

Alaska's 2013 Air Monitoring Network Plan

Chapter 5

Matanuska-Susitna Borough

Air Quality Division

Air Monitoring
&
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5 MATANUSKA-SUSITNA BOROUGH MONITORING SITE DESCRIPTIONS

5.1 *General Information*

The Matanuska-Susitna (Mat-Su) Borough has a population¹ of 88,995 and covers 24,682 square miles of land and 578 square miles of water. There are three incorporated cities, several unincorporated communities, and twenty-five recognized community councils within the Mat-Su Borough. Average temperatures in the winter range from 6°F to 14°F; in the summer, 47°F to 67°F. Average annual precipitation is 16.5 inches, with an average 58 inches of snowfall.

The State of Alaska has been conducting long-term air quality monitoring investigations into particulate matter concentrations in the Matanuska–Susitna (Mat-Su) Valley since 1998. Monitoring was initiated in response to staff observations and well-documented accounts of wind-blown dust off the Matanuska and Knik River drainages. Particulate matter (PM) is divided into three fractions depending on the size of the particle: PM₁₀, PM_{2.5}, and PM_{Coarse}. Monitoring in the Mat-Su Valley began with sampling for PM₁₀ which means coarse particulate that is all particulate matter of a particle size less than or equal to 10 micrometers (µm). PM₁₀ is usually associated with crustal materials, which in this case is primarily wind-blown glacial silt from the river basins. PM_{2.5} is referred to fine particulate and is particulate matter equal or less than 2.5 µm and usually associated with smoke. PM_{Coarse} is a recent monitoring development to further differentiate PM₁₀ from PM_{2.5} and represents the fraction of particles in the size range between PM₁₀ and PM_{2.5}.

Currently, there are three particulate monitoring sites located near the population centers in the southern Mat-Su Borough. All three sites are operated by DEC staff.

The designated State & Local Air Monitoring Site (SLAMS) is located at Harrison Court in the unincorporated area of Butte. The other two monitoring sites located in Palmer and Wasilla are special purpose monitoring (SPM) sites. The Palmer site is located between E. Dahlia Avenue and E. Elmwood Avenue near S. Gulkana Street. The Wasilla site is located adjacent to Fire Station 61 near the intersection of W. Swanson and Lucille. Figure 5.1:1 provides the map locations for all three monitoring sites.

¹ Population data obtained from 2010 U.S. Census (April 1, 2011).

Table 5.1:1 SLAMS and SPM sites in the Matanuska-Susitna Borough

PM _{2.5}					
Site Name	Location	AQS ID	Designation	Install Date	Scale
Harrison Court	Butte	02-170-0008	SLAMS	1998	Neighborhood
South Gulkana Street	Palmer	02-170-0012	SPM	2010	Neighborhood
100 W Swanson	Wasilla	02-170-0013	SPM	2010	Neighborhood
PM ₁₀					
Site Name	Location	AQS ID	Designation	Install Date	Scale
Harrison Court	Butte	02-170-0008	SPM	1998	Neighborhood
South Gulkana Street	Palmer	02-170-0012	SPM	2010	Neighborhood
100 W Swanson	Wasilla	02-170-0013	SPM	2010	Neighborhood

