5.6 AIR QUALITY

5.6.1 Impact Assessment Methodology

The air quality study addresses impacts from both vehicle and ferry emissions sources for the different alternatives and modes of travel. The evaluation is based on a calculation of the total emissions from all modes of travel (ferry, car, bus) that might be affected by implementation of the WTA program. The different types of travel modes generate different rates of emissions.

The overall impacts from the system as a whole, i.e., ferries, passenger cars, and buses, were evaluated to obtain a regional, cumulative emissions estimate for each of the project alternatives and for the No Project alternative. For purposes of evaluating the significance of impacts, the estimated emissions from all these modes were summed for each alternative. The total emissions were then compared among the alternatives to determine if any would result in an overall decrease or increase in emissions. This is discussed in more detail under "Significance Criteria" below. This comparative evaluation was done instead of examining the emissions from each individual source alone and comparing them to a threshold level. Nevertheless, in addition to a discussion of the regional emissions impacts under the "Project Impacts" section, each individual impact is broken out for discussion to fully disclose all anticipated environmental impacts.

The ferry and vehicle emissions are presented for the criteria pollutants, which include oxides of nitrogen (NO_x), reactive organic gases (ROG), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter (PM_{10}).

5.6.1.1 Vehicle Emissions

Vehicle emissions (passenger cars and buses) were calculated using forecasts of total vehicle miles traveled for the year 2025, and ferry emissions were calculated using the projected schedule of routes and frequencies for that same year. The emissions calculations were performed for the three project alternatives and the No Project alternative. The year 2025 is consistent with the MTC travel forecast model that was used as a basis for the vehicle forecasts.

Vehicle emissions were modeled using EMFAC2000, which incorporates anticipated emissions changes for future years, i.e., emissions decrease due to expected improvements in engine and fuel technology and the retirement of older vehicles from the fleet. For example, year 2025 passenger car emissions of ROG, CO, and NO_x are anticipated to decrease from 1.5, 10.8, and 1.0 grams per mile, respectively, in 2002 to 0.3, 1.5, and 0.2 grams per mile, respectively, in 2025. PM_{10} emissions are not expected to change significantly in the future. Emissions from cold starts were included in the total vehicle emissions. Cold starts occur after a vehicle has been off for more than four hours, and cold-start emissions represent a major portion of the total trip emissions for a vehicle.

5.6.1.2 Ferry Emissions

Ferry emissions were estimated assuming that EPA Tier 2 standards would be in effect, which require new diesel engines manufactured after the year 2007 to meet lower emissions than current diesel engines. The assumption was that all ferries in the year 2025, with or without the project, would use engines that would at least meet the EPA Tier 2 standards. This emission level was used as the "baseline" level, i.e., the level at which the highest emissions from ferries would be expected by the time the year 2025 comes. The ferry emissions for the WTA program were developed for the future projected year 2025, using a combination of site-specific data, readily available emission factors, and current and projected operating conditions. Existing data for each ferry system were reviewed and analyzed. Initially, future baseline emissions were based upon peak and off-peak conditions, where peak hours represented 6 hours per day and non-peak hours represented 6.5 hours per day. Baseline emissions for each period were calculated by multiplying together the total travel time from all ferries, the average horsepower rating, and the emission factors for marine diesels. Total travel time was computed for both peak and non-peak periods by: (1) dividing the total time within each period by the frequency of visits by each ferry to obtain the number of trips; (2) multiplying the number of trips for each ferry by the estimated time per trip; and (3) summing the trip times for all ferries. For the No Project alternative the average horsepower rating was calculated as the mean rating for all of the existing ferries (Hutchison 2002). The ferry system schedules for each of the alternatives is presented in Appendix AIR-A.

The significance criteria used for this study and a discussion of each of the impacts follows.

5.6.2 Significance Criteria

The significance criterion used in this EIR is as follows:

- Emissions that are higher for the proposed project than for the No Project alternative (Alternative 4) would have a significant impact.

As applied to the WTA program, this involved calculation of total emissions by criteria pollutant, and by alternative, for each mode of travel: ferry, bus, and passenger car. These are compared to Alternative 4 to determine whether an alternative results in overall higher or lower regional emissions. This criterion was used because it allows comparison of alternatives on a regional scale, consistent with the WTA program. This type of significance criterion was used in the 2001 Regional Transportation Plan (RTP) EIR issued by the Metropolitan Transportation Commission.

