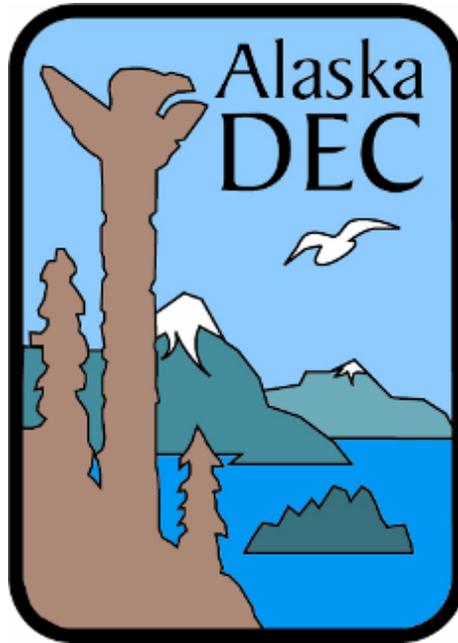


# Alaska's 2010 Air Monitoring Network Plan

## Chapter 3 - Anchorage



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## 3 ANCHORAGE MONITORING SITE DESCRIPTION

### 3.1 *General Information*

The Municipality of Anchorage (MOA) with a population<sup>1</sup> of 275,240 is the largest city in Alaska. Anchorage encompasses 1,697 square miles of land and 264 square miles of water and is located between the Chugach Mountains to the east, the Knik Inlet to the north, the Cook Inlet to the west, and the Turnagain Arm to the south. The average temperatures range from 6 °F to 20 °F in the winter and from 50 °F to 70 °F in the summer. Annual precipitation is 15.9 inches, with 69 inches of snowfall.

Anchorage was designated non-attainment for CO on November 15, 1990. The community developed a rigorous Inspection and Maintenance (I&M) program to reduce tail pipe emissions from automobiles and US Environmental Protection Agency (EPA) has required that new automobiles emit less environmental pollution, both of which have helped improve the air quality in Anchorage. The Municipality was re-designated from CO, “serious non-attainment area” to “maintenance” area on July 23, 2004. Appendix A lists the definitions of each designation.

Plagued by springtime dust and residual volcanic ash from erupting Cook Inlet volcanoes in the late 1980s and in the early 1990s, the Municipality of Anchorage was flirting with a PM<sub>10</sub> problem. On December 5, 1995, the Municipality of Anchorage, the Alaska DEC, and the EPA entered into a memorandum of agreement to reduce dust impacts and avoid a PM<sub>10</sub> non-attainment designation. A control strategy was developed and agreed to by all parties with the implementation responsibility placed on the Municipality. The control strategies were made part of a community’s long range transportation plan.

The Municipality of Anchorage’s (MOA) air quality program currently operates five air monitoring stations in the municipality. Each station can be equipped to monitor for multiple pollutants. The network pollutant monitors have designations for both State and Local Air Monitoring Site (SLAMS) and Special Purpose Monitoring Sites (SPM). The municipality’s SLAMS and SPM sites are described below in Table 3-1. Figure 3.1:1 is a map showing the entire Anchorage monitoring network. Appendix B lists siting criteria.

Due to the lowering of the ozone standard and the population of the Upper Cook Inlet airshed, ozone monitoring will begin with the 2010 season. The State and the Municipality of Anchorage air quality staff are in the process of selecting the most representative sites for ozone monitoring. Using at least two sites will likely best represent the complexity of the airshed; one site is proposed in Eagle River and one within the Anchorage bowl. Ozone monitors were purchased in April 2009.

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<sup>1</sup> Population data from 2005 U. S. Census.

**Table 3-1: SLAMS and SPM sites in the Municipality of Anchorage**

<b>PM<sub>2.5</sub></b>					
<b>Site Name</b>	<b>Location</b>	<b>AQS ID</b>	<b>Designation</b>	<b>Install Date</b>	<b>Scale</b>
Garden †	Anchorage	02-020-0018	SPM	Nov, 1998	neighborhood
DHHS	Anchorage	02-020-0052	SPM	Sept, 2008	middle
Parkgate	Eagle River	02-020-1004	SPM	Oct, 2008	neighborhood
<b>PM<sub>10</sub></b>					
<b>Site Name</b>	<b>Location</b>	<b>AQS ID</b>	<b>Designation</b>	<b>Install Date</b>	<b>Scale</b>
Garden	Anchorage	02-020-0018	SPM	Nov, 1998	neighborhood
DHHS	Anchorage	02-020-0052	SPM	Sept, 2008	middle
Tudor	Anchorage	02-020-0044	SPM	Oct, 1996	microscale
Parkgate ††	Eagle River	02-020-1004	SLAMS	Oct, 1987	neighborhood
<b>CO</b>					
<b>Site Name</b>	<b>Location</b>	<b>AQS ID</b>	<b>Designation</b>	<b>Install Date</b>	<b>Scale</b>
Garden	Anchorage	02-020-0018	SLAMS	Jan, 1979	neighborhood
Turnagain ‡	Anchorage	02-020-0048	SLAMS	Oct, 1998	neighborhood
DHHS	Anchorage	02-020-0052	SPM	Sept, 2007	neighborhood
Parkgate	Eagle River	02-020-1004	SPM	Dec, 2005	neighborhood

† The PM<sub>2.5</sub> SPM monitor at the Garden site is a Partisol 2000 FRM sampler. MOA intends to re-assign a BAM1020 monitor as the Garden PM<sub>2.5</sub> SPM monitor after two years of collocation with the FRM and determination of the precision and bias statistics of the PM<sub>2.5</sub> data from the BAM1020 monitor with respect to the FRM.

