

4.3 Air

4.3.1: Affected environment

Air quality

Meteorology

Weather is one of several variables that influence air quality. Atmospheric conditions, such as wind speed and direction and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersion of air pollutants and consequently affect air quality.

Periods with stable high pressure systems and periods that include nighttime thermal inversions due to the low solar heating of the land in winter create stable atmospheric conditions.

It is during these very stable atmospheric conditions, when little vertical dispersion occurs, that monitoring instruments measure high concentrations of air pollutants emitted at ground level. Such ground-level emitted pollutants primarily include CO from motor vehicles and particulate matter from woodstoves, outdoor burning, mobile sources, and other activities.

Carbon monoxide (CO)

Carbon monoxide (CO) is a product of incomplete combustion. It is generated by transportation sources (e.g., motor vehicles, marine vessels) and other fuel-burning activities such as residential space heating, especially heating with solid fuels like coal or wood.

CO is usually the pollutant of greatest concern related to roadway transportation sources because it is the pollutant emitted in the greatest quantity for which short-term health standards exist.

The highest ambient concentrations of CO usually occur near congested roadways and intersections during wintertime periods of air stagnation. CO typically has a localized impact as concentrations diminish within a short distance of roads.

A colorless, odorless gas, CO exposure can result in harmful health effects by reducing oxygen delivery to the body's organs. It affects the cardiovascular system and the central nervous system.

For people who suffer from heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise. Repeated exposures may contribute to other cardiovascular effects.

At higher doses, CO affects the central nervous system, even in healthy people, resulting in vision problems, reduced ability to work/learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO can be fatal. CO also contributes to the formation of smog ground-level ozone, which can trigger serious respiratory problems.

CO standard - Pierce County was a maintenance area for CO through 2006. As part of the maintenance plans, a second maintenance plan was developed and submitted for a second consecutive 10 year period (2006-2016). This second 10-year maintenance plan for CO was approved by EPA in 2004.

CO trends - from 1980 -2007, the nation has seen a 77% reduction in CO levels based on the 8-hour National Ambient Air Quality Standards (NAAQS).

CO levels around the Puget Sound have decreased significantly in the past 15 years. Levels are well below federal standards, and there has not been a violation of the NAAQS for CO in the Tacoma area since 1992 due primarily to cleaner car technology.

Particulate matter (PM)

On occasion, Puget Sound has problems with a pollutant called "particulate matter". Particulate matter is a federally regulated pollutant that in high concentrations poses a health risk to both sensitive populations and to healthy, active people as well.

Particulate matter or "PM" - is a form of pollution composed of very small particles of dust, smoke, soot, and other materials. PM comes in many shapes, sizes, and compositions. However, the EPA has identified 2 sizes of PM that have identifiable health risks - PM₁₀ and PM_{2.5}.

PM₁₀ is composed of particles that are 10 microns or smaller in diameter - or about 1/ 7th the diameter of a human hair. PM_{2.5} is even smaller being only 2.5 microns across or 1/28th the diameter of a human hair.

Central Puget Sound Region Designated Maintenance Areas



Source: Puget Sound Regional Council - www.psrc.org

The severity of the health effects from breathing these particles depends upon the concentration, or "how much" of the PM is in the air. EPA's NAAQS calls these "criteria pollutants" that are considered to have the greatest adverse effect on the people and which have an associated concentration and duration that areas cannot exceed.

PM₁₀ and PM_{2.5} are among the most harmful of all air pollutants - that when inhaled they evade the respiratory system's natural defenses and lodge deep in the lungs. PM can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections.

Although particulate matter can cause health problems for everyone, certain people are especially vulnerable to the adverse health effects of PM. These "sensitive populations" include children, the elderly, exercising adults, and those suffering from asthma or bronchitis. Recent studies link PM exposure to the premature death of people who already have heart and lung disease, especially the elderly.

Healthy, active people are also at risk if they are often outside and breathing more air during exercise thereby increasing exposure.

Major sources of PM in urban and rural areas include:

- Activity-related and wind-blown dust from construction and agriculture
- Wind-blown dust from open lands
- Outdoor and agricultural burning
- Wood burning stoves and fireplaces
- Wildfires
- Industrial sources
- Motor vehicles

PM is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industrial activities undergo chemical reactions in the atmosphere.

Air Quality Index - PSCAA currently measures air pollution to establish the Air Quality Index (AQI). The pollutant with the highest AQI is the pollutant that is most responsible for health impacts.

Air Quality Index (PM_{2.5} ratings)

Good	Air quality is good for everyone.
Moderate	Air is generally ok but persons who are very sensitive may want to reduce outdoor activities.

Unhealthy for Sensitive Groups	Persons with respiratory or heart disease, the elderly, and children should limit prolonged exertion.
Unhealthy	People with respiratory or heart disease, the elderly, and children should avoid prolonged exertion; everyone else should limit prolonged exertion.
Very Unhealthy	People with respiratory or heart disease, the elderly, and children should avoid any outdoor activity; everyone else should avoid prolonged exertion.

Note - the AQI index is not used for determining "burn day" status.

Source: Puget Sound Clean Air Agency (PSCAA)

PSCAA monitors and reports PM₁₀ and PM_{2.5} levels to the EPA by:

Daily monitors - that obtain a 24-hour sample of PM₁₀ and PM_{2.5} that is weighed and analyzed. The daily monitors produce "official" data that is reported to Ecology and EPA.

Continuous monitors - producing information about the levels of both PM₁₀ and PM_{2.5} every 15-minutes. Data from the continuous monitors is useful to both the PSCAA and the public for real-time analyses. The continuous monitors are "unofficial" data and are only used by the PSCAA.

Ozone (O3)

Ozone (O3) is created at ground level by a chemical reaction between oxides of nitrogen and volatile organic compounds (VOC) in the presence of sunlight.

Even at low concentrations ground level ozone adversely affects human health and has detrimental effects on other species. Even at very low levels, ground-level ozone triggers a variety of health problems including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis.

Ozone can irritate lung airways and cause inflammation much like sunburn. Other symptoms include wheezing, coughing, pain when taking a deep breath, and breathing difficulties during exercise or outdoor activities.

People with respiratory problems are most vulnerable, but even healthy people that are active outdoors can be affected when ozone levels are high. Repeated exposure to ozone pollution for several months may cause permanent lung damage. Anyone who spends

time outdoors in the summer is at risk, particularly children and other people who are active outdoors.

Ground-level ozone interferes with the ability of plants to produce and store food, which makes plants more susceptible to disease, insects, other pollutants, and harsh weather, thereby affecting crop and forest yields. Ozone damages the leaves of trees and other plants, ruining the appearance of cities, national parks, and recreation areas.

Ozone (O₃) is a form of oxygen created by the action of the sun on hydrocarbons and nitrous oxides like those found in automobile exhaust and emissions from coal-fired power plants, garbage incinerators, and oil refineries. These photochemical reactions take several hours to occur and typically create the highest ozone levels within developed urban areas.

Cars and trucks on public roads are the largest single source of carbon monoxide (CO) emissions in urban areas. However, until the early 1990s there were no air quality regulations that applied to public roadway projects. In 1990, EPA and the state legislature enacted new regulations requiring federally or state-funded highway projects to evaluate their local and regional air quality impacts.

Ozone standard - Pierce County regained "attainment" status of the ozone standard in 1996 meaning Pierce County was a maintenance area for the 1-hour ozone standard through 2006. As part of the maintenance plan, a second maintenance plan was developed and submitted for a second consecutive 10-year period (2006-2016).

