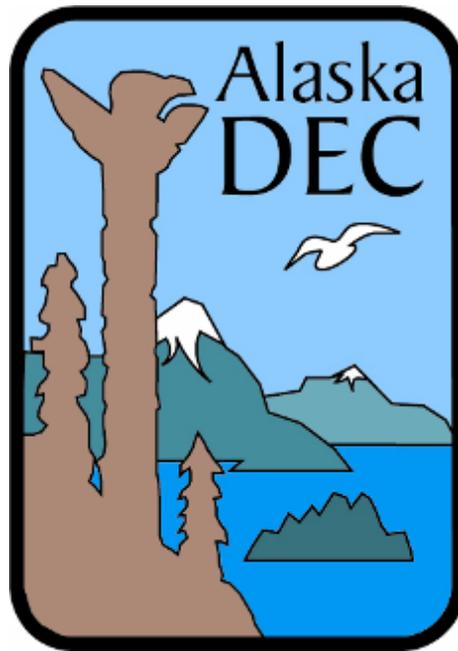


# Alaska's Air Monitoring 2010 Network Plan

## Chapter 4 - Fairbanks



### **Prepared by:**

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## 4 FAIRBANKS MONITORING SITES

### 4.1 *General Information*

Fairbanks is the second largest city in Alaska (population<sup>1</sup> 34,500), located within the Fairbanks North Star Borough (FNSB; population 87,560). Fairbanks is situated on the banks of the Chena River in the upper Tanana Valley. Interior Alaska experiences seasonal temperature extremes. The average temperatures range from -2°F to -19°F in the winter and from 53°F to 72°F in the summer. Temperatures have been recorded as low as -78°F in mid-winter, and as high as 93°F in summer. Average annual precipitation is 11.3 inches. Ice fog is common during the winter. Fairbanks experiences 21 hours of daylight between May 10th and Aug. 2nd each summer, and less than 4 hours of daylight between Nov. 18th and Jan. 24th each winter.

Fairbanks was designated non-attainment for carbon monoxide (CO) on November 15, 1990. The community developed a rigorous Inspection and Maintenance (I&M) program to reduce tail pipe emissions from automobiles and the EPA required automobile manufacturers to reduce environmental pollution, both of which have helped improve area air quality in the Fairbanks North Star Borough. Fairbanks was re-designated to CO “maintenance” status on July 23, 2004. Appendix A- lists the definitions of each designation.

The FNSB Air Program operates and manages seven monitoring stations: two State and Local Air Monitoring Site (SLAMS) for CO, one SLAMS for PM<sub>2.5</sub> and four Special Purpose Monitoring Sites (SPM) for PM<sub>2.5</sub>. The FNSB SLAMS and SPM sites are identified below in Table 4-1. Appendix B- lists siting criteria for each type of monitoring site.

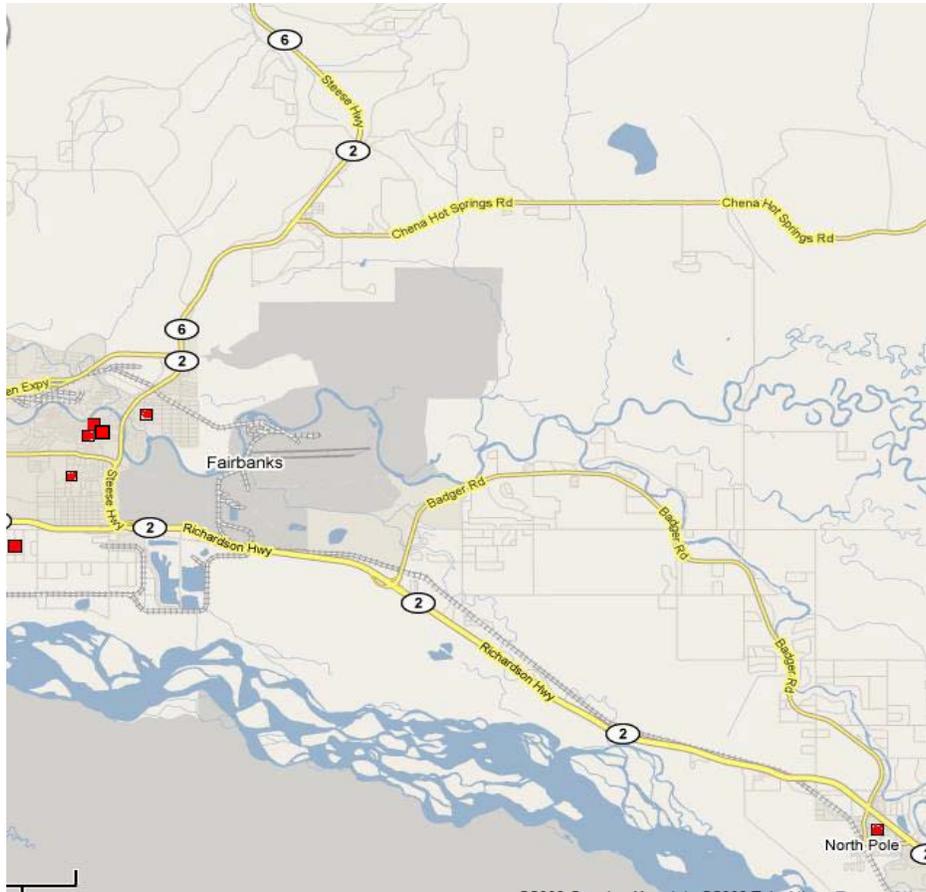
The Fairbanks and North Pole monitoring sites are located within the Northern Alaska Air Quality Control Region. Figure 4.1:1 is a map showing the entire Fairbanks area and surrounding geographical features. Figure 4.1:2 is a satellite map indicating locations of the four monitoring sites. Fairbanks is bordered by hills to the north and west, with the flats opening up to the south and east.

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<sup>1</sup> Population data from 2005 US Census.

**Table 4-1: SLAMS and SPM sites in the Fairbanks North Star Borough**

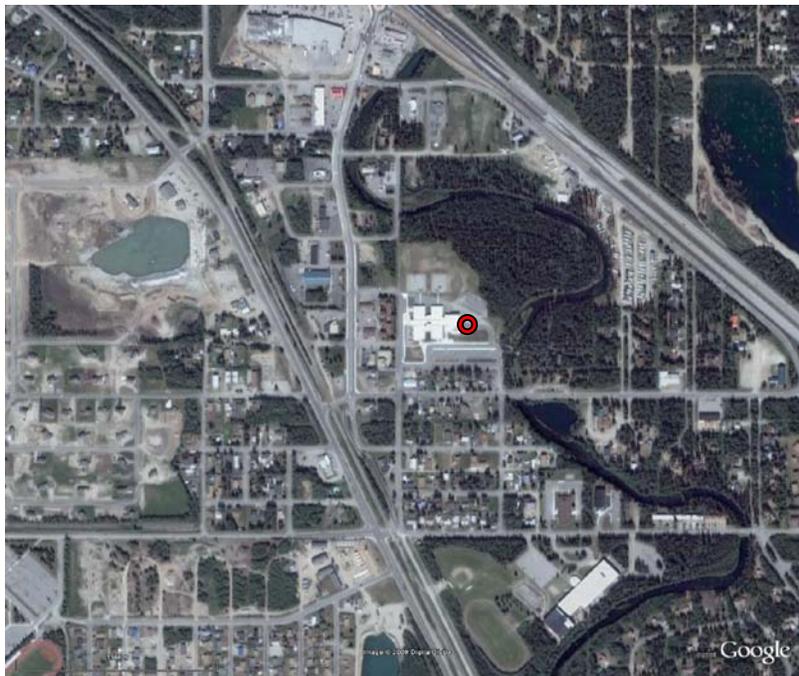
<u>PM<sub>2.5</sub></u>					
<u>Site Name</u>	<u>Location</u>	<u>AQS ID</u>	<u>Designation</u>	<u>Install Date</u>	<u>Scale</u>
State Office	Fairbanks	02-090-0010	SLAMS	Oct, 1998	neighborhood
Sadler's	Fairbanks	n/a	SPM	Nov, 2006	neighborhood
Nordale	Fairbanks	n/a	SPM	Nov, 2006	neighborhood
TAC (Peger Rd)	Fairbanks	n/a	SPM	Nov, 2007	neighborhood
North Pole	North Pole	n/a	SPM	Nov, 2008	neighborhood
<u>CO</u>					
<u>Site Name</u>	<u>Location</u>	<u>AQS ID</u>	<u>Designation</u>	<u>Install Date</u>	<u>Scale</u>
Hunter School	Fairbanks	02-090-0020	SLAMS	Jan, 1979	neighborhood
Old Post Office	Fairbanks	02-090-0002	SLAMS	Jan, 1972	micro