†† The PM<sub>10</sub> SLAMS monitor at the Parkgate site is a GMW-1200 FRM sampler. MOA intends to re-assign a BAM1020 monitor as the Parkgate PM<sub>10</sub> SLAMS monitor after two years of collocation with the FRM and determination of the precision and bias statistics of the PM<sub>2.5</sub> data from the BAM1020 monitor with respect to the FRM.

‡ Because the Turnagain site CO monitor records the highest CO concentrations in the Anchorage network and data from this monitor is used to determine the CO design value for the Anchorage MSA, MOA has changed the Turnagain site designation from SPM to SLAMS for CO.



**Figure 3.1.1:** Map of Anchorage area. Red dots indicate monitoring sites.

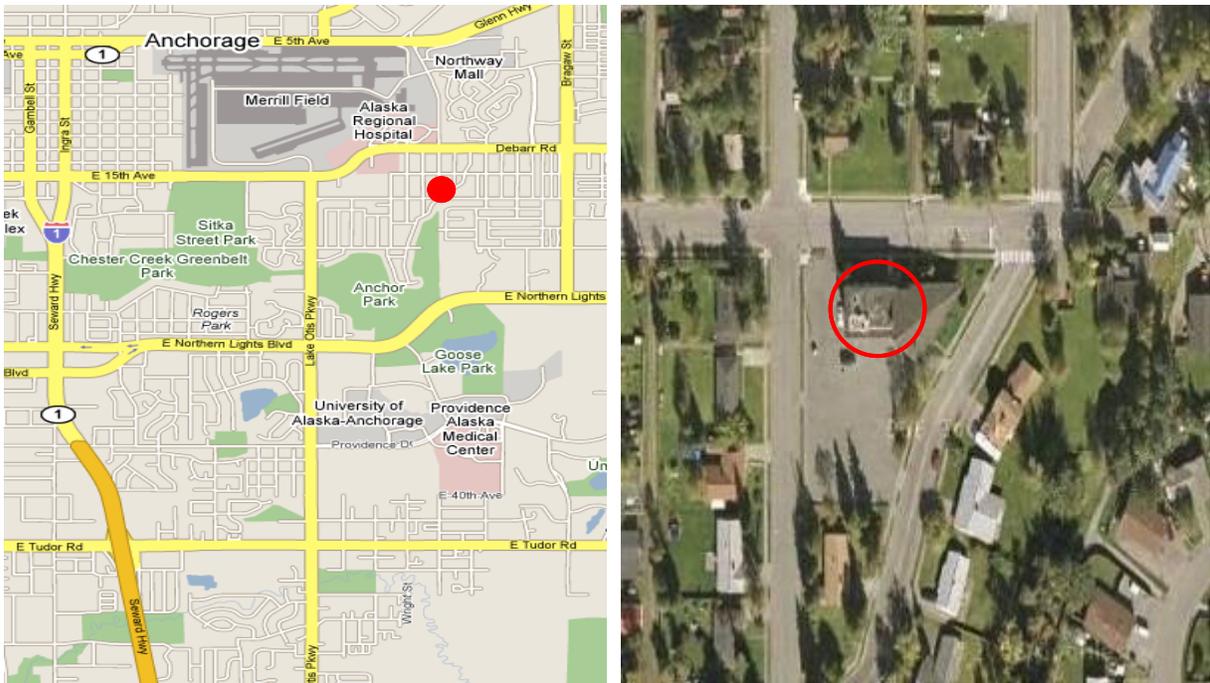
## 3.2 GARDEN SITE - ANCHORAGE

3000 East 16th Avenue  
Parameters: CO, PM<sub>2.5</sub>, PM<sub>10</sub>

AQS ID 02-020-0018  
Established: January 1, 1979

### 3.2.1 Site Information

The Garden monitoring site is located at the Trinity Christian Reformed Church between 16<sup>th</sup> Avenue, Garden Street, and Sunrise Drive at latitude N 61° 12' 21.1", longitude – W149° 49' 29.0", and 128 feet (39 meters) above sea level. Figure 3.2:1 shows a street map of the central Anchorage area and a satellite image of the area. The site is located in a suburban, residential area. Garden is a neighborhood, population-oriented CO and PM site.



**Figure 3.2:1: Street map and satellite image of the Garden monitoring site. The red circles indicate the sites location.**

### 3.2.2 Sources

Carbon monoxide levels are closely associated with automobile activity and combustion from local residential heating systems in the area. Other sources in the Anchorage Bowl which might have influence on this site for CO are: the Municipal Light and Power (90 and 250 megawatt gas turbines – 3.5 miles west), Chugach Electric (48 MW gas turbine – 3.5 miles northeast), Fort Richardson (18 MW gas turbine – five miles northeast) and Elmendorf Air Force Base (22 MW gas turbine – 3.5 mile northwest). Fine and coarse particulate matter can also be impacted from the combustion from local heating systems as well as dust from the local road system. All roads in the vicinity are paved; the alleys

are mostly unpaved, and roadways are sanded for traction during the winter months. Other contributing sources for coarse and fine particulate matter are: the Merrill Field airport (one mile north) and the Alaska Railroad (two miles northwest). Anchorage is seasonally affected by wind-blown glacial loess, and occasionally impacted by wildfire smoke and ash from volcanic eruptions.

