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2024 Annual Air Quality Monitoring Network Plan

Alaska Department of Environmental Conservation

Public Comment Draft

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AMQA	Air Monitoring and Quality Assurance Program
ANP	annual network plan
AQI	air quality index
AQS	Air Quality Systems
ARP	The American Rescue Plan
CAA	Clean Air Act
CASTNET	Clean Air Status and Trends Network
CBJ	City & Borough of Juneau
CBSA	Core Base Statistical Area
Census	the Census Bureau
CFR	Code of Federal Regulations
CO	carbon monoxide
CSN	Chemical Speciation Network
DEC	Alaska Department of Environmental Conservation
DV	design value
EEWR	exceptional event waiver request
EPA	U.S. Environmental Protection Agency
FEM	Federal Equivalent Method
FNSB	Fairbanks North Star Borough
FRM	Federal Reference Method
HVAC	heating and ventilation air conditioning system
IMPROVE	Interagency Monitoring of Protected Environments
LC	local (actual) conditions of temperature and pressure
LMP	limited maintenance plan
NAA	nonattainment area
NAAQS	National Ambient Air Quality Standards
NCore	National Core Multi-Pollutant Monitoring Stations
NO	nitric oxide
NO_2	nitrogen dioxide
NOy	reactive nitrogen compounds
NWS	National Weather Service
m^3	cubic meter
Mat-Su	Matanuska Susitna
MFC	mass flow controller
MOA	Municipality of Anchorage
MSA	metropolitan statistical area
µg	micrograms
µSA	micropolitan areas
O_3	ozone
OMB	U.S. Office of Management and Budget
Pb	lead
Pb-TSP	lead total suspended particulate
PM	particulate matter
PMC	Plant Material Center
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than 2.5 micrometers

PM_{10}	particulate matter with an aerodynamic diameter less than 10 micrometers
POC	parameter occurrence code
ppb	parts per billion
ppm	parts per million
RadNet	Radiation Monitoring Network
RH	relative humidity
S	scalar
SCC	sharp cut cyclone
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Stations
SO_2	sulfur dioxide
SPM	special purpose monitor
STD	standard conditions of temperature and pressure
V	vector
VPD	vehicles per day
VSCC	very sharp cut cyclone
WD	wind direction
WGS	World Geodetic System
WS	wind speed

EXECUTIVE SUMMARY

This 2024 Annual Monitoring Plan describes the Alaska air quality monitoring network under the Alaska Department of Environmental Conservation's (DEC) oversight and spells out anticipated changes to the network for the calendar year 2025.

Most of the air monitoring activities are focused on population centers and areas that have shown in the past to have air quality problems. Budget cuts over the past several years allow the DEC only to operate the minimum regulatory required ambient monitoring network. Looking ahead, DEC does not expect to expand the network during the next several years due to fiscal constraints.

The most significant changes to the network during 2023 and 2024 to date:

- **Floyd Dryden Site**: The Teledyne T640X was designated as the primary PM_{10} instrument for site monitoring requirements under the Limited Maintenance Plan on January 1, 2024. The PM_{10} FRM Partisol was also removed from the Floyd Dryden State and Local Air Monitoring Stations (SLAMS) site at that time. Inherent bias of the $PM_{2.5}$ T640X measurements and desire not to perform a data alignment led DEC to designate the instrument for use as a Special Purpose Monitor and retain the data for the purposes providing near real time Air Quality Index values to the public and designate the Thermo Scientific Partisol 2000i $PM_{2.5}$ FRM sampler as the primary monitor for the purposes of calculating the annual and 24hr design values. The sampler will continue to run on a 1 in 3 day EPA schedule. This sampler was replaced by a Thermo Scientific 2025i FRM sampler on February 18th, 2024, on the same sample schedule. These changes were approved by the Environmental Protection Agency (EPA) Region 10 (R10) in the 2023 Annual Monitoring Network Plan (ANP) approval letter[1]. See 4.1.3 Floyd Dryden Site. An EPA Region 10 letter[2] dated December 19th, 2023, approves the swap of the 2000i FRM sampler with a 2025i FRM sampler.

- **Butte Harrison Court / Plant Materials Center (PMC) Site**: Due to a siting conflict with nearby property owners, DEC performed a study and analysis to find a representative monitoring site in the in the nearby community. After review and discussions with EPA, a new site was located at the PMC, which is a State of Alaska owned property and expected to be a stable long term siting location. This relocation was included in the 2023 ANP and EPA approved a discontinuation of the Harrison Court location in the 2023 ANP approval letter. The site was subsequently shut down December 30th, 2023. The PMC site was established and began operation on October 26th, 2023, and overlapped a short time with the Harrison Court station. PMC became the sole source of regulatory PM_{10} and $PM_{2.5}$ continuous monitoring for the Mat-Su Borough on January 1st, 2024.

[1] https://dec.alaska.gov/air/air-monitoring/monitoring-plans

[2] https://dec.alaska.gov/media/mreht3q3/adec_networkmodreq_jan2024_final.pdf

- **A-Street Site:** The continuous BAM-1020 $PM_{2.5}$ instrument was converted from non-Federal Equivalent Method (non-FEM) to Federal Equivalent Method (FEM) beginning on January 2nd, 2024. This was accomplished by exchanging a Sharp Cut Cyclone (SCC) for a Very Sharp Cut Cyclone (VSCC) as required for FEM status. The A-Street Monitoring shelter will be replaced in 3rd Quarter 2024. The replacement may affect data capture of the FRM instrument during the installation of the shelter and monitors, the FEM monitor is expected to run in a small temporary shelter. The new permanent shelter will have better climate control and serve as a better base for long term monitoring efforts as the Fairbanks maximum impact site.

- **NCore Site:** This station utilized two Thermo Scientific Partisol 2000i $PM_{2.5}$ and PM_{10} operating on a 1 in 3 day sample schedule to calculate PM_{10}-$PM_{2.5}$ coarse PM fraction as an NCore requirement. These samplers were discontinued and removed from service on December 22nd, 2023. A Thermo Scientific Partisol 2025i configured for PM_{10} was placed into service at that time and data will be compared against the site's existing primary $PM_{2.5}$ FRM Partisol determine PM_{10}-$PM_{2.5}$. These changes were approved December 19th, 2023 by Region 10 EPA in response letter[3] to a DEC request letter[4] dated November 22nd, 2023.

- **Hurst Road:** DEC operates a Special Purpose Monitor (SPM) trace level Sulfur Dioxide (SO_2) instrument at the station to better understand the Sulfur/Sulfate ratio, arctic photochemistry, and effects of the transition from biomass fuel sources to home heating oil. To ensure instrument reliability and data capture objectives, DEC is replacing an aged continuous Thermo Scientific 43i SO_2 trace level analyzer (Method Code 560) with a like model Teledyne T100U SO_2 trace level analyzer (Method Code 100). This change is tentatively scheduled to occur early 3rd quarter of 2024.

Changes proposed for calendar year 2025 include:

- **Garden Site:** Carbon Monoxide (CO) levels have dropped precipitously over the past twenty years, with no exceedances of the standard. For the past three calendar years, the 8-hour maximum values have been below 30% of the National Ambient Air Quality Standard (NAAQS) and have not been higher than 41% in the last 10 years. As such, DEC will seek a State Implementation Plan (SIP) modification for the end of the second 10-year Limited Maintenance Plan period. DEC proposes to discontinue CO monitoring in the Anchorage MSA at the end of the 2024/2025 CO winter monitoring season (by March 31st,

[3] https://dec.alaska.gov/media/mreht3q3/adec_networkmodreq_jan2024_final.pdf

[4] https://dec.alaska.gov/media/r2ajchqc/adec_network_modifications_1_2024.pdf

2025). If the SIP modification is not approved, DEC will begin CO monitoring again at the beginning of the winter CO season in October 2025.

- **NCore Site:** As airshed maximum $PM_{2.5}$ concentrations have fallen and continuous $PM_{2.5}$ technology has improved, DEC has observed a reduced bias compared to that previously observed during elevated biomass particulate events between the *near*-Federal Equivalent Method (FEM) Met One BAM 1020 instruments and the Federal Reference Method (FRM) particulate samplers. This improved performance, and data from the prior winter's operation of the A-Street BAM 1020 as an FEM, encourages DEC that the NCore station will operate accurately as a FEM. DEC intends to convert the site $PM_{2.5}$ BAM to FEM by replacing the Sharp Cut Cyclone (SCC) with a Very Sharp Cut Cyclone (VSCC) on January 1, 2025. Additionally, In November of 2023, DEC requested that EPA Region 10 approve a reduction in sampling frequency of the FRM at the site. This facilitated discussions with EPA, and all parties agreed to postpone a change in sampling frequency until January of 2025 to ensure sufficient data capture for the State Implementation Plan efforts and upcoming Annual $PM_{2.5}$ Standard. DEC will reduce $PM_{2.5}$ FRM monitoring sample frequency from 1 in 1 day sample schedule to a 1 in 3 day sampling schedule on January 1, 2025. The FRM will continue to be the primary monitor at the station.

- **Low-Cost Sensor Network:** While the current long-term monitoring network meets the regulatory requirement in terms of number of monitoring stations and monitored pollutants, it is confined to the population centers and does not adequately characterize conditions in outlying and rural communities. DEC has purchased 55 QuantAQ Modulair™ sensor pods using various funding sources to establish a community sensor network. DEC will use some of the Modulair pods to replace the previously purchased AQMesh™ sensors. DEC has set aside six (6) sensor pods for QA purposes. Roughly 40 pods are intended to be located in rural and underserved communities across the state. These sensor pods will collect baseline air quality data, including particulate matter, ozone, nitric oxide, nitrogen dioxide, and carbon monoxide. To date DEC has deployed 27 sensors in communities and as QA sensors. DEC plans to replace another six (6) AQMesh sensors before the end of June 2024 and has identified another 13 communities for potential deployment. For more information see section See 5.4 Low-Cost Sensor Network.

1 INTRODUCTION

The Code of Federal Regulations (CFR) Title 40 §58.10 requires each state agency to adopt and submit to the U.S. Environmental Protection Agency (EPA) Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance system that consists of a network made up of the following types of monitoring stations:

- State and local air monitoring stations (SLAMS), including monitors that are designated as:
  - Federal Reference Method (FRM), or
  - Federal Equivalent Method (FEM)
- National Core Multi-Pollutant Monitoring Stations (NCore)
- $PM_{2.5}$ Chemical Speciation Network (CSN), and
- Special Purpose Monitoring (SPM) stations

The plan shall include a statement of purpose for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of 40 CFR 58 where applicable.

The annual monitoring network plan must be made available for public inspection for at least 30 days prior to submission to EPA. Any annual monitoring network plan that proposes SLAMS network modifications, including new monitoring sites, is subject to the approval of the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove the plan and schedule within 120 days. If the State or local agency has already provided a public comment opportunity on its plan and has made no changes after that comment opportunity and has submitted the received comments together with the plan, then the Regional Administrator is not required to provide a separate opportunity for comment.

This 2024 Annual Monitoring Network Plan describes the Alaska air quality monitoring network under the State's oversight and spells out anticipated changes to the network for the calendar year 2025. This plan shall include all required stations to be operational by January 1, 2025. Specific locations for the required monitors shall be included in the annual network plan which is due to be submitted to the EPA Regional Administrator by July 1, 2024.

The annual monitoring network plan must contain the following information for each existing and proposed site:

1. The Air Quality System (AQS) site identification number
2. The location, including street address and geographical coordinates
3. The sampling and analysis method(s) for each measured parameter
4. The operating schedules for each monitor
5. Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal

6. The minimum monitoring requirements for spatial scale of representativeness for each monitor as defined in 40 CFR 58, Appendix D
7. The minimum monitoring requirements for probe and monitoring path siting criteria as defined in 40 CFR 58, Appendix E
8. The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) as described in 40 CFR 58.30
9. The Metropolitan Statistical Area, Core-Based Statistical Area, Combined Statistical Area, or other area represented by the monitor
10. The designation of any lead monitors as either source-oriented or non-source-oriented according to 40 CFR 58, Appendix D
11. Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of 40 CFR 58, Appendix D
12. Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM_{10} monitoring in lieu of lead total suspended particulate (Pb-TSP) monitoring as allowed for under paragraph 2.10 of 40 CFR 58, Appendix C

2 AIR QUALITY MONITORING PRIORITIES

In 1970, the Congress of the United States created the EPA and promulgated the Clean Air Act (CAA). Title I of the CAA established NAAQS to protect public health. NAAQS were developed for six *criteria pollutants*: particulate matter (PM), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and lead (Pb). Particulate matter has two associated NAAQS: one for fine particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$) and one for coarse particulate matter less than 10 micrometers in aerodynamic diameter (PM_{10}). Threshold limits established under the NAAQS to protect human health are known as primary standards. The primary health standards are to protect the most sensitive of the human population, including those people with existing respiratory or other chronic health conditions, children, and the elderly. Secondary standards established under the NAAQS are to protect the public welfare and the environment. Since promulgation of the original CAA, the EPA has continued to revise the NAAQS based on its assessment of national air quality trends and on current (and ongoing) health studies.

