# Metropolitan Tansportation Plan 2040 Air Quality Conformity Demonstration

The conformity demonstration for the Portneuf Valley Non-Attainment outlines the transportation conformity process used to demonstrate that the 2020- 2026 Transportation Improvement Program and the 2040 Metropolitan Transportation Plan follows the State Implementation Plan and Idaho Administrative Rules on conformity.

**Approved by the BTPO Policy Board on October 7, 2019**

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# Introduction

The Portneuf Valley Nonattainment Area (PVNAA) was shown to have met the $PM_{10}$ National Ambient Air Quality Standards (NAAQS) with the approval of the redesignation request and associated State Implementation Plan (SIP)/Maintenance Plan by the Environmental Protect Agency (EPA) (71 FR 39574, July 13, 2006). Federal transportation rules require that "maintenance areas" demonstrate attainment of the motor vehicle emissions budgets (MVEB) in the maintenance plan. The PVNAA is required to demonstrate that transportation activities will not cause an additional exceedance of the $PM_{10}$ NAAQS.

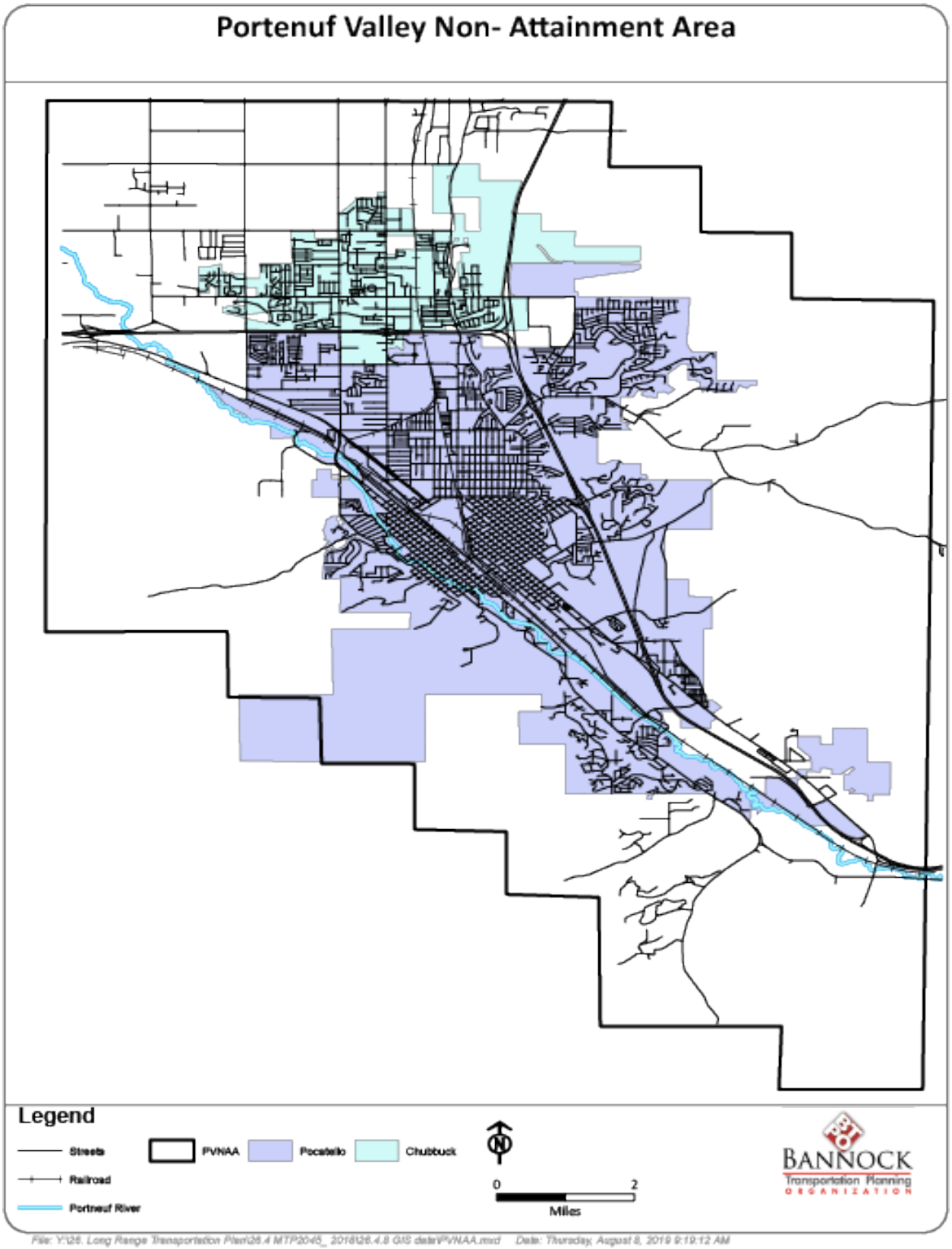
Bannock Transportation Planning Organization (BTPO) is the Metropolitan Planning Organization (MPO) for the PVNAA, and as the MPO is required to conduct a conformity determination on the Long-Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP).