This second 10-year maintenance plan for ozone (1-hour) was approved by EPA in its Final Rulemaking published in 2004. However, in 2005, EPA revoked the 1-hour ozone standard for all areas except for 8-hour "Early Action Compact" areas (which does not include Pierce County). This means that Pierce County is no longer designated as a 1-hour ozone maintenance area.

However, with a violation of the strengthened 8-hour ozone NAAQS at an Enumclaw monitoring site in 2008, ozone is still a concern and estimates of increases in ozone precursors (VOCs and NO_x) are monitored.

Nitrogen oxides

Nitrogen oxides (nitrogen dioxide, nitric acid, nitrous oxide, nitrates, and nitric oxide, collectively known as NO_x) are highly reactive

gases, many of which are colorless and odorless. However, nitrogen dioxide (NO₂) along with particles in the air can often be seen as a reddish-brown layer over many urban areas.

Nitrogen oxides (nitrogen dioxide, nitric acid, nitrous oxide, nitrates, and nitric oxide) cause a wide variety of health and environmental impacts. Nitrogen oxides react with other substances in the air to form ground level ozone, acid rain, and particulate matter.

Increased nitrogen loading into bodies of water results in a process called eutrophication. Eutrophication leads to oxygen depletion and a reduction in fish and other aquatic species populations.

In the air, NO_x reacts readily with common organic chemicals, to form a wide variety of toxic products, some of which may cause biological mutations. Examples of these chemicals include the nitrate radical, nitroarenes, and nitrosamines. Nitrate particles and nitrogen dioxide can block the transmission of light, reducing visibility. Nitrous oxide is a greenhouse gas.

The MLK subarea is in attainment of ambient standards for NO₂.

Sulfur dioxide (SO₂)

Sulfur dioxide (SO₂) belongs to the family of sulfur oxide (SO_x) gases. Sulfur oxides dissolve easily in water and SO_x gases are formed when fuel containing sulfur (such as coal and oil) is burned, when gasoline is extracted from oil, or when metals are extracted from ore. Sulfur dioxide dissolves in water vapor to form acid, and interacts with other gases and particles in the air to form sulfates.

In the United States, more than 65% of SO₂ released to the air comes from electric utilities, especially those that burn coal. When SO₂ is released into the air by power plants and other sources, it is carried by the prevailing wind, sometimes hundreds of miles away. Other sources include non-road diesel equipment that burns sulfur fuel and release SO₂ emissions to the air in large quantities.

Sulfur dioxide causes a wide variety of health and environmental impacts due to the way it reacts with other substances in the air. Particularly sensitive groups include people with asthma who are active outdoors, children, the elderly, and people with heart or lung disease.

Short term exposure to peak levels of SO₂ in the air can cause temporary breathing difficulty for people with asthma who are active outdoors. Longer-term exposures to high levels of SO₂ gas and particles cause respiratory illness and aggravate existing heart disease.

Sulfate particles are a major cause of reduced visibility due to an atmospheric condition known as regional haze. Sulfate particles cause this condition by scattering and absorbing ambient light. Sulfur dioxide and nitrogen oxides react with other substances in the air to form acids, which fall to earth as rain, fog, snow, or dry particles (acid rain). Acid rain damages forests and crops, changes soil composition, and acidifies water bodies, detrimentally affecting aquatic species including fish.

Sulfur dioxide accelerates the decay of building materials and paints, including structures of historic significance.

The MLK subarea is in attainment of ambient standards for SO₂.

Lead

Lead is a metal found naturally in the environment as well as in manufactured products. The primary use of lead is in the manufacture of batteries.

In the past, the largest sources of lead emissions have been motor vehicles and industrial sources. Due to the phase out of leaded gasoline, air lead levels have decreased significantly.

People, animals, and fish are mainly exposed to lead by breathing and ingesting it in food, water, soil, or dust. Lead accumulates in the blood, bones, muscles, and fat. Infants and young children are especially sensitive to lead. Lead damages organs including the kidneys, liver, brain and nerves.

Exposure to lead can also lead to osteoporosis and reproductive disorders. Excessive exposure to lead affects the brain and nerves resulting in seizures, mental retardation, behavioral disorders, memory problems, and mood changes. Low levels of lead damage the brain and nerves in fetuses and young children, resulting in learning deficiencies and lowered IQ. Lead exposure causes high blood pressure and increases heart disease, especially in men. Lead exposure may also lead to anemia.

Animals can ingest lead while grazing and are affected in the same way as humans. Low

concentrations of lead can retard vegetation growth. Lead can enter water systems through runoff and from sewage and industrial waste streams. Elevated levels of lead in the water can cause reproductive damage in some aquatic life and cause blood and neurological changes in aquatic species, including fish.

Lead has not been included with emissions testing because of the significant decrease of this source in the environment.

Air quality standards

Three agencies have air quality jurisdiction in the Tacoma/Pierce County area - the US Environmental Protection Agency (EPA), Washington State Department of Ecology (Ecology), and the Puget Sound Clean Air Agency (PSCAA).

Air quality regulations are designed to limit emissions from air pollution sources and to minimize concentrations of pollutants in the outdoor air. EPA's NAAQS consist of primary standards designed to protect public health, and secondary standards designed to protect public welfare (e.g., preventing air pollution damage to vegetation).

Washington State has established additional ambient standards for total suspended particulates (TSP) and sulfur dioxide (SO₂), which are more stringent than the federal standards.

Ambient air quality standards

Pollutant	US	WA	PSCAA
Carbon monoxide			
1-hour average ¹	35 ppm	35 ppm	35 ppm
8-hour average ¹	9 ppm	9 ppm	9 ppm
Particulate matter - PM₁₀			
Annual Average	Revoked ⁶	50 ug/m ³	50 ug/m ³
24-hour average ¹	150 ug/m ³	150 ug/m ³	150 ug/m ³
Particulate matter - PM_{2.5}			
Annual average	15 ug/m ³		
24-hour average ^{1*}	35 ug/m ³		
Total suspended particles⁵			
Annual average	60 ug/m ³	60 ug/m ³	60 ug/m ³
24-hour average ¹	150 ug/m ³	150 ug/m ³	150 ug/m ³
Ozone			
1-hour average ³	Revoked ⁷		

8-hour average	0.075 ppm		
Nitrogen dioxide			
Annual average	0.053 ppm	0.05 ppm	0.05 ppm
Sulfur dioxide			
Annual average	0.03 ppm	0.02 ppm	
24-hour average ¹	0.14 ppm	0.10 ppm	
1-hour average/yr ¹		0.40 ppm	
1-hour average/7 day ⁵		0.25 ppm	
Lead			
Quarterly average	1.5 ug/m ⁵		

Annual standards are never to be exceeded. Short-term standards are not to be exceeded more than once per year unless noted.
 ppm = parts per million
 PM₁₀ = particles 10 microns or less in size
 PM_{2.5} = particles 2.5 microns or less in size
 ug/m³ = micrograms per cubic meter
 Source: Chapter 173, Sections 470-475 Washington Administrative Code (WAC).

Attainment, Nonattainment, and Maintenance Areas - Ecology and the PSCAA maintain a network of air quality monitoring stations throughout the region to measure existing air quality.

Based on monitoring information collected over a period of years by these agencies and by EPA, regions are designated as "attainment" or "nonattainment" areas for each criteria air pollutant.