**Figure 4.1.1: Map of Fairbanks and North Pole area. The red squares indicate monitoring sites.**



**Figure 4.1.2:** Satellite photo of Fairbanks. Red circles indicate monitoring sites (in order from top down) (1) Old Post Office, (2) State Office Building, (3) Hunter Elementary School, (4) Sadler, (5) TAC (Peger Rd), and (6) Nordale School sites.



**Figure 4.1.3:** Satellite photo of North Pole. The red circle indicates the monitoring site at North Pole Elementary School.

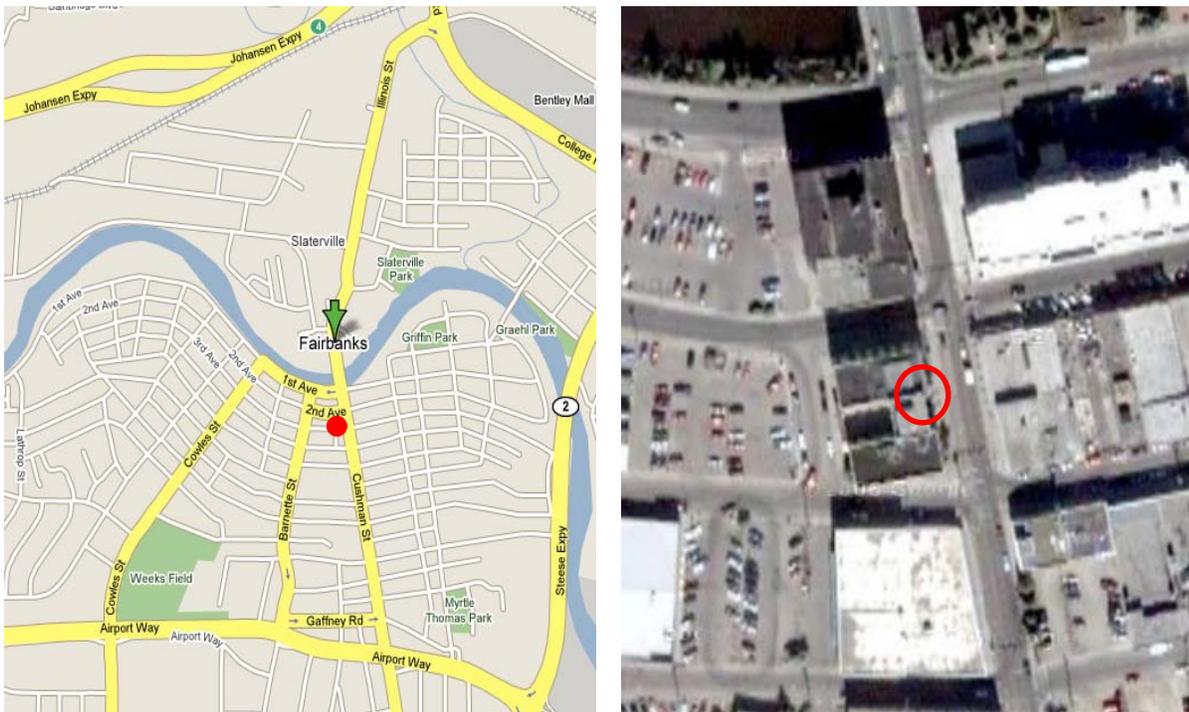
## 4.2 OLD POST OFFICE SITE - FAIRBANKS

250 Cushman Street  
Parameters: CO

AQS ID 02-090-0002  
Established: January 1, 1972

### 4.2.1 Site Information

The site is located in the Old Post Office building at 250 Cushman Street at latitude  $64^{\circ} 50' 43''$ , longitude  $-147^{\circ} 43' 16''$ , and 460 feet (140 meters) above sea level. Figure 4.2:1 shows a street map of downtown Fairbanks and satellite image of the area. The site is located in the middle of the central business district. The Old Post Office is a micro-scale, population-oriented site located in downtown Fairbanks.



**Figure 4.2:1:** Map and satellite image of the Old Post Office monitoring site. The red circles indicate the site location.

### 4.2.2 Sources

The dominant source of CO emissions for this site is automobile exhaust. Within 200 meters of the site, land use is predominantly business (generally medical practices and small offices) with some small single family dwellings. Many older downtown houses have chimneys and may be using woodstoves in the winter for supplemental heat. The Alaska Railroad industrial area (north) and the Aurora Energy coal fired power plant (west) are both located within one mile of the site. Coal-fired power plants operated by the University of Alaska (to the west) and Fort Wainwright Army Post (to the east) are located within five miles. Fairbanks is occasionally impacted by wildland fire smoke in the summer months.

### **4.2.3 Monitors**

The Old Post Office site is currently equipped with:

- CO (SLAMS) – A single Thermo Electron 48C CO monitor operates seasonally (October – March) with an inlet approximately 3 meters above the ground.

### **4.2.4 Siting**

The Old Post Office is located between 2<sup>nd</sup> and 3<sup>rd</sup> Avenues on the west side of Cushman Street. The probe passes through the eastern exterior wall and extends out one meter at a height of two meters above the ground. The inlet is three meters from the nearest traffic lane on Cushman Street, and ten meters (32 feet) from the intersection at 2<sup>nd</sup> Avenue. There are no parking lots in the vicinity of the probe, but there is parallel parking on both 2<sup>nd</sup> and 3<sup>rd</sup> Avenues.

### **4.2.5 Traffic**

This site is located at one of the busiest intersections in downtown Fairbanks. Traffic within one mile of the site sees daily traffic counts ranging from 3,700 to 7,400 vehicles per day.

**Figure 4.2:2: Pictures of the Old Post Office Site**

North	East	South
		
<p><b>Views in three cardinal directions from the Old Post Office Site</b></p>		
North	South	West
		