To protect public health and assess compliance with NAAQS, DEC established an air quality monitoring program. The State of Alaska has a large geographical area with a small population. Anchorage and the Matanuska-Susitna (Mat-Su) Valley have the bulk of the 733,406[5] residents in the state, about 55% of the overall population. The remainder of the population is distributed among the cities of Juneau and Fairbanks, both with populations of just over 30,000 residents, and

[5] Based on population estimates for July 1, 2023, obtained from the United States Census Bureau, https://www.census.gov/quickfacts/fact/table/juneaucityandboroughcountyalaska,fairbanksnorthstarboroughalaska,matanuskasusitnaboroughalaska,anchoragemunicipalitycountyalaska,AK/PST045222

many scattered and isolated small villages, most of which are off the road system and have populations ranging from 16 to 10,000 people. The total land area of the state is approximately 571,022 square miles (1.5 million square kilometers)[6].

In accordance with the National Monitoring Strategy, DEC plans air monitoring activities using the following criteria:

- Monitor in larger communities to cover the largest possible population exposure
- Monitor in designated smaller towns and villages that are representative of multiple communities in a region
- Monitor in response to air quality concerns, as funding and staffing levels allow

The Air Monitoring & Quality Assurance (AMQA) program of the DEC Air Quality Division has a relatively small staff of professionals who conduct the State's air quality assessment efforts. To enhance the quality of work performed statewide, DEC's staff works closely with the Municipality of Anchorage (MOA), the Fairbanks North Star Borough (FNSB), the Matanuska-Susitna Borough, the City & Borough of Juneau (CBJ), and environmental staff in other, smaller communities to assess air quality levels statewide. To continue to protect public health and the environment, air quality monitoring is focused on seven primary issues by descending priority:

1. Fine particulate matter ($PM_{2.5}$) monitoring
2. Coarse particulate matter (PM_{10}) monitoring
3. Wildland fire monitoring ($PM_{2.5}$)
4. Carbon monoxide (CO) monitoring
5. Rural community and tribal village monitoring (primarily PM_{10})
6. Lead (Pb) monitoring
7. Ozone (O_3) monitoring

3 STATE OF ALASKA AMBIENT AIR MONITORING NETWORK

3.1 MINIMUM MONITORING REQUIREMENTS

Minimum monitoring requirements are based on several factors including pollutant levels (see **Appendix A**) and populations in statistically defined metropolitan areas. The definitions for the statistical based metropolitan areas are provided by the US Office of Management and Budget (OMB) and the Census Bureau (Census).

Alaska has four statistical areas as designated by OMB in 2009 with updated boundaries based on the 2020 Census data (**Appendix B**). The four Core Based Statistical Areas (CBSA) include two Metropolitan Statistical Areas (MSA) and two Micropolitan Areas (μSA), see Table 3-1 below.

[6] Based on the land area coverage, as of 2020, obtained from the 2023 population estimate quick facts page from the United States Census Bureau, https://www.census.gov/quickfacts/fact/table/AK/PST045222

The two MSAs are the Anchorage MSA, which includes the entire Municipality of Anchorage and the entire Matanuska-Susitna Borough, and the Fairbanks MSA, which is comprised of the Fairbanks North Star Borough. The two Micropolitan Areas are the Juneau µSA and the Ketchikan µSA, which encompass the City and Borough of Juneau and the Ketchikan Gateway Borough, respectively.

Table 3-1: Alaska's Core Based Statistical Areas

Core Based Statistical Areas	Population*	Includes:	
Anchorage, MSA	401,314	Municipality of Anchorage	286,075
		Matanuska-Susitna Borough	115,239
Fairbanks, MSA	94,840		
Juneau, µSA	31,555		
Ketchikan, µSA	13,738		

* based on population estimates for July 1, 2023 obtained from the United States Census Bureau https://www.census.gov/quickfacts/fact/table/ketchikangatewayboroughalaska,juneaucityandboroughcountyalaska,fairbanksnorthstarboroughalaska,matanuskasusitnaboroughalaska,anchoragemunicipalitycountyalaska,AK/PST045222

The minimum number of sites required for the Alaskan CBSAs for the six criteria pollutants are summarized for the Alaska network in Table 3-2. No monitoring is required for lead anywhere in the Alaskan CBSAs. No air quality monitoring sites are currently required for the Ketchikan µSA.

Monitoring in the Juneau µSA focuses on particulate matter monitoring. One monitoring site is required for PM_{10} based on the PM_{10} Limited Maintenance Plan. The Mendenhall Valley had been designated as a PM_{10} non-attainment area and has met the standard since 1994. No $PM_{2.5}$ monitoring site is required; however, a continuous $PM_{2.5}$ monitor is used to issue burn curtailments by the local government. A 2025i Partisol is used to satisfy SLAMS monitoring.

CO monitoring is required in the Anchorage and Fairbanks MSAs based on the Limited Maintenance Plans for the MSAs. Both areas had previously been designated as being in non-attainment and have been able to lower their concentrations over time. Neither MSA has had a violation of the CO standard since 2001.

PM10 monitoring in the Anchorage MSA meets and exceeds the requirement for number of sites. There are four sites: Parkgate and Laurel (required), as well as two extra sites, Garden and PMC.

Based on a 2021 design value (DV) of 28 $\mu g/m^3$, no $PM_{2.5}$ monitoring sites are required for the Anchorage MSA. Currently, the two sites in the Anchorage MSA $PM_{2.5}$ monitoring network exceed the minimum requirements. The minimum requirement for $PM_{2.5}$ monitoring in the Fairbanks MSA is one monitoring site. The Fairbanks $PM_{2.5}$ monitor requirement is based on the elevated concentrations measured in Fairbanks and North Pole. The DEC's Fairbanks $PM_{2.5}$ monitoring network exceeds this requirement because of its status as a serious nonattainment area.

Table 3-2: Minimum Monitoring Requirements for Alaskan CBSAs

Criteria Pollutant		SLAMS site requirement			
Comments		Anchorage MSA	Fairbanks MSA	Juneau µSA	Ketchikan µSA
$PM_{2.5}$	Most recent 3-year design value ≥ 85% of NAAQS	0	1	0	0
	Most recent 3-year design value < 85% of NAAQS	0	0	0	0
PM_{10}	Two monitoring sites based on PM_{10} Limited Maintenance Plans (Juneau and Eagle River).	0-1	0	0	0
Pb	Waiver for source-oriented monitoring - see section 3.1.1	0	0	0	0
CO	Two monitoring sites based on CO Limited Maintenance Plans (Fairbanks and Anchorage); Fairbanks also meets NCore requirement	0	0	0	0
O_3	Most recent 3-year design value ≥ 85% of NAAQS	0	0	0	0
	See EPA O_3 NAAQS waiver[1]	0[1]	0	0	0
SO_2	NCore site requirement	0	0	0	0
NO_2	Requirement based on population numbers. Alaska does not meet the threshold requirement	0	0	0	0

[1] EPA 5-Year Ozone NAAQS Monitoring Requirement Waiver (see or Appendix C, Waiver C-1)

3.1.1 Lead

Alaska does not meet the population thresholds for lead monitoring in any of the communities. DEC currently does not monitor for lead. DEC received a waiver from EPA for source-oriented monitoring as per 40 CFR 58 Appendix D, see 3.5.3 Lead Source Oriented Monitoring.

3.1.2 Appendix D & E Siting Forms

In 2014, EPA Region 10 provided network evaluation forms to determine compliance with design and minimum monitoring requirements for each of the criteria pollutants under 40 CFR 58 Appendix D. These evaluation forms were reviewed and updated, when necessary, in 2024 by DEC and are presented in **Appendix D.**

In 2014, EPA Region 10 provided siting evaluation forms to determine compliance with siting requirements for each of the criteria pollutants under 40 CFR 58 Appendix E. These site evaluation forms were reviewed and updated, when necessary, in 2024 by DEC and are summarized by MSA in **Appendix E.**

3.2 Current Monitoring Sites

DEC operates and maintains several ambient air monitoring networks throughout Alaska. Table 3-3 provides the site name, address, geographic coordinates, and identification number for all the air monitoring sites for which data are submitted to the EPA AQS database as of May 2024. NCore parameters measured are PM_{10}, $PM_{2.5}$, $PM_{10-2.5}$, CO, O_3, SO_2, NOy, NO, $PM_{2.5}$ chemical speciation, and meteorological parameters. There are four sites that are collocated: Garden ($PM_{2.5}$ and PM_{10}), Hurst Rd. ($PM_{2.5}$), NCore (PM_{10}), and A St. ($PM_{2.5}$), which are described further in Table 3-15. All the primary and secondary monitors are located within one to four meters of each other.

Table 3-3: AQS Monitoring Sites as of May 2024

Site Name	Address	Latitude/Longitude[1]	AQS ID	Agency
Garden	3000 East 16th Ave. Anchorage, AK	61.205861 N 149.824602 W	02-020-0018	DEC
Laurel	4335 Laurel St. Anchorage, AK	61.181117 N 149.834003 W	02-020-0045	DEC
Parkgate	11723 Old Glenn Hwy. Eagle River, AK	61.326700 N 149.569707 W	02-020-1004	DEC
NCore	907 Terminal St.[3] Fairbanks, AK	64.845307 N 147.72552 W	02-090-0034	DEC
Hurst Road[2]	3288 Hurst Rd. North Pole, AK	64.762973 N 147.310297 W	02-090-0035	DEC
A Street	397 Hamilton Ave Fairbanks, AK	64.84593 N 147.69327 W	02-090-0040	DEC
Plant Material Center	5310 Bodenburg Spur Rd. Palmer, AK	61.522780 N 149.083714 W	02-170-0010	DEC
Floyd Dryden Middle School	3800 Mendenhall Loop Road Juneau, AK	58.388889 N 134.565556 W	02-110-0004	DEC

[1] Coordinates for latitude and longitude are consistent with the World Geodetic System (WGS 84).
[2] Hurst Road is the new name for the North Pole Fire Station #3 site. It was changed in 2018 at Fairbanks North Star Borough's request.
[3] NCore's address has been updated, but the location has not changed.

3.3 SITING CRITERIA

In 2014, EPA Region 10 provided site evaluation forms to determine compliance with 40 CFR 58 Appendix E requirements for monitoring path and siting criteria. These forms were distributed to the individual site operators for completion. Summaries of the site evaluation forms are presented in three tables – PM, CO and all other gaseous pollutants – in **Appendix E** of this report. Monitoring site photos and location maps can be found at: http://dec.alaska.gov/air/air-monitoring/monitoring-site-information/. The operation of each monitor complies with the requirements identified in 40 CFR 58 Appendix A. Moreover, all SPM sites are operated like SLAMS and therefore meet these requirements.

3.3.1 CARBON MONOXIDE SITES

CO inlet probes should be at least 1 meter away, both vertically and horizontally, from any supporting structure or wall. For micro-scale sites the probe height must be between 2.5 and 3.5 meters, whereas for other scale sites the probe must be between 3 and 15 meters high.

A probe must have unrestricted airflow for at least 270 degrees, or 180 degrees if it is located on the side of a building. Obstructions must be a minimum distance away equal to twice the distance by which the height of the obstruction exceeds the height of the probe. Trees should not be present between the dominant CO source or roadway and the inlet probe. Table 3-4 lists the CO monitoring sites in Anchorage and Fairbanks.

Table 3-4: CO Monitoring Sites in Anchorage and Fairbanks as of May 2024

Site Name	Monitoring Scale	Probe Distance from Wall (meters)	Height (meters)	Unrestricted Air Flow	Spacing from Roadway (meters)	Trees
Garden 02-020-0018	Neighborhood	1	3	180 degrees unobstructed	7.6	Yes[1]
NCore 02-090-0034	Neighborhood	Not applicable	3	360 degrees unobstructed	70	10 m

[1] One spruce tree 7.6 m tall and 1.3 m from the building. It is roughly 2.7 m to the northeast of the CO probe

3.3.2 PARTICULATE MATTER (PM_{10} AND $PM_{2.5}$) SITES

For micro-scale sites, particulate matter inlets must be between 2 and 7 meters from ground level. For other siting scales the probe must be between 2 and 15 meters high.