In addition, since the impact from each travel mode is discussed separately under "Project Impacts," an increase in emissions from a particular mode by itself (e.g. ferry) over those for the No Project Alternative for that mode is considered a significant impact.

5.6.3 Impacts and Mitigation

Impact A-1 **Regional cumulative emissions from passenger cars, buses, and ferries together would increase under Alternatives 1, 2, and 3 over those under the No Project Alternative (Alternative 4). The increase of Alternative 1, 2, and 3 cumulative emissions (unmitigated) represents the following percentage increase over total, current Bay Area emissions:**

	Alternative 1 (percent)	Alternative 2 (percent)	Alternative 3 (percent)
NO_x	4	4	0.1
SO_2	1	1	0.2
PM_{10}	0.7	.6	0.1
CO	0.04	.04	.01
ROG	0.02	0.2	.05

The evaluation of significance is based on the sum of vehicle (passenger car and bus) emissions plus ferry emissions for a given alternative. If the emissions sum of vehicles plus ferries for a given project alternative (Alternative 1, 2, or 3) is less than the emissions sum of vehicles plus ferries for the No Project Alternative (Alternative 4), the impact is considered less than significant. If, however, the sum of vehicles plus ferry emissions from any of the project alternatives is greater than the sum of passenger car plus ferry emissions from the No Project Alternative, then the impact is considered significant. This comparison is done for each of the pollutants.

Tables 5.6.1 through 5.6.3 summarize emissions from ferries, passenger cars, and buses for each of the alternatives. Tables in Appendix AIR-C present the route information (e.g. frequencies, number of vessels, sailing times) for each alternative, as well as the per-route emissions.

Summary of Impact A-1

- Alternative 1 emissions from vehicles (passenger cars and buses) plus ferries are greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 2 emissions from vehicles plus ferries are greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 3 emissions from vehicles plus ferries are greater than those for the No Project Alternative, resulting in a significant impact.

Mitigation A-1.1: Emissions from ferries under Alternatives 1, 2, and 3 could be reduced by elimination of routes with low ridership to consolidate ridership on the most effective service routes. For example, an evaluation of only the following routes was performed:

- Alameda to San Francisco
- Harbor Bay to San Francisco
- Oakland to San Francisco
- Sausalito to San Francisco
- Tiburon to San Francisco
- Berkeley to San Francisco
- Richmond to San Francisco
- Larkspur to San Francisco
- Martinez to San Francisco
- Vallejo to San Francisco

- Hercules to San Francisco
- Pittsburg to San Francisco

Impact after Mitigation: Providing full service on only the routes listed above reduces the net pollutant increase by half. Thus, emissions from ferries and vehicles (cars and buses) would be reduced but would remain greater under Alternatives 1, 2, and 3 than they are under the No Project Alternative. This impact would remain potentially significant.

Mitigation A-1.2: NO_x and PM_{10} emissions from ferries would be reduced by using SCR and particulate traps. The WTA evaluation considered a range of vessel types, fuels, and propulsion systems (in JJMA 2002) that could be potentially used on the projected service routes. These different technologies result in various levels of emissions of NO_x, ROG, CO, SO_2, and PM_{10}. Some examples of the technologies include diesel engines fueled with natural gas, gas turbines fueled with diesel or natural gas, and diesel engines fueled with diesel with selective catalytic reduction (SCR) and particulate traps. The WTA's evaluation of vessel technology involved a comprehensive investigation of emerging technologies and their relative suitability to Bay Area passenger service. Section 2.5 summarizes the evaluation that was performed in coordination with the "Clean Marine Ad Hoc" Work Group. The use of SCR and particulate traps is examined here as mitigation of emissions from ferries.