<p><b>Views in three cardinal directions toward the Old Post Office Site</b></p>		

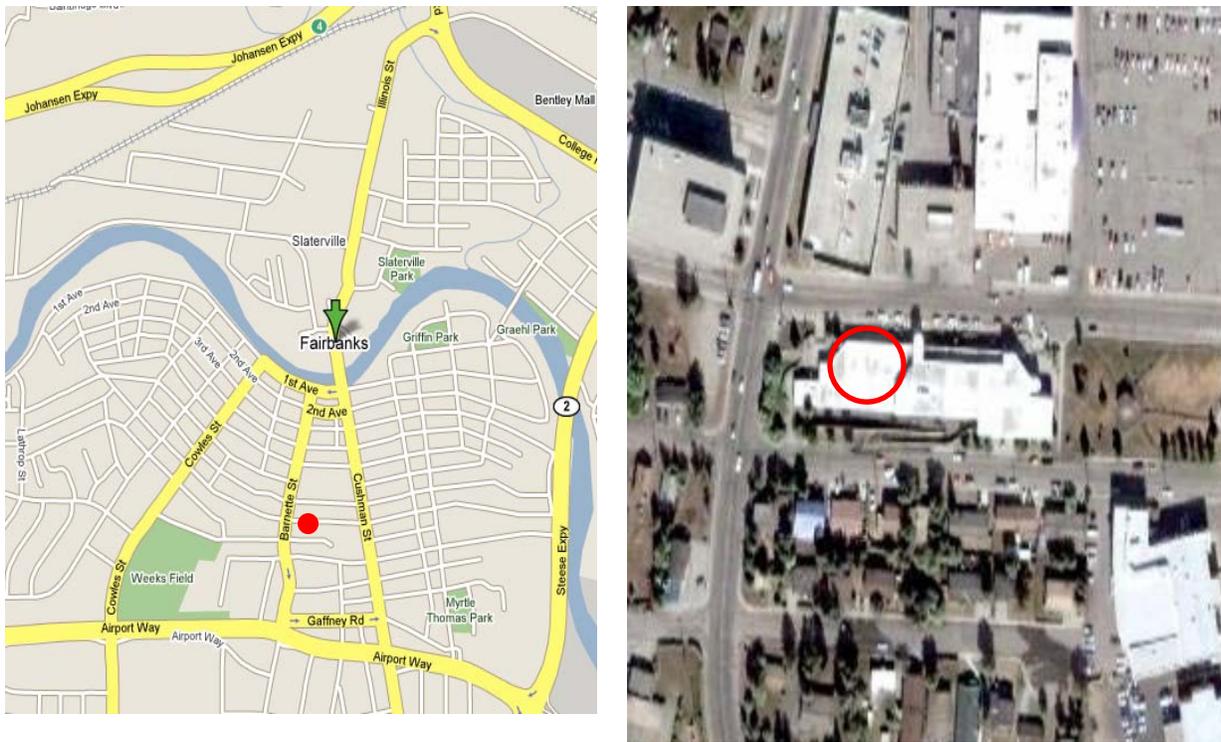
### 4.3 STATE OFFICE BUILDING

675 Seventh Avenue  
Parameters: PM<sub>2.5</sub>

AQS IDs 02-090-0010  
Established: January 1, 1972

#### 4.3.1 Site Information

The site is located on the State Office Building at 675 7<sup>th</sup> Avenue. The latitude is 64° 50' 27", longitude is -147° 43' 23", and 460 feet (140 meters) above sea level. Figure 4.3:1 shows a street map of the downtown Fairbanks area and satellite image of the area. The site is located in the middle of the central business district. This is a neighborhood-scale, population-oriented PM<sub>2.5</sub> site.



**Figure 4.3:1:** Map and satellite image of the State Office Building. The red circles indicate the sites location.

#### 4.3.2 Sources

The dominant source of fine particulate matter (PM<sub>2.5</sub>) for this site changes season to season. During the long winter months the primary sources of fine particulates are; home heating, vehicle exhaust, and wood smoke. During the summer months, the main source is from wildland fire smoke.

### **4.3.3 Monitors**

The State Office Building site is currently equipped with:

- PM<sub>2.5</sub> (SLAMS) – Two Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 samplers. One sampler runs on a 1-in-3 day alternating sampling schedule with the second operating as a collocated monitor.
- PM<sub>2.5</sub> (SPM) – A single Met-One Beta Attenuation Monitor (BAM 1020) was installed to provide information in real time for evaluating the Air Quality Index.
- PM<sub>2.5</sub> (SPM) – A single Met-One Super SASS Speciation Monitor. This multi filter sampler is set to sample on a 1-in-3 day sampling schedule.

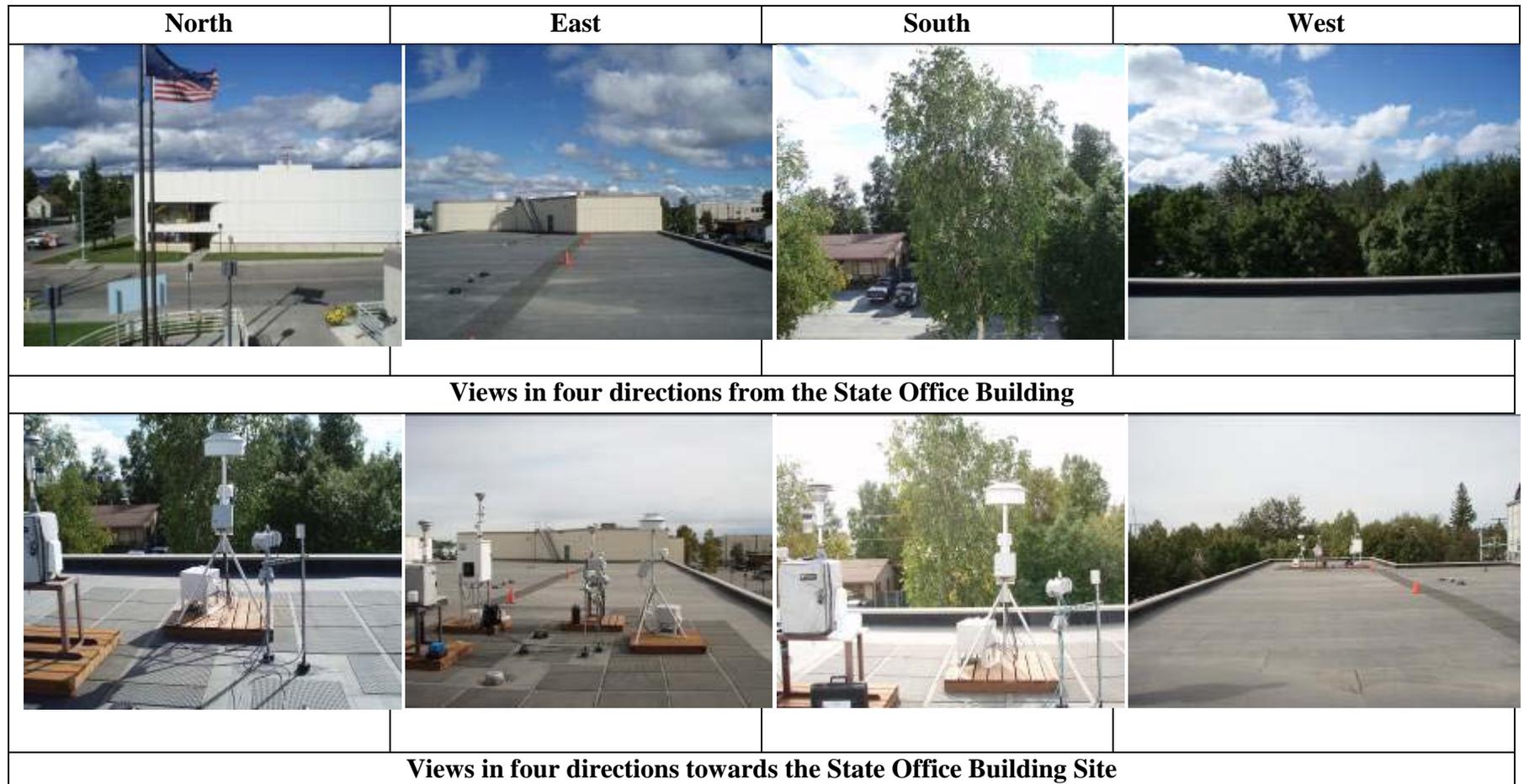
### **4.3.4 Siting**

The equipment is located on the west end of the State Office Building's first story roof. The inlets for all samplers are approximately six meters above the ground. There is unrestricted airflow around the samplers. The building has a partial second floor that is approximately 3.75 meters higher than the roof the samplers sit upon. The nearest second floor wall is approximately thirty meters west of the samplers. There is a birch tree approximately ten meters south of the samplers whose height exceeds that of the inlets.

### **4.3.5 Traffic**

This site is located in downtown Fairbanks with numerous roads within one mile of the site. Area roads have daily traffic counts ranging from 3,700 to 7,400 vehicles per day. There are no parking lots in the vicinity of the probe, but there is parallel parking on 7<sup>th</sup> Ave.