A status of "attainment" for a given pollutant indicates that the air quality in an area complies with the NAAQS for that pollutant. If the area does not meet the NAAQS for a particular pollutant, the area is designated "nonattainment" for that pollutant.

A plan, called a State Implementation Plan (SIP), is developed and implemented to reduce ambient pollutant concentrations below the NAAQS and bring the area back into attainment with the NAAQS.

When the air in a nonattainment area has been cleaned up to the point that the standard is no longer exceeded for a specified period, the area is redesignated as "attainment" - this redesignation requires a maintenance plan (typically covering the first 10 years after redesignation) to ensure that ambient concentrations do not deteriorate back to

nonattainment levels. These redesignated areas are called "maintenance areas."

Pierce County's air quality

Most of Pierce County was designated a nonattainment area for fine particle pollution in 2009, becoming one of 32 nonattainment areas in the country and the only nonattainment area in the state. This means that fine particle pollution levels too frequently exceeded the national limit, posing public health risks.

These pollution levels are so high that they violate the Clean Air Act and have resulted in the area being designated as a "nonattainment area" by the EPA. This designation requires completion of a regulatory plan to clean up the problem and carries stricter rules for businesses and industry within the area. By law, Pierce County is required to clean up the air by 2019.

PSCAA is working with Ecology, with input from the Tacoma-Pierce County Clean Air Task Force, to develop a plan to reduce pollution from all sources, particularly wood smoke. The specific actions to reduce wood smoke pollution are still being finalized, but will likely closely follow the Tacoma-Pierce County Clean Air Task Force's recommendations to enhance enforcement of burn bans and require removal of older, more polluting "uncertified" wood stoves.

Pierce County air quality is typically good in the Puget Sound region for most of the year. However, the county has a problem with very high levels of fine particle pollution in Tacoma and most of Pierce County during the fall and winter months.

Air quality in Pierce County is influenced by topography and the shape of the land, meteorology and weather patterns, and the sources of pollution located in the community.

Industry, cars, trucks and ships emit fine particle pollution, but the biggest source of wintertime pollution is wood smoke. Pollution from wood smoke reaches unhealthy levels on cold, clear winter days when air is trapped close to the land ("inversion" conditions) and there is little wind to blow the smoke away.

The worst pollution levels in Pierce County were recorded at the air monitor located at South L Street in the South End neighborhood of Tacoma. Most episodes of elevated pollution levels occur on winter nights.

The nonattainment designation is a result of 2 factors:

- a stronger air pollution limit set by the EPA in 2006; and
- spikes in fine particle pollution levels during the winter that violate the limit.

The EPA strengthened the federal limit for fine particle pollution in 2006. This action came in response to numerous scientific studies that concluded that exposure to fine particle pollution had serious health effects at concentrations lower than previously understood. Previously it was thought that particles only contributed to short-term breathing problems.

A rapidly growing body of research, however, found that fine particles can enter the body and cause a wide range of serious health problems including heart attacks, reduced lung function, increased cancer risk, and shorter lifespan.

Based on this evidence, the EPA tightened the federal daily standard from 65 micrograms per cubic meter to 35 micrograms per cubic meter to better protect public health and the environment.

Under the new standard, Pierce County's air quality is considered unhealthy. Over the past decade fine particle pollution levels in Tacoma's south end have remained somewhat stable. These levels were below the former pollution standard, but violate the current, more protective standard.

An important factor contributing to Pierce County's air quality challenge is its pattern of pollution spikes during the winter.

In the Pierce County nonattainment area, fine particle pollution comes primarily from smoke from burning in fireplaces and wood stoves and exhaust from motor vehicles (trucks, buses, ships, etc.). Industrial operations also contribute a small portion of fine particle pollution.

The mix of fine particle pollution changes with the season. During the summer, fine particle pollution levels are lower overall, and motor vehicles typically contribute more than other sources.

During colder, winter months, a greater portion of fine particle pollution comes from smoke from woodstoves and fireplaces. The higher pollution levels are also due to stagnant weather conditions at night that trap the smoke from these fires and cause neighborhood air pollution to build up rapidly.

This pattern is particularly apparent in densely populated neighborhoods of Tacoma, where monitoring data collected from 2000 to 2010 clearly show increased particle pollution during winter months. During January, February, November and December, pollution levels violated the strengthened federal air quality standard and posed increased public health risk.

Fine particle pollution

Dust, soot, smoke are all considered "particulate matter," and one of the 6 criteria air pollutants monitored and regulated by the PSCAA under the Clean Air Act. Easily inhaled into lungs, fine particulate matter poses a host of serious health effects, and represents the most serious issues in the Tacoma/Pierce County area.

Fine particle pollution refers to any solid or liquid matter (or a mixture of both) in the air. There are many different sizes of particles in the air, but those measuring 2.5 micrometers in diameter or smaller can much more easily enter the lungs and be absorbed by the body. This size range of particulate matter is called "fine particle pollution" or PM_{2.5} and is the pollutant of primary concern in the Puget Sound region.

Impacts of fine particle pollution

Both long- and short-term exposure to fine particle pollution can pose a range of serious health effects. Fine particles are microscopic, a fraction the diameter of a single human hair. Their tiny size allows them to easily enter human airways, where they travel deeply into the lungs and circulatory system, affecting the heart.

Exposure to fine particle pollution is linked with respiratory disease, decreased heart and lung function, asthma attacks, heart attacks, strokes, and premature death. Children, older adults and people with respiratory and cardiac illnesses are especially at risk and should avoid outdoor exertion if fine particle pollution levels are high.

Breathing fine particle pollution can cause coughing, wheezing, and decreased lung function even in otherwise healthy children and adults. Certain types of particulate matter are considered air toxics. For example, both diesel exhaust and wood smoke contain chemicals known to cause cancer.

Each year millions of dollars are spent treating illnesses and health conditions that stem from fine particle pollution - and are entirely preventable.

In addition to health effects, fine particle pollution can limit visibility. Fine particle pollution can also deposit in lakes, rivers and the Puget Sound, affecting ecosystems and organisms.

Sources of fine particulate

Fine particle pollution comes primarily from combustion (burning) of fuels, such as wood and fossil fuels. This includes exhaust from motor vehicles (trucks, buses, ships, etc.) and smoke from burning in fireplaces and wood stoves, as well as land-clearing burning and backyard burning of yard waste. Industrial operations also contribute a small portion of fine particle pollution.

PSCAA measures and evaluates fine particle pollution levels through a network of monitors located throughout the 4-county jurisdiction. The federal limit for fine particle pollution is 35 micrograms per cubic meter over any 24-hour period.

To provide perspective, breathing air with 35 micrograms per cubic meter of particle pollution over the course of a day would expose an individual to 200 million to 2 trillion particles, each containing a range of toxic chemicals. PSCAA takes daily readings of air monitoring data to assess overall air quality and design programs to reduce pollution.

Air monitoring stations are located in King, Kitsap, Pierce and Snohomish Counties. These monitors are typically located in populated, residential areas, or in some instances industrial areas.

Air quality nonattainment

The Clean Air Act of 1970 is the law that defines the EPA's responsibilities for safeguarding the nation's air quality. Under the Clean Air Act, the EPA is charged with protecting public health and the environment by setting limits on how much pollution can be in the air. The purpose of these standards is to prevent air pollution from reaching levels that harm public health and welfare.

There are NAAQS for 6 common air pollutants: fine particle pollution (also sometimes called PM_{2.5}), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides and lead.