Transportation conformity is the process of evaluating the planned transportation activities emissions against the Motor Vehicle Emissions Budget (MVEB) established by the SIP. The latest SIP for the Portneuf Valley Non-Attainment Area was approved by the Environmental Protection Agency (EPA) on July 13, 2006, and effective on August 14, 2006. Due to changes in the requirements for air quality modeling an amendment to that SIP and MVEB was submitted in April 2014 and was approved by EPA with an effective date of September 15, 2014 (79 FR 41647, July 17, 2014). The Code of Federal Regulation Title 40 CFR §93.100 – §93.129 and 40 CFR §51.390 provides the requirements and specification for determining transportation conformity.

The State of Idaho Rules for the Control of Air Pollution in Idaho IDAPA 58.01.01.563 through 58.01.01.574 describes the rules and procedures for determining transportation conformity.

The procedure to determine if the Long-Range Transportation Plan or Transportation Improvement Program conforms to the SIP is the budget test. The budget test compares emissions from a specific action such as an update of the LRTP or TIP to the emissions limitation established in the budget referred to as the Motor Vehicle Emissions Budget (MVEB).

*Figure 1 Portneuf Valley Non-Attainment Area*



## Interagency Consultation

The State of Idaho Rules for the Control of Air Pollution in Idaho IDAPA 58.01.01.567 requires an Interagency Consultation Committee with representatives from local, state, and federal agencies with interest in transportation air quality. The development of conformity determination for the 2040 Metropolitan Transportation Plan and the 2020 – 2026 Transportation Improvement Program included consultation from the ICC.

The PVNAA ICC reviewed the assumptions and methodologies used in the development of the conformity determination. The ICC reviewed the project list including an evaluation of a regionally significant project at their July 8, 2019 meeting. The July meeting and follow-up meeting on August 5, 2019, established the horizon years for the budget test. Appendix A provides a summary of both meetings.

## Time Horizons

40 CFR §93.106(d)(1) and 40 CFR§93.106(d)(2) allow the modification of the time horizon if the Policy Board, in conjunction with IDEQ and other stakeholders agree. In the past conformity determinations, BTPO has elected to modify the time frame of the conformity determination and has used a shortened time frame. BTPO has elected to not the shortened time frame since there was no saving in time or effort.

In analyzing the time frame requirements in 40 CFR §93.106(a)(1), 40 CFR §93.106(d)(1) and 40 CFR §93.118(b)(2) the following horizon or analysis year have been identified:

- Horizon Year 2020 – This is the last year of the Motor Vehicle Emission Budget and within ten years of the validation of the 2015 travel demand model per 40 CFR §93.106(d)(2)(i)(B)
- Horizon Year 2030 – The horizon years must be with ten years. per 40 CFR §93.106(a)(1)(ii)
- Horizon Year 2040 - 40 CFR §93.106(a)(1)(i) requires the last year of the 2040 MTP to be a horizon year.

# Portneuf Valley Non-Attainment Area Transportation Conformity Assumptions

The TDM[1] and Portneuf Valley $PM_{10}$ Maintenance Plan Amendment[2] documents provide a detailed description of inputs used in the development of conformity models. Both the TDM and the MOVES model are complicated software packages which used local data to reproduce or simulate either travel or emissions for existing and future conditions. This section discusses the key assumptions or inputs for the TDM and MOVES models.

[1] http://bannockplanning.org/wp-content/uploads/2015-Travel-Demand-Model-Documentation-Approved.pdf
[2] https://www.deq.idaho.gov/media/1117336/portneuf-valley-pm10-maintenance-plan-amendment-0414.pdf

## Emissions Model

The EPA approved Motor Vehicle Emissions Simulator Model (MOVES2014) on October 7, 2014, as the official model for conducting transportation conformity. EPA also provided a two-year grace period beginning October 7, 2014, and ending October 7, 2016, to implement the MOVES2014 for transportation conformity (79 FR 60343 October 7, 2014). MOVES2014b was used to complete this conformity analysis. The MOVES model provides vehicle emissions for Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOCs) and a portion of Particulate Matter less than ten microns ($PM_{10}$). The paved road dust portion of $PM_{10}$ is calculated using the 2011 AP-42 Compilation of Air Pollutant Emission Factors – Chapter 13.

## MOVES2014b Input Assumptions

National emissions data is the basis of the MOVES model. Local data replaces some of the national data set to improve the accuracy of the MOVES model.

### *Vehicle Fleet Key Assumptions*

Vehicle population and age distribution came from the following four sources::

- Cars, motorcycles, trucks and light commercial trucks – Idaho DMV
- Intercity and transit buses – Phone interview with providers
- School buses – Idaho Department of Education
- Commercial trucks – Short and long haul – National defaults

The vehicle population data was for Bannock County. The 2010 census population percentage of the PVNAA to the county population was 89.3 percent. That percentage was used to scale those populations with local data. Populations with national data of VMT from local sources was used to scale the national defaults.

The Idaho Department of Environmental Quality developed Vehicle Age Distribution data for Bannock County using a VIN –decoded vehicle registration data. The emissions inventory and all of the conformity runs use the same age distribution.

### *Fuel-Related Key Assumptions*

All analysis years use the national default fuel supply. National defaults were used to account for alternative-fueled vehicles, which are the setting used in the Portneuf Valley $PM_{10}$ Maintenance Plan Amendment.

