/ hour)

S_L = Congested speed of the link (miles/hour)

VMT_L = Weekday VMT for the link (miles)

The daily VMT and the VMT weights containing speed are then summed for each of the 7 modeled facility types:

$$SW_T = \sum_{1}^{n} SW_L$$

$$VMT_T = \sum_{1}^{n} VMT_L$$

Where:

SW_T = Total VMT weights containing speed for a given facility type (miles^2/ hour)

VMT_T = Total weekday VMT of a given facility type (miles)

n = number of links for a given facility type

To arrive at a final speed for each travel demand model facility, the total VMT weight containing speed for each facility type is divided by the total VMT of a given facility type:

$$S_M = \frac{SW_T}{VMT_T}$$

Where:

S_M = Speed used in MOBLIE 6.2 for a given facility type (miles/hour)

This was the methodology used to develop the on-road portion of the PM_{10} Maintenance Plan's emission inventory and motor vehicle emissions budgets.

MOBILE6.2 Modeling of Facility Types:

Travel Demand Model Interstate = MOBILE6.2 Freeways

Travel Demand Model Principal Arterials = MOBILE6.2 Arterial

Travel Demand Model Minor Arterials = MOBILE6.2 Arterial

Travel Demand Model Collectors = MOBILE6.2 Arterial

Travel Demand Model Local Roads: For local facility types MOBILE6.2 assigns a speed of 12.9 mph. However travel demand model speeds of local roads are well above 12.9 mph. Therefore emissions factors for local roads are calculated using the ratios of three MOBILE6.2 generated emissions factors:

$$EF_{local} = EF_{AS} \times \frac{EF_L}{EF_{AL}}$$

Where:

EF_{Local} = Emissions factor for local roads (grams/mile)

EF_{AS} = The MOBILE6.2 emissions factor for local roads modeled as an arterial (grams/mile)

EF_L = The MOBILE6.2 emissions factor for local roads modeled as a local road (grams/mile)

EF_{AL} = The MOBILE6.2 emissions factor for local roads modeled as an arterial at a speed of 12.9 mph (grams/mile)

Travel Demand Model Ramps: For freeway ramps, MOBILE6.2 assigns a speed of 34.6 mph. This was accepted and used for the

PM_{10} Maintenance Plan's emissions inventory.

Travel Demand Model Centroid Connectors = MOBILE6.2 Arterial. Note: Centroid connectors are more representative of a MOBILE6.2 local roadway than a MOBILE6.2 arterial. The travel demand model speeds of most centroid connectors are close to 15 mph, while the speeds of local roadways are closer to those found on minor arterials and collectors. However, an analysis conducted as part of the FY2004-2008 Northern Ada County TIP regional emissions analysis showed changing the emissions estimation methodology to have an insignificant impact on the analysis.

Road Dust Emissions

In February of 2002, Desert Research Institute (DRI) completed a study of fugitive road dust emissions from paved and unpaved roadways in Ada and Canyon Counties (*Treasure Valley Road Dust Study: Final Report*, Etyemezian et. all, DRI; February 15, 2002). It was included in Appendix F of the PM_{10} Maintenance Plan and used to establish the PM_{10} motor vehicle emissions budget for Ada County. Section 5 of the report yielded a more current and area specific emissions estimation methodology. It estimates emissions using roadway speeds and an empirically derived emissions potentials:

Unpaved Roads:

$$b = C_{C,S,T} \times s^{-x}$$

Where:
b = Roadway emissions potential (grams PM_{10}/VKT/mps)
$C_{C,S,T}$ = Constant assumed to be 8.58 grams PM_{10}/VKT/mps for dry unpaved roads in Ada County (Section 5.2 of the *Treasure Valley Road Dust Study: Final Report)*
s^{-x} = Dry emissions multiplier used to account for snow cover and precipitation on unpaved roads in Ada County (Table 5-11 of the *Treasure Valley Road Dust Study: Final Report*)

Because unpaved roads are not included in COMPASS' model networks, the *Treasure Valley Road Dust Study: Final Report* assumed unpaved roadway speeds to be 25 miles per hour (11.2 mps). The result is a constant emissions factor of 0.31 pounds road dust per mile traveled for unpaved roadways. Average daily trips on unpaved roadways in Ada County can be assumed, as in past regional emissions analyses, to be 120 vehicles per day. Paving is assumed to occur in Ada County at a rate of 1.95% a year, based on data from ACHD.