Fine particle pollution poses the greatest threat in the Puget Sound region and is the basis for the Tacoma-Pierce County nonattainment designation.

The federal Clean Air Act requires the EPA to review its standards every 5 years to ensure they effectively protect human health and the environment. In December 2006, the EPA set a tighter daily standard for fine particle pollution, strengthening it from 65 micrograms per cubic meter to 35 micrograms per cubic meter. The EPA made this change based on evidence from numerous health studies that showed the previous standard did not sufficiently protect human health.

When an area's monitored air pollution exceeds the NAAQS for a specified number of times, the EPA designates it as a nonattainment area. This designation is determined by a formula, which uses the number of times the standard is exceeded each year, and also includes 3 years of data to ensure that an area isn't designated as nonattainment because of 1 unusual year.

Nonattainment implications

Numerous national and international studies show an association between increases in fine particle pollution levels and increases in premature death. A study conducted by Ecology conservatively estimates that approximately 1,100 die every year in Washington due to fine particle pollution.

Under EPA rules, large industries seeking to expand or new large businesses looking to build and bring jobs here are already facing additional strict requirements because of the nonattainment designation. Some large existing businesses could be required to install additional emission control equipment. These factors may prompt businesses to locate their operations elsewhere, taking jobs and potential revenue from the region.

Tourism could also be negatively affected by nonattainment, and the perception that the Tacoma-Pierce County region has "dirty air."

Federal funding

If Washington State doesn't complete an implementation plan (SIP) to improve air quality, the EPA may impose a Federal Implementation Plan (FIP), mandating solutions that may not be the best for the region. It is important for those affected by nonattainment to define solutions that make the most sense for Tacoma and Pierce County and produce an acceptable SIP within the mandated timeframe.

Under the Clean Air Act, nonattainment areas that don't clean up air pollution are subject to cuts in federal transportation funding if new highway projects could add to fine particle

pollution. And the EPA could withhold all or part of the grant funds it provides to the state to support air quality monitoring, planning and control programs.

Attainment

It typically takes several years for an area to restore its attainment status. When an area is designated nonattainment, Ecology is required to develop a State Implementation Plan (SIP) and submit it to the EPA within 3 years.

A SIP is a plan for restoring air quality and bringing the area back into attainment status as quickly as possible. The SIP must define what actions will be taken to control air pollution, how these actions will lead to attainment, and a projection of when air quality will meet the standard. The SIP must be approved by the EPA.

Once monitoring data indicate air quality has improved, the State can petition the EPA to re-designate an area from nonattainment to attainment. The EPA can only approve this request if the following conditions are met:

- Air quality monitoring data shows the area meets the standard.
- Reductions in the area's emissions are permanent and enforceable.
- The SIP developed for the area has met the requirements of the federal Clean Air Act and been fully approved by the EPA.
- The EPA has fully approved a 10-year Maintenance Plan for the area submitted by Ecology as a revision to the SIP.
- The area meets requirements of the Clean Air Act for general SIPs and nonattainment areas.

Key agencies

Puget Sound Clean Air Agency (PSCAA)	Regional air quality regulatory agency with jurisdiction over Pierce County	Administers the task force, analyzes results and provides recommendations to Ecology on strategies for bringing Pierce County back into attainment. Conducts outreach to seek broad input.
Washington State Department of Ecology (Ecology)	State environmental protection agency	Prepares and submits State Implementation Plan to EPA

US Environmental Protection Agency, Region 10 (EPA)	Northwest regional office of the agency of the federal government charged to protect human health and the environment.	Reviews and approves State Implementation Plan. Determines whether Pierce County has reached attainment.
---	--	--

Tacoma-Pierce County nonattainment area

The federal Clean Air Act requires that a nonattainment area include not only the area that is violating the federal pollution standard, but also nearby areas that contribute to the violation. Criteria that factored into determining the boundaries for the nonattainment area include: air quality data, emissions information, population density, traffic and commuting patterns, expected growth, weather, topography, jurisdictional boundaries, and control of emissions.



With these considerations in mind, the final boundary was set around most of Pierce County's urban growth area, with the following exceptions:

- The nonattainment area does not include less populated areas of Pierce County such as DuPont and Joint Base Lewis-McChord.
- The nonattainment area also excludes the far eastern peninsula of Pierce County, east of the Puyallup River and White River Valley. While these areas do create fine particle pollution, and occasionally also experience high levels of fine particle pollution, topography and typical weather patterns make it unlikely that pollution from this area affects air quality around the

neighborhoods experiencing the worst pollution.

Tacoma-Pierce County Clean Air Task Force recommendations

PSCAA formed the Tacoma-Pierce County Clean Air Task Force - a diverse cross-section of community leaders representing Pierce County residents including those who heat their homes with wood, business, government and health and who volunteered their time and input to explore meaningful, yet achievable ways for Pierce County to improve its air quality.

The Task Force explored over 60 possible tactics for reducing fine particle pollution from wood-burning, transportation and goods movement activities. With technical guidance provided by the Puget Sound Clean Air Agency staff to assess the feasibility, cost, and potential air quality benefits, the Task Force honed in on 3 primary strategies.

Because fine particle pollution comes from a variety of sources, these strategies target multiple sectors, including wood smoke from residential home heating, and emissions from transportation and industrial sources.

The following overarching principles were adopted by the Task Force in developing their recommendations:

- All residents and communities in the nonattainment area should contribute to the solution.
- The solutions should be implemented in a manner that will provide some form of assistance to low- and fixed-income residents or helping them find alternatives.
- Education efforts are a key component to ensure effective implementation.

Solution 1: Enhance Enforcement of Air Quality Burn Bans

Goal: Ensure that those who are contributing the most to the fine particle pollution during periods of the poorest air quality reduce their emissions.

Under Washington State law, PSCAA can temporarily ban the use of wood-burning heating devices when air pollution reaches, or is expected to reach, unhealthy levels. To improve the effectiveness of air quality burn bans, the Task Force recommended:

- Expanded education and outreach. The Task Force agreed that community education about burn bans.
- Increased enforcement of burn bans. This includes leveraging part-time personnel to enforce burn bans, exploring technologies to improve evening enforcement of burn bans, and adjusting the criteria for when burn bans are called to more effectively protect health.

Solution 2: Require the Removal of Uncertified Wood Stoves and Inserts by a Certain Date

Goal: Remove the older, more polluting wood stoves and inserts from the nonattainment area.

Wood stoves and inserts manufactured prior to 1988 produce more pollution and are less efficient than more modern devices. These stoves and inserts are called uncertified devices. There are approximately 24,000 of these old, high-polluting, uncertified devices in the nonattainment area. Removing these devices would effectively reduce fine particle pollution in the long run.

The Task Force recommended establishing a clear date by which time all residents will need to remove their uncertified wood stove or insert. They proposed the end of August 2015. To date, more than 1,200 of these devices have been removed and replaced under a prior voluntary PSCAA program.

Solution 3: Reduce Pollution from Gasoline Vehicles, Diesel Vehicles, Industries, Ships

The Task Force recommended continued implementation of rules and support for programs and initiatives that target pollution reductions from transportation and industrial sources.

Approximately 25-33% of the emission reductions needed to meet the fine particle pollution standard by 2019 will be accomplished from new federal regulations and local initiatives related to non-wood smoke sources of pollution (vehicles, ships, etc.). Most of these regulations and initiatives are in the process of being implemented.

Vehicle sources - nationally, the focus for reducing fine particle pollution related to gasoline vehicles has been on creating cleaner standards for both engines and fuels.

