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APPENDIX G: AIR QUALITY CONFORMITY ANALYSIS FOR THE DRAFT 2023-2026 REGIONAL TRANSPORTATION IMPROVEMENT PROGRAM

Introduction

This paper documents the positive air quality findings of the draft 2023-2026 Regional Transportation Improvement Program (TIP) for conformity with the State Implementation Plan for Air Quality (SIP). Required under the federal Clean Air Act, a SIP provides a blueprint of how current and former nonattainment areas will meet and maintain the National Ambient Air Quality Standards (NAAQS). Positive findings of conformity are required by the federal Clean Air Act, the Infrastructure Investment and Jobs (IIJA) Act and the Clean Air Washington Act. A positive conformity finding will allow the region to proceed with implementation of transportation projects in a timely manner.

As demonstrated in the sections below, PSRC has determined the draft 2023-2026 Regional TIP conforms to the Washington State Implementation Plan as required by the federal Clean Air Act and the state Clean Air Washington Act. This includes an emission analysis demonstrating that on-road transportation emissions are expected to be below the motor vehicle emissions budgets specified in the State Implementation Plan (SIP).

Transportation conformity is a mechanism for ensuring that transportation activities -- plans, programs and projects -- are reviewed and evaluated for their impacts on air quality prior to funding or approval. The intent of transportation conformity is to ensure that new projects, programs and plans do not impede an area from meeting and maintaining air quality standards. Specifically, regional transportation plans, improvement programs and projects may not cause or contribute to new violations, exacerbate existing violations, or interfere with the timely attainment of air quality standards or the required interim emissions reductions towards attainment. Meeting conformity requirements takes the collective participation of all jurisdictions and agencies that implement transportation projects and programs within the central Puget Sound region.

Air Quality Status

Air quality conformity must be addressed for areas designated by the U.S. Environmental Protection Agency (EPA) as nonattainment or maintenance for specific pollutants. This section outlines the status of the Puget Sound region for each of the six criteria air pollutants and the respective obligations related to transportation conformity. The federal Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants: particulate matter (fine particulates, $PM_{2.5}$, and coarse particulates, PM_{10}), ground-level ozone, carbon monoxide (CO), sulfur oxides,

nitrogen oxides (NO_X), and lead. Areas of the country where there have been exceedances of the NAAQS may be designated by the U.S. Environmental Protection Agency (EPA) as “nonattainment” for a particular pollutant.

The Clean Air Act requires states to develop a general plan to attain and maintain the NAAQS in all areas of the country and a specific plan to attain the standards for each area designated nonattainment for any pollutant. These plans, known as State Implementation Plans or SIPs, are developed by state and local air quality management agencies and submitted to EPA for approval. A nonattainment area that has demonstrated pollutant concentration levels below the NAAQS may be redesignated to attainment. These areas are subject to an EPA-approved maintenance plan that is included as part of the SIP and are commonly referred to as maintenance areas.

Within the Puget Sound region, there is currently a $PM_{2.5}$ maintenance area. The region is in attainment of all other criteria pollutants. Figure 1 on the next page shows the location of the current, and former, nonattainment and maintenance area boundaries. More information on these areas is provided below.

In 2008, a portion of Pierce County was designated as nonattainment for $PM_{2.5}$. This area is located in the Wapato Hills-Puyallup River Valley area near Tacoma. Effective March 12, 2015, the region was redesignated by the EPA as attainment with an approved maintenance plan for $PM_{2.5}$. $PM_{2.5}$ nonattainment and maintenance areas must consider sources of indirect $PM_{2.5}$ emissions because they can result in formation of $PM_{2.5}$ emissions. NO_X is considered a $PM_{2.5}$ precursor; therefore, NO_X emissions are addressed as part of the $PM_{2.5}$ conformity demonstration. Other pollutants can be considered $PM_{2.5}$ precursors but were not identified in the SIP as having a significant contribution to $PM_{2.5}$ emissions within the maintenance area.