### *Meteorology Key Assumptions*

Meteorology inputs including average hourly temperature, relative humidly and precipitation came from observed data for 2011 at the Pocatello Regional Airport. All conformity runs use the 2011 meteorological data used in the development of the 2014 Maintenance plan.

## *Paved Road Dust Key Assumptions*

The January 2011 AP-42 Compilation of Air Pollutant Emission Factors Section 13.2.1 Paved Roads Equation 2[3] was used to determine the daily paved road dust emissions. The emissions for each roadway type are the product of the emission factors and the VMT each day. Components of the road dust equation are VMT, road surface silt loading, average vehicle weight, and precipitation. Differences in silt loading during winter and summer season requires defining the seasons. The period November 1 – February 29 is the winter season and the period from April 1 – October 31 is the winter season. The method used is the same method used in the Portneuf Valley $PM_{10}$ Maintenance Plan Amendment.

$$E_{ext} = [K\ (sL)^{0.91}\ X\ (W)^{1.02}]\ X\ (1 - P/4N)$$

Were

Eest = $PM_{10}$ or $PM_{2.5}$ emission factor in the same units as k

K = particle size multiplier (1.0 for $PM_{10}$) (grams/VMT)

sL = road surface silt loading (grams per square meter)

W = average weight of the vehicles traveling the road (tons)

(E*quation 2 from January 2011 AP-42 Compilation of Air Pollutant Emission Factors Section 13.2.1 Paved Roads)*

Vehicle Miles Traveled: VMT is generated from the TDM outputs along with ATR data to get hourly distribution by roadway type.

Silt Loading: Silt loading is the average amount of material on the road. Due to changes in road sanding the PVNAA now uses national defaults. Silt loading for paved road emission calculations is available in Table 8 of the Portneuf Valley $PM_{10}$ Maintenance Plan Amendment.

Average Vehicle Weight: All horizon years use the national default average vehicle for each vehicle type.

Precipitation Data: If there is a day with more than a trace of precipitation (≥0.01 inches) that day is considered not to have measurable road dust. Data came from the MESOWEST and Western Regional Climate Center and was for 2011. 2020, 2030, and 2040 horizon year use the 2011 data.

## *Vehicle Miles Traveled Conversion*

The BTPO Travel Demand Model (TDM) provides the average annual weekday traffic (AAWDT) for the PVNAA area for each time horizon. Automatic Traffic Recorder (ATR) data is used to convert the AAWDT into hourly, daily, and monthly traffic volume. The ATR data set used here

[3] https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf

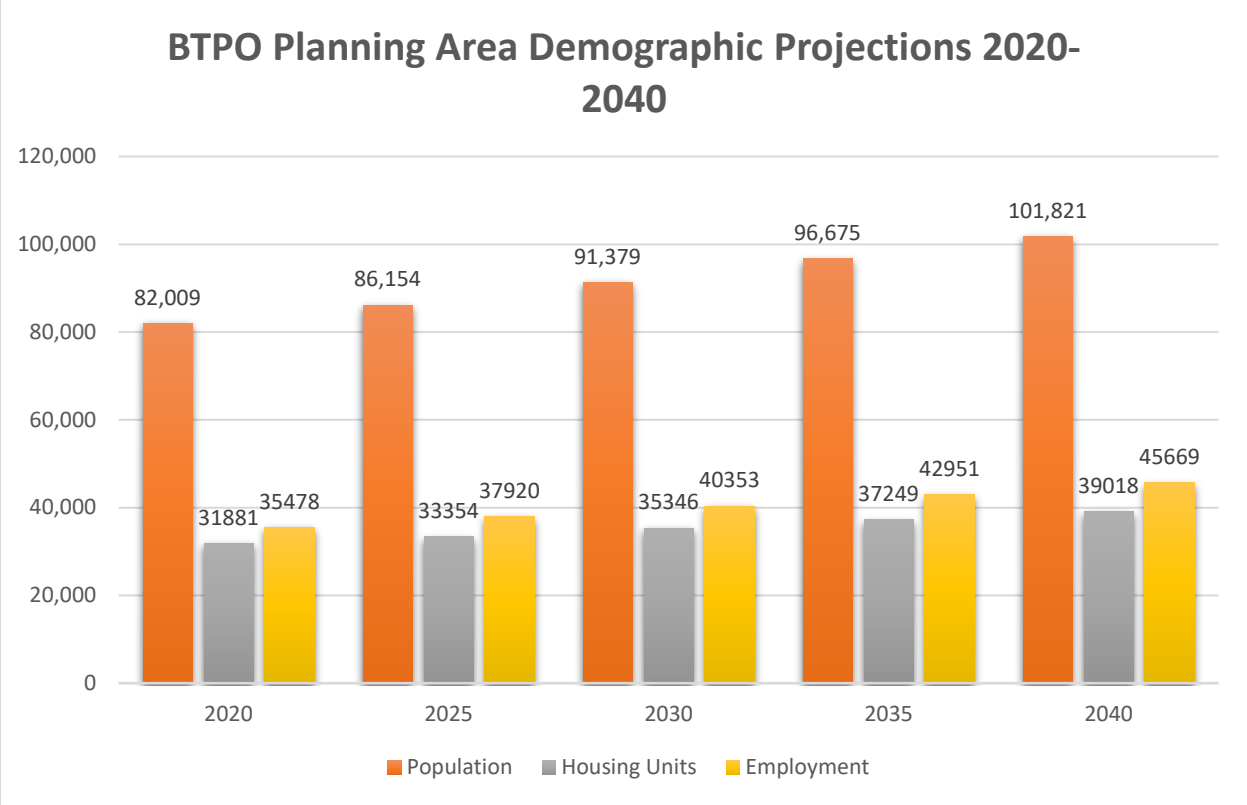
is from ITD covering 2016-2017. The data set includes a total of one hundred and six (106) ATR sites with complete data in southern Idaho counties. Combined with the vehicle mix datasheet updated on May 2018 by ITD, From this data, the VMT and VHT related MOVES input files are produced