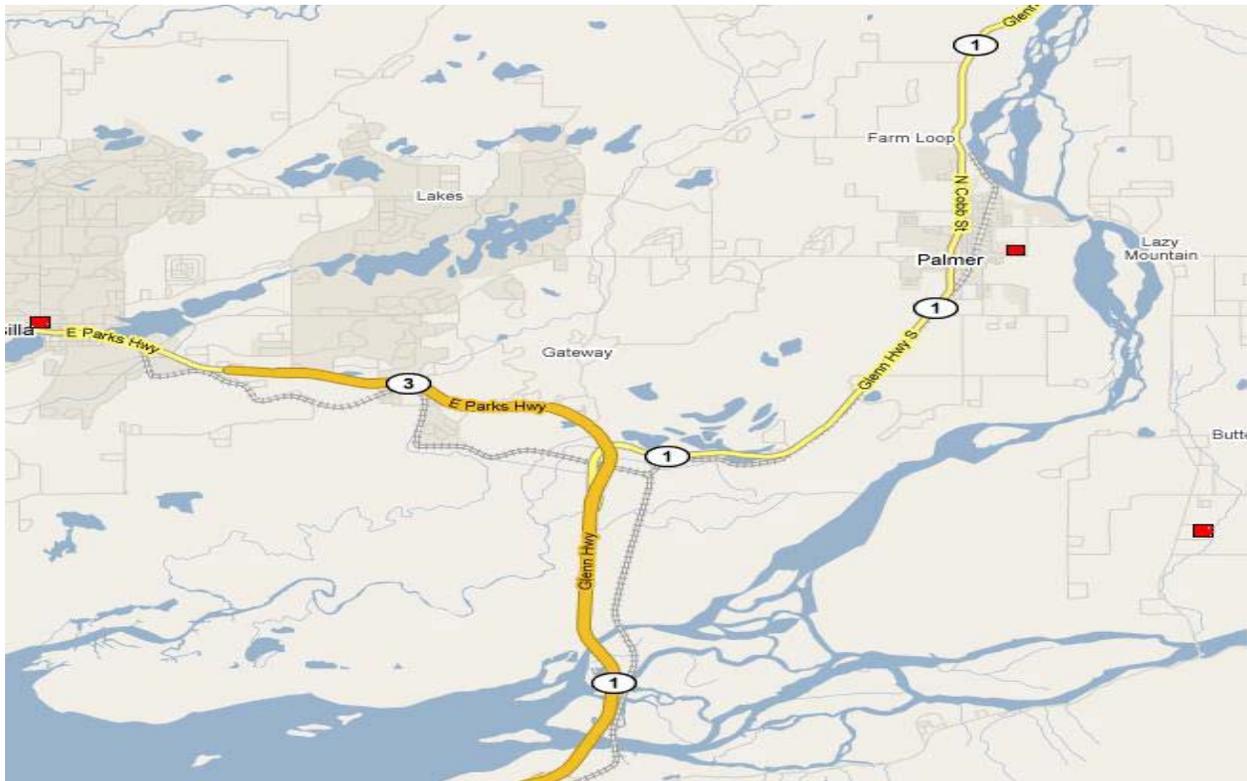


Figure 5.1:1 Map of the Southern Mat-Su Borough area. The red squares indicate the location of the three monitoring sites. (Courtesy of Google Maps)

5.2 Harrison Court (Butte) Site- Matanuska-Susitna Borough

Harrison Court
Parameters: PM₁₀, PM_{2.5}, PM_{Coarse}

AQS ID 02-170-0008
Established: April 11, 1998

5.2.1 Site Information

This monitoring site is located at the end of the Harrison Court cul-de-sac off of McKechnie Loop. The site coordinates are latitude 61° 32' 2.986" north (61.534163), longitude 149° 1' 53.96" (-149.031655), and elevation of 28 meters (90 feet) above sea level. This site has two manual, FRM samplers (Partisol 2000) and two continuous, FEM monitors (BAM 1020) for PM_{2.5} and PM₁₀. DEC installed the two continuous BAM 1020s in August 2011. DEC changed its primary PM₁₀ and PM_{2.5} monitors from the manual Partisol 2000s to the BAM 1020s as of the first quarter of 2012. Figure 5.2:1 is a street map of the monitoring site and surrounding area. Harrison Court is a neighborhood PM site.