Impact after Mitigation: Ferry emissions from diesel engines with SCR and particulate traps would be less under Alternatives 1, 2, and 3 than those for the No Project Alternative for NO_x and PM_{10}, resulting in a less-than-significant impact for those two pollutants. ROG, CO, and SO_2 emissions would remain greater than those for the No Project Alternative, resulting in a significant impact for those pollutants. It should be noted that the sum of NO_x and ROG emissions decreases under Alternative 2 with this mitigation. This is important because NO_x and ROG are precursors to ozone, and the Bay Area does not attain the ozone standard. Therefore, the project serves to decrease the contribution to this non-attainment pollutant. The reduction of PM_{10} is also important because it is a nonattainment (state standards) pollutant in the Bay Area. The Bay Area is in attainment for both SO_2 and CO. The residual emissions of SO_2, CO, and ROG represent the following percentage increase over total current Bay Area emissions (there is a net decrease of NO_x and PM_{10}):

Reduced Alternative 2 with Mitigation A-1.2

NO_x	Net decrease
SO_2	0.6 percent
PM_{10}	Net decrease
CO	0.007 percent
ROG	0.04 percent

In conclusion, after application of these emission reduction measures, there remains a small regionwide increase in SO_2, CO, and ROG. ROG is primarily of concern because it is an ozone precursor, and as noted above this mitigation measure results in a net decrease in ozone precursors. The remaining pollutants of concern, SO_2 and CO, are currently in attainment in the Bay Area, but because they show a small regionwide increase, this impact is identified as potentially significant.

Impact A-2 **Total vehicle miles traveled are reduced with Alternatives 1, 2, and 3 as commuters use ferries for all or a portion of their commute. This results in a beneficial reduction in overall passenger car pollutant emissions in comparison to Alternative 4 (No Project).**

The California Air Resources Board (CARB) model EMFAC2000 was used to calculate regional emissions based on vehicle miles traveled (VMTs) for each alternative. EMFAC2000 is the latest in a series of California emission factor models that calculates emissions of CO, NO_x, ROG, and PM_{10} for current and future years. This is the model accepted by the CARB and most local air pollution control districts for analysis of motor vehicle emissions in California. The EMFAC2000 model reflects the emissions decreases from motor vehicles in future years due to anticipated improvements in engine and fuel technology.

Emission factors from the EMFAC2000 model were used to estimate emissions for the No Project Alternative and Alternatives 1 through 3. In addition, emissions from cold starts based on trip purpose were also calculated for each of the alternatives, using factors from the EMFAC2000 model. The cold-start emissions were incorporated into the daily total emissions presented in Tables 3.6-5 through 3.6-7.

Daily vehicle miles traveled (VMTs), total vehicle trips, and trip purpose for each of the alternatives (including No Project) were obtained from the traffic analysis performed by Cambridge Systematics for the WTA.

Summary of Impact A-2

- Alternative 1 emissions from passenger cars are less than those for the No Project Alternative, resulting in a less-than-significant impact.
- Alternative 2 emissions from passenger cars are less than those for the No Project Alternative, resulting in a less-than-significant impact.
- Alternative 3 emissions from passenger cars are less than those for the No Project Alternative, resulting in a less-than-significant impact.

Impact A-3 **Motor vehicles leaving ferry terminals during the evening commute period would produce cold-start emissions that could lead to a localized violation of the short-term carbon monoxide standard.**

As vehicles in a parking area leave a ferry terminal, there could be a concentration of cold-start emissions at those locations, instead of the emissions being dispersed throughout the Bay Area at people's homes, as during the morning commute. This "clustering" of cold-start emissions during the evening commute hour could produce a violation of the one-hour carbon monoxide standard at locations near the terminal parking lots. This is a potentially significant impact.

Summary of Impact A-3

- Alternatives 1, 2, and 3 could result in cold-start emissions during the evening commute period that would lead to a violation of the short-term carbon monoxide standard, leading to a potentially significant impact.

Mitigation A-3.1: Cold-start emissions would be reduced by restricting the number of cars parking at the ferry terminals. This could be accomplished by limiting the amount of parking at the ferry terminals to a level less than full ridership. Parking management strategies could also be implemented, such as fees for parking and provision of preferential parking for carpools and vanpools In addition, feeder shuttle buses could be equipped with zero emission or ultra-low emission engines.

Impact after Mitigation: The effectiveness of Mitigation A-3 cannot be quantified, as the design and exact number of ferry terminals is not defined at this time. Therefore, the impact remains potentially significant.