### **3.2.3 Monitors**

The Garden Site is currently equipped with:

- PM<sub>2.5</sub> (SPM) – Three Thermo Electron (formerly Rupprecht and Patashnick) Partisol 2000 samplers were operated at the site until October 2008. Two samplers ran on a 1-in-6 day alternating sampling schedule resulting in a 1-in-3 day sampling frequency. The third sampler operated as a collocated monitor. Two samplers were removed in October 2008. The one remaining sampler operates on a 1-in-6 day sampling schedule.
- PM<sub>10</sub> (SPM) – One General Metal Works high-volume sampler.
- PM<sub>2.5</sub> (SPM) – A single Thermo Electron TEOM 1400a continuous monitor was installed by ADEC in 2003 to provide real-time PM<sub>2.5</sub> data for evaluating the Air Quality Index. MOA operated the TEOM from 2004 -2008 and removed it in 2009.
- PM<sub>2.5</sub>, PM<sub>10</sub>, PM Coarse (SPM) – Two Met One BAM 1020X continuous monitors were installed in June 2008, and were tested for measurement of PM<sub>2.5</sub>, PM<sub>10</sub> and PM Coarse, and for proper integration within a DR DAS internet-based network. MOA has begun submitting PM<sub>2.5</sub> and PM<sub>10</sub> data from these monitors to AQS, starting with first quarter 2009.
- CO (SLAMS) – A single Thermo Electron 48i CO monitor operates seasonally (October – March), but will operate continuously throughout 2009 to collect data in support of EPA’s Community Scale Air Toxics Program.
- PAH (SPM) – Two Tisch Environmental, TE-1000PUF high-volume, Poly Urethane Foam (PUF) samplers. The primary and collocate samplers were installed in October 2008. Starting in November 2008, MOA began 1-in-6 day operation of these samplers for a planned one year measurement of Polycyclic Aromatic Hydrocarbons (PAHs) in support of EPA’s Community Scale Air Toxics Program.

### **3.2.4 Siting**

The particulate matter samplers are located on the roof at the south end of the Trinity Christian Reformed Church. Access to the site is from use of a window from a split level section of the church. This split level area is several meters from the monitoring site. The roof height is six meters (19 feet), and there are no trees in the vicinity that significantly exceed the height of the samplers. The airflow to these samplers is unobstructed. The samplers are approximately 14 meters (32 feet) south of the nearest traffic lane of 16<sup>th</sup> Avenue.

The CO monitor is installed in the church. The inlet probe is approximately three meters (9.5 feet) above the ground. The inlet probe is approximately 10 meters (32 feet) from

the nearest traffic lane of 16<sup>th</sup> Avenue. Between the inlet and 16<sup>th</sup> Avenue is one tall spruce tree. The church itself obstructs air flow from the south.

### **3.2.5 Traffic**

There are six other major roadways within two miles with approximate average daily traffic ranging from 14,000 to 54,000 vehicles per day. All roads are paved; alleys are usually dirt roads.