**Figure 4.3.2: Pictures of the State Office Building**



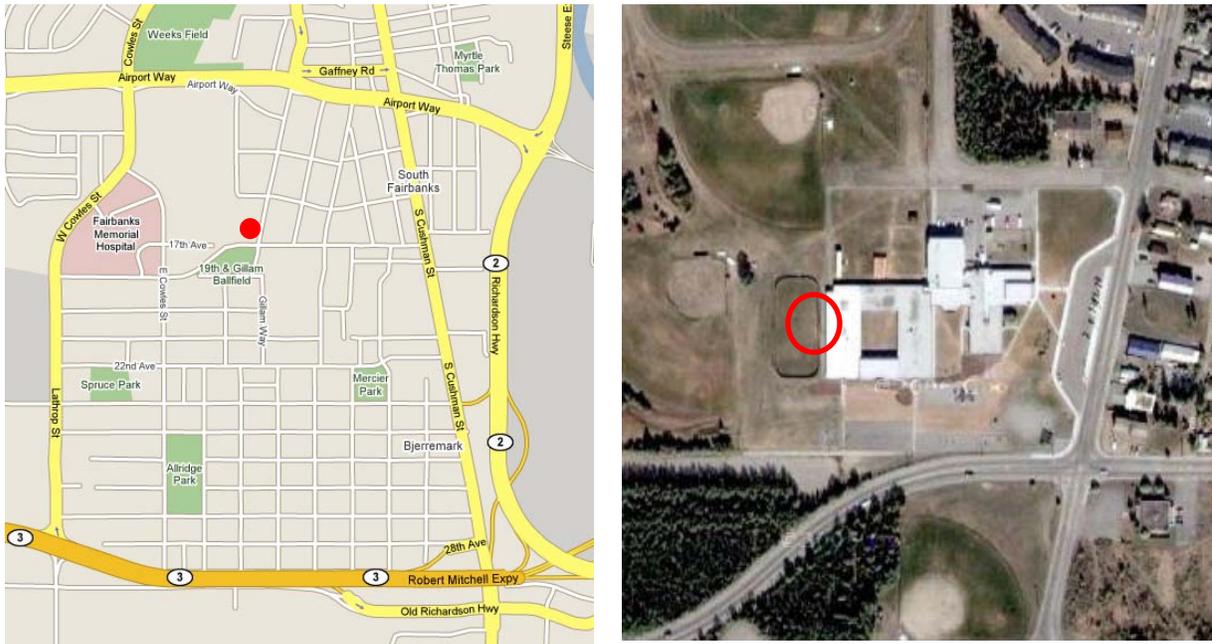
## 4.4 HUNTER ELEMENTARY SCHOOL SITE - FAIRBANKS

1630 Gillam Way  
Parameters: CO

AQS ID 02-090-0020  
Established: January 1, 1979

### 4.4.1 Site Information

The site is located at Hunter Elementary School, on the corner of 17<sup>th</sup> Avenue and Gillam Way. The latitude is 64° 49' 58", longitude is -147° 43' 53", and 446 feet (136 meters) above sea level. Figure 4.4:1 shows a street map of the local area and a satellite picture of the Hunter site. This is a neighborhood-scale, population-oriented site.



**Figure 4.4:1: Map and satellite image of the Hunter Elementary site. The red circles indicate site location.**

### 4.4.2 Sources

The dominant source of CO emissions for this site is from vehicle exhaust. Within 200 meters of the site, land use is predominantly single family dwellings, small businesses (generally medical practices and small offices) and public schools. Many houses have chimneys and may be using wood stoves in the winter for supplemental heat.

Other sources of CO may be from the Fairbanks Memorial Hospital (less than one quarter mile west), the Aurora Energy coal fired power plant (one mile north), and the coal-fired power plants operated by the University of Alaska (two to three miles northwest) and Fort Wainwright Army Post (one mile east).

#### **4.4.3 Monitors**

The Hunter Elementary site is currently equipped with:

- CO (SLAMS) – A single Thermo Electron 48C CO monitor operates seasonally (October – March) with an inlet approximately 2.5 meters above the ground.

#### **4.4.4 Siting**

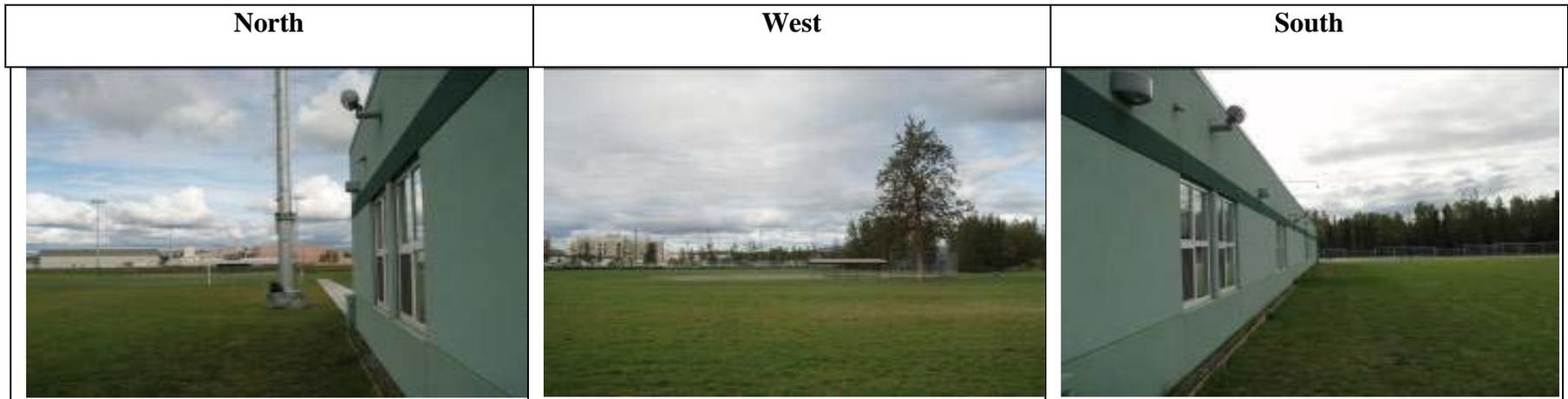
The school is between 16<sup>th</sup> Avenue and 17<sup>th</sup> Avenue on the west side of Gillam Way. The CO inlet is 50 meters from the nearest traffic lane on 17<sup>th</sup> Avenue, and approximately 30 meters from the nearest traffic lane on 16<sup>th</sup> Avenue. The probe extends 1.5 meters through the western exterior wall at a height of 2.9 meters. On the west side of the school is a grass strip of land and a hockey rink. There are no streets or parking areas in the vicinity of the probe.

The school parking lot is on the east side of the building and is paved. A smaller, paved, faculty parking lot is on the north side of the building. A small unpaved lot provides supplementary parking near the faculty lot, but is used very little. All parking lots have plug-ins for automobile head-bolt heaters in winter.

#### **4.4.5 Traffic**

Average daily traffic for this location is unknown at this time, but is expected to be below 5,000 vehicles per day.