Impact A-4 **Criteria pollutant emissions from ferries would increase under Alternatives 1, 2, and 3 over those from the No Project Alternative. Emissions from NO_x would be less than 5 percent of total Bay Area emissions for Alternatives 1 and 2, and less than 1 percent of total Bay Area emissions for Alternative 3. Emissions of SO_2 would be 1 percent or less of total Bay Area emissions for the three project alternatives. Emissions of PM_{10}, CO, and ROG would all be less than 1 percent of Bay Area total emissions for each of the three alternatives.**

Ferries would be a source of CO, NO_x, ROG, and PM_{10} emissions. NO_x and ROG are of major concern due to their photochemical reactions downwind of specific sources and are considered regional emission concerns. Since the majority of the emissions occur during transport, emissions from the ferry exhaust are mobile and therefore dispersed over a significant spatial region. PM_{10} emissions are a concern due to the toxicity of PM_{10} emissions from diesel exhaust.

Summary of Impact A-4

- Alternative 1 emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 2 emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 3 emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.

Mitigation A-4.1: See Mitigations A-1.1 and A-1.2.

Impact After Mitigation: Ferry emissions of NO_x and PM_{10} would be less under Alternatives 1, 2, and 3 than for the No Project Alternative, resulting in a less-than-significant impact for those two pollutants, but ROG, CO, and SO_2 emissions would remain greater than those for the No Project Alternative, resulting in a significant impact for those pollutants. However, the project with this mitigation decreases ozone precursors, as discussed in Impact After Mitigation A-1.2, above.

Impact A-5 **Ferries would emit toxic pollutants in the exhaust in the form of particulate matter from the combustion of diesel fuel. Emissions from Alternatives 1, 2, and 3 would be greater than those from the No Project Alternative.**

In 1998, the California Air Resources Board (CARB) formally identified particulate matter emitted by diesel-fueled engines as a toxic air contaminant (TAC). Diesel engines emit TACs in both gaseous and particulate forms. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by the EPA as hazardous air pollutants (HAPs), and by the CARB as TACs. Because by weight, the vast majority of diesel exhaust particles are very small (94 percent of their combined mass consists of particles less than 2.5 microns in diameter), both the particles and their coating of TACs are inhaled into the lung. While the gaseous portion of diesel exhaust also contains TACs, the CARB's August action was specific to diesel particulate emissions which, according to supporting CARB studies, represent 50 to 90 percent of the mutagenicity of diesel exhaust (CARB 1998).

Diesel particulate emissions were calculated as described above under "Ferry Emissions." For the purposes of characterizing potential air toxic impacts, the entire mass of estimated particulate matter emissions from diesel engines is considered toxic.

Since the majority of diesel particulate matter is in the fine fraction (less than 2.5 micrometers in diameter, or $PM_{2.5}$), it can remain airborne for several days. The area of impact will depend on meteorological conditions. If light to moderate wind conditions prevail in the project area, diesel particulate is likely to be dispersed widely and have its impact on a regional scale. During periods of very light wind speeds, low inversion heights, and atmospheric stability, diesel particulates may remain in the project area and have a relatively larger local impact. Because health risks relate to long-term, lifetime exposure, it is long-term average exposure to diesel particulate that is of most concern. Due to the prevailing meteorological conditions in the project area and the distance of the closest residential areas from the emissions sources, levels of particulate in the area of local impact are expected to be well dispersed. Nevertheless, any substantial increase in such emissions could be potentially significant.

Summary of Impact A-5

- Alternative 1 $PM_{2.5}$ emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 2 $PM_{2.5}$ emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 3 $PM_{2.5}$ emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.

Mitigation A-5.1: See Mitigations A-1.1 and A-1.2. Those mitigation measures include the use of Selective Catalytic Reduction (SCR) and particulate traps on ferry engines to reduce emissions.

Impact after Mitigation: Ferry $PM_{2.5}$ emissions from Alternatives 1, 2, and 3 would be less than those for the No Project Alternative, resulting in a less-than-significant impact.

Impact A-6 **Buses traveling to and from the ferry terminals would emit criteria pollutants in the exhaust. The emissions increases for NO_x, PM_{10}, and ROG would be less than 10 pounds per day. Emissions increases of CO would be 50 pounds per day for Alternatives 1 and 2 and less than 30 pounds per day for Alternative 3.**

Bus mileage traveled was obtained for each of the alternatives from Cambridge Systematics. Alternatives 1, 2, and 3 would increase bus service to the ferry terminals, and there would be an associated increase in criteria pollutant emissions. This would lead to a significant impact.