**Figure 3.2:2: Pictures of the Garden Site**

North	East	South	West
			
<p><b>Views in four directions from the Garden Site</b></p>			
			
<p><b>Views in four directions towards the Garden Site</b></p>			



**Figure 3.2:3: View of CO probe at Garden Site. The red circle indicates where the probe is located.**

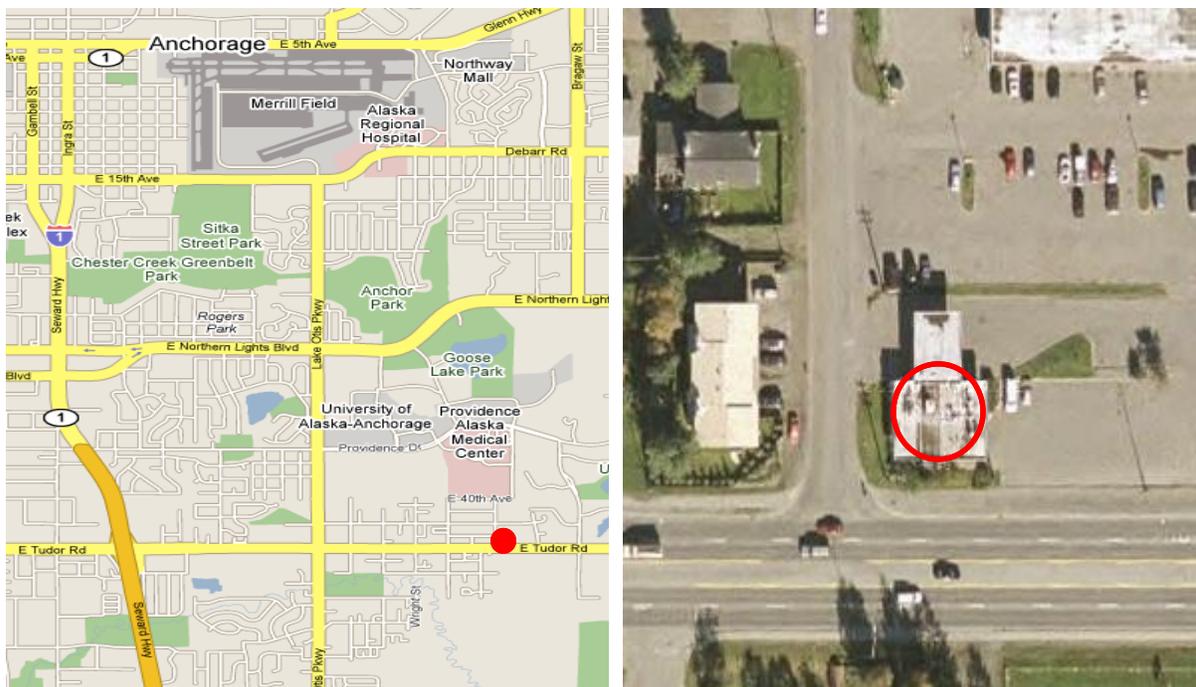
### 3.3 TUDOR SITE - ANCHORAGE

3335 East Tudor Road  
Parameters: PM<sub>10</sub>

AQS ID 02-020-0044  
Established: October 12, 1996

#### 3.3.1 Site Information

The Tudor monitoring site is located at the Allstate Insurance Company building on Tudor Road at latitude N 61° 10' 51.9", longitude W 149° 49' 02.8", and 164 feet (50 meters) above sea level. Figure 3.3:1 shows a street map of the central Anchorage area and a satellite picture of the area immediately surrounding the Tudor site. The site is located in an urban, commercial location. Tudor is a microscale, population-oriented site.



**Figure 3.3:1:** Street map and satellite image of the Tudor monitoring site. The red circle indicates the sites location.

#### 3.3.2 Sources

The primary source of course particulate matter at this site is from automobile activity. Roadways are sanded for traction and are abraded by studded tires during winter months and the fine particles get re-entrained in the air during the dry summer days, in the fall, winter and especially during the spring melt. Within five miles is Merrill Field (a small plane airport) and the Alaska Railroad passes within six miles of the site. Anchorage is seasonally affected by wind-blown glacial loess, and occasionally affected by wildfire smoke and volcanic eruptions.

### **3.3.3 Monitors**

The Tudor Site is currently equipped with:

- PM<sub>10</sub> (SPM) – Three General Metal Works high-volume samplers. The Hi-Vol samplers are operated on a 1-in-3 day sampling schedule. Alternating samples are run in collocation at this site every fifteen days for precision determination.
- PM<sub>10</sub> (SPM) – A single Thermo Electron TEOM 1400a continuous monitor was installed in April 2005 to provide information in real time for evaluating the Air Quality Index.
- PM<sub>2.5</sub> (SPM) – samplers were removed from the site end of December 2002.

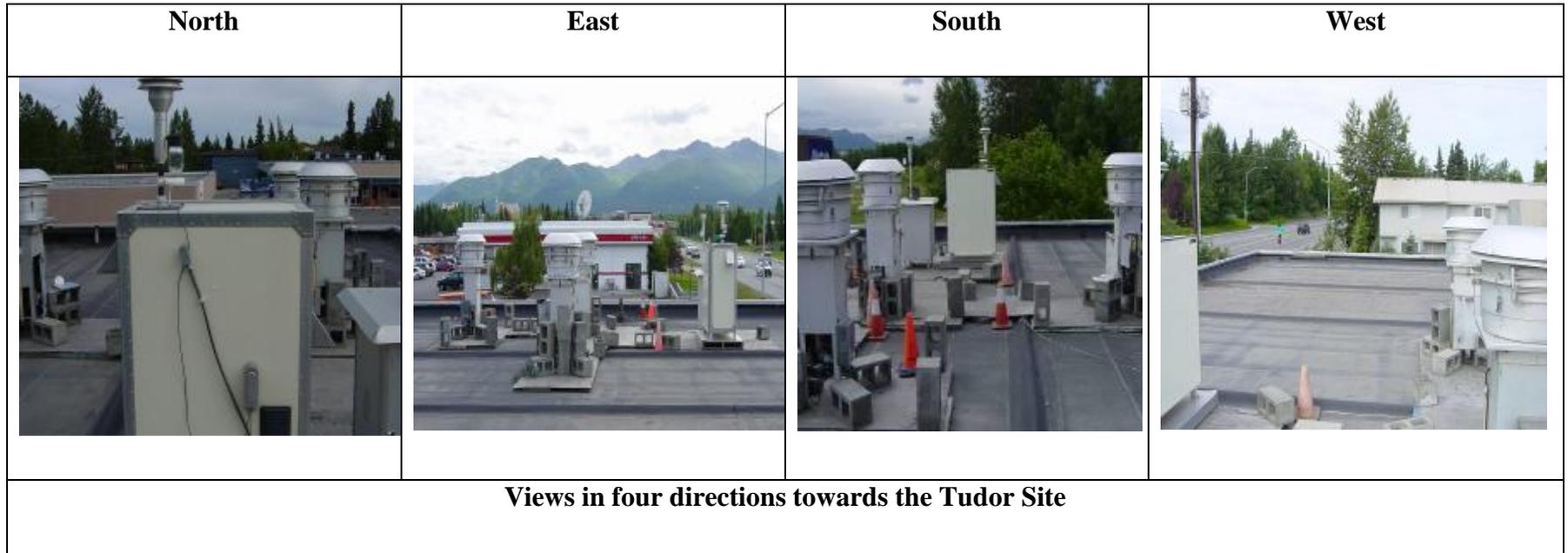
### **3.3.4 Siting**

The particulate matter samplers are located on the roof near the southeast edge. The roof height is 3.3 meters (10.5 feet), and there are no other structures. Twenty foot tall mountain ash trees between the samplers and the roadway do not significantly exceed the height of the samplers. The airflow to these samplers is unobstructed. The samplers are approximately seven meters north of the nearest traffic lane of Tudor Road.