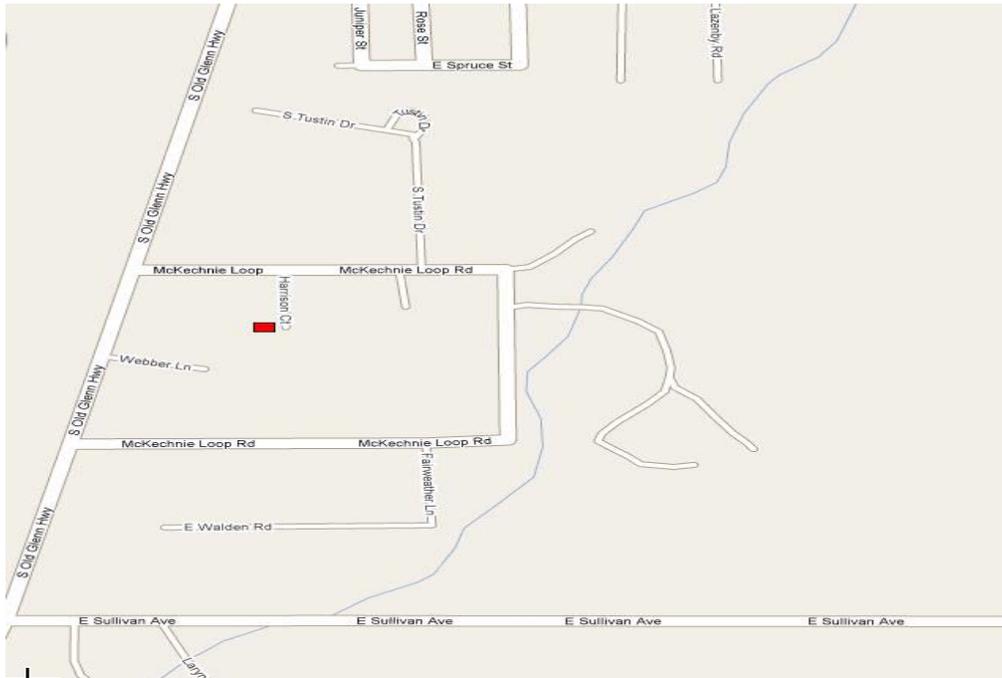


Figure 5.2:1 Map of the Butte area. The red square denotes the Harrison Court site. (Courtesy of Google Maps)

5.2.2 Sources

The major sources of PM₁₀ impacting this site are dust from the Knik and Matanuska River basins. Both are glacier fed meandering rivers that deposit glacial silt over wide braided riverbeds and out to the Cook Inlet tidal zone. During times when the gravel bars are exposed (spring through fall), dry windy weather suspends large amounts of silt in the air from the tidal flats and gravel bars. Additionally, within an 8 km (5 miles) diameter area are two small gravel airstrips (activity unknown but expected to be light), a dirt-track motor raceway, farmland, and recreation areas along both river basins. Most land in the area is undeveloped forest. Sources of

PM_{2.5} include residential wood smoke, vehicular exhaust, and forest fires. Typically, several air quality alerts are issued per year during spring and fall months because of wind-blown dust events.

5.2.3 Monitors

The Harrison Court (Butte) Site is currently equipped with:

- PM_{2.5} (SPM) – One Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 sampler operated on a 1-in-6 day schedule.
- PM₁₀ (SPM) – One Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 sampler operated on a 1-in-6 sampling schedule.
- PM₁₀ / PM_{2.5} /PM_{Coarse} (SLAMS) – Dual Met-One Inc., BAM 1020X FEM continuous monitors which include one continuous monitor for PM₁₀ and one continuous monitor for PM_{2.5}. PM_{Coarse} is calculated by subtracting the PM_{2.5} value from the PM₁₀ value. DEC uses the data to calculate an Air Quality Index for forecasting local air quality conditions and for reporting to the EPA Air Quality System (AQS) data base.

5.2.4 Siting

The manual samplers are located on the roof of the trailer and the continuous monitors are housed inside the insulated, temperature-controlled trailer. All inlets are at a height of approximately four meters (13 feet) above the ground. There is uninterrupted airflow around the inlets. The monitoring objective of this site is to measure airborne glacial loess raised by high winds on the Knik and Matanuska river beds, as well as measure exposure to fine particulate matter from automobiles and home heating in this rural location. The trailer is on the southwest corner of the unpaved Harrison Court cul-de-sac. Photographs of the Harrison Court site are presented in Figure 5.2:2 (below).