## Travel Demand Model

The BTPPO travel demand model provides an average annual daily traffic estimate for the PVNNA area. BTPO's travel demand model software is TransCAD, and the current version is TransCAD 8.0. The TDM was validated and calibrated with a 2015 base year. The TDM models all roads in the PVNAA. The 2018 actual road network is the initial transportation network. The horizon year network includes changes identified in the projects listed in section 3. The 2015 travel model documentation is available on BTPO's website (https://www.bannockplanning.org/travel-demand-model/).

In 2019, BTPO updated 2020, 2030, 2035, and 2040 demographic projections. The construction of the Northgate interchange required an evaluation of the demographic projections. Figure 3 provides the population, housing unit, and employment projections from 2020 to 2040.

*Figure 2 Demographic Projections for 2020 to 2040*



## Mode Split Assumptions

Built into the TDM is a method to account for non-vehicle travel. While this method is not an official mode split model, it does assume which percentage of trips from district to district would use transit, walking, or bicycling as a mode of travel. In this method, the number of riders is constant over the twenty years of the TDM.

## Travel Demand Model Assumptions

### *Vehicle Miles Traveled Inputs*

Household Disaggregation: A conversion table, based on the 2012 household survey, converted households into a household size and the number of workers per household.

Trip Generation: The TDM uses six trip purposes to calculate the average weekday person trips. The trip purposes are:

- HBW – Home Base Work
- HBC – Home Base College
- SCH – Home Based School
- HBS – Home Based Shopping
- HBO – Home Based Other
- NHB – Not Home Based

Trip Distribution: The 2012 household survey is the bases of the destination choice model. The Destination choice models help reproduce the vehicle travel patterns in the PVNAA.

Mode Split: The model split model uses a simple lookup table of auto share by district production-attraction pairs as calculated from the household survey by trip purpose.

TDM Vehicle Miles Traveled (VMT): The TDM provides output in the form of Average Annual Weekday Traffic. Vehicle Miles Traveled is calculated by multiplying the length of each road segment by the ADT of that segment.

Road Types: The TDM and MOVES use different roadway types. A crosswalk table converts the TDM road types into the four road types used by MOVES.

### *Vehicle Hours Traveled (VHT) Key Assumptions*

VHT characterize the time spent traveling and the average speed of a vehicle traveling on specific road type. The Akcelik volume-delay function from the TDM was used to adjust the average speed to account for congestion. The MOVES and TDM models use the same Akcelik volume-delay function (Equation 1).

*Equation 1 Akcelik Volume Delay Function*

$$R = R_0 + D_0 + 0.25T\left[(x-1)+\sqrt{\left((x-1)^2+\frac{16J\cdot X\cdot L^2}{T^2}\right)}\right]$$

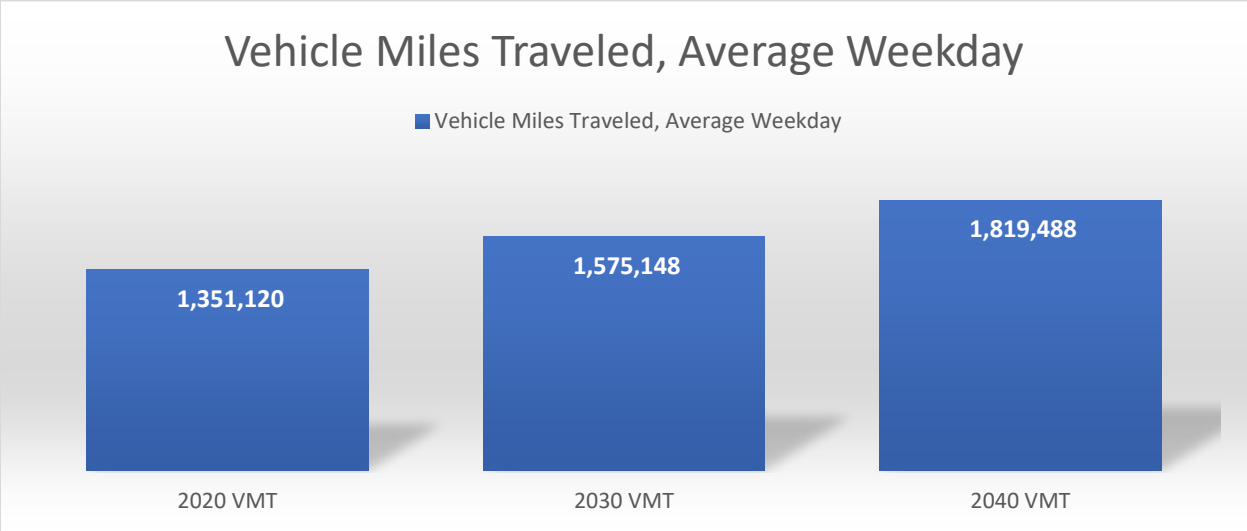
Where:

$R$ = Link traversal time
$R_0$ = Free flow link traversal time
$D_0$ = zero flow control delay
$T$ = expected duration of demand
$X$ = flow to capacity ratio
$J$ = calibration parameter
$L$ = Link length

## Travel Demand Model Output

Figure 3 provides the results for 2020, 2030, and 2040, the three horizon years.