Summary of Impact A-6

- Alternative 1 would increase emissions from buses over those of the No Project, resulting in a significant impact.
- Alternative 2 would increase emissions from buses over those of the No Project, resulting in a significant impact.
- Alternative 3 would increase emissions from buses over those of the No Project, resulting in a significant impact.

Mitigation A-6.1: Emissions would be reduced by decreasing or not providing bus service to new terminals.

Mitigation A-6.2: Bus emissions would be reduced by fueling buses servicing the new terminals with compressed natural gas (CNG), propane, fuel cells, or other low-emission technology that could become practicable in the future.

Impact after Mitigation: Emissions from buses for Alternatives 1, 2, and 3 would be equal to or less than those for the No Project Alternative, and the impact would be less than significant.

Impact A-7 **Air pollutants would be deposited on the bay, increasing the levels of nitrates and sulfates in the water.**

A fraction of airborne pollutant emissions from ferry fuel combustion would be deposited on the Bay. Emissions of nitrogen and sulfur oxides would be deposited as nitrates and sulfates, respectively. A portion of the particulate matter in the diesel exhaust, mostly in the fine fraction ($PM_{2.5}$) would also be deposited. Not all of the exhaust emissions would be deposited on the Bay; some would be transported over land by winds.

The amount of pollutants deposited on land versus on the Bay depends on several factors including the proximity of the ferry to land, the distance the ferry travels over water, the amount of wind transporting the pollutants, and the location of the exhaust port on the ferry. The most pollutant deposition would likely occur from ferries traveling the longest routes, e.g. San Francisco to Redwood City and San Francisco to Port Sonoma.

Summary of Impact A-7

- Deposition of nitrates and sulfates on the Bay from ferry emissions would increase under Alternative 1, leading to a potentially significant impact.

- Deposition of nitrates and sulfates on the Bay from ferry emissions would increase under Alternative 2, leading to a potentially significant impact.
- Deposition of nitrates and sulfates on the Bay from ferry emissions would increase under Alternative 3, resulting in a potentially significant impact.

Mitigation A-7: See Mitigations A-1.1 and A-1.2.

Impact after Mitigation: Deposition of nitrates and sulfates from ferry emissions from Alternatives 1, 2, and 3 would be less than those for the No Project Alternative, and the residual impact is less than significant.

Impact A-8 **Construction of ferry terminals would create emissions of fugitive dust from excavation and grading, and emissions of ROG, NO_x, CO, SO_2, and PM_{10} in construction equipment exhaust.**

Construction-related pollutant emissions have not been quantified because the specific plans for each terminal are not defined at this time. Furthermore, the BAAQMD does not require quantification of construction emissions, but does require a discussion of construction mitigation measures. As for any construction project, there can be occasional concentrations of emissions from construction activities that temporarily approach or exceed air quality standards.

Summary of Impact A-8

- Construction impacts under Alternatives 1, 2, and 3 could be potentially significant.

Mitigation A-1.1: The BAAQMD CEQA Guidelines contain a list of mitigation measures to control fugitive dust emissions from construction activities. These measures involve activities such as watering and covering exposed soil surfaces to minimize dust emissions. The BAAQMD considers construction impacts to be less than significant if the recommended mitigation measures are used. Each individual ferry expansion project should employ the current BAAQMD-recommended construction emissions control measures to reduce impacts.

Impact after Mitigation: Construction impacts under Alternatives 1, 2, and 3 would be less than significant.

References

Bay Area Air Quality Management District (BAAQMD) 2001. Clean Air Plan 2000.

Hutchison, Bruce. 2002. Personal communication regarding power output of ferry engines.

John J. McMullen Associates, Inc. (JJMA). 2002. New Technologies and Alternative Fuels: Working Paper on Alternative Propulsion and Fuel Technology Review. May.