Using Table 5-11 of the *Treasure Valley Road Dust Study: Final Report* yields a winter dry emissions multiplier (s^{-x}) of 0.77 and a summer value equal to 0.90. In the past it appears that incorrect winter and summer multipliers of 0.91 and 0.94 were used in this calculation. These values result if paved road emissions multipliers from Table 5-4 are mistakenly used.

Paved Roads:

$$b = C_{C,S,T} \times s^{-x}$$

Where:
b = Roadway emissions potential (grams PM_{10}/VKT/mps)
$C_{C,S,T}$ = Constant dependant on County, setting, and season (grams PM_{10}/VKT/mps)
S = Posted speed of the roadway (mps)
x = Empirically derived exponent dependant on County, setting, and season (1/mps)

Table 5-1 in the Treasure Valley Road Dust Study contains values used in the equation above. DRI found $C_{C,S,T}$ for paved residential/local roadways to be independent of speed (x = 0). However, paved residential roadway emissions potentials were still seasonally dependant.

In order to calculate road dust emissions, emissions factors were calculated for Ada County's paved urban rural roadways during both summer and winter seasons:

$$EF_{S,T} = b_{S,T} \times s$$

Where:

$EF_{S,T}$ = Roadway PM_{10} emissions factor per setting and season (grams PM_{10}/VKT)

$b_{S,T}$ = Roadway emissions potential per setting and season (grams PM_{10}/VKT/mps)

S = Posted speed of the roadway (mps)

Individual link speeds and DRI's urban/rural setting designations were used to calculate paved road emissions factors for each roadway link in COMPASS' travel demand model network. Posted speed, in miles per hour (mph), are converted to meters per second (mps) using a conversion factor of 0.447.

Because paved road dust emissions factors change with the seasons, two emissions factors were calculated for each link: a winter factor and a summer factor. Each of these seasonal emissions factors was then adjusted to account for precipitation effects (7% reduction in the summer and 9% reduction in the winter). The seasonal emissions factors adjusted for precipitation effects were then combined, using 0.25 as the fraction of the year the winter scenario applies and 0.75 as the fraction of the year that is summer. This results in one composite emissions factor per roadway link.

PM_{10} emissions for each link were then calculated by applying the emissions factor to average weekday vehicle kilometers traveled (VKT) of the link:

$$E_{PM10,L} = EF_{C,L} \times VKT_L$$

Where:

$E_{PM10,L}$ = PM_{10} emissions for a given link (grams PM_{10}/day)

$EF_{C,L}$ = Composite PM_{10} emissions factor for a given link (grams PM_{10}/VKT)

VKT_L = Average weekday vehicle kilometers traveled for the link (VKT)

Conversion factors of 1.6 kilometers/mile and 907,184.74 grams/ton were applied to get a result in ton PM_{10}/day.

Appendix E: Emissions Adjustment Factors

Separate emissions factors were developed to account for the Canyon County resident portion of Ada County VMT. Estimates of the Canyon portion of Ada VMT were based on COMPASS' 2002 Household Travel Survey. The only difference between the Canyon County emissions factors and Ada County's are the impacts associated with the I/M program. According to the *2002 Household Travel Survey*, 32.2% of Canyon County residents commute to work in Ada County during the week. Therefore, to more accurately represent the emissions of the Canyon County vehicles commuting on Ada County roadways:

2008 Percentage Ada VMT traveled by Canyon Vehicles:

% Canyon County Emissions in Ada:

32% Canyon Pop. That work in Ada from Table 28 of the *2002 Treasure Valley Transportation Survey*

33.70% Going Home trips from Table 35 of the *2002 Household Travel Survey*
8.30% Work Trips from Table 35 of the *2002 Household Travel Survey*
5.40% Work Related Trips from Table 35 of the *2002 Household Travel Survey*

47.40% Sum of all Canyon work related trips per *2002 Household Travel Survey*

Therefore:

32% Canyon Commuting Pop. x
47.40% of Canyon Trips related to work =
15.17% Canyon Trips that involve Ada travel, based on work trips.