A sampler must have at least 2 meters separation from walls, parapets, penthouses, etc. A sampler must have unrestricted airflow for at least 270 degrees, or 180 degrees for street canyon sites. Obstructions must be a minimum distance away from the sampler with the separation equal to twice the distance by which the height of the obstruction exceeds the height of the sampler inlet.

Micro-scale sampler inlets must be located between 5 and 15 meters from the nearest traffic lane for traffic corridor sites, and between 2 and 10 meters for street canyon sites. The minimum separation distance between the probe and nearest traffic lane for middle, neighborhood, or urban scale sites depends upon the number of vehicles per day (VPD) that use the roadway according to a table in Appendix E of 40 CFR 58. Table 3-5 lists all PM monitoring sites in Alaska and how they fit the siting criteria from Appendix E of 40 CFR 58 (also see **Appendix E**).

Table 3-5: PM Monitoring Sites in Alaska as of May 2024

Site Name AQS Codes	Monitoring Scale PM_{10}	Monitoring Scale $PM_{2.5}$	Height (meters)	Spacing from Obstructions (meters)	Spacing from Roadway (meters)	Traffic (VPD)	Trees within 10 meters?
Garden 02-020-0018	Neighborhood	Neighborhood	11	no obstructions	14	770 Sunrise Dr 1,270 Airport Heights Dr.	no
Laurel 02-020-0045	Microscale	-	6.4	no obstructions	11	29,400 Tudor Rd[4]	no
Parkgate 02-020-1004	Neighborhood	Neighborhood	10.4	no obstructions	44	12,800 Old Glenn Hwy[5]	no
Plant Material Center 02-170-0010	Neighborhood	Neighborhood	4.3	no obstructions	10	5310 Bodenburg Spur Rd	no
A Street 02-090-0040	-	Neighborhood	4.3	no obstructions	5.8[2]	1,510[3] Hamilton Ave 3,700 Farewell Ave	no
NCore 02-090-0034	Neighborhood	Neighborhood	4.5	no obstructions	70	4,700 Phillips Field Rd 830 Driveway St	no
Hurst Road 02-090-0035	-	Neighborhood	4.7	no obstructions	21	3,350 Hurst Rd	no
Floyd Dryden 02-110-0004	Neighborhood	Neighborhood	10	no obstructions	100	15,700 Mio-Mendenhall Loop Road	no

[1] Average annual traffic count 2022 traffic data accessed at: https://alaskatrafficdata.drakewell.com/publicmultinodemap.asp
[2] Site is <10m from adjacent A-Street, a paved, low traffic neighborhood street, remainder of site grass covered
[3] Traffic count is listed for Hamilton Ave and Farewell Ave (ADOTPF Site ID #31280070) to be consistent with prior ANP reporting. However, the streets to the north and south of A-Street, Craig Ave and Eureka Ave respectively, have traffic counts of 90 and 100. See Section 3.5.4.
[4] Tudor Road between Piper St. & Thorne Pl.
[5] Old Glenn Hwy between Easy St. & Hanson Dr.

3.3.3 NCore Site

The NCore site pollutant monitors listed in Table 3-6 are representative at a neighborhood scale. Meteorological monitoring is representative at a neighborhood scale. Table 3-6 also lists additional relevant siting information.

Table 3-6: NCore Gaseous[1] Monitoring and Meteorological Monitoring as of May 2024 in Alaska

Parameter Name	Monitoring Scale	Height (meters)	Spacing from Obstructions (meters)	Spacing from Roadway (meters)	Traffic (VPD)	Trees < 10 m?
NOy, NO & DIF	Neighborhood	3[2]	no obstructions	70	4700[3]	None
O_3	Neighborhood	3	no obstructions	70	4700	None
SO_2 (1 hr & 5 min)	Neighborhood	3	no obstructions	70	4700	None
T_{amb}, WS, & WD	Neighborhood	3	no obstructions	70	4700	None
T_{amb}, WS, & WD	Neighborhood	10	no obstructions	70	4700	None
Relative Humidity	Neighborhood	3	no obstructions	70	4700	None

[1] Excluding CO. For CO see Table 3-4.
[2] Probe height is 3 meters rather than the 10 meters recommended to remain below the unusually low winter inversion layer.
[3] 2022 Philips Field Rd traffic data accessed at: https://alaskatrafficdata.drakewell.com/publicmultinodemap.asp

3.4 Monitoring Methods, Designation, and Sampling Frequency

Tables 3-7 to Table 3-15 present information for current sites (and monitors) used in coding the data submitted by DEC to the AQS database. The information provided in Tables 3-7 to 3-15 for each monitoring site includes pollutant parameter name, monitor designation, the AQS parameter codes and parameter occurrence codes (POC), the AQS method code, the frequency of sampling, and the instrumentation used. The monitor designation states the purpose for which the data are to be used, such as: for SLAMS to demonstrate NAAQS compliance, SPM for general air quality assessments, and the CSN for atmospheric chemistry assessments. AQS parameter, method and unit codes are specific to the pollutant, instrumentation, and sampling equipment used, and how the concentration units are expressed in either local conditions or corrected to standard conditions for temperature and pressure. The 5-digit parameter code identifies the parameter being measured e.g. PM_{10}, SO_2, or wind speed. The 1-digit POC code is the parameter occurrence code. As suggested by EPA Region 10, DEC uses the POC to indicate whether the sampler or instrument is (1) a primary data source, or (2) a secondary data source such as a collocated sampler, or (3) that an instrument is measuring on a continuous basis. However, the NCore site is coded differently, with the secondary PM_{10} sampler assigned a POC 1 designation since it is part of a *coarse pair*. The AQS method code provides information specific to the analytical technique used for the pollutant determination such as instrumental analysis using chemiluminescence for nitric oxide or

gravimetric analysis for particulate. The notation presented in the sample frequency indicates how often the pollutant concentration is determined. For example, "1/6" indicates that one sample is collected every sixth day according to the national EPA air monitoring schedule. Continuous indicates that an instrument is continuously analyzing a sample stream providing a pollutant concentration on a real-time basis (e.g. 1-min SO_2 reading) or a near-real time basis (e.g. 1-hour $PM_{2.5}$ reading from a BAM). The equipment information column identifies on-site equipment (either a sampler or instrument) specific to the AQS parameter code.

Other monitoring sites operated by DEC to gather data related to rural road dust and wildland fires, but that are not submitted to the AQS database are discussed in **Appendix F**. The Interagency Monitoring of Protected Environments (IMPROVE) monitoring sites operated in Alaska under the federal program to characterize and protect scenic visibility around National Parks and designated wilderness areas are described in **Appendix G**.

A summary of pollutant concentration data calculated as NAAQS design values, maxima, or as averages are presented in **Appendix A**.

Table 3-7: Anchorage MSA: AQS Codes May 2024

Site Name/ Location/ AQS ID	Pollutant Parameter	Monitor Designation	Monitor Starting Date	AQS Parameter/ Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
Garden/ Anchorage 02-020-0018	PM_{10STD}/ PM_{10LC}	SLAMS	1/1/2009 STD 1/1/2015 LC	81102-3/ 85101-3	122	Continuous	Met One BAM 1020 - FEM
	PM_{10STD}/ PM_{10LC}	SLAMS	2/24/2022	81102-2/ 85101-2	126	1/6	Thermo Scientific Partisol 2000i - FRM
	$PM_{2.5LC}$	SLAMS	1/1/2009	88101-3	170	Continuous	Met One BAM 1020 (VSCC) FEM
	$PM_{2.5LC}$	SLAMS	2/22/2022	88101-2	143	1/6	Thermo Scientific Partisol 2000i (VSCC) - FRM
	CO	SLAMS	1/1/1979	42101-1	554	Continuous	Thermo Scientific Model 48i-TLE - FRM
Laurel/ Anchorage 02-020-0045	PM_{10STD}/ PM_{10LC}	SPM	5/28/2015	81102-3/ 85101-3	122	Continuous	Met One BAM 1020 - FEM
Parkgate/ Eagle River 02-020-1004	PM_{10STD}/ PM_{10LC}	SLAMS	1/1/2009 STD 1/1/2015 LC	81102-3/ 85101-3	122	Continuous	Met One BAM 1020 - FEM
Plant Material Center/ Matanuska-Susitna Valley 02-170-0010	PM_{10STD}/ PM_{10LC}	SLAMS	10/26/2023	81102-3/ 85101-3	122	Continuous	Met One BAM 1020 - FEM
	$PM_{2.5LC}$	SLAMS	10/26/23	88101-3	170	Continuous	Met One BAM 1020 (VSCC) - FEM

STD = standard conditions of temperature and pressure; LC = local (actual) conditions of temperature and pressure

Table 3-8: FNSB Monitors: AQS Codes as of May 2024

Site Name/Location	Pollutant Parameter	Monitor Designation	AQS Monitor Starting Date	AQS Parameter - Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
NCore/ Fairbanks 02-090-0034	PM_{10STD}/ PM_{10LC}	NCORE	2/15/2011	81102-3/ 85101-3	122	Continuous	Met One BAM 1020 FEM
	$PM_{2.5LC}$	SPM	2/15/2011	88501-3 88502-3	731	Continuous	Met One BAM 1020 (SCC) non-FEM
	PM_{10STD}/ PM_{10LC} collocate	NCORE	11/10/2012	81102-1/ 85101-1	127	1/3	Thermo Scientific Partisol 2025i-FRM[1]
	$PM_{2.5LC}$	NCORE	11/4/2009	88101-1	145	1/1	Thermo Scientific Sequential Partisol 2025i (VSCC)-FRM
	PM_{10LC} - $PM_{2.5LC}$	NCORE	2/15/2011	86101-1	176	1/3	Paired Thermo Scientific Partisol 2025i's
	CO	NCORE	8/1/2011	42101-1	593	Continuous	Teledyne T300U-FRM
	SO_2 (1-hr)/ SO_2 (5-min)	NCORE	8/1/2011/ 8/18/2011	42401-1/ 42401-2	560	Continuous	Thermo Scientific 43iQ-TL-FEM
	NO_Y	NCORE	10/5/2012	42600-1	699	Continuous	Teledyne T-200U-NOy
	NO	NCORE	10/5/2012	42601-2	699	Continuous	Teledyne T-200U-NOy
	NO_Y-NO	NCORE	10/5/2012	42612-1	699	Continuous	Teledyne T-200U-NOy

[1] The NCore sites have a PM Coarse (PM_{10LC} - $PM_{2.5LC}$) measurement requirement. As the $PM_{2.5}$ BAM is non-FEM, DEC is operating $PM_{2.5}$ and PM_{10} 2025i-FRM samplers on a 1/3 schedule to calculate PM Coarse.