**Figure 4.4:2: Pictures of the Hunter Elementary School Site**



**Views in three directions from the Hunter Elementary School Site**



**Views in three directions towards the Hunter Elementary School Site**

## 4.5 SADLER SITE - FAIRBANKS

610 Cushman, St.

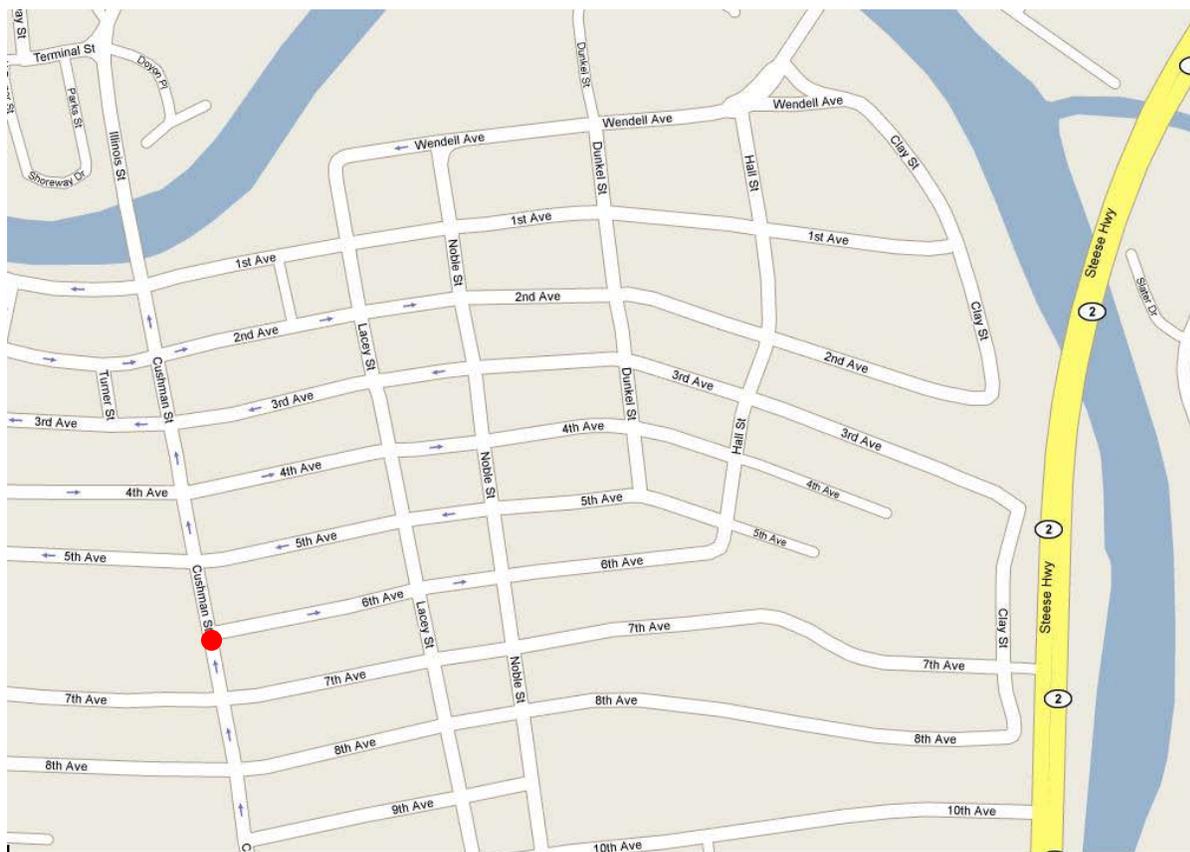
Parameters: PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, Black Carbon

AQS ID: n/a

Established: Nov. 1, 2006

### 4.5.1 Site Information

The site is located at the Sadler's Furniture Store on the corner of 6<sup>th</sup> Avenue and Cushman St. at latitude 64° 50'26", longitude -147° 43'19", and 446 feet (136 meters) above sea level. Figure 4.6:1 shows a street map of the local area. This is a neighborhood-scale, population-oriented site.



**Figure 4.5:1:** Map of the Sadler monitoring site. The red circle indicates site location.

### 4.5.2 Sources

The source of the NAAQS pollutants in Fairbanks is unclear. The FNSB Winter Monitoring Project conducted during the winters of 2008-09 and 2009-10 is to evaluate wintertime pollutant characteristics and develop a strategy to reduce the concentration in Fairbanks.

### **4.5.3 Monitors**

The Sadler site is currently equipped with:

- PM<sub>2.5</sub> (SLAMS) – One Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 sampler operating on a 1-in-3 day alternating sampling schedule.
- PM<sub>2.5</sub> (SPM) – A single Thermo Electron TEOM/FDMS 1400a/8500 samples continuously.
- Elemental Carbon – a Magee Scientific Aethalometer with GBI 2.5 µm sharp cut cyclone samples continuously.
- NO<sub>x</sub> – A TECO Model 42C samples continuously.
- SO<sub>2</sub> - A TECO Model 43C samples continuously.

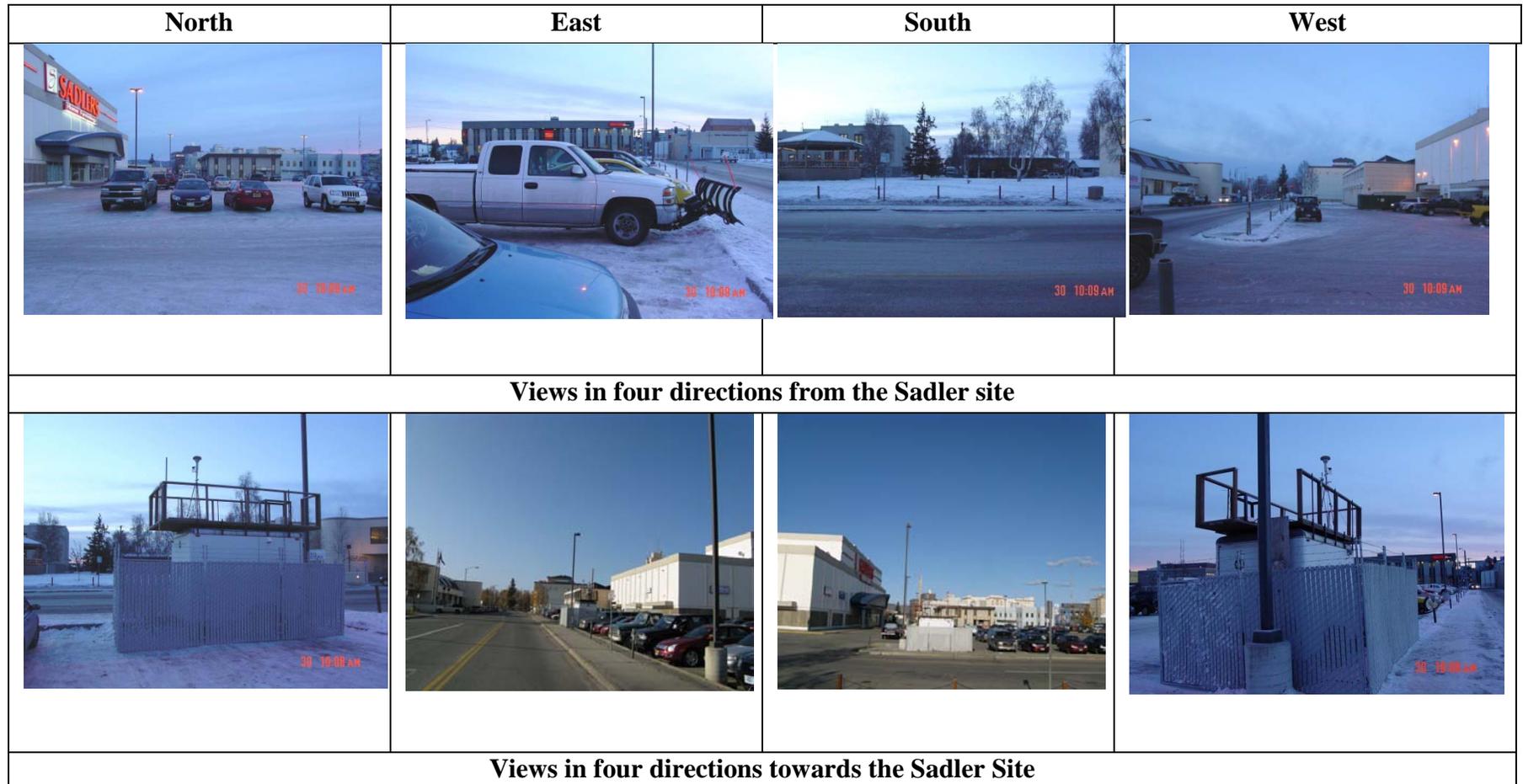
### **4.5.4 Siting**

The Sadler site is located in the Sadler's Furniture store parking lot in downtown Fairbanks. The parking lot is paved, and is located very near Cushman Street.