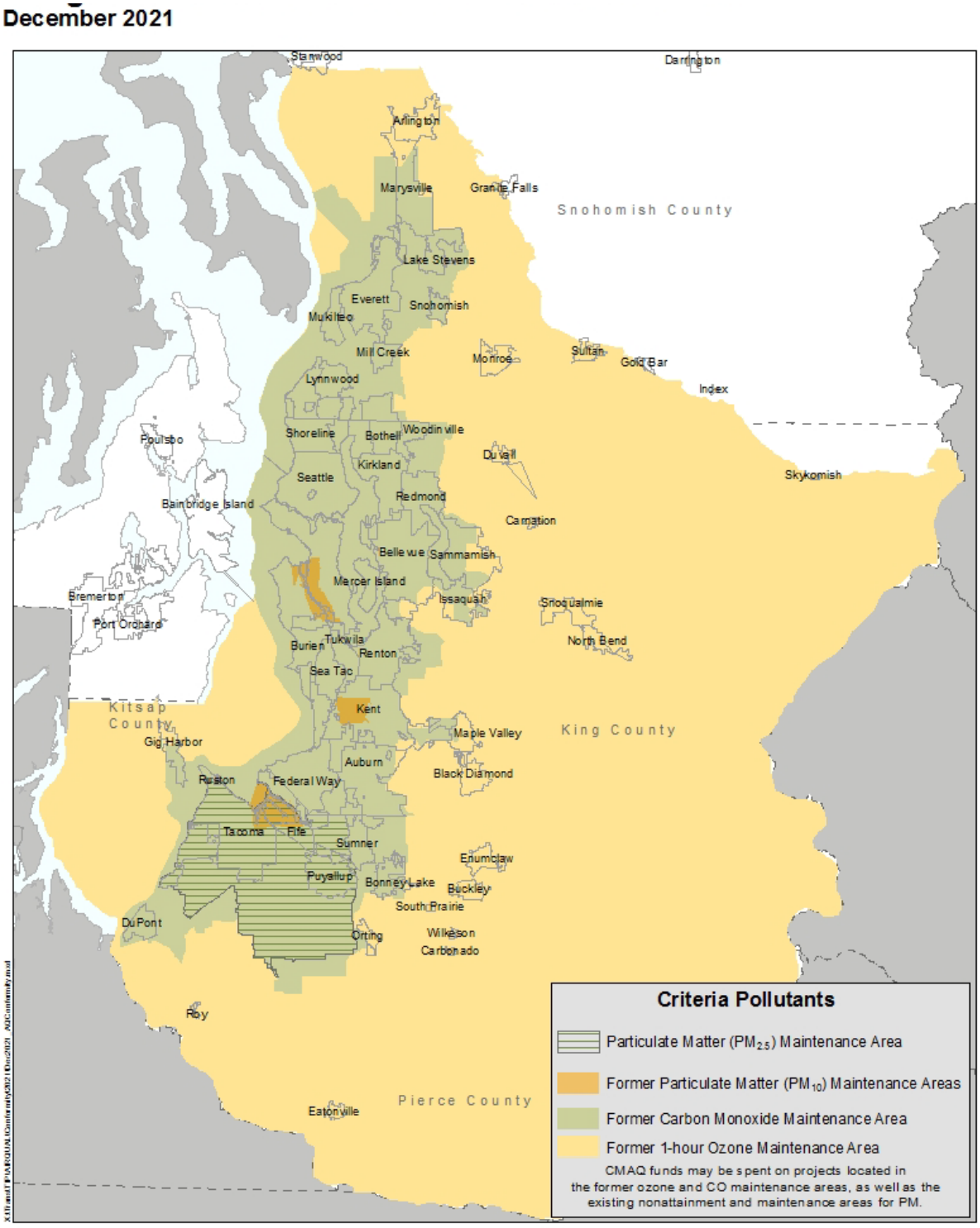
In 1987, the industrial areas of the Seattle Duwamish River, Kent Valley and Tacoma Tideflats were classified as nonattainment areas for PM_{10}. The three PM_{10} areas were redesignated as attainment with an approved maintenance plan effective May 14, 2001. EPA approved a limited maintenance plan for conformity purposes on May 30, 2014, resulting in a regional emissions analysis no longer being required to demonstrate conformity for the three PM_{10} areas.[1] EPA released the final approval of the limited maintenance plan on August 20, 2014. On August 16, 2021, the areas reached the end of the 20-year maintenance period for PM_{10}; transportation conformity is no longer required for PM_{10} in the region as of this date.

[1] Additional requirements still apply under a Limited Maintenance Plan, including consultation, the implementation of any outstanding TCMs, and project level analyses.