Washington State has adopted the California Clean Car Standards for vehicles, the most stringent automobile standards in the country.

These standards will help to reduce fine particle pollution.

Local governments have adopted several programs to reduce fine particle pollution related to gasoline engines, including installing electric vehicle charging stations, using electric and biodiesel vehicles, and adopting anti-idling programs.

The regional transportation plan adopted by the Puget Sound Regional Council has several policy goals that will help reduce fine particle pollution even further.

A number of planned transportation capital investments will also help, such as high occupancy vehicle (HOV) lane extensions, ramp metering, Sound Transit Sounder rail improvements, and investments in alternative means of travel.

In addition, the task force suggested continued education efforts that encourage individual car and truck owners to take actions to reduce pollution emissions (e.g. anti-idling initiatives).

Industrial sources - among the industrial sources of fine particle pollution in the nonattainment area, there are 6 that have been identified by Ecology and PSCAA as the largest industrial emitters of fine particle pollution. Collectively, these 6 sources contribute more than 90% of the industrial fine particle pollution from industrial sources in the nonattainment area.

The federal Clean Air Act establishes a requirement for working with industries to reduce their levels of pollution called Reasonably Available Control Technology (RACT).

Engineering staff at Ecology and PSCAA are reviewing the existing pollution controls and operations at these 6 industrial sources to determine if they already meet RACT. A preliminary analysis indicates that most, if not all, of the sources do.

For ocean-going ships, new international standards require use of lower sulfur fuel, beginning in 2012 and moving to much stricter levels by 2015. These cleaner fuels will reduce the fine particle pollution from ships.

The Port of Tacoma and its tenant, Totem Ocean Trailer Express (TOTE), have also installed shore power facilities and retrofitted ships so that ships can use shore power instead of operating diesel engines to create power when at berth.

Adoption

The Task Force transmitted its recommendations to PSCAA in December 2011. PSCAA's board of directors will review the report and make recommendations to Ecology. Ecology will conduct further analysis and prepare a State Implementation Plan (SIP). There will be opportunities for public review and comment on the Plan.

Because any local rules or state laws required for the solutions will need to be in place before the SIP is submitted to the EPA, PSCAA will seek state legislation in 2012 to clarify its existing authority for implementing the recommended solutions.

Ecology must submit the SIP to the EPA by December 2012 for their review and approval. At the same time, PSCAA will be developing plans and implementing actions to improve air quality in the nonattainment area.

Attainment timeline

2006	Health studies cause EPA to tighten standard for fine particle pollution
December 2009	EPA designates Tacoma-Pierce County as a nonattainment area
Summer 2011	PSCAA convenes Tacoma-Pierce County Clean Air Task Force
Fall 2011	Clean Air Task Force makes recommendations to PSCAA
Winter 2011/2012	PSCAA submits recommendations to Ecology
December 2012	Ecology submits State Implementation Plan to EPA
2014	Target for Tacoma-Pierce County nonattainment area to reduce fine particle pollution to meet federal standard
2019	Final deadline to meet federal standard for fine particle pollution

Conformity

Conformity is the process by which areas of nonattainment and air quality maintenance are protected from further air quality deterioration due to new development. This process is defined and mandated by the Clean Air Act Amendments.

The objective of the conformity regulation is to ensure that Federal actions (which include

funding, transportation projects, permit actions, approvals, etc.) are consistent with, or conform to, the applicable State Implementation Plan (SIP). This ensures that Federal Agency actions don't impinge on an area's attainment demonstration or cause new violations of the NAAQS.

SIPs developed by State environmental regulatory agencies or their delegate (includes all nonattainment areas within the state) must be submitted for approval by EPA Regional Office for that State. Projects are in conformity when they do not:

- cause or contribute to any new violation of the NAAQS,
- increase the frequency or severity of any existing violation of the NAAQS, or
- delay timely attainment of the NAAQS.

A Conformity Determination is required for all "Federal Actions" in nonattainment and maintenance areas to ensure that such actions taken by federal agencies conform to an applicable SIP.

Federal actions can include the issuance of permits, funding of projects, etc. Conformity must be addressed in 2 areas: Transportation Conformity and General Conformity.

Transportation conformity process - ensures that traffic projects affecting public roads and highways comply with an area's Transportation Improvement Plan in nonattainment or maintenance areas (i.e., this process evaluates all "on-road" activities).

General conformity process - ensures that projects that have "non-road" components (such as construction equipment, marine vessels, mining equipment, etc.) conform to the applicable SIP or Maintenance Plan for the area (i.e., this process evaluates all "non-road" equipment associated with the Federal Action).

In general, federal actions within nonattainment or maintenance areas have to demonstrate conformity with the applicable SIP or Maintenance Plan prior to the start of project work.

In addition, all on-road transportation projects that otherwise meet conformity requirements but add trips to, or result in, intersection level of service (LOS) of D, E, or F may still require Transportation Conformity analysis.

Washington State conformity requirements

The Washington State Environmental Policy Act (SEPA) requires that all major actions sponsored, funded, permitted, or approved by state and/or local agencies undergo planning to ensure environmental considerations such as impacts on air quality are given due weight in decision-making. (WAC 197-11 and WAC 468-12 (WSDOT))

The Clean Air Washington Act (CAWA) of 1991 (RCW 70.94) requires transportation plans, programs, and projects to be consistent with the SIP to improve air quality in areas where federal air quality standards are not met.

The act gives responsibility for determining conformity to the state, local government, or metropolitan planning organization that is developing the transportation plan, program, or project. It also authorized establishment of a local air pollution control authority for each area of the state.

WAC 173-420, Conformity of transportation activities to air quality implementation plans -

contains regulations to ensure conformity of transportation activities to the SIPs. These regulations were developed jointly by Ecology and WSDOT to meet federal and state statutory requirements.

The regulations set forth minimum requirements for evaluating transportation plans, programs, and projects for conformity, provide a basis for evaluating conformity determinations, and guide state, regional, and local agencies in making conformity determinations.

Determining regional and project level conformity

Regional and project level conformity analysis must be undertaken on all non-exempt projects located in 'nonattainment' or 'maintenance' areas.

If the project is listed in the Transportation Improvement Plan (TIP) and/or in the Metropolitan Transportation Plan (MTP) for the appropriate Metropolitan Planning Organization (MPO), then it has undergone regional conformity analysis and can be concluded to meet regional conformity requirements for all criteria pollutants.

For projects within the central Puget Sound region of Washington State, the Puget Sound Regional Council (PSRC) is responsible for developing the long range transportation plan,

for maintaining the TIP and for undertaking regional conformity analysis to ensure that all projects listed in the MTP/TIP meet regional conformity standards.

Even if a project meets regional conformity requirements, a project level (hot spot) analysis for CO and/or PM₁₀ may still be required if the project requires quantitative analysis.

Effectively this means that a project level conformity analysis will be required if any of the intersections (signalized or non-signalized) within the project area (or outside the project boundary but potentially affected by the project) have or will have a level of service (LOS) of D, E, or F under any of the future conditions (year of opening, forecast year, and horizon year).

Greenhouse gas and climate change issues

The impact emissions from human activities has on the global climate has been the subject of extensive international research during the past several decades.

There is now a broad consensus among atmospheric scientists that emissions caused by humans have already caused measurable increases in global temperature and are expected to result in significantly greater increases in temperature in the future. However, there is still considerable uncertainty about the exact magnitude of future global impacts and the best approach to mitigate the impacts.