### **4.5.5 Traffic**

This site is located in downtown Fairbanks with numerous roads within one mile of the site. Area roads have daily traffic counts ranging from 3,700 to 7,400 vehicles per day.

**Figure 4.5.2: Pictures of the Sadler site**



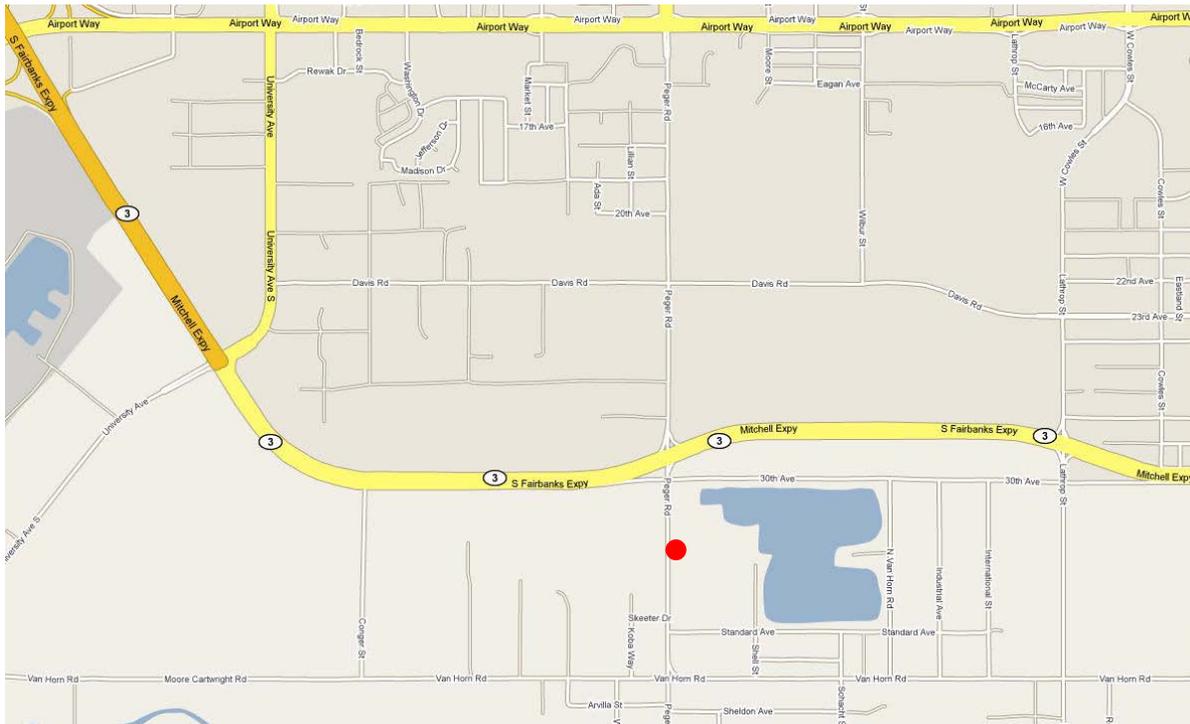
## 4.6 TAC (PEGER ROAD) SITE - FAIRBANKS

3175 Peger Road  
Parameters: PM<sub>2.5</sub>

AQS ID: n/a  
Established: Nov. 1, 2007

### 4.6.1 Site Information

The site is located at the Transit Admin Center (TAC) on Peger Road at latitude 64° 49'08", longitude -147° 46'27", and 436 feet (133 meters) above sea level. Figure 4.7:1 shows a street map of the local area. This is a neighborhood-scale, population-oriented site.



**Figure 4.6:1:** Map of the TAC (Peger Road) monitoring site. The red circle indicates site location.

### 4.6.2 Sources

The source of the NAAQS pollutants in Fairbanks is unclear. The FNSB Winter Monitoring Project conducted during the winters of 2008-09 and 2009-10 is to evaluate wintertime pollutant characteristics and develop a strategy to reduce the concentration in Fairbanks.

### 4.6.3 Monitors

The TAC site is currently equipped with:

- PM<sub>2.5</sub> (SLAMS) – One Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 sampler on a 1-in-3 day alternating sampling schedule.

- PM<sub>2.5</sub> (SPM) – A single Met-One Beta Attenuation Monitor (BAM 1020) was installed to provide information in real time for evaluating the Air Quality Index.
- PM<sub>2.5</sub> (SPM) – A single Met-One Super SASS Speciation Monitor. This multi filter sampler is set to sample on a 1-in-3 day sampling schedule.
- PM<sub>2.5</sub> (SPM) – A single Thermo Electron TEOM 1400a samples continuously.

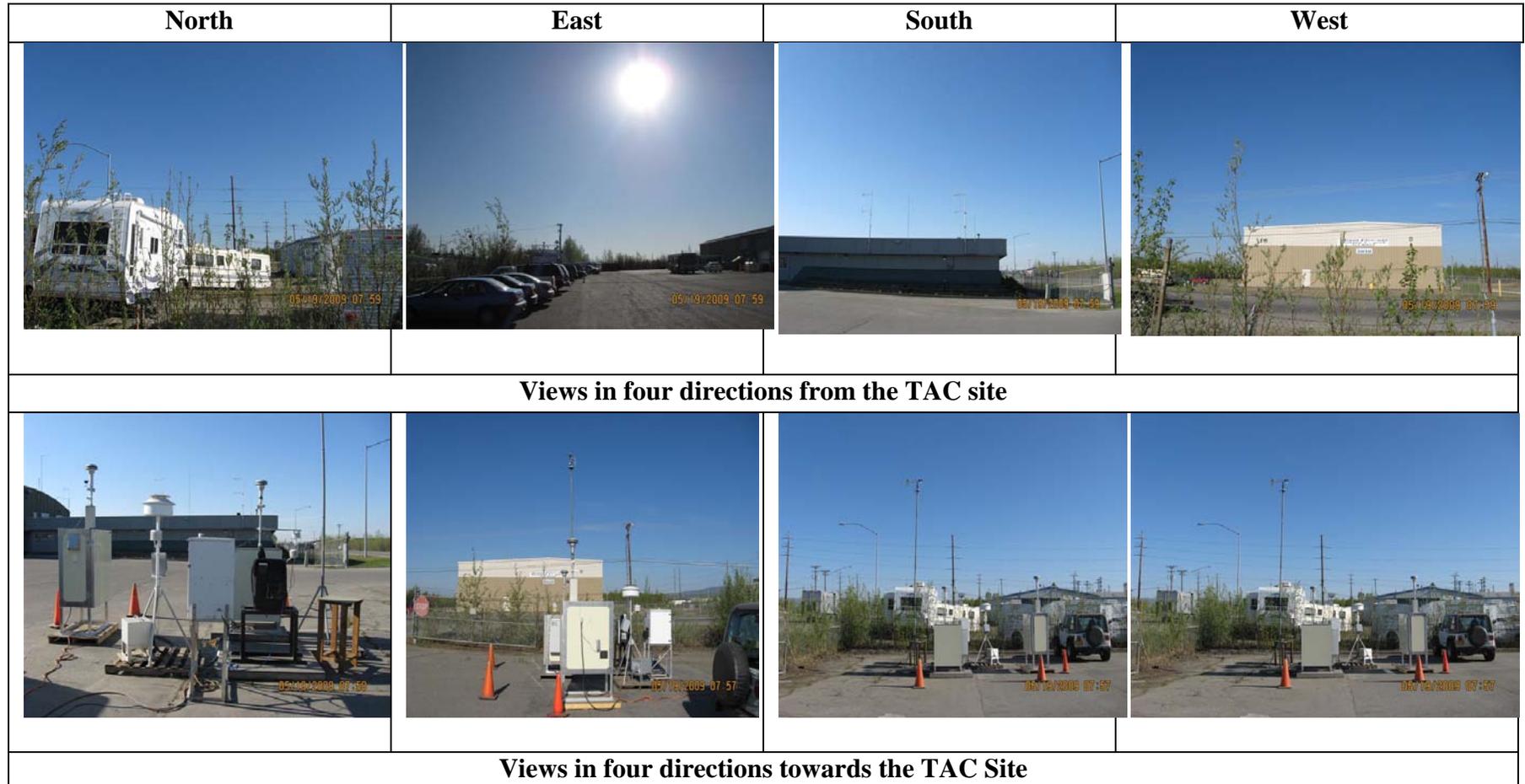
#### **4.6.4 Siting**

The TAC site is in an industrial area, approximately 222 meters (730 feet) from the Peger Road/Mitchell Expressway intersection. One of the PM<sub>2.5</sub> Partisol samplers is located approximately 82 meters (270 feet) to the east of the rest of the monitoring equipment and acts as a non-road baseline to compare with the roadway site.