Table 5.6.1
Emission Estimates for Year 2025 No Project vs. Alternative 1 (lbs/day)

FERRIES

	Year 2025 No Project	Year 2025 Alternative 1	Project Increase over No Project (difference)
NO_x	3394	62627	59233
SO_2	117	2156	2039
PM_{10}	202	3733	3531
CO	194	3609	3415
ROG	179	3306	3127

PASSENGER VEHICLES

Vehicle Miles Traveled

2025 No Project	**177,851,516**
2025 Alternative 1	**177,573,856**

		Year 2025 No Project				Year 2025 Alternative 1				
	EMFAC2000 Emission Factors (g/mi) - Year 2025	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	**Alt 1 Decrease (lb/day**
NO_x	0.152	59598	6346	2885	68829	59504	6341	2880	68726	-102
PM_{10}	0.015	5881	70493	33141	109516	5872	70442	33086	109400	-116
CO	1.544	605385	2752	1480	609617	604440	2750	1477	608668	-950
ROG	0.158	61950	153	74	62177	61853	153	74	62080	-97

BUSES

Alternative 3 Shuttles to Ferry Terminals
Vehicle Miles Traveled 10272

	EMFAC2000 Emission Factors (g/mi) -	**Year 2025 Alternative 1** Emissions (lb/day)
NO_x	0.325	7
PM_{10}	0.038	1
CO	2.203	50
ROG	0.368	8

Table 5.6.2

FERRIES

	Year 2025 No Project	Year 2025 Alternative 2	Project Increase over No Project (difference)	Year 2025 "Reduced Routes" Alternative 2	Project Increase over No Project (difference)	Year 2025 "Reduced Routes Alt. 2 with SCR and Particulate Traps	Project Increase over No Project (difference)
NO_x	3394	54459	51065	25459	22065	2665	-729
SO_2	117	1875	1758	876	759	1172	1055
PM_{10}	202	3246	3044	1518	1316	80	-122
CO	194	3126	2932	1459	1265	1459	1265
ROG	179	2873	2694	1343	1164	721	542

PASSENGER VEHICLES

Vehicle Miles Traveled

2025 No Project	**177,851,516**
2025 Alternative 2	**177,618,525**

		Year 2025 No Project				Year 2025 Alternative 2				
	EMFAC2000 Emission Factors (g/mi) - Year 2025	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	**Alt 2 Decrease (lb/day)**
NO_x	0.152	59598	6346	2885	68829	59519	6342	2881	68743	-86
PM_{10}	0.015	5881	70493	33141	109516	5874	70452	33097	109422	-94
CO	1.544	605385	2752	1480	609617	604592	2751	1478	608821	-797
ROG	0.158	61950	153	74	62177	61869	153	74	62096	-81

BUSES

Alternative 3 Shuttles to Ferry Terminals

Vehicle Miles Traveled 10272

		Year 2025 Alternative 2
	EMFAC2000 Emission Factors (g/mi) -	Emissions (lb/day)
NO_x	0.325	7
PM_{10}	0.038	1
CO	2.203	50
ROG	0.368	8

Table 5.6.3
Emission Estimates for Year 2025 No Project vs. Alternative 3 (lbs/day)

FERRIES

	Year 2025 No Project	**Year 2025 Alternative 3**	**Project Increase over No Project (difference)**
NO_x	3394	14850	11456
SO_2	117	511	394
PM_{10}	202	885	683
CO	194	849	655
ROG	179	783	604

PASSENGER VEHICLES

Vehicle Miles Traveled	
2025 No Project	**177,851,516**
2025 Alternative 3	**177,811,385**

		Year 2025 No Project				**Year 2025 Alternative 3**				
	EMFAC2000 Emission Factors (g/mi) - Year 2025	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	**Alt 3 Decrease (lb/day)**
NO_x	0.152	59598	6346	2885	68829	59584	6344	2884	68812	**-17**
PM_{10}	0.015	5881	70493	33141	109516	5880	70473	33125	109477	**-39**
CO	1.544	605385	2752	1480	609617	605249	2752	1479	609479	**-138**
ROG	0.158	61950	153	74	62177	61936	153	74	62163	**-14**

BUSES

Alternative 3 Shuttles to Ferry Terminals

Vehicle Miles Traveled **5825**

		Year 2025 Alternative 3
	EMFAC2000 Emission Factors (g/mi) -	Emissions (lb/day)
NO_x	0.325	4
PM_{10}	0.038	0
CO	2.203	28
ROG	0.368	5