Site Name/Location	Pollutant Parameter	Monitor Designation	AQS Monitor Starting Date	AQS Parameter - Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
NCore/ Fairbanks 02-090-0034	O_3	NCORE	8/1/2011	44201-1	047	Continuous	Thermo Scientific 49iQ-TL-FEM
	WD**(V) 10 m	NCORE	4/5/2011	61104-1	068	Continuous	RM Young Ultrasonic Anemometer
	WD (V) 3 m	NCORE	4/5/2011	61104-2	068	Continuous	RM Young Ultrasonic Anemometer
	WS (V) 10 m	NCORE	4/5/2011	61103-1	068	Continuous	RM Young Ultrasonic Anemometer
	WS (V) 3 m	NCORE	4/5/2011	61103-2	068	Continuous	RM Young Ultrasonic Anemometer
	RH	NCORE	11/4/2013	62201-1	061	Continuous	Met One Relative Humidity Sensor
	Ambient Temp 3 m	NCORE	4/1/2011	62101-2	040	Continuous	Met One T-200 RTD Sensor
	Ambient Temp 10 m	NCORE	4/1/2011	62101-1	040	Continuous	Met One T-200 RTD Sensor
	$PM_{2.5LC}$ Speciation	NCORE/CSN	1/1/2015	Multiple[1]	Multiple[1]	1/3	URG 3000N
	$PM_{2.5LC}$ Speciation	NCORE/CSN	1/1/2015	Multiple[1]	Multiple[1]	1/3	Met One Super SASS
	$PM_{2.5LC}$	SLAMS	7/15/2019	88101-1	145	1/1	Thermo Scientific Sequential Partisol 2025i (VSCC)-FRM

Site Name/Location	Pollutant Parameter	Monitor Designation	AQS Monitor Starting Date	AQS Parameter - Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
A Street/ Fairbanks 02-090-0040	$PM_{2.5LC}$	SPM	1/2/2024	88101-3	170	Continuous	Met One BAM 1020 (VSCC) FEM
	Ambient Temp 3 m	SPM	10/1/2019	62101-2	040	Continuous	Met One T-200 RTD Sensor
	Ambient Temp 10 m	SPM	10/1/2019	62101-1	040	Continuous	Met One T-200 RTD Sensor
	WD (V) 3 m	SPM	10/1/2019	61104-2	068	Continuous	RM Young Ultrasonic Anemometer
	WS (V) 3 m	SPM	10/1/2019	61103-2	068	Continuous	RM Young Ultrasonic Anemometer
	WD (V) 10 m	SPM	10/1/2019	61104-1	068	Continuous	RM Young Ultrasonic Anemometer
	WS (V) 10 m	SPM	10/1/2019	61103-1	068	Continuous	RM Young Ultrasonic Anemometer
Hurst Road/ North Pole 02-090-0035	$PM_{2.5LC}$	SLAMS	3/1/2012	88101-1	145	1/1	Thermo Scientific Sequential Partisol 2025i (VSCC)-FRM
	$PM_{2.5LC}$ collocate	SLAMS	7/18/2019	88101-2	145	1/3	Thermo Scientific Sequential Partisol 2025i (VSCC)
	SO_2 (1-hr)/ SO_2 (5-min)	SPM	3/10/2022/ 3/10/2022	42401-1/ 42401-2	560	Continuous	Thermo Scientific 43i TL-FEM
	$PM_{2.5LC}$	SPM	3/1/2012	88501-3 88502-3	731	Continuous	Met One BAM 1020 (SCC) non-FEM

Site Name/Location	Pollutant Parameter	Monitor Designation	AQS Monitor Starting Date	AQS Parameter - Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
Hurst Road/ North Pole 02-090-0035	$PM_{2.5LC}$ Speciation	CSN	8/1/2019	Multiple[1]	Multiple[1]	1/3	URG 3000N
	$PM_{2.5LC}$ Speciation	CSN	8/1/2019	Multiple[1]	Multiple[1]	1/3	Met One Super SASS
	Ambient Temp 23 m	SPM	9/24/2019	62101-3	040	Continuous	Met One T-200 RTD Sensor
	Ambient Temp 10 m	SPM	9/24/2019	62101-1	040	Continuous	Met One T-200 RTD Sensor
	Ambient Temp 3 m	SPM	9/24/2019	62101-2	040	Continuous	Met One T-200 RTD Sensor
	WD[2] (V) 23 m	SPM	9/24/2019	61104-3	068	Continuous	Met One Ultrasonic Anemometer
	WS (V) 23 m	SPM	9/24/2019	61103-3	068	Continuous	Met One Ultrasonic Anemometer
	WD (V) 10 m	SPM	9/24/2019	61104-1	068	Continuous	Met One Ultrasonic Anemometer
	WS (V) 10 m	SPM	9/24/2019	61103-1	068	Continuous	Met One Ultrasonic Anemometer
	WD (V) 3 m	SPM	9/24/2019	61104-2	068	Continuous	Met One Ultrasonic Anemometer
	WS (V) 3 m	SPM	9/24/2019	61103-2	068	Continuous	Met One Ultrasonic Anemometer
Hurst Road/ North Pole 02-090-0035	RH	NCORE	3/29/2024	62201-1	061	Continuous	Met One Relative Humidity Sensor

[1] Multiple AQS codes are used to identify individual chemical species
[2] Meteorological parameters (WS and WD) also measured in scalar

Table 3-9: Juneau µSA: AQS Codes (as of May 2024)

Site Name/Location	Pollutant Parameter	Monitor Designation	Monitor Starting Date	AQS Parameter and Occurrence Code	AQS Method Codes	Sample Frequency	Equipment
Floyd Dryden Middle School/ Juneau 02-110-0004	$PM_{2.5LC}$	SPM	6/23/2021	88502-3	238	Continuous	Teledyne T640X - FEM
	$PM_{2.5LC}$	SPM	2/18/2024	88101-2	145	1/3	Thermo Scientific Partisol 2025i (VSCC) - FRM
	PM_{10STD}/ PM_{10LC}	SPM	6/23/2021	81102-3/ 85101-3	239	Continuous	Teledyne T640X - FEM
	Ambient Temp 3 m	SPM	1/1/2024	62101-2	040	Continuous	Teledyne T640X - FEM
	WD (V) 3 m	SPM	1/1/2022	61104-1	065	Continuous	RM Young Ultrasonic Anemometer
	WS (V) 3 m	SPM	1/1/2022	61103-1	065	Continuous	RM Young Ultrasonic Anemometer

[1] Multiple AQS codes are used to identify individual chemical species.
[2] Meteorological parameters (WS and WD) also measured in scalar.

Table 3-10: May 2024 Site Level Monitoring Objectives

Site Name	AQS ID	Pollutant(s)	Monitoring Objectives 40 CFR Part 58 App D 1.1.1
Garden	02-020-0018	$PM_{10}/PM_{2.5}$/CO	(b) Typical concentrations (population density based) (d) General background concentration levels
Laurel	02-020-0045	PM_{10}	(a) Highest concentrations expected in area (c) Impact of significant sources/source categories
Parkgate	02-020-1004	PM_{10}	(b) Typical concentrations (population density based) (d) General background concentration levels
NCore	02-090-0034	$PM_{10}/PM_{2.5}/PM_{10\text{-}2.5}$/CO/ SO_2/O_3/ NO/NOy/Speciation	(b) Typical concentrations (population density based) (d) General background concentration levels
Hurst Road	02-090-0035	$PM_{2.5}$/ SO_2/Speciation	(a) Highest concentrations expected in area (c) Impact of significant sources/source categories
A Street	02-090-0040	$PM_{2.5}$	(a) Highest concentrations expected in area (c) Impact of significant sources/source categories
Plant Material Center	02-170-0010	$PM_{10}/PM_{2.5}$	(a) Highest concentrations expected in area (c) Impact of significant sources/source categories
Floyd Dryden Middle School	02-110-0004	$PM_{10}/PM_{2.5}$	(b) Typical concentrations (population density based) (d) General background concentration levels

Table 3-11: 2024 Anchorage MSA Instrument-Level Monitoring Purposes and AQS Monitoring Objective

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
Garden/ Anchorage 02-020-0018	PM_{10STD}/PM_{10LC}	81102-3/85101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
	PM_{10STD}/ PM_{10LC} collocated	81102-2/85101-2	Population exposure	-Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
	$PM_{2.5LC}$ collocated	88101-2	Population exposure	-Determine ambient air quality standard compliance
	CO	42101-1	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
Laurel/ Anchorage 02-020-0045	PM_{10STD}/PM_{10LC}	81102-3/85101-3	Source Oriented Highest Concentration	-Provide timely air pollution information -Determine ambient air quality standard compliance
Parkgate/ Eagle River 02-020-1004	PM_{10STD}/PM_{10LC}	81102-3/85101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
Plant Material Center/ Mat-Su Valley 02-170-0010	PM_{10STD}/PM_{10LC}	81102-3/85101-3	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88101-3	Population exposure Highest Concentration	-Provide timely air pollution information -Determine ambient air quality standard compliance

Table 3-12: 2024 FNSB Instrument-Level Monitoring Purposes and AQS Monitoring Objective

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
NCore/ Fairbanks 02-090-0034	PM_{10STD}/ PM_{10LC}	81102-3/ 85101-3	Population exposure	-Provide timely air pollution information - Determine ambient air quality standard compliance -Support air pollution research studies
	$PM_{2.5LC}$	88501-3/88502-3	Population exposure	-Provide timely air pollution information -Support air pollution research studies
	$PM_{2.5LC}$	88101-1	Population exposure	-Determine ambient air quality standard compliance -Support air pollution research studies
	PM_{10LC} - $PM_{2.5LC}$	86101-1	Population exposure	-Determine ambient air quality standard compliance -Support air pollution research studies
	CO	42101-1	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies
	SO_2 (1-hr)	42401-1	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies
	SO_2 (5-min)	42401-2	Population exposure	-Determine ambient air quality standard compliance -Support air pollution research studies
	NO_Y	42600-1	Population exposure	-Support air pollution research studies

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
NCore/ Fairbanks 02-090-0034	NO	42601-2	Population exposure	-Support air pollution research studies
	NO_Y-NO	42612-1	Population exposure	-Support air pollution research studies
	O_3	44201-1	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies
	WD	61104-1	Population exposure	-Provide timely air pollution information -Support air pollution research studies
	WS	61103-1	Population exposure	-Provide timely air pollution information -Support air pollution research studies
	BP	64101-1	Population exposure	-Provide timely air pollution information. -Support air pollution research studies
	RH	62201-1	Population exposure	-Provide timely air pollution information. -Support air pollution research studies
	Ambient Temp 3 m	62101-2	Population exposure	-Provide timely air pollution information. -Support air pollution research studies

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
NCore/ Fairbanks 02-090-0034	Ambient Temp 10 m	62101-1	Population exposure	-Provide timely air pollution information. -Support air pollution research studies
	$PM_{2.5LC}$ Speciation	Multiple*	Population exposure	-Support air pollution research studies -part of CSN
	$PM_{2.5LC}$	88101-1	Population exposure	-Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88501-3/88502-3	Population exposure	-Provide timely air pollution information
A Street/ Fairbanks 02-090-0040	$PM_{2.5LC}$	88101-1	Population exposure Highest Concentration	-Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88101-3	Population exposure	-Provide timely air pollution information
	Ambient Temp 3 & 10 m	62101-2,1	Population exposure	-Provide timely air pollution information
	WD 3 & 10 m	61104-2,1	Population exposure	-Provide timely air pollution information
	WS 3 & 10 m	61103-2,1	Population exposure	-Provide timely air pollution information
Hurst/ North Pole 02-090-0035	$PM_{2.5LC}$	88101-1	Population exposure Highest Concentration	-Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88501-3/88502-3	Population exposure	-Provide timely air pollution information

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
Hurst/ North Pole 02-090-0035	$PM_{2.5LC}$ collocated	88101-2	Population exposure	-Determine ambient air quality standard compliance
	$PM_{2.5LC}$ Speciation	Multiple*	Population exposure	-Support air pollution research studies -part of CSN
	SO_2 (1-hr)	42401-1	Population exposure	-Provide timely air pollution information -Determine ambient air quality standard compliance -Support air pollution research studies
	SO_2 (5-min)	42401-2	Population exposure	-Determine ambient air quality standard compliance -Support air pollution research studies
	Ambient Temp 3, 10, & 23 m	62101-2,1,3	Population exposure	-Provide timely air pollution information
	WD 3, 10, & 23 m	61104-2,1,3	Population exposure	-Provide timely air pollution information
	WS 3, 10, & 23 m	61103-2,1,3	Population exposure	-Provide timely air pollution information

Table 3-13: 2024 Juneau Instrument-Level Monitoring Purposes and AQS Monitoring Objective

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Monitoring Objective	Monitoring Purpose(s)
Floyd Dryden Middle School/ Juneau 02-110-0004	PM_{10STD}/ PM_{10LC}	81102-3/ 85101-3	Population exposure	-Provide timely air pollution information - Determine ambient air quality standard compliance -Support air pollution research studies
	$PM_{2.5LC}$	88101-1	Population exposure	-Determine ambient air quality standard compliance
	$PM_{2.5LC}$	88502-3	Population exposure	-Provide timely air pollution information

Table 3-14: Monitors required by Nonattainment Area (NAA) or Limited Maintenance Plan (LMP)

MSA or µMSA	Site Name/ Location/	AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	Required by NAA or LMP?
Fairbanks MSA	Hurst Road/North Pole	02-090-0035	$PM_{2.5LC}$	88101-1	Fairbanks $PM_{2.5}$ NAA
	NCore/Fairbanks	02-090-0034	CO	42101-1	Fairbanks CO LMP
Anchorage MSA	Garden/Anchorage	02-020-0018	CO	42101-1	Anchorage CO LMP
	Parkgate/Eagle River	02-020-1004	PM_{10STD}	81102-3	Eagle River PM_{10} LMP
Juneau µMSA	Floyd Dryden Middle School/Juneau	02-110-0004	PM_{10STD}	81102-3	Juneau PM_{10} LMP

Table 3-15: 2024 Collocations

Site Name/ Location/ AQS ID	Pollutant Parameter	AQS Parameter/ Occurrence Code	AQS Method Code	Equipment	Primary or Secondary
Garden/ Anchorage 02-020-0018	$PM_{2.5LC}$	88101-3	170	Met-One BAM 1020	Primary
	$PM_{2.5LC}$ collocate	88101-2	143	Thermo Scientific Partisol 2000i	Secondary
	PM_{10STD}	81102-3/ 85101-3	122	Met-One BAM 1020	Primary
	PM_{10STD} collocate	81102-2/ 85101-2	126	Thermo Scientific Partisol 2000i	Secondary
Hurst Road/ North Pole 02-090-0035	$PM_{2.5LC}$	88101-1	145	Thermo Scientific Partisol 2025i	Primary
	$PM_{2.5LC}$ collocate	88101-2	145	Thermo Scientific Partisol 2025i	Secondary
A Street/ Fairbanks 02-090-0040	$PM_{2.5LC}$	88101-1	145	Thermo Scientific Partisol 2025i	Primary
	$PM_{2.5LC}$ collocate	88101-3	170	Met-One BAM 1020	Secondary
NCore/ Fairbanks 02-090-0034	PM_{10STD}	81102-3/ 85101-3	122	Met-One BAM 1020	Primary
	PM_{10STD} collocate	81102-1/ 85101-1	127	Thermo Scientific Partisol 2025i	Secondary

3.5 MONITORING WAIVERS

3.5.1 ANCHORAGE MSA OZONE MONITORING

On October 15th, 2018, EPA waived the ozone monitoring requirements for the Anchorage MSA. The population of the MSA triggered a monitoring requirement, but previous ozone measurements in several areas of the MSA showed ozone concentrations well below 80% of the NAAQS. This waiver was valid through 2023. It can be found in **Appendix C** (Waiver C-1).