The United Nations' Intergovernmental Panel on Climate Change (IPCC) published the most recent sets of 5-year progress reports summarizing worldwide research on global climate change in 2001 and 2007.

The reports indicated that some level of global climate change is likely to occur and that there is a significant possibility of adverse environmental effects. Several alternative mitigation measures were evaluated by the worldwide scientific community to reduce global emissions, including the first round of worldwide reductions in greenhouse gases (GHGs), as prescribed in the Kyoto Protocol.

Global climate change is a cumulative issue related to worldwide GHG emissions rather than emissions from any individual facility. No single project emits enough GHG to influence global climate change by itself.

GHG emitted anywhere on the planet remains active for roughly 100 years, and eventually disperses through the world. Therefore, future climate change in Washington State would be influenced as much by new industrial activity in China as it would be by MLK subarea developments.

Washington State's Governor issued Executive Order 07-02 - committing the state to reducing its GHG emissions under a staged schedule including:

- Reducing emissions to 1990 levels by 2020
- Reducing emissions to 50% below 1990 levels by 2050.

In March 2008, the Washington legislature enacted House Bill 2815, which directed Ecology to develop rules for the mandatory reporting of greenhouse gas emissions by sources that emit more than certain specified threshold amounts.

Greenhouse gas emissions include carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄) from sources such as on-road heavy-duty vehicles, railroad locomotives, and construction related activities. In addition, emissions of refrigerants have been evaluated, as have emissions from purchased electricity and building heating.

Estimates of individual greenhouse gases are converted to "CO₂ equivalents" (CO₂E) by multiplying each pollutant by its global warming potential relative to CO₂. The CO₂E conversion factors are:

- Carbon Dioxide (CO₂) - 1 CO₂E
- Nitrous Oxide (N₂O) - 310 CO₂E
- Methane (CH₄) - 21 CO₂E
- Refrigerants, represented by HFC-134a - 1,300 CO₂E

CO₂ emissions are by far the largest in terms of mass emissions and total global warming potential, even after the other gases are converted to CO₂ equivalents.

Sources of on-road emissions on and in the vicinity of the MLK subarea primarily include trucks and cars traveling along subarea or adjacent roadways. The trend for the country and the region's CO emissions is downward.

Even though the proposed project will result in more vehicles at MLK subarea intersections, the CO emissions are expected to be lower with the proposed project than under current conditions.

This is due to better engine technology and the implementation of maintenance plans.

4.3.2: Impacts

Both alternatives

Both alternatives will continue development of the lands within the MLK subarea for urban uses and activities to various intensities including the generation of localized air pollutant emissions associated with automobile traffic, industrial manufacturing, and construction activities.

Additional urban activities and accompanying automobile traffic will produce and increase suspended particulate (PM₁₀), ozone (O3), and carbon monoxide (CO) content within the local area, particularly along MLK Way, Yakima Avenue, and other connector road corridors.

However, considering the relative magnitude of proposed development activities, it is unlikely that the volume of urban activity within the MLK subarea will create air pollutant conditions to a point where EPA, Ecology, or PSCAA standards will be at risk.

Any additional urban development whether of previously undeveloped lands or of a higher intensity of previously committed lands will involve minor to extensive amounts of grading and filling activity and the use of diesel-powered trucks and equipment. While these emissions would be temporary and localized, all construction activities can cause dust and other particulate pollution (PM₁₀) if not contained or managed.

Any additional urban development will create particulate pollution from the burning of wood stoves and fireplaces in direct proportion to the amount of population to be provided for - if proper wood burning management controls are not instituted.

Alternative 1: No-action

The Washington Administrative Code requires a no-action alternative be considered within the environmental review process. Under a no-action alternative, the prevailing 2012 Tacoma Comprehensive Plan, Zoning Map, and development regulations would remain in effect and all MLK subarea planning and implementation policies would continue to be coordinated with these documents.

The present plan and policies or no-action would result in the following:

Mixed use zoning - would remain as designated in the current zoning map including the classification of the single family neighborhood located in the south portion of the subarea and of the apartment buildings and churches in the north portion of the subarea potentially resulting in additional redevelopment construction activity.

Alternative 2: MLK Subarea Plan

Alternative 2: MLK Subarea Plan will conform to the 2012 Tacoma Comprehensive Plan but amend the Zoning Map, and development regulations to result in the following impacts:

Mixed use zoning - will be slightly revised to retain and protect the existing single family housing stock and neighborhood in the south end of the subarea and older apartment buildings and churches adjacent to MultiCare Health Systems hospital development in the north end of the subarea. This will retain existing usable building stock and avoid potentially fragmented and ill-advised redevelopment activities with construction related particular matter (PM), carbon monoxide (CO), and ozone (O3) air pollution.

4.3.3: Mitigating conditions/policies

Both alternatives

Under both alternatives, EPA, Ecology, and PSCAA will maintain air quality and greenhouse gas emissions using the following policies and programs.

GMA

Chapter 4 Environmental Element of Tacoma's Comprehensive Plan was updated in 2011 as required by the State Growth Management Act (GMA) and was adopted as part of the Tacoma Municipal Code. Chapter 4 identifies the goals, policies, guidelines, and requirements of GMA "to designate and classify ecologically sensitive and hazardous areas and to protect these areas and their functions and values, while also allowing for reasonable use of private property".

Pollution - affects the livability of our environment and affects land use:

E-P-1 Environmental Protection

Acknowledge the dangers to health presented by all forms of environmental pollution and degradation by individuals as well as by

industries, and support education and technical assistance, as well as rigorous enforcement of regulations when necessary, to alleviate these dangers.

E-P-2 Air and Water Pollution

Support education and technical assistance, as well as strict enforcement when necessary, of air, water, noise and other pollution laws and regulations with the ultimate purpose of eliminating these problems as negative features of the environment.

E-P-3 Prevention and Mitigation

Prioritize prevention and avoidance of pollution when possible. Use SEPA Substantive Authority, where warranted, in conjunction with adopted policies to provide mitigation for unavoidable impacts to environmental quality.

Source: Chapter 4 Environmental Element, Tacoma Comprehensive Plan 2011

Air quality - affects the livability of our environment and affects land use:

E-AQ-1 Air Pollution

Support the control and ultimate elimination of the contaminating by-products of transportation equipment.

E-AQ-2 Air Quality Studies

All developments subject to SEPA environmental review procedures should address air quality impacts resulting from the development and its operation. In order to adequately assess impacts, any development proposal that requires state or federal air permits or reporting shall provide a quantitative study as part of their environmental analysis.