In 1978, the central Puget Sound region was classified as a nonattainment area by EPA for carbon monoxide (CO). In 1996, having met the federal standards for several years, the region was redesignated by the EPA as attainment with an approved maintenance plan for CO. On October 11, 2016, the area reached the end of the 20-year maintenance period for CO; transportation conformity is no longer required for CO in the region as of this date.

The region was previously a maintenance area for the original 1-hour ground-level ozone standard; a newer standard based on an 8-hour average concentration replaced the 1-hour standard as of June 15, 2005. The 1-hour standard was revoked, and conformity no longer applies. The region is currently designated as Unclassifiable / Attainment for the 8-hour ground-level ozone standard. The former ozone maintenance area is included on the map in Figure 1 because the area is still eligible for funds from the Congestion Mitigation Air Quality (CMAQ) Program.

Figure 1 – Current Central Puget Sound Region Designated Maintenance and Nonattainment Areas



Conformity Analysis Requirements

Transportation conformity is required by the Clean Air Act section 176(c) (42 U.S.C. 7506(c)) to ensure that federal funding and approval are given to highway and transit projects that are consistent with ("conform to") the air quality goals established by a SIP. Conformity to the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS.

Section 93.109 of the federal conformity rule identifies the applicable criteria and procedures for determining conformity of transportation plans, programs and projects, which are further detailed in sections 110-119. The sections applicable to TIPs are summarized below.

> *Section 93.110: The conformity determination must be based on the latest planning assumptions.*[2]
> *Section 93.111: The conformity determination must be based on the latest emissions estimation model available.*
> *Section 93.112: The MPO must make the conformity determination according to consultation procedures identified in the conformity rule.*
> *Section 93.113: Plans and TIPs must provide for the timely implementation of transportation control measures (TCMs) from the applicable SIP.*
> *Section 93.118: Regional emissions must be less than or equal to the motor vehicle emissions budgets established in the applicable SIP or submitted SIP revision.*

The TIP implements PSRC's Regional Transportation Plan, and all projects submitted for inclusion in the TIP undergo a rigorous review for consistency with the plan. All regionally significant projects[3] must be individually listed as projects in the plan; all other projects are reviewed for consistency with the policies contained in the plan. All applications for TIP amendments are reviewed to verify that the project changes do not affect the conformity finding; any change in scope to a regionally significant project must be captured in the plan before the revised project is allowed into the TIP.

All projects in the Draft 2023-2026 Regional TIP have been previously included in the most recent regional conformity finding, which occurred as part of the Regional

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[2] This requirement is further clarified in the joint FHWA/EPA Memorandum, "Guidance for the Use of Latest Planning Assumptions in Conformity Determinations," dated December 2008.

[3] Defined as Regional Transportation Plan Regional Capacity Projects; more details may be found on PSRC's website at https://www.psrc.org/planning-2050/regional-transportation-plan.

Transportation Plan adopted in May 2022. There were no new regionally significant projects submitted to the TIP that were not already included in the plan, nor were there any modelable changes to regionally significant projects. Therefore, the analysis conducted as part of the Regional Transportation Plan reflects the conformity analysis for the Draft 2023-2026 Regional TIP. Additional information on the conformity analysis requirements listed above is provided in the next section.

Latest Planning Assumptions

The federal conformity rule includes procedures for estimating regional emissions for transportation conformity analyses (§93.122). The process for estimating regional emissions for conformity analyses involves the integration of PSRC's land use and travel demand modeling with EPA's emissions factor model. The land use and travel demand modeling must be based on the latest planning assumptions. The following sections describe the technical analysis used for the RTP conformity analysis.

Land Use Modeling

PSRC used an application of the UrbanSim land use model system to develop a land use allocation product that projects growth in the PSRC region through 2050 and was developed through the following process. First, the PSRC Regional Macroeconomic Forecast supplies regional totals for population, households, and jobs. Second, the Macroeconomic Forecast is apportioned to annual jurisdictional control totals using numeric policy guidance from the Vision 2050 Regional Growth Strategy and adopted local growth targets. Third, the control totals are used in UrbanSim to allocate projected growth on developable land at the parcel level. Lastly, the dataset is converted into the applicable formats for use as input in the regional activity-based travel demand model.