#### **4.6.5 Traffic**

Average daily traffic for this location is unknown at this time, but this location is in an industrial area near the Mitchell Expressway.

**Figure 4.6:2: Pictures of the TAC (Peger Rd.) site.**



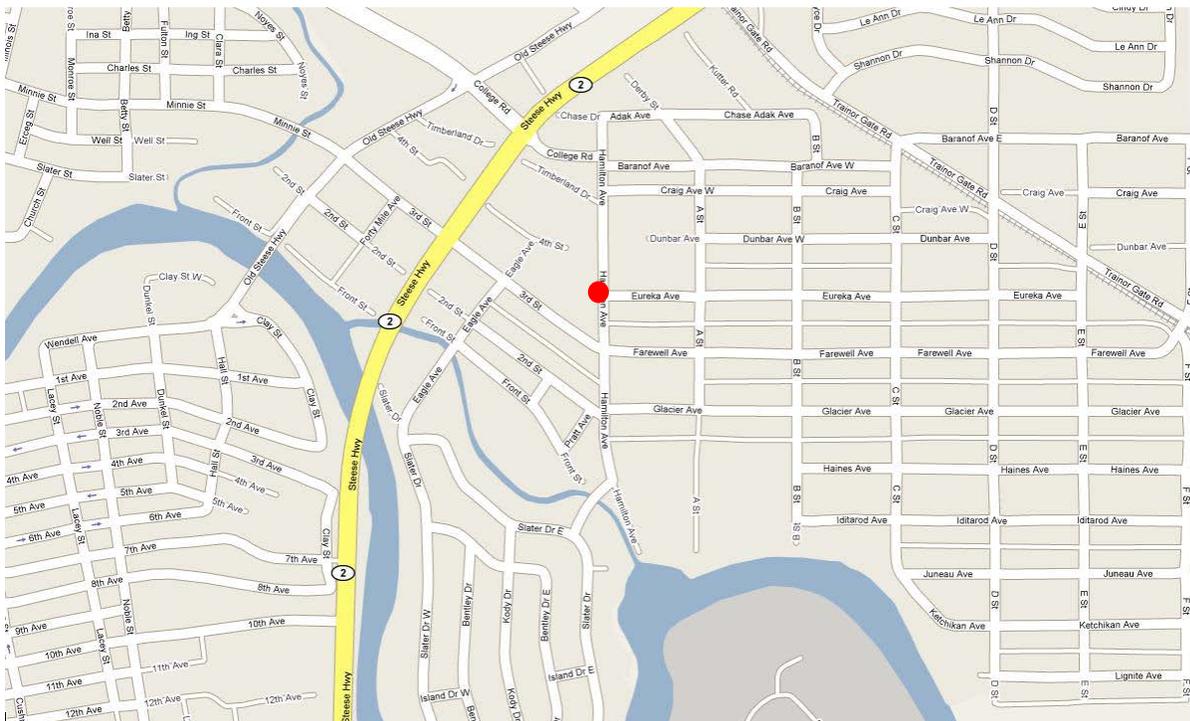
## 4.7 NORDALE SCHOOL SITE - FAIRBANKS

397 Hamilton Avenue  
Parameters: PM<sub>2.5</sub>, Black Carbon

AQS ID: n/a  
Established: Nov. 1, 2006

### 4.7.1 Site Information

The site is located at the Nordale School on the corner of Hamilton Avenue and Eureka Avenue at latitude 64° 50'45", longitude -147° 41'35", and 446 feet (136 meters) above sea level. Figure 4.7:1 shows a street map of the local area. This is a neighborhood-scale, population-oriented site.



**Figure 4.7:1:** Map of the Nordale School monitoring site. The red circle indicates site location.

### 4.7.2 Sources

The source of the NAAQS pollutants in Fairbanks is unclear. The FNSB Winter Monitoring Project conducted during the winters of 2008-09 and 2009-10 is to evaluate wintertime pollutant characteristics and develop a strategy to reduce the concentration in Fairbanks.

### **4.7.3 Monitors**

The Nordale site is currently equipped with:

- PM<sub>2.5</sub> (SLAMS) – One Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 samplers on a 1-in-3 day alternating sampling schedule.
- PM<sub>2.5</sub> (SPM) – A single Thermo Electron TEOM/FDMS 1400a/8500 samples continuously.
- Elemental Carbon – a Magee Scientific Aethalometer with GBI 2.5 µm sharp cut cyclone samples continuously.
- Wind speed/wind direction – One R. M. Young Model 05305VM (Windbird) combined wind vane anemometer. The wind direction and wind speed data is continuously recorded.