On October 30th, 2023, the EPA approved a 5-year waiver extension that is valid through October 2028 pursuant to 40 C.F.R. Part 58, Appendix D, Section 4.1(b). The EPA concurred with the DEC's assessment that ozone levels within the MSA remain well below 80% of the NAAQS and there is a low likelihood of exceedances. The waiver extension approval can be found in the *2023 Alaska ANP Approval Letter* in **Appendix C** (Waiver C-2). The waiver can also be found online on the DEC's website (Air Monitoring Network Plans (alaska.gov)).

3.5.2 LEAD SOURCE ORIENTED MONITORING

To meet source-oriented lead monitoring requirements and after consultation with EPA, DEC decided to pursue a modeling demonstration to show that lead concentrations at the ambient boundary of the Red Dog Mine meet the new lead standard. On August 11, 2016, EPA approved the State of Alaska's first waiver request for lead monitoring at the Red Dog Mine based on the results of dispersion modeling. The results of the modeling showed that the maximum ambient air 3-month rolling average lead concentration at the mine boundary did not exceed 50 percent of the lead NAAQS. Pursuant to 40 CFR Part 58 Appendix D, section 4.5(a)(ii), this waiver must be renewed every 5 years as part of the Alaska 5-year Air Monitoring Network Assessment. DEC submitted an updated waiver request to EPA on June 12, 2020. The waiver request included a new modeling analysis performed by Teck Alaska Inc., the operator of the Red Dog Mine, which was reviewed and approved by DEC. EPA approved the waiver request on December 7, 2021. The EPA approval letter can be found in **Appendix C** (Waiver C-3). The letter can also be found on the DEC's website[8].

3.5.3 A-STREET SITING WAIVER REQUEST

The A-Street SLAMS station is sited in a neighborhood community on the east side of Fairbanks. Selected primarily due to its proximity to a residential neighborhood with a moderate level of solid fuel home heating and its identity as a $PM_{2.5}$ hotspot, the location allows for a suitable Fairbanks Air Quality Zone maximum impact site. The added benefit of a location on school district property allows for long-term site stability and protection of a sensitive population. With the objective of placing the monitoring station as close as possible to the residential area, and not negatively impacting schoolyard activities, the site was placed at less

than the 15-meter recommended siting distance from the A-Street roadway (3 meters to the edge of the sidewalk and start of the paved roadway shoulder.)

As this site is primarily concerned with quantifying the impacts of emissions from solid fuel burning within the community, PM from the nearby roadway is not expected to have significant impact as traffic at the site is minimal. Traffic values for A-Street are not currently available, but Alaska Department of Transportation traffic data[7] is available for the streets to the north and south of the station (see Figure 1)and indicate daily traffic counts of 100 or less. The direct PM impacts from the adjacent paved roadway are minimal when considering siting criteria as opposed to area wide impacts. Additionally, this data was collected prior to the post COVID-19 permanent closure of the school, and traffic is likely to have decreased on surrounding streets.

On October 30th, 2023, the EPA approved a waiver for the proximity to roadway siting criteria. Pursuant to 40 C.F.R. Part 58 Appendix E, Figure E-1, PM samplers must generally be located more than 15 meters away from roadways. The EPA stated that the site is sufficiently representative of the monitoring area for the purposes of the intended data collection activities. The waiver can be found in the *2023 Alaska ANP Approval Letter* in **Appendix C** (Waiver C-2).

4 Network Modifications Completed in 2024

4.1.1 Plant Materials Center Site

Due to a siting conflict with nearby property owners, DEC performed a study and analysis to identify a representative monitoring site to replace the Butte Harrison Court site elsewhere in the in the nearby community. DEC received EPA approval in the 2023 Annual Network Plan to relocate the Harrison Ct Monitoring site to the Plant Material Center location for permanent ambient monitoring. The site was established and started collection data in late October 2023. The new Plant Material Center (PMC) site is located at 5310 Bodenburg Spur Rd, Palmer AK 99645. The new site has been established in AQS with the site ID 02-170-0010.

The PMC is a 270-acre plot of land operated by the Alaska Department of Natural Resource's Division of Agriculture and is located approximately 1.8 miles to the southwest of the current S. Harrison Ct. site. The new location will be situated on a grassy field and greater than 10 meters away from any buildings, 30 meters from the nearest tree, see Figure 3. There are two greenhouses to the north of the site, a seed storage facility to the east, and farmland to the south and west. The site is accessible via an adjacent gravel road that is traveled at low speeds (< 10 mph) by PMC employees only.

[7] https://alaskatrafficdata.drakewell.com/publicmultinodemap.asp
[8] https://dec.alaska.gov/air/air-monitoring/guidance/waivers/

PMC site was established and began operation on October 26th, 2023, and overlapped a short time with the Harrison Court station before its shutdown on December 29th, 2023. PMC became the source of regulatory PM_{10} and $PM_{2.5}$ continuous monitoring for the Mat-Su Borough on January 1st, 2024.

4.1.2 National Core Multipollutant Site

To reduce network complexity and simplify site operations, two Thermo Scientific Partisol 2000i $PM_{2.5}$ and PM_{10} FRM samplers were removed from the site. These samplers were operating on a 1 in 3 day sample schedule to calculate the PM_{10}-$PM_{2.5}$ coarse fraction as is an NCore requirement. The samplers were discontinued and removed from service on December 22nd, 2023. A Thermo Scientific Partisol 2025i configured for PM_{10} was placed into service at that time and its filter data will be compared against the site's existing primary $PM_{2.5}$ FRM Partisol to determine PM_{10}-$PM_{2.5}$. These changes were approved December 19th, 2023, by Region 10 EPA in response letter[8] to a DEC request letter[9] dated November 22nd, 2023.

4.1.3 Floyd Dryden Monitoring Station

To simplify the station operations and remove an excess monitor from that was previously used to assess instrument performance, the Teledyne T640X was designated as the primary PM_{10} instrument for site monitoring requirements under the Limited Maintenance Plan on January 1, 2024. As a result, the PM_{10} FRM Partisol was removed from the site as a redundant monitor. Inherent bias of the $PM_{2.5}$ T640X measurements and desire not to perform a data alignment led DEC to designate the instrument for use as a Special Purpose Monitor and retain the data for the purposes providing near real time Air Quality Index (AQI) values to the public and designate the Thermo Scientific Partisol 2000i $PM_{2.5}$ FRM sampler as the primary monitor for the purposes of calculating the annual and 24hr design values. The sampler will continue to run on a 1 in 3 day EPA schedule. On February 18th, 2024, this sampler was replaced by a Thermo Scientific 2025i FRM sampler, on the same schedule, to reduce the necessary manual sample change interval. These changes were approved by the Environmental Protection Agency (EPA) Region 10 in the 2023 Annual Monitoring Network Plan (ANP) approval letter[10]. See 4.1.1 Floyd Dryden Site. An EPA Region 10 letter[11] dated December 19th, 2023, approves the swap of the 2000i FRM sampler with a 2025i FRM sampler.

4.1.4 A - Street

To aid future SIP and annual NAAQS revision efforts, the continuous BAM-1020 $PM_{2.5}$ instrument was converted from non-Federal Equivalent Method (non-FEM) to Federal

[8] https://dec.alaska.gov/media/mreht3q3/adec_networkmodreq_jan2024_final.pdf

[9] https://dec.alaska.gov/media/r2ajchqc/adec_network_modifications_1_2024.pdf

[10] https://dec.alaska.gov/media/5dvdobgk/2023-adec-anp-final-letter-10302023.pdf

[11] https://dec.alaska.gov/media/mreht3q3/adec_networkmodreq_jan2024_final.pdf

Equivalent Method (FEM) beginning on January 2nd, 2024. This was accomplished by exchanging a Sharp Cut Cyclone (SCC) for a Very Sharp Cut Cyclone (VSCC) as required for FEM status. The A-Street Monitoring shelter is scheduled for replacement in 3rd Quarter 2024. The replacement may affect data capture of the FRM instrument during the installation of the shelter and monitors, and to combat this, DEC intends to run the FEM monitor in a small temporary standalone monitoring shelter. The new permanent shelter will have better climate control and serve as a better base for long term monitoring efforts as the Fairbanks maximum impact site. This change was approved in the 2023 Annual Network Plan letter[10].

4.1.5 HURST ROAD

DEC operates a trace level Sulfur Dioxide (SO_2) Special Purpose Monitor (SPM) at the site to better understand the Sulfur/Sulfate ratio, arctic photochemistry, and effects of the transition from biomass fuel sources to home heating oil. To ensure instrument reliability and data capture objectives, DEC is replacing an aged continuous Thermo Scientific 43i SO_2 trace level analyzer (Method Code 560) with a like model Teledyne T100U SO_2 trace level analyzer (Method Code 100). This change is tentatively scheduled to occur early 3rd quarter of 2024.

4.4 SLAMS SAMPLING SITE IMPROVEMENTS FUNDED BY THE AMERICAN RESCUE PLAN DIRECT GRANT AWARD

The American Rescue Plan (ARP) provides funding for EPA to address health outcome disparities from pollution and the COVID-19 pandemic, including $50 million for activities authorized under the Clean Air Act. DEC's American Rescue Plan Direct Awards will fund the following monitoring site improvements for the DEC SLAMS network. The status is indicated in ***bold italics***.

- Replace aging Chemical Speciation Network samplers at the NCore site, specifically the Met One Super SASS and URG 3000n. ***The URG instrument was delivered, and the SASS is expected prior to July 2023. Both will be installed in the summer of 2023.***
- Upgrade the heating and ventilation air conditioning system (HVAC) for the A-Street site particulate matter sampling shelter. ***Staff are still requesting quotes.***
- Purchase a replacement particulate matter sampling shelter for the new Butte sampling site. ***The new shelter was installed in fall of 2023. The new PMC SLAMS site is fully functional and reporting data since January 1, 2024***.
- Purchase a replacement particulate matter sampling shelter for the Teledyne T640X sampler at the Juneau Mendenhall Valley sampling site. ***The shelter was purchased and replaced in February 2024.***
- Purchase a Primary Flow Standard for mass flow controller (MFC) calibrations. ***Instrument was delivered and staff is working on creating a SOP.***

While these site improvements will allow for more stable site operations and improve data quality and completeness, none of these items are adding monitoring sites or samplers or will result in changes to the data in AQS. The grant was closed out in Spring 2024.

5 PLANNED NETWORK MODIFICATIONS FOR 2025

5.1 REGULATORY MONITORING STATIONS

5.1.1 GARDEN MONITORING STATION

Carbon Monoxide (CO) levels have dropped precipitously over the past twenty years, with no exceedances of the standard. For the past three calendar years, the 8-hour maximum values have been below 30% of the National Ambient Air Quality Standard (NAAQS) and have not been higher than 41% in the last 10 years. As such, DEC will seek a State Implementation Plan (SIP) modification for the end of the second 10-year Limited Maintenance Plan period. DEC proposes to discontinue CO monitoring in the Anchorage area at the end of the 2024/2025 CO winter monitoring season (by March 31st, 2025). If the SIP modification is not approved, DEC will begin CO monitoring again at the beginning the winter CO season in October 2025.