### **3.3.5 Traffic**

There are three major roadways within two miles with approximate average daily traffic ranging from 30,000 to 54,300 vehicles per day. There are typical residential and commercial streets and alleys in the vicinity. All roads are paved; alleys are usually dirt roads.

**Figure 3.3:2 : Pictures of the Tudor Site**



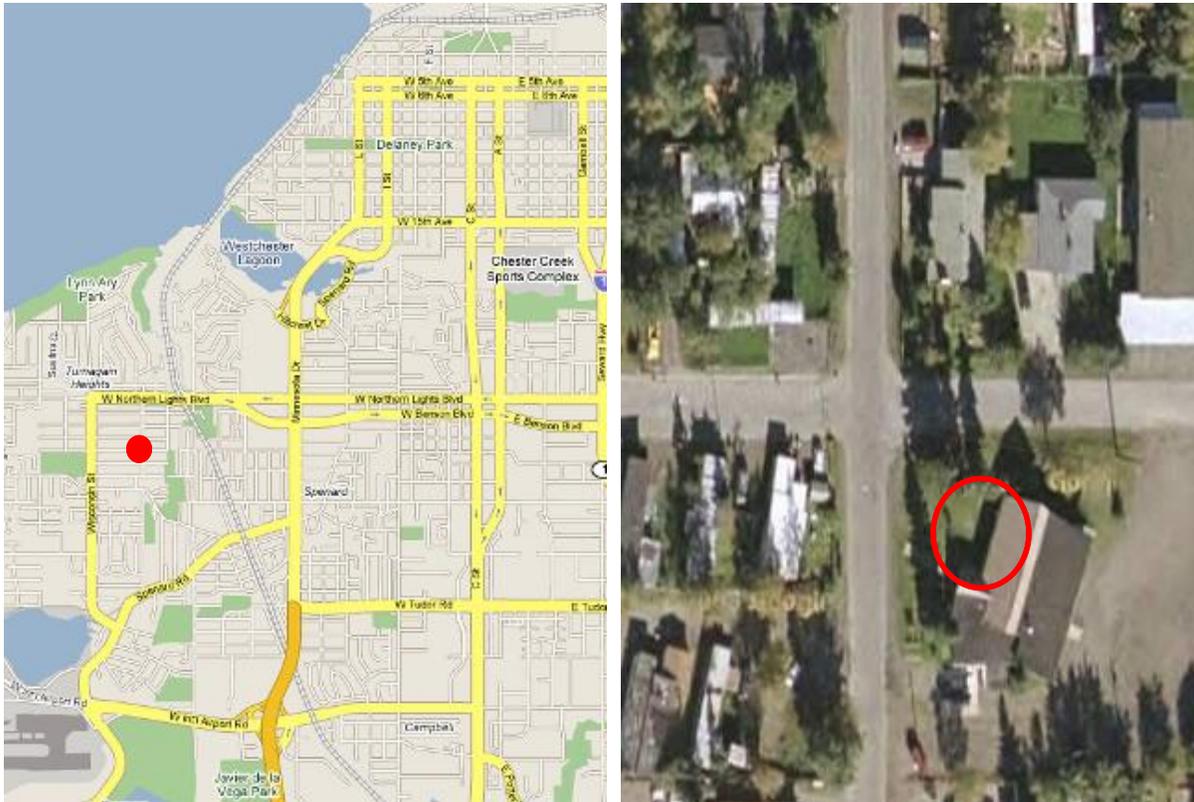
### 3.4 *TURNAGAIN SITE - ANCHORAGE*

**3201 Turnagain Street**  
**Parameters: CO**

**AQS ID 02-020-0048**  
**Established: October 15, 1998**

#### 3.4.1 Site Information

The Turnagain carbon monoxide monitoring site is located at the corner of Turnagain Street and 32<sup>nd</sup> Avenue at latitude N 61° 11' 29.4", longitude W 149° 56' 06.9", and 69 feet (21 meters) above sea level. Figure 3.4:1 is street map of the western part of Anchorage and a satellite picture of the Turnagain site and surrounding area. The site is located in a suburban location. Turnagain is a neighborhood scale, population-oriented site.



**Figure 3.4:1:** Street map and satellite image of the Turnagain monitoring site. The red circles indicate the sites location.

#### 3.4.2 Sources

Advisory carbon monoxide levels are closely associated with automobile activity and combustion from local residential heating systems in the area. Other sources in the Anchorage Bowl which might have influence on this site for CO are: the Anchorage International Airport (including a lake for small float planes) is a half mile to the

southwest, Municipal Light and Power (90 and 250 megawatt gas turbines), Chugach Electric (48 MW gas turbine), and Elmendorf Air Force Base (22 MW gas turbine).