5.2.5 Traffic

There are only three house lots on Harrison Court, and traffic is very light. There are numerous unpaved roadways throughout the area. All main roads are paved. Average daily traffic for the area is 270 vehicles along McKechnie Loop. Annual average daily traffic count along the Old Glenn Highway is 3,004 vehicles.²

² State Department of Transportation and Public Facilities, 2009 traffic maps

Figure 5.2:2 Photographs of the Harrison Court Site

			
<p>From the site looking North</p>	<p>From the site looking East</p>	<p>From the site looking South</p>	<p>From the site looking West</p>
			
<p>Looking toward the site from the North to the South</p>			

5.3 Palmer Site- Matanuska-Susitna Borough

Palmer

Parameters: PM₁₀, PM_{2.5} PM_{Coarse}

AQS ID 02-170-0012

Established: October 1, 2008

5.3.1 Site Information

The Palmer monitoring site is located on South Gulkana Street between East Dahlia Avenue and East Elmwood Avenue near the city tennis court and Little League baseball field. The site coordinates are latitude 61° 35.961' north (61.598898), longitude 149°6.217' west (-149.106220). The average elevation for Palmer is 73 meters (239 feet) above mean sea level. The monitoring site is located in the downtown district. The dominant land use within a 400 meter (0.25 mile) radius is residential and commercial buildings with large, open grass-covered areas. Palmer is a neighborhood scale PM site.

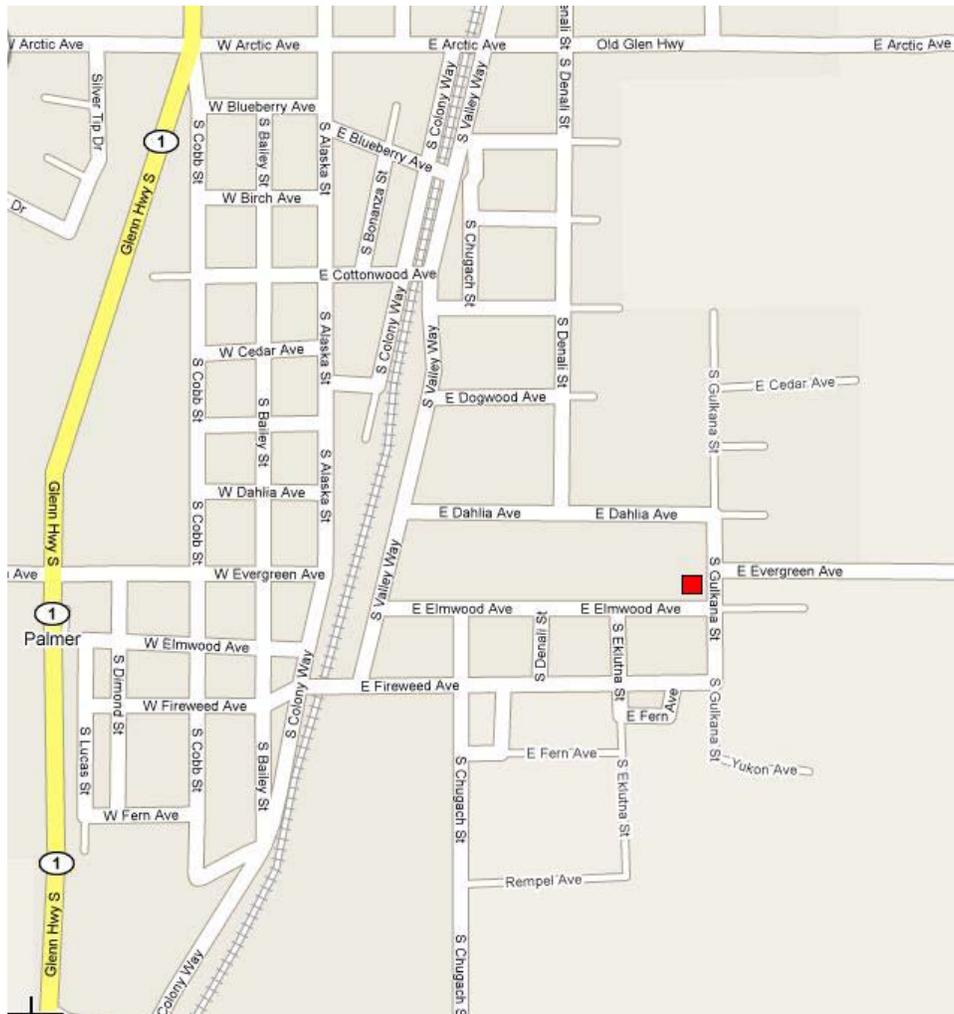


Figure 5.3:1 Map of the City of Palmer. The red square denotes the monitoring site. (Courtesy of Google Maps)