5.1.2 NATIONAL CORE MULTIPOLLUTANT STATION (NCORE)

As airshed maximum $PM_{2.5}$ concentrations have fallen and continuous $PM_{2.5}$ technology has improved, DEC has observed a reduced bias compared to that previously observed during elevated biomass particulate events between the *near*-Federal Equivalent Method (FEM) Met One BAM 1020 instruments and the Federal Reference Method (FRM) particulate samplers. This improved performance, and data from the prior winter's operation of the A-Street BAM 1020 as an FEM, encourages DEC that the NCore station will operate accurately as a FEM. DEC intends to convert the site $PM_{2.5}$ BAM to FEM by replacing the Sharp Cut Cyclone (SCC) with a Very Sharp Cut Cyclone (VSCC) on January 1, 2025. Additionally, In November of 2023, DEC requested that EPA Region 10 approve a reduction in sampling frequency of the FRM at the site. This facilitated discussions with EPA, and all parties agreed to postpone a change in sampling frequency until January of 2025 to ensure sufficient data capture for the State Implementation Plan efforts and upcoming Annual $PM_{2.5}$ Standard. DEC will reduce $PM_{2.5}$ FRM monitoring sample frequency from 1 in 1 day sample schedule to a 1 in 3 day sampling schedule on January 1, 2025. The FRM will continue to be the primary monitor at the station.

5.2 LOW-COST SENSOR NETWORK

While the current long term monitoring network meets the regulatory requirement in terms of number of monitoring stations and monitored pollutants, it is confined to the population centers and does not adequately characterize conditions in outlying and rural communities.
Advances in sampling technology allowed for the development and commercial sale of smaller, portable, and cheaper sensors. This new low-cost sensor technology provides DEC the

opportunity to expand monitoring into areas across the state that previously were cost prohibitive.

After state funds were made available in 2019 to purchase sampling equipment for use in port communities, DEC conducted a search for multi-pollutant sampling pods and finally purchased eight AQMesh sensor pods. These pods were designated for use in Southeast and Southcentral Alaska port communities. Late in 2020, DEC was able to use carry-over grant funding to purchase ten additional sensor pods, for a total of 18 sensors. Due to sensor performance issues DEC conducted a sensor comparison study during the 2022/23 winter at the NCore sites to evaluate multiple sensor pods from different manufacturers. DEC selected the QuantAQ Modulair™ sensor pods for new sensor locations and to replace all 18 AQMesh™ sensors. DEC is using a combination of various state funds and grants from EPA (American Rescue Plan (ARP) direct grant, ARP competitive grant, and EPA 103 and 105 grants) to expand the community sensor network. Currently DEC has 55 Quant AQ Modulair sensor pods.

The Modulair sensor pods will collect baseline air quality data, including PM, O_3, NO, NO_2 and CO. The communities these sensors are deployed in include:
Napaskiak, Tok, Fairbanks (2 sites: Badger Rd, Goldstream Valley), Galena, Delta Junction, Ketchikan, Haines, Wrangell, Hoonah, Skagway, Sitka, Juneau (2 sites: 5th St and Museum), Homer, Seward, Soldotna, Ninilchik, Kotzebue and Nome, along with six (6) Quality Assurance (QA) sensor pods collocated at the Fairbanks NCore (3), Anchorage Garden (2) and The Juneau Floyd Dryden regulatory monitoring sites.
The following communities have been identified for potential deployment in summer of 2024: Bethel, Denali Park, Kodiak Palmer/Chickaloon, Sterling, Talkeetna, Big Lake/Houston, Wainwright, Willow, Utqiagvik, Cordova, Nenana, Copper Center, Yakutat, Valdez, Aniak, Arctic Village.

Since developing the initial plan for the community network, DEC discovered that the cell network in some Alaskan communities is not compatible with the sensors communication system of the main sensor pod manufacturers. While the manufacturers of the sensors DEC purchased claim that their sensors work on all cell networks within the State of Alaska, DEC discovered that the SIM cards do not work in areas that are solely serviced by the Alaskan telecommunication company GCI. Of the major cell phone network companies that are available in Alaska, AT&T and T-Mobile are currently the only compatible networks for any sensor pod. Alaska's primary cell networks are GCI, AT&T and Verizon, with limited T-Mobile. Additionally, publicly available cell coverage maps are not completely accurate and require ground-truthing. Before offering to place a sensor in a community, DEC now needs to first test the cell network to determine if a sensor can connect to the internet. QuantAQ has provided DEC with a test kit for testing connectivity and signal strength. Unfortunately, this slows down sensor deployment, as DEC now first needs to send out the test kit and wait for the results before scheduling a sensor deployment.

Appendix A
NAAQS Summary Tables

Table A-1: PM2.5 DV Under Local/Actual Conditions (µg/m^3)

$PM_{2.5}$ Monitoring Sites	AQS Site ID	98th Percentile			Weighted Annual Mean			2023 Design Value	
		2023	2022	2021	2023	2022	2021	24-hour	Annual
Garden/ Anchorage	02-020-0018	14.2	24.0	18.7	4.2	4.9	6.0	19	5.1
Butte/ Matanuska-Susitna Valley	02-170-0008	17.5	21.2	21.2	4.1	4.4 †	4.4	25	5.2
NCore Site/ Fairbanks	02-090-0034	20 (30.7)	27.5 (76.3)	29.1 (27.5)	6.4 (8.4)	6.7 (11.3)	8.0	26 (45)	7.3 (9.2)
Hurst Rd/ North Pole	02-090-0035	51.9 (62.5)	51.2 (72.5)	65.5	9.5 (11.7)	8.3 (12.7)	11.8	56 (67)	9.9 (12.1)
A Street/ Fairbanks	02-090-0040	27.8 (34.4)	48.6*	29.6*	7.0 (8.5)	9.5 (13.9)*	12.0*	n/a (38)*	n/a (11.5)*
Floyd Dryden/ Juneau	02-110-0004	16.8	23.0	17.1	5.3	5.3	4.7	19	5.1

Note: Exceedance exceptional event values not included. Some values in this table have been calculated by DEC to exclude exceptional events. The numbers in the parentheses include these exceptional events.

* Annual values did not meet data completeness criteria. This value is preliminary and subject to the maximum value substitution test as outlined in 40 CFR Part 50 Appendix N. A Street DVs cannot be officially calculated until 2024 monitoring data has been collected and verified.
† Quarters 1-3 (Q1-Q3) for 2022 at the Butte site met the completeness criteria with percent completeness of 96% or greater; however, Butte's Q4 did not meet the 75% criteria with only 61% completeness. Using the maximum value substitution test (PM2.5 24-hour standard: 40 CFR Part 50 Appendix N, §4.2 (c) (i), and PM2.5 annual standard 40 CFR Part 50 Part 50 Appendix N, § 4.1 (c) (ii)), the max value of Q4 (29.6 µg/m^3) for all days with <75% daily data capture, the 24-hr DV is 25 µg/m^3 and the Annual DV is 5.2 µg/m^3.

Table A-2: DV Ozone (O_3) (ppb)

O_3 Monitoring Sites	Site ID	2023			2022			2021			3-Years	
		Valid Days	Percent Complete	4th Max	Valid Days	Percent Complete	4th Max	Valid Days	Percent Complete	4th Max	Percent Complete	Design Value
NCore/ Fairbanks	02-090-0034	350	96	0.050	350	96	0.055	279	76	0.046	89	0.050

Table A-3: DV Sulfur Dioxide (SO_2) (ppb)

SO_2 Monitoring Sites	Site ID	2023		2022		2021		3-yrs Design Value
		99th Percentile	Completed Quarters	99th Percentile	Completed Quarters	99th Percentile	Completed Quarters	
NCore/ Fairbanks	02-090-0034	14.7	4	32.8	4	33.0	4	27
Hurst Rd/ Fairbanks	02-090-0035	5.6	4	8.1*	3	N/A	N/A	7*

* Does not meet data completeness criteria

Table A-4: DV Carbon Monoxide (CO) (ppm)

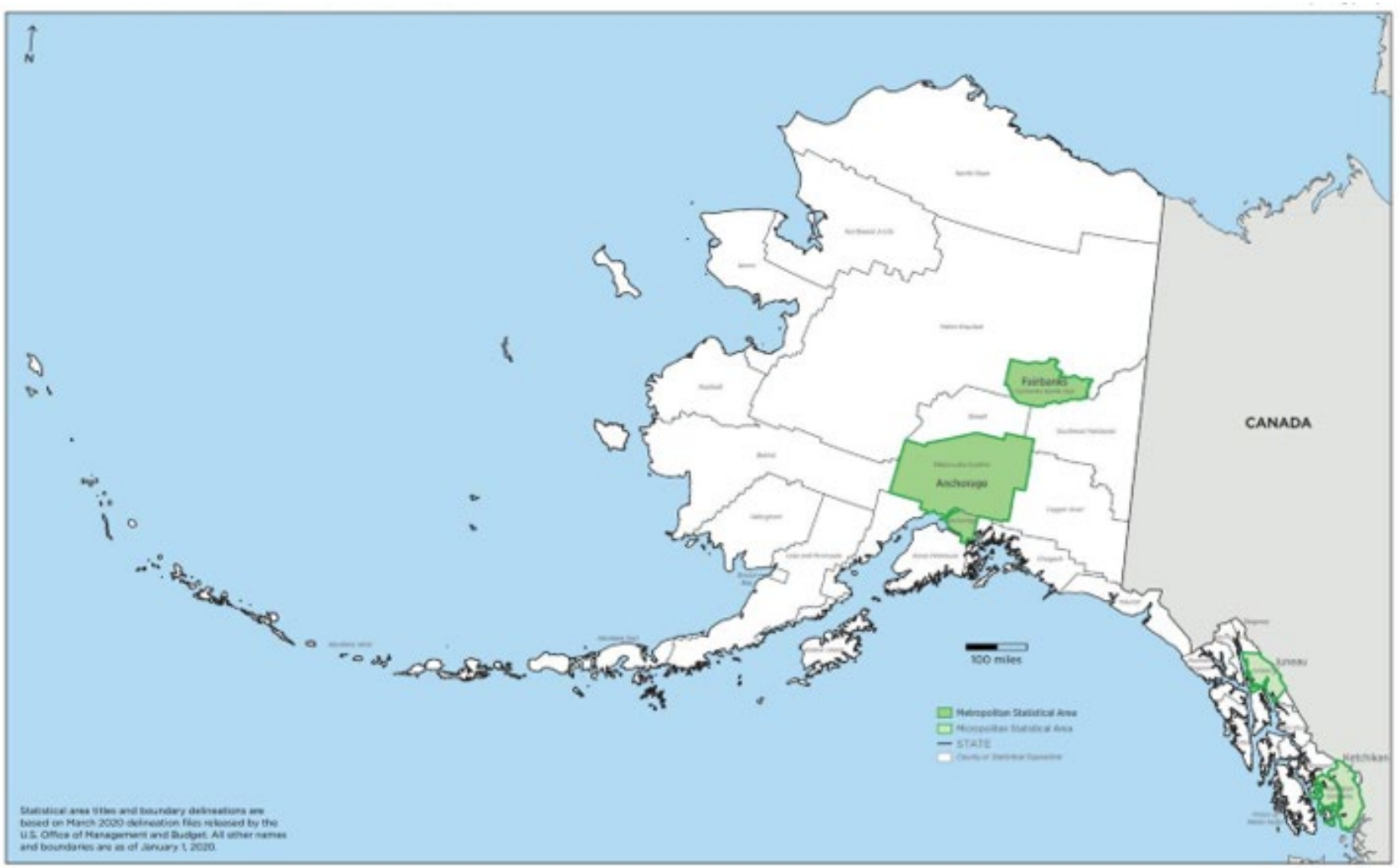
CO Monitoring Sites	Site ID	2023			2022			2021		
		Exceedances	1st Max 8-hr	2nd Max 8-hr	Exceedances	1st Max 8-hr	2nd Max 8-hr	Exceedances	1st Max 8-hr	2nd Max 8-hr
NCore/ Fairbanks	02-090-0034	0	2.3	1.9	0	2.8	2.5	0	1.8	1.5
Garden/ Anchorage	02-020-0018	0	2.6	2.4	0	2.5	2.4	0	2.2	2.2

Table A-5: PM_{10} DV Under Standard Conditions ($\mu g/m^3$)

PM_{10} Monitoring Sites	Site ID	2023			2022			2021		
		Exceedances	1st Max 24-hr	2nd Max 24-hr	Exceedances	1st Max 24-hr	2nd Max 24-hr	Exceedances	1st Max 24-hr	2nd Max 24-hr
Garden/ Anchorage	02-020-0018	0	59	53	0	57	52	0	49	47
Laurel/ Anchorage	02-020-0045	0	95	88	0	103	101	0	108	97
Parkgate/ Anchorage	02-020-1004	0	59	59	0	77	65	0	125	66
NCore/ Fairbanks	02-090-0034	1	170	138	2	243	171	0	70	57
Butte/ Matanuska-Susitna Valley	02-170-0008	0	132	130	0	90	76	0	92	75
Floyd Dryden Middle School/ Juneau	02-110-0004	0	44	36	0	38	38	0	28	25

Appendix B
Map of Alaska's Core Based Statistical Areas (CBSA)

Figure 1. Alaska 2020 Core Based Statistical Areas and Counties



U.S. Census Bureau

Appendix C
Waivers

Waiver C-1: EPA 5-Year Ozone NAAQS Monitoring Requirement Waiver

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101-3140

OFFICE OF
AIR AND WASTE

OCT 15 2018

ADEC AIR QUALITY
RECEIVED
OCT 18 2018
ANCHORAGE

Ms. Barbara Trost
Air Quality Division
Air Monitoring & Quality Assurance Program
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501-2617

Dear Ms. Trost:

In our August 2, 2018 response to your 2017 Annual Monitoring Network Plan, Region 10 indicated approval of a waiver to discontinue ozone monitoring in the Anchorage Metropolitan Statistical Area and stated a formal approval would follow in a separate correspondence. This correspondence is our formal approval for waiving ozone monitoring requirements for the Anchorage MSA for five years (2019 through 2023). For future Annual Monitoring Network Plans, please enclose a copy of this waiver as an appendix to the ANP.