### **3.4.3 Monitors**

The Turnagain Site is currently equipped with:

- CO (SLAMS) – A single Thermo Electron 48C CO monitor operates seasonally (October – March).

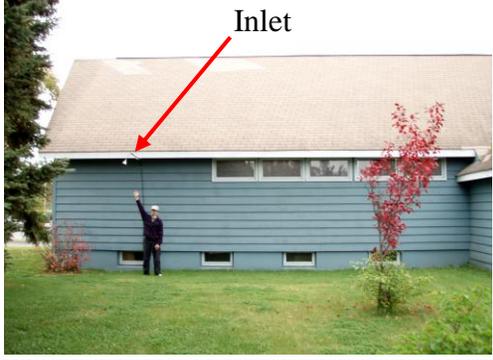
### **3.4.4 Siting**

The monitor is installed in the Unitarian church. The inlet probe is approximately three meters (9.5 feet) above the ground. The inlet probe is approximately 18.5 meters (58 feet) from the nearest traffic lane of Turnagain Street. Between the inlet and Turnagain Street are several tall white spruce trees. The church itself obstructs air flow from the south and east.

### **3.4.5 Traffic**

There are five major roadways within 2 miles with approximate average daily traffic ranging from 18,000 to 54,000 vehicles per day. There are residential streets and alleys in the vicinity.

**Figure 3.4:2: Pictures of the Turnagain Site**

North	East	South
 A photograph showing a view from the north towards the Turnagain Site. A person is standing on a grassy area in the foreground, pointing towards a light blue building. The word "Inlet" is written in the top right corner of the image.	 A photograph showing a view from the east towards the Turnagain Site. A person is standing on a grassy area, pointing towards the building. A red arrow points from the word "Inlet" to the roofline. The word "Inlet" is written in the top center of the image.	 A photograph showing a view from the south towards the Turnagain Site. A person is standing on a grassy area, pointing towards the building. A red arrow points from the word "Inlet" to the roofline. The word "Inlet" is written in the top left corner of the image.
<p><b>Views in three directions towards the Turnagain Site</b></p>		
North	West	South
 A photograph showing a view from the north looking away from the Turnagain Site. A yellow building and a brown pickup truck are visible in the background. The sky is overcast.	 A photograph showing a view from the west looking away from the Turnagain Site. A dark green car is parked in a lot, and a large evergreen tree is in the foreground.	 A photograph showing a view from the south looking away from the Turnagain Site. A paved road leads away from the site, lined with trees and a utility pole.
<p><b>Views in three directions from the Turnagain Site</b></p>		

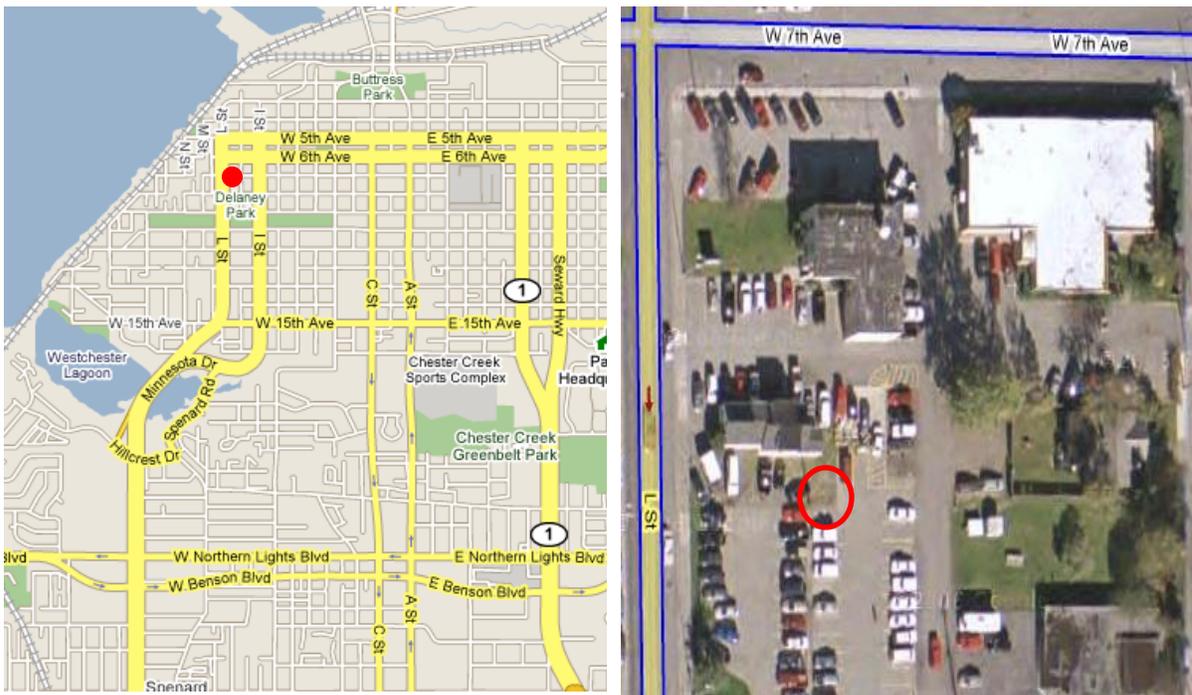
### 3.5 DHHS - ANCHORAGE

727 L Street.  
Parameters: CO

AQS ID 02-020-0052  
Established: September 27, 2007

#### 3.5.1 Site Information

The Department of Health and Human Services (DHHS) carbon monoxide monitoring site is located in the employee parking lot for DHHS at latitude N 61° 12' 54.1", longitude W 149° 54' 11.2", and 115 feet (35 meters) above sea level. Figure 3.5:1 shows a street map of the western part of Anchorage and a satellite picture of the DHHS site and surrounding area. The site is located downtown. The Municipality of Anchorage considers the DHHS site to be middle scale, representing a dimensional area up to 0.5 km.