*Figure 3 Vehicle Miles Traveled Estimated for Horizon Years*




# Projects Included in the Transportation Conformity Determination

Transportation conformity is designed to ensure that emissions from the transportation activities within the area will not exceed the MVEB for that area. Transportation conformity at a program level pertains to the Metropolitan Transportation Plan and the Transportation Improvement Program (TIP). The MTP includes all the TIP projects.

Table 1 lists the 2025 horizon year projects modeled by the TDM. BTPO made no additional modifications to the street network for 2030 or 2040. Table 2 lists the projects exempt from the regional conformity determination requirement.

*Table 1 - 2025 Horizon Year Projects*

| Key Number | Project Name | Activity | Year of Activity | Sponsor |
|---|---|---|---|---|
| B1001 | E. Siphon Road- Whitaker Road to Hiline Rd | The project will widen E. Siphon Road from 2 to five lanes including bicycle facilities | 2021 | Chubbuck |
| 21860 | Yellowstone - Park Lawn and Siphon | The project will widen the Yellowstone Avenue from two to five lanes | 2024 | ITD |
| Sponsor Codes: BPO = Bannock Transportation Planning Organization; Chubbuck = City of Chubbuck; Pocatello = City of Pocatello PRT = Pocatello Regional Transit; ITD = Idaho Transportation Department. | | | | |

CFR 40 §93.126 and CFR 40 §93.127 lists the project types which are exempt from conformity determinations. Table 2 lists the exempt projects included in the FY 2020 – 2026 Transportation Improvement Program.

*Table 2 Projects in FY 2020 -2026 TIP which are exempt from conformity determination requirements*

| Key Number | Project Name | Activity | Year of Activity | Reference |
|---|---|---|---|---|
| 13800 | Pocatello UZA Operations | Operations provide funds for the day to day operations of the PRT fixed-route system. | 2019-2022 | Table 2 |
| 13801 | Pocatello UZA Capital | Capital Facility Lease provides funds to lease a transfer station for the fixed transit route system | 2019-2022 | Table 2 |
| 13802 | Pocatello UZA Demand Response Operation | Demand Response Operations provides door to door transit service for elderly and disabled persons in the Pocatello urban area. | 2019-2022 | Table 2 |

| Key Number | Project Name | Activity | Year of Activity | Reference |
|---|---|---|---|---|
| 13803 | Pocatello UZA Preventive Maintenance | Provide all maintenance costs related to vehicles, including supplies, materials, labor, services, and associated costs required to preserve or extend the life of transit vehicles. | 2019-2022 | Table 2 |
| 19755 | Pocatello UZA Capital | The Capital Vehicle Replacement project will purchase new or buses to replace those buses which are beyond their useful life. An estimated four busses will be purchased | 2019-2022 | Table 2 |
| 22128 | Pocatello UZA Capital | Bus shelter and new stop improvements at the intersection of Day Street and Grant Street | 2020 | Table 2 |
| 19527 | FY 2020 BTPO Metropolitan Planning | Planning | 2020 | Table 2 |
| 19952 | FY 2021 BTPO Metropolitan Planning | Planning | 2021 | Table 2 |
| 20432 | FY 2022 BTPO Metropolitan Planning | Planning | 2022 | Table 2 |
| 20432 | FY 2023 BTPO Metropolitan Planning | Planning | 2023 | Table 2 |
| New | FY 2024 BTPO Metropolitan Planning | Planning | 2024 | Table 2 |
| 21911 | Yellowstone Ave; Breneman to Knudsen | Safety improvement to add a median to the center turn lane | 2025 | Table 2 |

| Key Number | Project Name | Activity | Year of Activity | Reference |
|---|---|---|---|---|
| 19867 | FY 20, N Bannock County Pavement Preservation Project | Seal Coats at various locations In Northern Bannock County | 2020 | Table 2 |
| 12099 | The intersection of Hawthorne and Quinn | Improve capacity by installing a signal or other traffic control device | 2024 | Table 3 |
| 20589 | I-86/I-15 Interchange Complex | Updates to the interchange complex including repair or replacement of bridges and ramps | 2025 | Table 3 |
| 22094 | State, FY 20 Pocatello 15 ADA Ramps | Construct 15 ADA Ramps on  in Pocatello | 2020 | Table 2 |
| ORN22450 | State, FY 21 Pocatello 15 ADA Ramps | Construct 15 ADA Ramps on  in Pocatello | 2020 | Table 2 |
| 12098 | Center Street Underpass | Bridge Rehabilitation | 2025 | Table 2 |
| ORN05002 | S. 5th Avenue Safety Improvement | Sidewalks and crosswalks | 2022 | Table 2 |
| ORN21827 | I-15B, Cedar to Flandro | Mill and inlay | 2021 | Table 2 |
| Sponsor Codes: BPO = Bannock Transportation Planning Organization; Chubbuck = City of Chubbuck; Pocatello = City of Pocatello PRT = Pocatello Regional Transit; ITD = Idaho Transportation Department. | | | | |
| Projects types included in this list are listed in 40 CFR §93.126 and 40 CFR §93.127 and are exempt for the conformity requirements. | | | | |
| | | | | |