In considering your waiver request, Region 10 examined the available historic monitoring data produced by ADEC for the Anchorage MSA as well as factoring in the resources constraints you have identified. Region 10 examined the data available in AQS and past Annual Network Plans and found that Alaska has monitored in four separate areas in the Anchorage MSA since ozone monitoring commenced in 2010 (Anchorage, Eagle River, Wasilla, and Palmer). There have been no exceedances of the ozone standard. Additionally, we did not observe any concentrations at or above 80 percent of the NAAQS. Given ADEC's resource constraints and a low likelihood of ozone exceedances in the Anchorage MSA, we are supporting your waiver request.

If ADEC would like to continue to not operate an ozone monitor in the Anchorage MSA after 2023, ADEC should resubmit a request for renewal of the waiver. The EPA reserves the right to reinstate ozone monitoring requirements in the MSA sooner than five years should a future need arise (e.g., changes in air quality, monitor regulation changes, or revisions to the NAAQS).

If you have any questions regarding this correspondence, please contact me at (206) 553-2970 or Doug Jager at (206) 553-2961.

Sincerely,

Gina Bonifacino
Acting Manager, Air Planning Unit

Waiver C-2: EPA 2023 Alaska ANP Approval Letter

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101

AIR & RADIATION DIVISION

October 30, 2023

Ms. Barbara Trost
Division of Air Quality
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501

Dear Ms. Trost:

The U.S. Environmental Protection Agency, (EPA) evaluated the Alaska Department of Environmental Conservation's (ADEC) 2023 Annual Monitoring Network Plan (ANP) dated June 30, 2023. By this letter, EPA documents its findings from the review and approves the State of Alaska's 2023 ANP.

We appreciate all the hard work ADEC staff have put into maintaining and improving Alaska's air quality monitoring network. One especially notable change is the inclusion of a Thermo Scientific 43i Sulfur Dioxide (SO_2) monitor at the North Pole Hurst Rd site (AQS ID: 02-090-0035). The Hurst Road site is the maximum impact $PM_{2.5}$ monitoring site in the Fairbanks nonattainment area and houses a Chemical Speciation Network (CSN) site. The SO_2 data will be helpful for interpreting the sulfate information gained from the speciation monitor. We also appreciate ADEC's continued work on establishing a network of sensor pods to extend the spatial coverage of the air quality monitoring network.

We approve the following network modifications described in the 2023 ANP:

1. Changing the primary $PM_{2.5}$ monitor at the Juneau Floyd Dryden site (AQS ID: 02-110-0004) and redesignating the continuous $PM_{2.5}$ monitor at the site as a non-FEM Special Purpose Monitor (SPM). ADEC will designate the $PM_{2.5}$ Federal Reference Method (FRM) monitor as the State and Local Air Monitoring Station (SLAMS) primary monitor in January 2024. This FRM monitor will operate on a 1-in-3 day schedule, which meets the operating frequency requirements set out in 40 C.F.R. § 58.12(d). This change in the primary monitor is in response to the performance concerns of the current Teledyne T640X $PM_{2.5}$ Federal Equivalent Method (FEM) monitor. Collocation of a T640X $PM_{2.5}$ monitor with an FRM is no longer required (40 C.F.R Part 58 Appendix A, § 3.2.3), as this was the only $PM_{2.5}$ T640X FEM in the ADEC monitoring network. Documenting this modification to the primary monitor fulfills the requirement to provide written communication to EPA describing network changes per 40 C.F.R. § 58.14(b).
   The T640X monitor will continue to measure $PM_{2.5}$ for AQI data, public information, and to inform burn ban decisions. The T640X will continue to be used as the primary FEM PM_{10} monitor, as there is little risk of high pollution events based on past data.
2. Running the continuous $PM_{2.5}$ monitor at A-Street (AQS ID: 02-090-0040) as an FEM: The primary $PM_{2.5}$ monitor at the A-Street site is a filter-based FRM (Thermo Scientific

Sequential Partisol 2025i). ADEC has historically also operated a continuous Met-One BAM 1020 $PM_{2.5}$ analyzer at the site, but that monitor has not been eligible to be designated as an FEM because it uses a Sharp Cut Cyclone (SCC) rather than a Very Sharp Cut Cyclone (VSCC). In January 2024, ADEC plans to replace the SCC with a VSCC, and has requested that the EPA approve designation of this monitor as an FEM. The EPA is approving this network change.

We provisionally approve the following network modification, pending further documentation:

1. Relocation of the Butte Harrison Court monitoring site (AQS ID: 02-170-0008). ADEC performed a saturation study in the Butte area to identify a suitable substitute site location during the winter of 2021/22. The study was initiated in response to planned construction in the area that may impact data collection at the current Butte site and in response to complaints from the neighboring property owners. After a year-long comparison between the three locations, ADEC selected the Plant Material Center (PMC) as the best substitution location. ADEC will provide documentation that the site meets criteria set out in 40 C.F.R. Part 58 Appendix E to EPA for approval before the site is finalized in the fall. ADEC plans to begin sampling at the location in time for an official January 1, 2024 sampling start date for both continuous $PM_{2.5}$ and PM_{10} monitoring.

Thank you for including documentation of the following network modifications approved since the 2022 ANP approval:

1. Floyd Dryden Site PM_{10} collocation: On January 21, 2022, a PM_{10} collocation using a Thermo Scientific Inc. Partisol 2000i was added to the Floyd Dryden SLAMS site as a federal reference method (FRM). This was approved by EPA in the 2022 ANP response letter.
2. Trinity Church (Garden) Site (AQS ID: 02-020-0018) $PM_{2.5}$ and PM_{10} collocations: On February 22, 2022, the $PM_{2.5}$ collocation monitor for the Met One BAM 1020 network was moved from the Harrison Ct (Butte) site to the Garden site. The PM_{10} FRM for the BAM 1020 network was moved from the Eagle River Parkgate site to the Anchorage Garden site on February 24, 2022. The first scheduled sample date for the $PM_{2.5}$ and PM_{10} Partisols were February 25th, 2022, and March 6th, 2022, respectively. This was approved by EPA Region 10 in the 2022 ANP response letter.

Thank you for including details on the following network modifications completed in Alaska in the period between ANP reports (July 2022 – July 2023) that do not require EPA approval:

1. Sulfur dioxide sampling at Hurst Road Site: On March 10, 2022, ADEC added a Thermo Scientific 43i Sulfur Dioxide monitor to the North Pole Hurst Rd site. The Hurst Road site is the maximum impact $PM_{2.5}$ monitoring site in the Fairbanks nonattainment area and houses a Chemical Speciation Network (CSN) site. The SO_2 data will be helpful for interpreting the sulfate information gained from the speciation monitor.
2. Monitoring site improvements funded by the American Rescue Plan (ARP). The 2023 ANP provided updates on the replacement of aging CSN samplers at the NCore site, an upgrade funded via ADEC's ARP Monitoring direct award. The URG instrument was delivered, and the SASS is expected prior to July 2023. Both will be installed in the summer of 2023.

Thank you for including details on the following network modifications planned for the next 18 months which may require approval in a future ANP:

1. Upgrade the heating and ventilation air conditioning system for the A-Street site particulate matter sampling shelter.
2. Purchase a replacement particulate matter sampling shelter for the new Butte sampling site.
3. Purchase a replacement particulate matter sampling shelter for the Teledyne T640X sampler at the Juneau Mendenhall Valley sampling site.
4. Purchase a Primary Flow Standard for mass flow controller calibrations.
5. Expansion of the Low-Cost Sensor Network: ADEC currently owns 18 AQMesh sensor pods. These sensor pods will collect baseline air quality data, including particulate matter, sulfur dioxide, nitric oxide, nitrogen dioxide, and carbon monoxide. ADEC selected 17 communities based on location, interest, and population density. The current proposed communities include Anchorage, Fairbanks, Homer, Juneau, Ketchikan, Kodiak, Kotzebue, Nome, Seward, Sitka, Skagway, Soldotna, and Unalaska/Dutch Harbor. Under the ARP direct grant and competitive grant awards from the EPA, ADEC received funds for 20 additional sensor pods. DEC is currently in the process of procuring additional low-cost sensors with the goal of installing all additional sensors by the end of October 2023.

We approve the following waiver requests:

1. Extension of the Anchorage MSA ozone monitoring waiver. The population of the MSA triggers the requirement for one ozone (O_3) monitoring site per 40 C.F.R. Part 58 Appendix D Table D-2. Based on resource constraints and the low likelihood of O_3 exceedances in the MSA, EPA approved a waiver of the O_3 monitoring requirements for the Anchorage MSA in the October 2, 2018 approval of ADEC's 2017 ANP. That waiver is valid through 2023. In their 2023 ANP, ADEC requested a 5-year extension of the waiver.
   Historically, O_3 values have been both consistently lower in the Anchorage MSA than in other areas of the state and consistently lower than 80% of the NAAQS. DEC explains in the waiver renewal request that there is a continued low likelihood of O_3 exceedances in the Anchorage MSA. Additionally, monitoring of O_3 at the Denali CASTNET site and the Fairbanks NCore site from 2018-2022 indicate O_3 levels continue to be below 80% of the NAAQS, which EPA believes suggest continued low levels within the Anchorage MSA. Because the same conditions underlying EPA's 2018 waiver approval remain, EPA is formally approving this 5-year extension of O_3 monitoring in the Anchorage MSA thru October 2028 pursuant to 40 C.F.R. Part 58, Appendix D, Section 4.1(b).
2. Proximity to roadway waiver for the A-Street site. Pursuant to 40 C.F.R. Part 58 Appendix E, Figure E-1, PM samplers must generally be located more than 15 meters from roadways unless EPA has approved a waiver of the siting requirement under Appendix E, Section 10. The A-Street SLAMS station is sited in a neighborhood community primarily due to its proximity to a residential neighborhood with solid fuel home heating and its identity as the area of expected maximum $PM_{2.5}$ concentrations. With the objective of placing the monitoring station as close as possible to the residential area and not negatively impacting schoolyard activities, the site was placed at less than the 15-meter recommended siting distance from the A-Street roadway.
   As the site is primarily concerned with quantifying the impacts of emissions from solid fuel burning, PM from the roadway is not expected to have significant impact as traffic at the site is minimal. The Alaska Department of Transportation traffic data for the streets to the north

and south of the monitoring station indicate daily traffic counts of 100 or less. For these reasons, EPA believes this site is as representative of the monitoring area in its current location as it would be if the siting criteria were met. Accordingly, EPA has determined the site eligible for a waiver for the proximity to a roadway per 40 CRF Appendix E Section 10, and EPA formally approves this waiver.