5.3.2 Sources

The major sources of PM₁₀ impacting this site are glacial dust from the Knik and Matanuska River basins. Both are glacier fed meandering rivers that deposit glacial silt over wide braided riverbeds and out to the Cook Inlet tidal zone. During times when the gravel bars are exposed (spring through fall), dry windy weather suspends large amounts of silt in the air from the tidal flats and gravel bars. Other local dust sources include road dust from local traffic and fugitive dust from activities in the adjacent ball fields, local farming operations, and recreation areas along the Matanuska River basin. Sources of PM_{2.5} include residential wood smoke, vehicular exhaust, and forest fires. Typically, several air quality alerts are issued per year during spring and fall months because of wind-blown dust events.

5.3.3 Monitors

The Palmer Site is currently equipped with:

PM₁₀ / PM_{2.5} / PM_{Coarse} (SLAMS) – Dual Met-One Inc., BAM 1020X FEM continuous monitors which include one continuous monitor for PM₁₀ and one continuous monitor for PM_{2.5}. PM_{Coarse} is calculated by subtracting the PM_{2.5} value from the PM₁₀ value. DEC uses the data to calculate an Air Quality Index for forecasting local air quality conditions and for reporting to the EPA Air Quality System (AQS) data base.

5.3.4 Siting

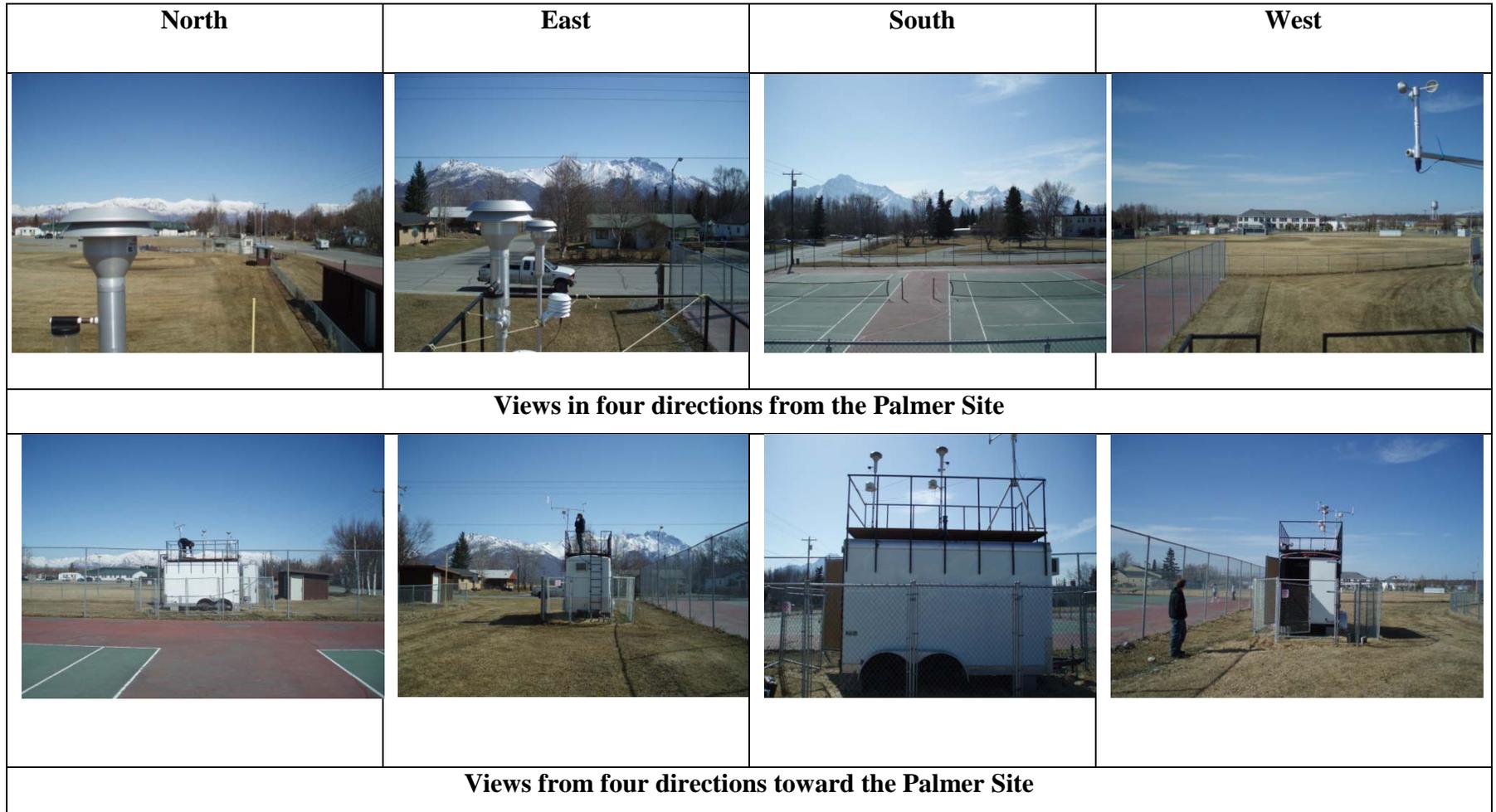
The continuous PM monitors are housed in an insulated temperature-controlled trailer. All inlets are at a height of approximately four meters (13 feet) above the ground. There is uninterrupted airflow around the inlets. The monitoring objective of this site is to measure the concentration of airborne particulate matter on an urban scale and to evaluate air quality impacts to the community, which has seen major growth over the last decade. Photographs of the Palmer site are presented in Figure 5.3:2.