Source: Chapter 4 Environmental Element, Tacoma Comprehensive Plan 2011

Development-related GHG reduction measures

Both alternatives will require development permit applicants (including Tacoma and other public and nonprofit agencies) to identify GHG reduction measures included in their projects and explain why other measures are not included or are not applicable in accordance with the following Ecology GHG reduction measures:

Ecology's GHG reduction measures

Site design	Comments	Emission		
Plant trees and vegetation near structures to shade buildings.	Reduces onsite fuel combustion emissions and purchased electricity plus enhances carbon sinks.	D	I	

Minimize building footprint.	Reduces onsite fuel combustion emissions and purchased electricity consumption, materials used, maintenance, land disturbance, and direct construction emissions.	D	I	
Design water efficient landscaping.	Minimizes water consumption, purchased energy, and upstream emissions from water management.		I	
Minimize energy use through building circulation.	Reduces onsite fuel combustion emissions and purchased electricity consumption.	D	I	

Building design/operations

Apply LEED standards (or equivalent) for design and operations.	Reduces onsite fuel combustion emissions and off-site/indirect purchased electricity, water use, and waste disposal.	D	I	
Purchase Energy Star equipment and appliances for public agency use.	Reduces onsite fuel combustions emissions and purchased electricity consumption.	D	I	
Incorporate on-site renewable energy production, including installation of photovoltaic cells or other solar options.	Reduces onsite fuel consumption emissions and purchased electricity consumption.	D	I	
Design street lights to use energy efficient bulbs and fixtures.	Reduces purchased electricity.		I	
Construct "green roofs" and use high-albedo roofing materials.	Reduces onsite fuel consumption emissions and purchased electricity	D	I	

Install high-efficiency HVAC systems.	consumption. Minimizes fuel combustion and purchased electricity consumption.	D	I		are extracted and/or manufactured within the region.	purchased materials.			
Eliminate or reduce use of refrigerants in HVAC systems.	Reduces fugitive emissions.	D			Use rapidly renewable building materials.	Reduces emissions from extraction of purchased materials.		I	
Maximize interior day lighting through floor plates, increased building perimeter, and use of skylights, clerestories, and lightwells.	Increases natural/day lighting initiatives and reduces electrical energy consumption.		I		Conduct 3 rd party building commissioning to ensure energy performance.	Reduces fuel consumption and purchased electricity consumption.	D	I	
Incorporate energy efficiency technology such as: <ul style="list-style-type: none"> ▪ super insulation ▪ motion sensors for lighting and climate control ▪ efficient, directed exterior lighting 	Reduces fuel combustion and purchased electricity consumption.	D	I		Track energy performance of building and develop strategy to maintain efficiency.	Reduces fuel consumption and purchased electricity consumption.	D	I	
Use water conserving fixtures that surpass building code requirements.	Reduces water consumption.		I		Transportation				
Re-use gray water and/or collect and re-use rainwater.	Reduces water consumption with its indirect upstream electricity requirements.		I		Size parking capacity to not exceed local parking requirements and, where possible, seek reductions in parking supply through special permits or waivers.	Reduced parking discourages auto dependent travel, encouraging alternative modes such as transit, walking, biking, etc. Reduces direct and indirect vehicle miles travelled (VMT).			T
Use recycled building materials and products.	Reduces extraction of purchased materials, possibly reduces transportation of materials, encourages recycling and reduction of solid waste disposal.		I	T	Develop and implement a marketing/information program that includes posting and distribution of ridesharing/transit information.	Reduces direct and indirect VMT.			T
Use building materials that	Reduces transportation of			T	Subsidize transit passes. Reduce employee trips during peak periods through alternative work schedules, telecommute, and/or flex-time. Provide a guaranteed ride home program.	Reduces employee VMT.			T
					Provide bicycle storage and showers/changing rooms.	Reduces employee VMT.			T
					Utilize traffic	Reduces	D		T

signalization and coordination to improve traffic flow and support pedestrian and bicycle safety.	transportation emissions and VMT.			
Apply advanced technology systems and management strategies to improve operational efficiency of local streets.	Reduces emissions from transportation by minimizing idling and maximizing transportation routes/systems for fuel efficiency.			T
Develop shuttle systems around business district parking garages to reduce congestion and create shorter commutes.	Reduces idling fuel emissions and direct and indirect VMT.			T

D = direct emissions including emissions generated onsite that the proponent of the action has direct control over.
I = indirect emissions including those generated offsite and for which the proponent does not have direct control over such as emissions associated with purchased or acquired electricity.
T = transportation emissions that are either direct (within control of the proponent) or indirect (outside of the proponent's direct control).
Source: Washington State Department of Ecology

Tacoma's Climate Action Plan

Tacoma Mayor Bill Baarsma established the city's commitment to reducing greenhouse gas emissions when he signed the US Mayors Climate Protection Agreement in April 2005, pledging that Tacoma would strive to meet or exceed the reduction target set in the Kyoto Protocol to cut emissions by 7% from 1990 levels by 2012.

In April 2006, the Tacoma City Council adopted a resolution supporting efforts to curb global warming and reduce greenhouse gases, while encouraging the continued growth and development of clean technology businesses in the City of Tacoma.

The 2006 resolution noted that greenhouse gas reduction activities complement many of the city's environmental values, including the promotion of clean and efficient energy use, commuter trip reduction efforts and clean air initiatives, solid waste reduction and recycling,

salmon recovery, assuring a reliable and affordable water supply, protecting urban and rural forests, and promoting low-impact development.

The resolution called for reducing greenhouse gas emissions in city operations, while pursuing reductions in community emissions through cooperative programs and policies.

A Green Ribbon Climate Action Task Force was appointed by the City Council in February 2007. The task force was charged with defining carbon reduction goals, and developing specific community and government action plans to achieve those goals.

The task force members represented a diverse set of interests and community groups, including business and trade groups, conservation organizations, government agencies, higher education institutions and the health community.

The task force reviewed Tacoma's emissions inventory, considered other scientific data, and studied climate action plans from other cities, as well as state and regional efforts. The task force looked at regional and national models, and identified the unique opportunities presented in Tacoma.

Task force members identified more than 80 strategies to reduce greenhouse gas emissions. These included about 40 new strategies, in addition to actions in progress or soon to be implemented, and strategies that couldn't be numerically quantified with a specific carbon savings

The task force gathered public feedback on the proposed strategies through a series of public meetings, by attending community meetings, and from an internet survey. After reviewing all of the input, the task force adopted its final recommendations in May 2008.

Tacoma's GHG emission reduction goals

Tacoma's 1990 estimated greenhouse gas emissions level was 1,990,830 tons, based on an emissions inventory conducted in 2007.

Because Tacoma has already implemented a series of sustainability programs, the city is on pace to reduce its emissions by 104,775 tons by 2012, which is more than 5% of Tacoma's 1990 estimated emissions level.

Through current and planned efforts, Tacoma is demonstrating that cities can meet the Kyoto Protocol. However, supported by the comments

of Tacoma citizens and the 2007 findings of the Intergovernmental Panel on Climate Change showing that intense efforts in the short term are better than moderate efforts over the long term, the Green Ribbon Climate Action Task Force believes that Tacoma and its citizens can and should be a leader in *exceeding* the Kyoto Protocol.

The Green Ribbon Climate Action Task Force recommended:

By 2012 - Tacoma's greenhouse gas emissions should be reduced to 15% below 1990 levels or by 214,373 tons below the level of emissions predicted for 2012.

By 2020 - Tacoma's greenhouse gas emissions should be reduced to 40% below 1990 levels or to a total of 1,194,498 tons, or by 712,081 tons below emissions predicted for 2012.

By 2050 - Tacoma's greenhouse gas emissions should be reduced to 80% below 1990 levels or to a total of 398,166 tons, which or by 1,508,413 below emissions predicted for 2012.

Tacoma's GHG strategies

Tacoma's greenhouse gas emission strategies are organized into 5 categories:

1: City lead by example - these strategies focus on specific actions to be taken by municipal government, calling on Tacoma to take the lead in reducing greenhouse gas emissions in the city.

Strategies include implementing policies on environmentally responsible purchasing and waste reduction/conservation; establishing green-building standards for all new or renovated city buildings; reducing electricity and natural gas consumption; and purchasing fuel-efficient or alternative-fuel vehicles for the city fleet.