2008	**Average Daily Canyon VMT (From COMPASS TDM)**
Interstate	980,640
P. Art	1,236,359
M. Art	809,003
Collector	312,831
Local	15,865
Ramp	45,896
Centroid Conn.	292,459
Total	3,693,053

15.17% x 3,693,053 VMT = 560,162

560,162 VMT ÷ 7,597,767 Ada VMT = .0737

Estimated Canyon VMT that includes Ada travel, based on work trips.

.0737 x 100 =

7.37% **Of Ada's 2007 VMT from Canyon Commuters**

2010 Percentage Ada VMT traveled by Canyon Vehicles:

2010	Average Daily Canyon VMT (From COMPASS TDM)
Interstate	1,024,976
P. Art	1,306,700
M. Art	891,297
Collector	359,295
Local	17,885
Ramp	48,388
Centroid Conn.	313,712
Total	3,962,253

15.17% x 3,962,253 VMT = 600,995

600,995 VMT ÷ 8,065,266 Ada VMT = .0745

Estimated Canyon VMT that includes Ada travel, based on work trips.

.0745 x 100 =

7.45% **Of Ada's 2010 VMT from Canyon Commuters**

2012 Percentage Ada VMT traveled by Canyon Vehicles:

2012	Average Daily Canyon VMT (From COMPASS TDM)
Interstate	1,155,663
P. Art	1,438,903
M. Art	993,343
Collector	401,810
Local	19,791
Ramp	52,186
Centroid Conn.	342,842
Total	4,404,538

15.17% x 4,404,538 VMT = 668,080

668,080 VMT ÷ 8,852,595 Ada VMT = .0755

Estimated Canyon VMT that includes Ada travel, based on work trips.

.0755 x 100 =

7.55% **Of Ada's 2012 VMT from Canyon Commuters**

2015 Percentage Ada VMT traveled by Canyon Vehicles:

2015	Average Daily Canyon VMT (From COMPASS TDM)
Interstate	1,219,376
P. Art	1,567,263
M. Art	1,066,392
Collector	434,216
Local	20,796
Ramp	55,086
Centroid Conn.	367,572
Total	4,730,702

15.17% x 4,730,702 VMT = 717,553

717,553 VMT ÷ 9,465,490 Ada VMT = .0758

Estimated Canyon VMT that includes Ada travel, based on work trips.

.0758 x 100 =

7.58% **Of Ada's 2015 VMT from Canyon Commuters**

2025 Percentage Ada VMT traveled by Canyon Vehicles:

2025	Average Daily Canyon VMT (From COMPASS TDM)
Interstate	1,586,322
P. Art	1,959,354
M. Art	1,476,319
Collector	720,135
Local	29,477
Ramp	62,965
Centroid Conn.	448,230
Total	6,282,801

15.17% x 6,282,801 VMT = 952,975

952,975 VMT ÷ 11,989,544 Ada VMT = .0795

Estimated Canyon VMT that includes Ada travel, based on work trips.

.0795 x 100 =

7.95% **Of Ada's 2025 VMT from Canyon Commuters**

2030 Percentage Ada VMT traveled by Canyon Vehicles:

2030	Average Daily Canyon VMT (From COMPASS TDM)
Interstate	1,651,997
P. Art	2,552,389
M. Art	1,335,061
Collector	593,754
Local	22,345
Ramp	74,794
Centroid Conn.	470,898
Total	6,701,238

15.17% x 6,701,238 VMT = 1,016,444

1,016,444 VMT ÷ 12,857,112 Ada VMT = .0791

Estimated Canyon VMT that includes Ada travel, based on work trips.

.0791 x 100 =

7.91% **Of Ada's 2030 VMT from Canyon Commuters**

Once the percentage of Canyon vehicle travel on the Ada County's roadway network was calculated for each analysis year, emissions were estimated using the Ada VMT and network speeds for a 100% Ada fleet and a 100% Canyon fleet. The total emissions for a given analysis were the sum of the portion of Canyon fleet emissions in Ada and the portion of Ada fleet emissions:

$$E_T = E_C(VMT_F) + (E_A(1- VMT_F))$$

Where:

E_T = Total Ada County Emissions (tons/day)

E_C = Emissions resulting from a 100% Canyon County Fleet on Ada's Network (tons/day).

E_A = Emissions resulting from a 100% Ada County Fleet on Ada's Network (tons/day).

VMT_F = Fraction Ada VMT traveled by Canyon County vehicles (percentages derived above ÷ 100%).