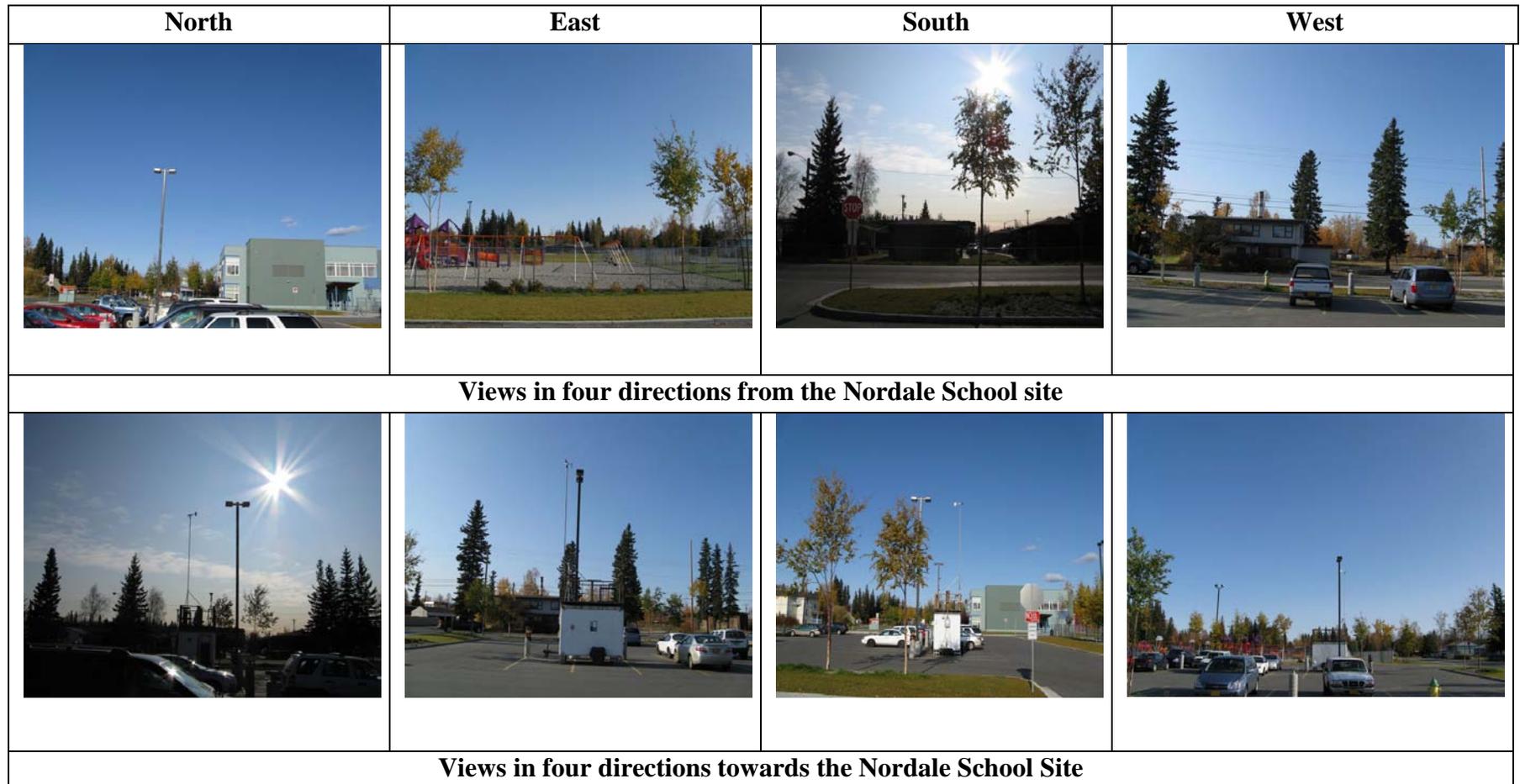
### **4.7.4 Siting**

The Nordale site is located in the parking lot of Nordale Elementary School on Hamilton Avenue.

### **4.7.5 Traffic**

Average daily traffic for this location is unknown at this time, but is expected to be below 5,000 vehicles per day. The Nordale site is located in a residential neighborhood called Hamilton Acres, east-northeast of the downtown area.

**Figure 4.7:2: Pictures of the Nordale School Site**



## 4.8 NORTH POLE ELEMENTARY SITE – NORTH POLE

250 Snowman Lane

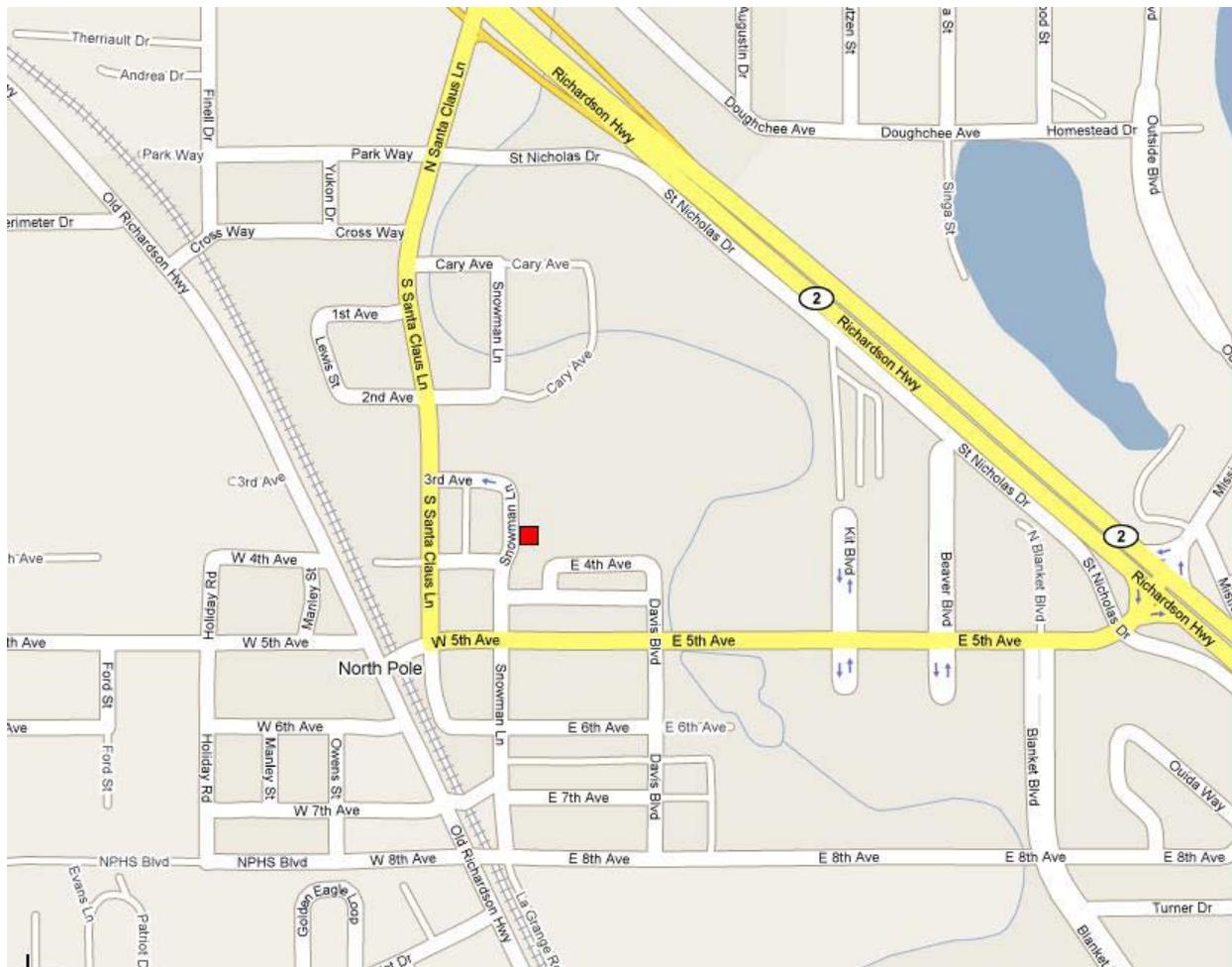
AQS ID: n/a

Parameters: PM<sub>2.5</sub>, WS/WD, Temp, Chemical Speciation, Black Carbon

Established: Dec. 20, 2008

### 4.8.1 Site Information

The site is located at the North Pole Elementary School on the East side of the parking lot at N64° 45.122' W147° 20.842', and 479 feet (146 meters) above sea level. Figure 4.8:1 shows a street map of the local area. This is a neighborhood-scale, population-oriented site.



**Figure 4.8:1:** Map of the North Pole monitoring site. The red circle indicates site location.

#### **4.8.2 Sources**

The source of the NAAQS pollutants in North Pole is unclear. The FNSB Winter Monitoring Project conducted during the winters of 2008-09 and 2009-10 is to evaluate wintertime pollutant characteristics and develop a strategy to reduce the concentration in North Pole.

#### **4.8.3 Monitors**

The North Pole Elementary site is currently equipped with:

- PM<sub>2.5</sub>– One Thermo Electron (formerly Rupprecht & Patashnick) Partisol 2000 sampler on a 1-in-3 day alternating sampling schedule.
- PM<sub>2.5</sub> (SPM) – A single Thermo Electron TEOM/FDMS 1400a/8500 samples continuously.
- Elemental Carbon – a Magee Scientific Aethalometer with GBI 2.5 µm sharp cut cyclone samples continuously.
- PM<sub>2.5</sub> (SPM) – A single Met-One Super SASS Speciation Monitor. This multi filter sampler is set to sample on a 1-in-3 day sampling schedule.
- Wind Speed/Wind Direction - MetOne Sonic Anemometer Model 50.5H

#### **4.8.4 Siting**

The North Pole Elementary School site is located on the eastside parking lot of North Pole Elementary School on Snowman Lane. The monitoring instrumentation is housed in a self-contained monitoring shelter. The sample inlets extend above the roof of the shelter at approximately 4 meters above ground level.

#### **4.8.5 Traffic**

Average daily traffic for this location is unknown. The site is within approximately 1000 feet (300 meters) from the Richardson Highway. Land use within a ¼-mile radius of the site is mixture of commercial, industrial, and residential. Annual average daily traffic along the Richardson Highway through North Pole is 10,400 vehicles per day. The daily traffic along Snowman Lane is unknown but expected to be less than 5,000 vehicles per day.

**Figure 4.8.2: Pictures of the North Pole Site**