5.3.5 Traffic

All main roads in the immediate area of the monitoring site are paved. Average daily traffic for the Palmer downtown district ranges from 400 to 3,300 vehicles per day. The nearest traffic count site to the monitoring location is 1,390 vehicles per day along E. Dahlia Avenue.³

³State Department of Transportation and Public Facilities, 2009 traffic maps,

Figure 5.3:2 Photographs of the Palmer Site



5.4 Wasilla Site - Matanuska-Susitna Borough

Wasilla

Parameters: PM₁₀, PM_{2.5}, PM_{Coarse}, O₃

AQS ID 02-170-0013

Established: October 1, 2008

5.4.1 Site Information

The Wasilla monitoring site is located in the 100 block of West Swanson Avenue adjacent to Fire Station 61 near the intersection with Lucille Street. The site coordinates are latitude 61° 34.998' north (61.598796), longitude 149° 27.212' west (-149.455255). The average elevation for Wasilla is 104 meters (341 feet) above mean sea level. The monitoring site is located in the downtown district and approximately 200 meters north of the George Parks Highway. The dominant land use is residential and commercial buildings with paved roads, parking lots, and mixed areas of land, both vegetated and graveled. Figure 5.4:1 is a street map of the monitoring site and surrounding area. Wasilla is a neighborhood scale PM site.