Example:

2008 Interstate NOx Emissions =

$$\left[\left(\frac{2{,}003{,}135\,VMT/day \times 1.72\,grams/mile}{907184.74\,grams/ton}\right)\times(0.0737)\right]+$$
$$\left[\left(\frac{2{,}003{,}135\,VMT/day \times 1.86\,grams/mile}{907184.74\,grams/ton}\right)\times(1-0.0737)\right]=3.82\,TPD$$

Appendix F: 2008 Baseline Scenario, MOBILE6.2 Model Files

Ada Vehicle Input File: A08Bas.IN
Canyon Vehicle Input File: C08Bas.IN
Ada Vehicle Output Files: A08Bas.OUT, A08Bas.PM
Canyon Vehicle Output Files: C08Bas.OUT, C08Bas.PM

Appendix G: 2010 Scenario, MOBILE6.2 Model Files

"Build" Scenario
Ada Vehicle Input File: A10Act.IN
Canyon Vehicle Input File: C10Act.IN
Ada Vehicle Output Files: A10Act.OUT, A10Act.PM
Canyon Vehicle Output Files: C10Act.OUT, C10Act.PM

"No Build" Scenario
Ada Vehicle Input File: A10Bas.IN
Canyon Vehicle Input File: C10Bas.IN
Ada Vehicle Output Files: A10Bas.OUT, A10Bas.PM
Canyon Vehicle Output Files: C10Bas.OUT, C10Bas.PM

Appendix H: 2012 Scenarios, MOBILE6.2 Model Files

"Build" Scenario
Ada Vehicle Input File: A12Act.IN
Canyon Vehicle Input File: C12Act.IN
Ada Vehicle Output Files: A12Act.OUT, A12Act.PM
Canyon Vehicle Output Files: C12Act.OUT, C12Act.PM

"No Build" Scenario
Ada Vehicle Input File: A12Bas.IN
Canyon Vehicle Input File: C12Bas.IN
Ada Vehicle Output Files: A12Bas.OUT, A12Bas.PM
Canyon Vehicle Output Files: C12Bas.OUT, C12Bas.PM

Appendix I: 2015 Scenario, MOBILE6.2 Model Files

"Build" Scenario
Ada Vehicle Input File: A15Act.IN
Canyon Vehicle Input File: C15Act.IN
Ada Vehicle Output File: A15Act.OUT, A15Act.PM
Canyon Vehicle Output File: C15Act.OUT, C15Act.PM

"No Build" Scenario
Ada Vehicle Input File: A15Bas.IN
Canyon Vehicle Input File: C15Bas.IN
Ada Vehicle Output Files: A15Bas.OUT, A15Bas.PM
Canyon Vehicle Output Files: C15Bas.OUT, C15Bas.PM

Appendix J: 2025 Scenario, MOBILE6.2 Model Files

"Build" Scenario
Ada Vehicle Input File: A25Act.IN
Canyon Vehicle Input File: C25Act.IN
Ada Vehicle Output Files: A25Act.OUT, A25Act.PM
Canyon Vehicle Output Files: C25Act.OUT, C25Act.PM

"No Build" Scenario
Ada Vehicle Input File: A25Bas.IN
Canyon Vehicle Input File: C25Bas.IN
Ada Vehicle Output Files: A25Bas.OUT, A25Bas.PM
Canyon Vehicle Output Files: C25Bas.OUT, C25Bas.PM

Appendix K: 2030 Scenario, MOBILE6.2 Model Files

"Build" Scenario
Ada Vehicle Input File: A30Act.IN
Canyon Vehicle Input File: C30Act.IN
Ada Vehicle Output Files: A30Act.OUT, A30Act.PM
Canyon Vehicle Output Files: C30Act.OUT, C30Act.PM

"No Build" Scenario
Ada Vehicle Input File: A30Bas.IN
Canyon Vehicle Input File: C30Bas.IN
Ada Vehicle Output Files: A30Bas.OUT, A30Bas.PM
Canyon Vehicle Output Files: C30Bas.OUT, C30Bas.PM

Appendix L: Public Comments and COMPASS Responses

The 15-day public comment period began October 8, 2007 and ended on October 23, 2007 for the Conformity Demonstration of the FY2008-2012 Northern Ada County Transportation Improvement Program Amendment and the *Communities in Motion Amendment*. This document was presented to the COMPASS Board on November 19, 2007. No public comments were received regarding this conformity document.