**Figure 3.5:1:** Street map and satellite image of the DHHS monitoring site. The red circles indicate the sites location.

#### 3.5.2 Sources

The Alaska Railroad passes within 0.5 mile of this site and the rail yard, where locomotives commonly idle, is located approximately one mile to the northeast. This site was established by the Municipality of Anchorage in September 2007 to represent typical exposure in the downtown business district.

### **3.5.3 Monitors**

The DHHS Site is equipped with:

- CO (SPM) – A single Thermo Electron 48C CO monitor which operated seasonally (October – March).
- PM<sub>2.5</sub>, PM<sub>10</sub>, PM Coarse (SPM) – Two Met One BAM 1020X continuous monitors were installed in September 2008 and were integrated into the DR DAS network. MOA commenced AQS reporting of PM<sub>10</sub> and PM<sub>2.5</sub> from these monitors starting January 1, 2009.

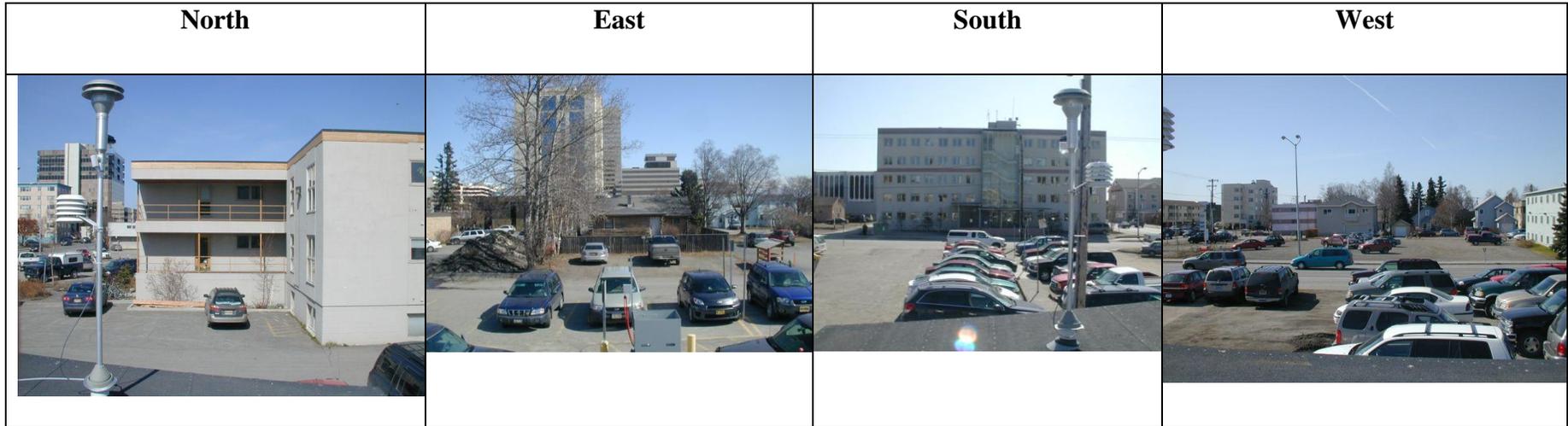
### **3.5.4 Siting**

The monitors are installed in a small shed building located at 727 L Street.. The CO inlet probe is approximately three meters (9.5 feet) above the ground. The inlet probe is approximately 28 meters (85 feet) from L Street, the nearest traffic lane. The probe extends off the northwest corner of the shed, and air flow to the probe is unobstructed for 270 degrees. The PM<sub>10</sub> and PM<sub>2.5</sub> inlets each extend one meter above the shed roof with two meters of separation between them. This site has sufficient separation distance from surrounding buildings to meet EPA siting criteria.

### **3.5.5 Traffic**

There are four major roadways within one mile with average daily traffic counts ranging from 11,830 to 15,120 vehicles per day.