## Motor Vehicle Emissions Budget

The PVNAA Motor Vehicle Emission Budget has been updated to reflect emission modeling with the MOVES model and the revised State Implementation Plan

*Table 3: PVNAA Revised Motor Vehicle Emission Budget*

| Year | $PM_{10}$ (TPY) | $NO_x$ (TPY) | VOC (TPY) |
|---|---|---|---|
| 2020 | 498 | 856 | 651 |

## Results

Tables 4, 5, and 6 demonstrate that the transportation emission outputs of the MOVES2014b model and Road Dust calculations from AP 42 13.2.1 are less than the MVB for horizon years 2020, 2030 and 2040. Therefore, the proposed 2020 to 2026 TIP and 2040 MTP passes the budget test for all three pollutants and conforms to the State Implementation Plan.

*Table 4: VOC Budget Test, Tons per Year*

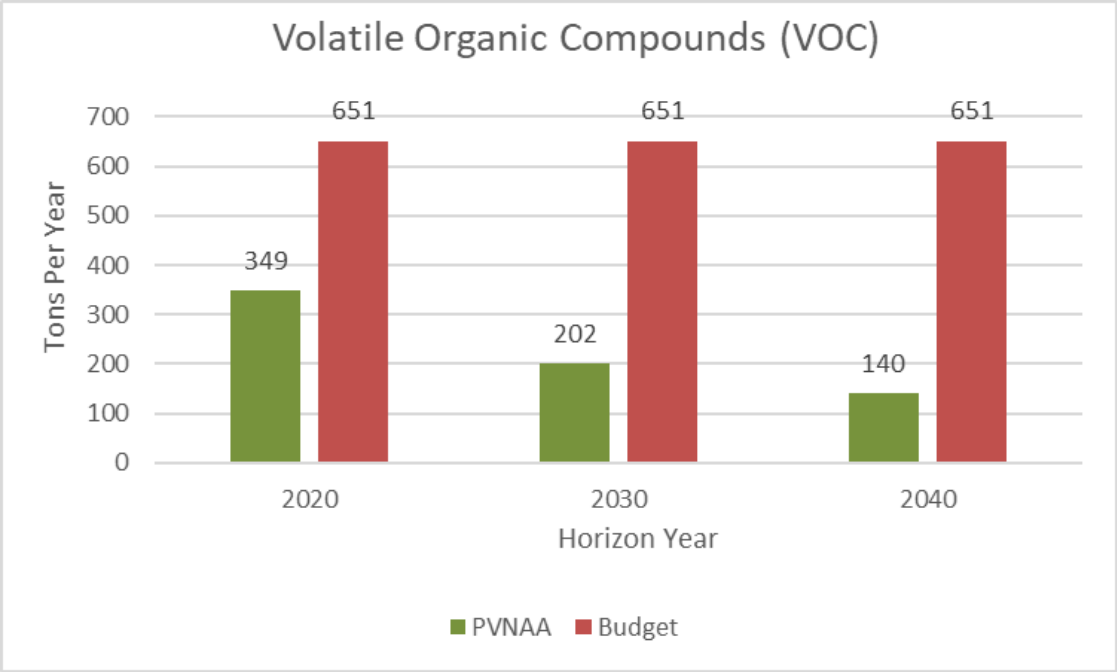


*Table 5: NOx Budget Test, Tons per Year*

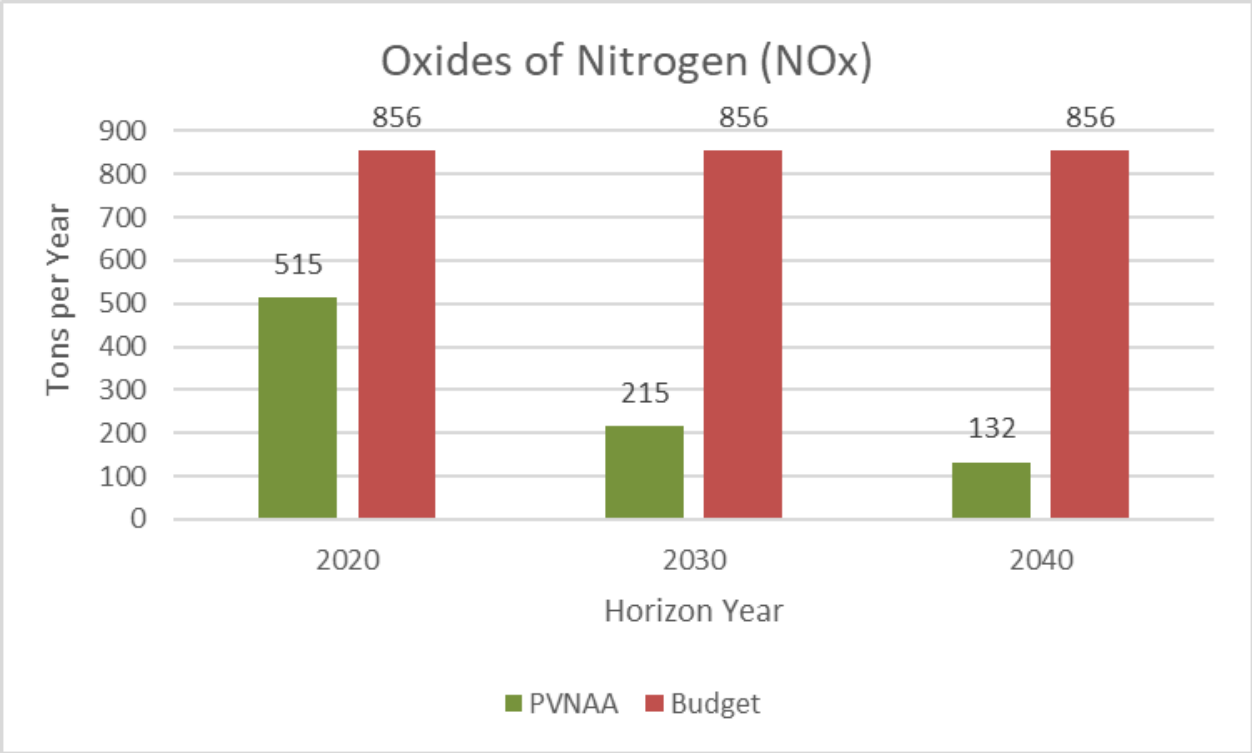
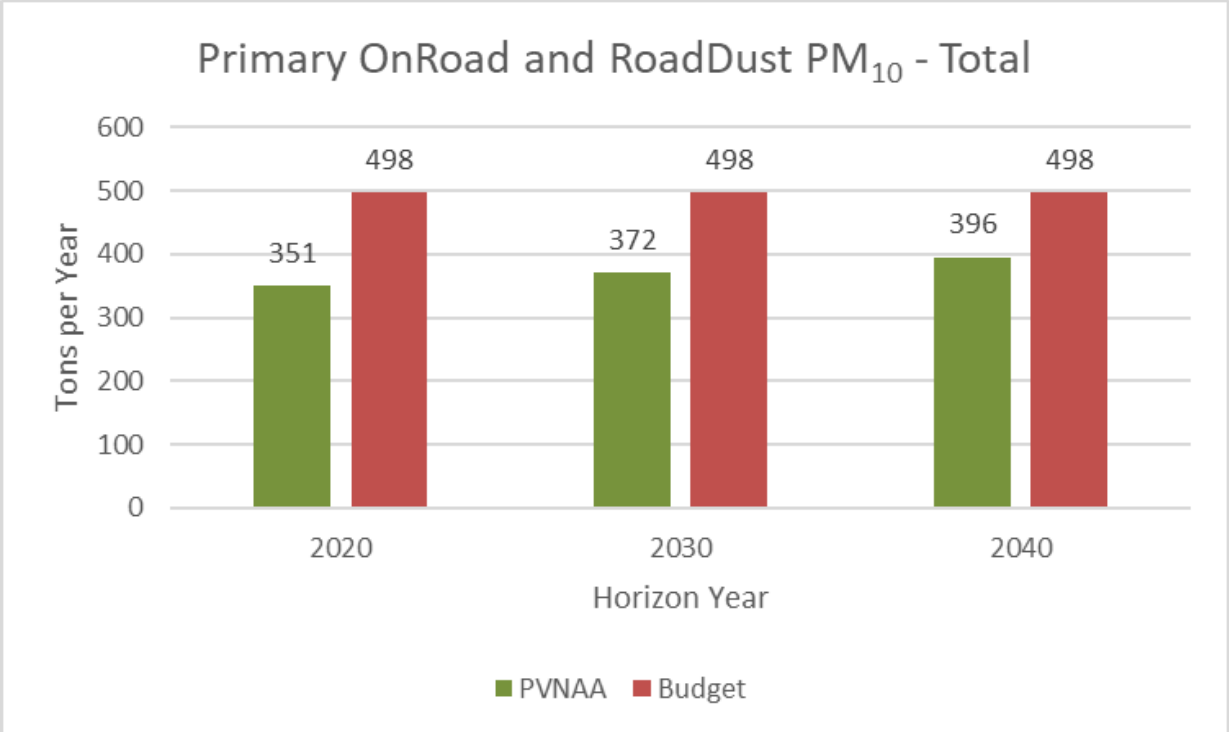