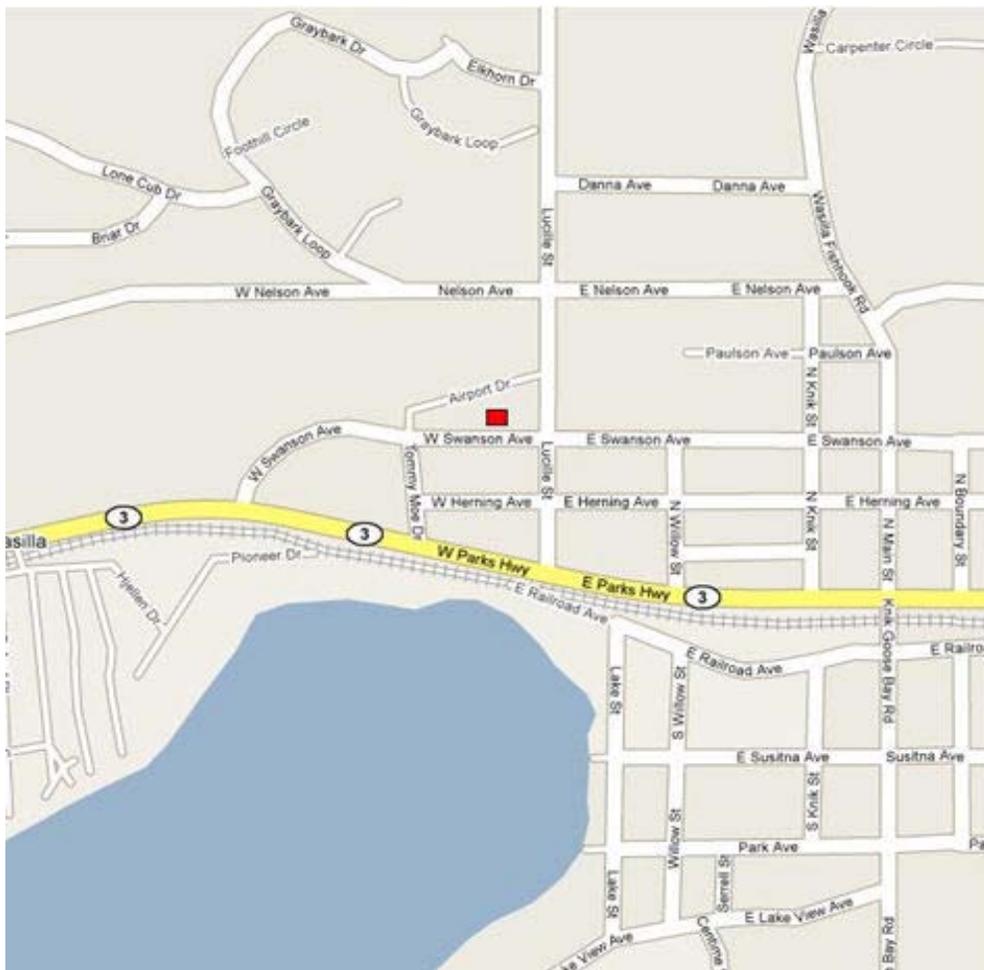


Figure 5.4:1 Map of the City of Wasilla. The red square denotes the monitoring site. (Courtesy of Google Maps)

5.4.2 Sources

The major sources of PM₁₀ impacting the Wasilla site are wind-blown dust from unpaved areas, traffic dust and glacial silt from river beds feeding in the northern end of the Cook Inlet. Several air quality alerts are issued per year during spring and fall months because of wind-blown dust events. Sources of PM_{2.5} include residential wood smoke, vehicular exhaust, and forest fires.

5.4.3 Monitors

The Wasilla Site is currently equipped with:

- PM₁₀ / PM_{2.5} /PM_{Coarse} (SLAMS) – Dual Met-One Inc., BAM 1020X FEM continuous monitors which include one continuous monitor for PM₁₀ and one continuous monitor for PM_{2.5}. PM_{Coarse} is calculated by subtracting the PM_{2.5} value from the PM₁₀ value. DEC uses the data to calculate an Air Quality Index for forecasting local air quality conditions and for reporting to the EPA Air Quality System (AQS) data base.
- PM_{2.5} (SPM) – A single Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 sampler. The manual sampler runs on a 1-in-6 day sampling schedule.
- Ozone (O₃) (SPM) – A single Teledyne API 400E O₃ analyzer was installed March 2011.

5.4.4 Siting

The continuous particulate monitors are housed in an insulated temperature-controlled trailer within a small security fenced area. All inlets are at a height of approximately four meters (13 feet) above the ground. There is uninterrupted airflow around the inlets. The monitoring objective of this site is to measure the concentration of airborne particulate matter on an urban scale and to evaluate air quality impacts to the community, which has seen major growth over the last decade. Photographs of the Wasilla Site are presented in Figure 5.4:2

5.4.5 Traffic

All main roads in immediate area of the monitoring site are paved. Average daily traffic for the area streets is not known. Commuter traffic and summer tourist traffic along the George Parks Highway can be heavy at times with an average daily traffic count of 30,330 vehicles. The annual average daily traffic count at the nearest traffic count along Lucille Street is 7,900 vehicles.⁴

⁴ State Department of Transportation and Public Facilities, 2009 traffic maps,

Figure 5.4:2 Photographs of the Wasilla Site



Views in four directions from the Wasilla Site



Views from four directions toward the Wasilla Site