2: Move people and goods more efficiently - transportation strategies start with reducing the number of single occupancy vehicles both locally and from out of the South Sound region.

Encouraging ridesharing, carpooling and the use of public transportation are key strategies in this area. Reducing the need for driving is another approach, with an emphasis on developing a comprehensive bicycle and pedestrian network, and promoting telecommuting and flexible work schedules - which is integral to Alternative 2: MLK Subarea Plan proposed actions.

Other strategies recommend changing parking policies to discourage single occupancy vehicle

driving, and policies and programs aimed at reducing fuel use and/or increasing fuel efficiency.

3: Enhance compact/livable neighborhoods - strategies include starting a regional transfer of development rights program and implementing smart growth principles - which is integral to Alternative 2: MLK Subarea Plan proposed actions.

The task force also recommends increasing tree-planting requirements, and adopting and funding the Open Space Habitat and Recreation Plan being developed by the city.

4: Energy efficiency in buildings, homes and industries - energy strategies include increasing conservation and expanding renewable energy sources.

Specific recommendations include requiring sellers to have an energy audit before the sale of any building, hiring a city "green building advocate" to assist with green-building projects, and encouraging installation of renewable energy.

5: Reuse and recycle ... from buildings to food waste - these strategies seek to maximize commercial and residential recycling, ramping up to 100% recycling.

Recommendations included exploring home composting programs and diverting more organic waste from landfill disposal. Other strategies emphasize reuse of materials and reducing waste generation through reusing older buildings and encouraging the deconstruction and recycling of structures being demolished in the city.

Tacoma's Climate Action Plan includes a recommendation for an implementation structure designed to ensure that the strategies are successfully executed, and a 2-year action plan identifying the steps to be taken during 2009-2010.

This plan is consistent with the latest reports from the Intergovernmental Panel on Climate Change, set up by the World Meteorological Organization and the United Nations Environment Programme, which strongly advises that early actions will have more impact than the same actions taken years later.

Construction emission controls

Tacoma requires all construction contractors implement air quality control plans for construction activities in the city and MLK

subarea to include best management practices (BMP) to control fugitive dust and odors emitted by diesel construction equipment including the following:

- using water sprays or other non-toxic dust control methods on unpaved roadways,
- minimizing vehicle speeds while traveling on unpaved surfaces,
- preventing the track out of mud onto public streets,
- covering soil piles when practical,
- minimizing work during periods of high winds when practical,
- maintaining construction equipment engines according to manufacturers' specifications, and
- minimizing idling of equipment while not in use.

Construction mitigation measures

Mitigation measures to reduce the potential for air quality impacts during construction include measures for reducing both exhaust emissions and fugitive dust. Construction contractor(s) are required to comply with all relevant federal, state, and local air quality regulations, including the preparation of a plan for minimizing dust and odors.

WAC 173-420-100 states that construction-related impacts that cause a temporary increase in emissions do not have to be taken into account in a conformity determination.

Anticipated impacts as a result of construction activities are emissions from construction equipment, an increase in dust and particulates as a result of soil disturbance, and an increase in CO emissions from idling vehicles as a result of an increase in traffic delays and congestion on alternate routes. The following measures can be taken to minimize construction air quality impacts:

- Construction vehicles be in good working order;
- Use of Ultra-Low Sulfur Diesel Fuel (ULSD);
- Best management practices (BMP's) be utilized to control fugitive dust. BMP's may include but are not limited to the use of water spray for dust suppression and covering stockpiles; and
- A traffic management plan be in place during construction and any alternative routes will be well signed.

Alternative 2: MLK Subarea Plan

In addition to the mitigation measures listed under both alternatives, Alternative 2: MLK Subarea Plan will also implement the following measures to mitigate impacts on air and GHG conditions by reducing vehicular traffic and particulate matter (PM), carbon monoxide (CO), and ozone (O3) air pollution potentials.

3: Economic sustainability - recruit businesses that employ technical, professional, and managerial skills offered by and/or able to be developed for MLK residents to facilitate live/work sustainability in MLK.

16: Housing options - increase housing choice by type, price, tenure, and location to house a mixed age, household, and income population in or near employment centers, transit corridors, and recreational sites to provide increased live/work/play opportunities in the MLK area.

17: Affordable housing - award additional density, reduced parking requirements, reduced permit fees, and/or other measures for new housing projects that promote rental and sale workforce housing for moderate income working households employed or resident within MLK.

35: Walkways and sidewalks - improve and complete key connections on 11th, 15th, 19th, 25th Streets, and MLK Way from the neighborhoods to the west of the MLK subarea, and from the MLK subarea to the downtown, UW Tacoma, Thea Foss Waterway, Murray Morgan Bridge, and other major walking destinations including a Safe Routes to School program for McCarver Elementary School.

38: Bikeway network - institute bike lanes on 6th, 11th, 19th, and 25th Avenues, I Street and Yakima Avenue, and bike boulevard on J Street to complete key connections to and the MLK district, schools, parks, and other major commuter and recreational destinations as well as with the downtown and larger city system. Develop the J Street bike boulevard in conjunction with MultiCare and Franciscan Health Systems to account for emergency access to the hospitals.

44: Green streets - reconfigure South I and J Streets, and the wider right-of-way in 14th, 21st, and 25th Streets (historical streetcar routes) to expand on-street parking, improve sidewalks, plant street trees, and develop bio-swale rain gardens to calm traffic, improve pedestrian and bike access, and establish a "green and park-

like” Green Complete Streets character to these residential neighborhood streets.

45: Streetcar (LINK) - re-install streetcar (or LINK) service on MLK Jr Way in shared lanes with vehicles or in a dedicated median lane with stops at least serving MultiCare Health System, People’s Park, the Business District core, People’s Community Center, Franciscan Health System, and 23rd Street. The streetcar (or LINK) service should connect the MLK district with local employment and residential areas and destinations, such as the Stadium District, Downtown core, UW Tacoma, Brewery District, Thea Foss Waterway, and the Dome District (where there are regional connections with Sound Transit, Greyhound, and Amtrak). The system should also be designed to allow potential loop configurations and future expansions west into the neighborhoods and to other commercial districts, mixed-use centers, and destinations.

46: Pierce Transit - retain and expand Pierce Transit’s schedules and stops to include hours and routes that support MLK district employees and residents, particularly at MultiCare and Franciscan Health System’s Hospitals, Community Health Care and within the business district core.

4.3.4: Unavoidable adverse impacts

Air quality

Both alternatives will increase urban development, motor vehicle traffic, and resulting air pollution but not of any significant unavoidable adverse impacts on regional or local air quality.

Alternative 2: MLK Subarea Plan, however, will develop walkways and streetscapes, bikeway networks, streetcar or LINK light rail connections, local live/work sustainability employment and housing that will reduce dependence on vehicular traffic and associated carbon monoxide (CO) and ozone (O3) production.

Temporary, localized dust and odor impacts could occur during construction activities under both alternatives.

GHG Emissions

Both alternatives will generate construction and operations which will contribute to local and regional greenhouse gas emissions of which CO2 emissions would be the largest source of greenhouse gas emissions.

Declaring the impact significant or not significant implies an ability to measure incremental effects of global climate change. However, the body of research and adopted regulations necessary to connect individual land uses, development projects, operational activities, etc. with the broader issue of global warming and greenhouse gas emissions do not currently exist.

Scientific research and analysis tools sufficient to determine a numerical threshold of significance for greenhouse gas emissions have not been established at this time and any conclusions regarding impact significance would be speculative.