**Figure 3.5:2: Pictures of the DHHS Site**



**Views in four directions from the DHHS Site**



**Views in four directions towards the DHHS Site**

### 3.6 *PARKGATE, EAGLE RIVER- ANCHORAGE*

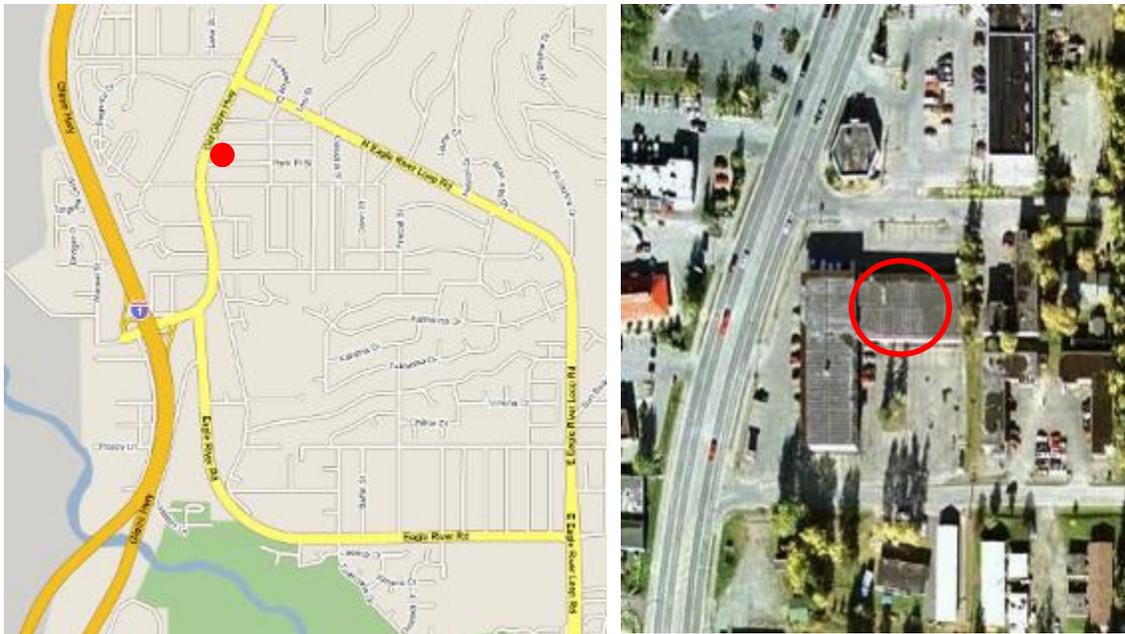
11723 Old Glenn Highway  
Parameters: PM<sub>10</sub>

AQS ID 02-020-1004  
Established: January 1, 1974

#### 3.6.1 Site Information

The Parkgate PM<sub>10</sub> monitoring site is located at the Parkgate Business Center building in Eagle River (a bedroom community of Anchorage that lies well within the Municipality) at latitude N 61° 19' 36.0", longitude W 149° 34' 10.8", and 328 feet (100 meters) above sea level. Figure 3.13 is a street map of the western Eagle River area and a satellite picture of the Parkgate site and surrounding area. The site is located in a suburban/commercial use area with monitoring site classified as neighborhood scale, population-oriented monitoring site.

The Eagle River dust problem goes back to the late 1980s when many of the roads and parking lots were not paved. Eagle River was declared non-attainment for PM<sub>10</sub>, and the State SIP required the Municipality of Anchorage to pave almost all of Eagle River's dirt roads. Since paving most of the surrounding gravel roads, the air quality has improved to the point that no violations of the national ambient air quality standards have been recorded in over 20 years. MOA has applied for re-designation of Eagle River to "attainment" status, and if approved, will be classified as a "maintenance" area for PM<sub>10</sub>.



**Figure 3.6:1:** Street map and satellite image of the Eagle River monitoring site. The red circle indicates the sites location.

#### 3.6.2 Sources

The primary source of course particulate matter at this site is from automobile activity. Roadways are sanded for traction during winter months and the sand gets re-entrained in

the air during dry summer days. The Alaska Railroad passes within 3 miles of the site. Eagle River is seasonally affected by wind-blown glacial loess, and occasionally affected by wildfire smoke and volcanic eruptions.

### **3.6.3 Monitors**

The Eagle River Site is currently equipped with:

- PM<sub>10</sub> (SLAMS) – One General Metal Works high-volume sampler. The Hi-Vol sampler is operated on a 1-in-6 day sampling schedule.
- CO (SPM) – A single Thermo Electron 48C CO monitor operates seasonally (October – March).
- PM<sub>2.5</sub>, PM<sub>10</sub>, PM Coarse (SPM) – Two Met One BAM 1020X continuous monitors were installed in October 2008 and were integrated into the DR DAS network. MOA commenced AQS reporting of PM<sub>10</sub> and PM<sub>2.5</sub> from these monitors starting January 1, 2009.

### **3.6.4 Siting**

The particulate matter samplers are located on the roof of the first story of the Parkgate Business Center. The roof height is 5 meters (16 feet). There is another section of the building 13 meters (41 feet) to the west that is two stories tall (4 meters above the first story roof height). No trees in the vicinity significantly exceed the height of the samplers. The airflow to these samplers is unobstructed. The samplers are approximately 44 meters east of the nearest traffic lane of the Old Glenn Highway and 23 meters (73 feet) south of Easy Street.

The CO inlet probe is approximately three meters (9.5 feet) above the ground and is attached to the east side of the building. The CO probe inlet is approximately 42 meters east of the nearest traffic lane of the Old Glenn Highway and 23 meters (73 feet) south of Easy Street. Airflow to the probe inlet is unobstructed from the north, south, and east. The Parkgate building itself obstructs air flow to the CO probe inlet from the west.

### **3.6.5 Traffic**

There are two major roadways within 2 miles ranging from 15,500 to 29,000 vehicles per day. There are typical residential and commercial streets and alleys in the vicinity. All roads are paved and alleys are unpaved.

**Figure 3.6:2: Pictures of the Parkgate Site**