The technical and policy assumptions underlying the land use forecast dataset were established to ensure federal air quality conformity analysis requirements regarding use of "latest available planning assumptions" were met. The key assumptions are as follows:

- The dataset is consistent with the region's most current long-range regional forecast of households, population and employment from the 2018 Regional Macroeconomic Forecast.
- The dataset reflects the regional long-range strategic growth assumptions as detailed by VISION 2050 Regional Growth Strategy.
- The dataset is reflective of currently adopted growth targets and comprehensive plans.

Travel Demand Modeling

PSRC has developed a customized set of computer programs and mathematical procedures to simulate current and future travel patterns and conditions within the four counties (King, Kitsap, Pierce, and Snohomish) of the central Puget Sound region. These programs and procedures are collectively referred to as the “regional travel demand forecasting model” or simply as the “travel model.” The travel model produces detailed spatial and network data that are used to analyze how the region’s transportation infrastructure and environment are likely to be impacted by future population growth and development. The travel model provides the analytical foundation from which PSRC develops many of its plans including the Regional Transportation Plan.

Model / Tool

A travel demand model called SoundCast produced model results for the plan. SoundCast is an activity-based model, which represents people’s need to travel to conduct daily activities and allows for greater temporal and spatial resolution to better evaluate alternative transportation policies. The performance outcomes shown throughout the plan rely on the fine-grained results from SoundCast. To learn more, visit: *https://www.psrc.org/activity-based-travel-model-soundcast*.

Land use and population allocations (representing demand conditions) along with transportation projects, policies, and network attributes (representing supply conditions) represent the key input assumptions for any travel demand analysis framework. For the travel demand analysis used to support the plan, the previously mentioned land use dataset, allocated throughout the region across 3,700 transportation analysis zones, comprises the key land use assumptions, while the set of transportation projects and policies enumerated within the plan form the basis for the key transportation network assumptions. Additional information on PSRC’s travel demand modeling procedures is available through PSRC’s web site (*www.psrc.org*) or by calling the Information Center ((206) 464-7532).

The conformity analysis must include modeling of all regionally significant projects. As defined by the conformity rule, a regionally significant project is:

> "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 conformity analysis includes all modelable projects and programs contained in the plan. Projects are coded into PSRC's travel demand model networks for their respective years of implementation. As described earlier, all projects in the Draft 2023-2026 Regional TIP were reviewed for consistency with the Regional Transportation Plan Regional Capacity Projects list and the current conformity analysis. The travel demand model analyses performed for the RTP include 2018, 2030, 2040 and 2050.

Latest Emissions Model

The conformity analysis for the plan was performed using the latest version of *EPA's Motor Vehicle Emission Simulator* (MOVES3). Emissions were calculated for $PM_{2.5}$ and NO_X. The emissions for each of the analyses were generated by output from PSRC's travel demand model and MOVES3. Emission estimates for $PM_{2.5}$ and NO_X were created using model settings consistent with the procedures used by Ecology to develop the motor vehicle emissions budgets provided in conjunction with the $PM_{2.5}$ Maintenance Plan and Redesignation Request. All model options and assumptions were coordinated with PSRC's air quality partner agencies.

MOVES inputs include the most current vehicle registrations, vehicle inspection and maintenance (I/M) settings, fuel supply data, and local meteorology at the county level. Ecology provided county-specific input files that were used in the most recent statewide emissions inventory. These files were used to create input files for future analysis years, assuming the fleet mix and age distribution remains constant. MOVES utilizes a database-centered design that does not create an input file that could be provided as part of this documentation; however, Attachment A contains more details about MOVES methodology and assumptions.

Interagency Consultation and Public Involvement

Federal Clean Air Act regulations, as identified in the federal conformity rule (40 CFR Part 93), and Clean Air Washington Act regulations defined in the state conformity rule (WAC 173-420-070), require formal consultation procedures for conducting conformity analyses. The consultation procedures for the conformity analysis of the Draft 2023-2026 Regional TIP are consistent with PSRC's Public Participation Plan, which is in compliance with the federal Statewide and Metropolitan Planning regulations (23 CFR Part 450) as well as the above conformity regulations. The Public Participation Plan may be obtained by contacting PSRC's Information Center ((206) 464-7532), or through PSRC's web site (www.psrc.org).