*Table 6: $PPM_{10}$ Budget Test, Tons Per Year*



# *Appendix A. ICC Meeting Summaries*

**Bannock Planning Organization**

**Interagency Consultation Committee Meeting**

**Monday, July 8, 2019**

**11:00 am**

**BTPO Office**

**Minutes**

**Members Attending**:

Karl Pepple – Environmental Protection Agency

Kimi Smith - Idaho Department of Environmental Quality

Aislinn johns - Idaho Department of Environmental Quality

Scott Frey – Federal Highway Administration

Ned Conroy – Federal Transit Administration

Mori Byington – BTPO

**Agenda Item #1 – Emission Modeling Assumptions**

Mori Byington started provided an overview of the conformity assumptions, emission models, and time horizon. The committee discussed each of the subjects in order. Scott Fry asked for additional clarification on the use of automatic traffic recorder (ATR) data. The ATR data is from southern Idaho location not including the counties of Ada and Canyon; The ATR data is used to adjust or factor the daily count output of the travel demand model into monthly, monthly, and daily factors for each day of the year. Scott Fry provided more information about the use of ATR data related to 48-hour traffic counts. Karl Pepple ask who provided the ATR data. The ATR data is supplied to IDEQ by ITD.

Mori Byington reviewed the emissions model used in the conformity determination. Scott Frey asked about the calibration data of the model and why it needed to be with ten years of the calibration date. After a committee discussion of the regulation and the wording of the description, the decision was made to change the calibration to validation. The new description is; "Vehicle Miles Traveled – TransCAD 8.0 with a validation date of 2015". Karl Pepple asked about using MOVES 2014a instead of 2014b. Kimi Smith said that IDEQ would be using MOVES 2014b in the analysis.

Mori Byington reviewed the four proposed time horizons and indicated the years and reference were from Scott Frey's summary of the May meeting as IDEQ headquarters. The

four-time horizons are 2020, 2030, 2040, and 2045. Karl Pepple added that the rules do allow for a reduction of runs to 2020, 2026, and 2045. Mori indicated that keeping the horizons on the five-year intervals of the demographic projects is preferred.

**Agenda Item #2 - Regionally Significant Project**

Mori Byington provided an overview of the Siphon Road widening project and why it qualified as a regionally significant project. The TDM modeling included the Siphon Road widening. Therefore, the regional conformity determination includes the Siphon Road widening project. Scott Frey brought up the idea that the project was included in the Federal-aid Interchange project's environmental and could be considered as federally funded. Either way, Siphon Road widening from Whitaker Road to Yellowstone Avenue is included in the conformity determination.

**Agenda Item #3 – 2045 Metropolitan Transportation Plan Project Lists**

Mori Byington reviewed list one those projects in the 2025 conformity determination and Table 2 those projects exempt from conformity. Scott Fry asked about additional projects from the Long-Range Transportation Plan (LRTP). The 2045 LRTP will not include any federally funded projects, just a list of unfunded needs called the illustrative list. There was a discussion of funded and unfunded projects. Mori also updated the committee that even though the I-86/I-15 Interchange complex is listed as an exempt, the TDM was modified to show the capacity and movement of I-15 mainline lanes. The committee discussed the intersection of Hawthorne and Quinn as a potential project, but it was decided that the project is exempt for regional conformity.

**Additional Items –** after Item three, the committee discussed the timeline for submittal of the regional conformity determination. Mori told the group that the LRTP conformity would be submitted with the draft plan in August, and the same conformity determination would be submitted with the STIP in November.

**Bannock Planning Organization**

**Interagency Consultation Committee Meeting**

**Monday, August 5, 2019**

**2:00 pm**

**Conference call**

**Minutes**

**Members Attending**:

Karl Pepple – Environmental Protection Agency

Brian= Himes - Idaho Department of Environmental Quality

Kimi Smith - Idaho Department of Environmental Quality

Aislinn Johns - Idaho Department of Environmental Quality

Scott Frey – Federal Highway Administration

Clay Woods - Idaho Department of Environmental Quality

Melissa Gibbs - Idaho Department of Environmental Quality

Mori Byington – Bannock Transportation Planning Organization

**Topics Discussed**

**Metropolitan Transportation Plan Forecast Year**

Bannock Interagency Consolation Committee discussed that the 2045 horizon year was not meeting the $PM_{10}$ Motor Vehicle Emissions Budget (MVEB), but the 2040 horizon year does meet the budget test. The committee discussed the option of keeping the MTP horizon year of 2040. With the MTP horizon year at 2040 the question regarding the planning required for a twenty-year forecast period and if the 2040 horizon period for the MTP would need to move to 2041 when the Transportation Improvement Program is undated in 2020?

Scott Frey reviewed the understanding of 23 CFR §450.324 is the twenty-year forecast period refers to the date federal approval of the MTP conformity determination occurs. The MPO has four years from that date before the twenty-year forecast horizon year would change.

The group consensus was the MTP forecast year should be 2040 and that forecast year is good for four years from the effective date of the MTP conformity determination,

**Reasons for the budget Overage**

Karl asked IDEQ about the reasons the PM10 budget was so far over the MVEB. Brian reviewed the history of the change in the MVEB when the change from MOBILE to MOVES occurred. The majority of the PM10 emissions comes from road dust. The assumption was that 100% of the NOX would be converted to Ammonium Nitrate. The 100% convergence is very conservative, and if the convergence rate were 75% the margin safety for PM10 would allow an increase above the current 498 tons per year.

The next step is for BTPO to complete the conformity determination on the 2040 MTP and for IDEQ to work on an amendment to the $PM_{10}$ budget.