A major task identified under the consultation procedures requirements is the review of key assumptions for conducting the conformity analysis. PSRC held a scoping meeting with the region's air quality consultation partners to present the methodology and procedures for the conformity analysis conducted for the plan in November 2021. These partner agencies include the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the Environmental Protection Agency (EPA), the Washington State Departments of Transportation (WSDOT) and Ecology, and the Puget Sound Clean Air Agency (PSCAA). This scoping meeting met the formal consultation requirements of the federal and state Clean Air Acts.

In addition to interagency consultation, opportunity for public comment is also provided. The Draft 2023-2026 Regional TIP is being released for a formal public comment period between September 8 and October 27, 2022, including this air quality conformity documentation. In addition, opportunity for public comment is provided at the beginning of each PSRC Board meeting. The adoption of the TIP and the approval of the conformity determination are expected to occur at PSRC's October 27, 2022 Executive Board meeting, preceded by a Transportation Policy Board recommendation on October 13, 2022. Additional information on public involvement throughout the preparation of the TIP is included in the TIP document, found on PSRC's website at *https://www.psrc.org/our-work/funding/transportation-improvement-program*.

Status of Transportation Control Measures

According to the federal conformity rule, transportation plans must provide for the timely implementation of Transportation Control Measures (TCMs) from an applicable maintenance plan (§93.113). TCMs are projects, programs or actions that will aid in the elimination or reduction of the severity or number of violations of the NAAQS, and help expeditiously attain and maintain those standards. TCMs can be strategies to increase the efficiency of existing transportation facilities, reduce travel demand, or lower the amount of emissions in vehicles leading to measurable vehicle emissions reductions. Expected emissions reductions, or credits, from these TCMs are included in maintenance plan inventories and attainment/maintenance demonstrations.

There are no control measures in the $PM_{2.5}$ maintenance plan relating to on-road mobile sources.

Motor Vehicle Emissions Budget

The conformity analysis must show that the total regional emissions produced by projects in the plan or TIP, plus activity on the existing travel network, do not exceed the motor vehicle emissions budget identified in the maintenance plan for each respective criteria pollutant. The emissions budget is a ceiling of total emissions that cannot be

exceeded. Emissions are calculated on an individual link basis, based on the vehicle miles traveled (VMT) and speed of each link. This calculation is performed separately for every hour of the day between 5am and 10pm, and for one overnight time period between 10pm and 5am. Emissions are calculated for both intrazonal and interzonal trips. The calculated emissions of individual links are then summed for the total daily emissions in each maintenance area.

Table 1 identifies the motor vehicle emissions budget for the required criteria pollutants and presents the analysis results. The emissions from the projects and programs in the plan – and correspondingly the Draft 2023-2026 Regional TIP - for each of the analysis years are below the established daily motor vehicle emissions budgets for $PM_{2.5}$ and NO_X.

Table 1 – $PM_{2.5}$ and NO_X Emissions Analysis Results (lbs./day)

Year	**$PM_{2.5}$**	**NOx**
2017 Motor Vehicle Emissions Budget*	1,888	41,790
2017	663	22,816
2020	621	20,456
2026 Motor Vehicle Emissions Budget**	1,321	22,880
2026	495	13,374
2030	410	8,653
2040	413	6,167
2050	443	6,155

* estimated emissions for years 2017 through 2025 must be less than the 2017 MVEB

** estimated emissions for years 2026 and beyond must be less than the 2026 MVEB

Emissions of $PM_{2.5}$ and NO_X were calculated for 2018, 2030, 2040 and 2050, corresponding to the available travel modeling analysis years. The emissions for 2017, 2020 and 2026 were therefore interpolated, per consultation with PSRC's air quality partner agencies and consistent with Section 93.118(d)(2) of the federal conformity rule. Pursuant to Section 93.118(b) of the federal conformity rule, analyses were conducted for each year for which a motor vehicle emissions budget has been established, the horizon year of the plan, and intermediary years such that the analyses are no more than 10 years apart. Under consultation with PSRC's air quality partner agencies and consistent with standard practices (Section 93.118(b)(2)(ii) of the federal conformity rule), these budgets were carried forward in this analysis as the budgets for 2020, 2030, 2040 and 2050, which is the horizon year of the plan. For background, VMT within the Tacoma-Pierce County $PM_{2.5}$ maintenance area was 12.2 million in 2018 growing to an estimated 15.3 million by 2050.

Fiscal Constraint

Every project in the Draft 2023-2026 Regional TIP has been reviewed for fiscal constraint. Per 23 CFR 450.324(i), it has been determined that full funding can reasonably be anticipated to be available for all projects in the Draft 2023-2026 Regional TIP within the time period contemplated for completion of the projects. The TIP document describes this procedure in greater detail, and Appendix D provides additional information on the financial plan for the TIP and the plan. This documentation can be found on PSRC's website at *https://www.psrc.org/our-work/funding/transportation-improvement-program*.

Conclusions

This analysis provides sufficient basis for PSRC to determine that the Draft 2023-2026 Regional TIP conforms to the Washington State Implementation Plan as required by the federal Clean Air Act and the state Clean Air Washington Act.

Attachment A: Emissions Methodology

As part of the regional conformity analysis, on-road mobile emissions of $PM_{2.5}$ and NO_X were estimated for required years within the designated maintenance area. The $PM_{2.5}$ and NO_X conformity analyses are consistent with the methodology Ecology used to develop the $PM_{2.5}$ and NO_X motor vehicle emissions budgets (MVEB). The budget calculation method developed by Ecology was designed to be as simple as possible, yet without sacrificing the accuracy of the emissions estimates. The basic calculation equation is shown below, followed by a more detailed description of the method and data sources. These examples are from the 2011 Clean Data Determination. Actual emissions analyses were performed using updated data years.

Basic Calculation

$E = (M \times F_{gmi}) + (V \times F_{gpveh})$
where E = emissions in g
M = VMT
V = vehicle population
F_{gmi} = emission factor in g/mi
F_{gpveh} = emission factor in g/vehicle

Vehicle Miles Traveled

As part of the plan update, average daily weekday VMT for the Puget Sound region for the years 2018, 2030, 2040 and 2050 was modeled. The travel demand model VMT is estimated for individual roadway links for every hour of the day between 5am and 10pm, and for one overnight time period between 10pm and 5am. Data for each link and time period includes:

Length
Facility type
Functional class (for most links)
County
NAA flag (Yes/No flag for in the nonattainment or maintenance area)
Congested speed
VMT

The VMT link data was combined with the MOVES emission factors. First, each link was assigned to its closest MOVES speed bin and classified as to its MOVES road type: Rural Restricted, Rural Unrestricted, Urban Restricted, or Urban Unrestricted. For $PM_{2.5}$ and NO_X calculations, the NAA link VMT data was summed by time period, MOVES speed bin and MOVES road type to estimate emissions for an average winter day.

Vehicle Population

Washington State Department of Licensing, Federal Transit Administration, and Washington State Office of the Superintendent of Public Instruction vehicle registration data was used to calculate the vehicle population in each county. The ratio of county VMT to nonattainment or maintenance area VMT was used to allocate the vehicle population to the appropriate area. Forecast year vehicle populations were estimated for each county using a combination of vehicle trips and households. The future vehicle population was then allocated to the nonattainment or maintenance area using the VMT ratio as described above.

Emission Factors

Ecology provided a series of MOVES input files that were used to create the 2011 statewide $PM_{2.5}$ emissions inventory. A set of files was created for each county and represented the current vehicle registration data, fuel supply data, and I/M programs specific to each county. These files were used to create MOVES input files for 2018, 2030, 2040 and 2050, assuming that the vehicle mix and age distributions remain constant in the future.

The $PM_{2.5}$ and NO_X budgets were developed with MOVES using a meteorological input file that represented the temperature profile for peak $PM_{2.5}$ conditions. MOVES was run with this same meteorological file for this conformity analysis. EPA's MOVES model was used to generate $PM_{2.5}$ and NO_X emission factors in grams/mile and grams/vehicle. The grams/mile factors were output by hour, road type, and speed bin. The grams/vehicle factors were output by hour.

The emission factors were prepared for combination with the VMT and vehicle population data. The grams/mile factors were averaged over each of the time periods resulting in one factor per road type, time period, and speed bin. The grams/vehicle factors were summed over each hour of the day resulting in one factor per day.

The MOVES runspec file is best viewed within the MOVES software, however an example of a runspec file used in this analysis is provided below. More details on these files may be found on EPA's website, at *https://github.com/USEPA/EPA_MOVES_Model/blob/master/docs/AnatomyOfARunspec.md*.

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