We greatly appreciate the information provided by these requests, but these activities do not require formal waivers:

1. NCore NO_y 10-meter inlet height. A 10-meter inlet height is recommended at NCore sites in the NCore Technical Assistance Document, but not is not required. 40 C.F.R. Part 58 Appendix E, Section 2 requires the monitor inlet to be placed at a height of 2 to 15 meters above ground level. Based on the information provided in the 2023 ANP waiver request, EPA agrees that a 4-meter inlet height is appropriate given the characteristics at the site, in particular the boundary layer height.
2. NCore NO_y requirement. In the 2023 ANP, ADEC requested to substitute the NO_y monitoring requirement for NO_x monitoring. According to 40 C.F.R. Part 58 Appendix D, section 3(b), NCore sites must measure NO_y, but there is no requirement to measure NO_x. Thus, it is not necessary for ADEC to seek a waiver to use NO_y as a substitute for NO_x data.

The enclosed Annual Monitoring Network Plan Checklist is the checklist EPA used to review your plan for overall items that are required to be included in the ANP along with our assessment of whether the plan submitted by your agency addresses those requirements.

All comments conveyed via this letter and the enclosed checklist should be addressed in next year's annual monitoring network plan via corrections or addition of information to the plan. Please note that we cannot approve portions of the annual network plan for which the information in the plan is insufficient to judge whether the requirement has been met, or for which the information, as described, does not meet the requirements as specified in 40 C.F.R. § 58.10 and the associated appendices. EPA Region 10 also cannot approve portions of the plan for which the EPA Administrator has not delegated approval authority to the regional offices.

EPA approves the State of Alaska's 2023 ANP. We appreciate the timeliness of the ANP submission and all the work ADEC does to protect the quality of Alaska's air, especially your proactive work to establish low-cost sensor hub sites. We look forward to our continued collaboration. If you have any questions about our approval of the ANP, please contact me at (206) 553-0985 or Sarah Waldo at (206) 553-1504.

Sincerely,

DEBRA SUZUKI Digitally signed by DEBRA SUZUKI Date: 2023.10.30 21:22:54 -07'00'

Debra Suzuki, Manager
Air Planning, State/Tribal Coordination Branch

Waiver C-3: Red Dog Mine Lead Monitoring Waiver

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101

AIR & RADIATION DIVISION

December 7, 2021

Alice Edwards, Director
Division of Air Quality
Alaska Department of Environmental Conservation
P.O. Box 111800
Juneau, AK 99811

Dear Ms. Edwards,

In your letter dated November 4, 2021, Alaska Department of Environmental Conservation (ADEC) Air Quality Division provided an updated request for a waiver of the lead (Pb) monitoring requirements at the Red Dog Mine. By this letter, Region 10 approves a waiver for lead monitoring at the Red Dog Mine. ADEC's waiver request was based on the results of dispersion modeling conducted by Teck Alaska Inc. (Teck), which were reviewed and approved by ADEC. The request was an update to the initial waiver request submitted June 12, 2020. The Red Dog Mine is a source of lead emissions exceeding 0.5 tons per year, which requires lead monitoring as specified in 40 C.F.R. Part 58, Appendix D, section 4.5(a). The lead emissions from Red Dog Mine were reported as 1.2 tons in the 2017 National Emissions Inventory, and 10.1 tons in the 2014 National Emissions Inventory.

According to 40 C.F.R. Part 58, Appendix D, section 4.5(a)(ii), the Regional Administrator may waive the requirement for lead source monitoring if the state can demonstrate that the source will not contribute to a maximum lead concentration in ambient air in excess of 50 percent of the lead National Ambient Air Quality Standards (NAAQS). A 5-year waiver for the lead monitoring requirement for Red Dog Mine was approved on August 11, 2016. The current waiver renewal request was timed to be in sync with the 5-year Air Monitoring Network Assessment, but the approval was delayed. The modeling approach and protocol for the Red Dog Mine conducted by Teck were consistent with the EPA's guidance, and were approved by the EPA. The results of this modeling demonstrates that the maximum ambient 3-month rolling average lead concentration at the mine does not exceed 50 percent of the lead NAAQS. This satisfies the requirement of remaining below 50 percent of the NAAQS, and, therefore, I approve a waiver for lead monitoring at the Red Dog Mine.

Pursuant to 40 C.F.R. Part 58, Appendix D, section 4.5(a)(ii), this waiver must be renewed every 5 years as part of the Alaska 5-year Air Monitoring Network Assessment. Therefore, if ADEC elects to renew the lead source-monitoring waiver, a formal written request to renew the lead source-monitoring waiver must demonstrate that the site conditions for which the previous modeling was conducted are still applicable. If site conditions have changed such that the previous modeling is no longer appropriate, then ADEC must update the modeling based on the current conditions.

This approval and existence of this lead source-monitoring waiver for the Red Dog Mine should be identified in the next ADEC Annual Ambient Air Monitoring Network Plan submitted to the EPA, after public review and comment, and shall be identified in all future Alaska Annual Ambient Air Monitoring Network Plans and the Alaska 5-year Air Monitoring Network Assessment Reports submitted to the EPA.

If you have any questions on the subject, please have your staff contact Sarah Waldo at (206) 553-1949 or waldo.sarah@epa.gov.

Sincerely,

DEBRA SUZUKI
Digitally signed by DEBRA SUZUKI
Date: 2021.12.07 20:20:32 -08'00'

Debra Suzuki, Manager
Air Planning, State/Tribal Coordination Branch

Appendix D
Network Evaluation Forms

Table D-1: $PM_{2.5}$ Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR PM2.5				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE**: 4/15/2024 **EVALUATOR:** Rochele Rodman				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.7.1(a)	States, and where applicable local agencies must operate the minimum number of required $PM_{2.5}$ SLAMS sites listed in Table D-5 of this appendix. Use the form below and Table D-5 to verify if each of your MSAs have the appropriate number of SLAMS FRM/FEM/ARM samplers.	✓		
4.7.1(b)	Each required SLAMS FRM/FEM/ARM monitoring stations or sites must be sited to represent area-wide air quality in the given MSA (typically neighborhood or urban spatial scale, though micro-or middle-scale okay if it represents many such locations throughout the MSA).	✓		
4.7.1(b)(1)	At least one SLAMS FRM/FEM/ARM monitoring station is to be sited at neighborhood or larger scale in an area of expected maximum concentration for each MSA where monitoring is required by 4.7.1(a).	✓		
4.7.1(b)(2)	For CBSAs with a population of 1,000,000 or more persons, at least one FRM/FEM/ARM $PM_{2.5}$ monitor is to be collocated at a near-road NO_2 station.			✓
4.7.1(b)(3)	For MSAs with additional required SLAMS sites, a FRM/FEM/ARM monitoring station is to be sited in an area of poor air quality.	✓		
4.7.2	Each State must operate continuous $PM_{2.5}$ analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor, in which case no collocation requirement applies.	✓		
4.7.3	Each State shall install and operate at least one $PM_{2.5}$ site to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport (note locations in comment field). Non-reference PM2.5 monitors such as IMPROVE can be used to meet this requirement.	✓		
4.7.4	Each State shall continue to conduct chemical speciation monitoring and analyses at sites designated to be part of the $PM_{2.5}$ Speciation Trends Network (STN).	✓		
Comments:				

MSA Description[1]	MSA population [2,3]	Design Value for years 2021-2023 24-hr/Annual Avg. µg/m^3	Minimum required number of PM2.5 SLAMS FRM/FEM/ARM sites (from Table D-5)	Present number of PM2.5 SLAMS FRM/FEM/ARM sites in MSA	Present number of continuous PM2.5 FEM/ARM analyzers in MSA	Present number of continuous PM2.5 STN analyzers in MSA
Anchorage MSA	401,314					
Municipality of Anchorage	286,075		0	1	1	0
Garden Site		19/5.1	SLAMS/FRM & FEM	1	1	0
Matanuska-Susitna Valley Borough	115,239		1	0	1	0
Butte Site		23**/5.0**	SLAMS/FEM	0	1	0
Fairbanks North Star Borough MSA	94,840		1	5	3	2 speciation
A Street		38***/11.5***	SPM/FRM	1	1	0
NCore Site		26/7.3	NCore/FRM	1	1*	1 speciation
Hurst Rd		56/9.9	SPM/FRM	2	1*	1 speciation
City and Borough of Juneau µSA	31,555		0	1	1	0
Floyd Dryden Site		19/5.1	SLAMS/FEM & FRM	1	1	0

[1] see https://www.census.gov/geographies/reference-files/time-series/demo/metro-micro/delineation-files.html

[2] Minimum monitoring requirements apply to the metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.

[3] Population based on population estimates for July 1, 2023 obtained from the United States Census Bureau, https://www.census.gov/quickfacts/fact/table/juneaucityandboroughcountyalaska,fairbanksnorthstarboroughalaska,matanuskasusitnaboroughalaska,anchoragemunicipalitycountyalaska,AK/PST045222

* MetOne BAM w/ SCC; per discussion with EPA VSCC cyclone removed

** Maximum value substitutions applied due to data completeness criteria not being met. Substitutions were performed according to the procedures outlined in 40 CFR Part 50 Appendix N, §4.2 (c) (i) and 40 CFR Part 50 Part 50 Appendix N, § 4.1 (c) (ii)).

*** Annual values did not meet data completeness criteria. This value is preliminary and subject to the maximum value substitution test as outlined in 40 CFR Part 50 Appendix N. A Street DVs cannot be officially calculated until 2024 monitoring data has been collected and verified.

Table D-5 of Appendix D to Part 58 – PM2.5 Minimum Monitoring Requirements

MSA population[1, 2]	Most recent 3-year design value ≥ 85% of any PM2.5 NAAQS[3]	Most recent 3-year design value < 85% of any PM2.5 NAAQS[3, 4]
>1 million	3	2
500K to 1 million	2	1
50K to <500K[5]	1	0

[1] Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
[2] Population based on latest available census figures. https://www.census.gov/
[3] The $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
[4] These minimum monitoring requirements apply in the absence of a design value.
[5] Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

Table D-2: PM_{10} Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR PM10				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE:** 4/12/2024 **EVALUATOR:** Rochele Rodman				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.6(a)	Table D-4 indicates the approximate number of permanent stations required in MSAs to characterize national and regional PM10 air quality trends and geographical patterns. Use the form below and Table D-4 to verify if your PM10 network has the appropriate number of samplers.	✓		
Comments: All of the site locations are based on historical agreements among the EPA, DEC and (where applicable) local agencies. One exceedance on May 7, 2019 at the Butte site caused the entire Anchorage MSA to be categorized as high concentration. DEC qualified the exceedance day data as RJ (high winds). These one day could be the basis for a 2019 EEWR should EPA request DEC or EPA start another PM_{10} designation process. Thus DEC assumes that medium concentration is applicable when these exceptional events are excluded from the compliance calculations (**Appendix A**, Table A-5 with assumed EEWRs).			

MSA Description[1]	MSA population[2, 3]	Minimum required number of PM_{10} stations (from Table D-4)	Present number of PM_{10} stations in MSA
Municipality of Anchorage & Matanuska-Susitna Valley Borough (MSA) (combined)	401,314	3-4 (high conc)/ 1-2 (med conc; high winds EE exceedances removed)	4 (SLAMS [1 collocated], 1 SPM)
Fairbanks North Star Borough MSA	94,840	0 (low conc)	1 (NCore, collocated)
City and Borough of Juneau µSA	31,555	0 (low conc)	1 (SLAMS)

[1] see https://www.census.gov/geographies/reference-files/time-series/demo/metro-micro/delineation-files.html

[2] Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.

[3] Population based on population estimates for July 1, 2023 obtained from the United States Census Bureau, https://www.census.gov/quickfacts/fact/table/juneaucityandboroughcountyalaska,fairbanksnorthstarboroughalaska,matanuskasusitnaboroughalaska,anchoragemunicipalitycountyalaska,AK/PST045222

Table D-4 of Appendix D to Part 58 – PM10 Minimum Monitoring Requirements			
MSA population[1, 2]	High concentration[2]	Medium concentration[3]	Low concentration[4 5]
>1 million	6-10	4-8	2-4
500K to 1 million	4-8	2-4	1-2
250K to 500K	3-4	1-2	0-1
100K to 250K	1-2	0-1	0

[1]Selection of urban areas and actual numbers of stations per area will be jointly determined by EPA and the State agency.

[2]High concentration areas are those for which ambient PM10 data show ambient concentrations exceeding the PM10 NAAQS by 20 percent or more.

[3]Medium concentration areas are those for which ambient PM10 data show ambient concentrations exceeding 80 percent of the PM10 NAAQS.

[4]Low concentration areas are those for which ambient PM10 data show ambient concentrations less than 80 percent of the PM10 NAAQS.

[5]These minimum monitoring requirements apply in the absence of a design value.

Table D-3: CO Site Evaluation Form

PART 58 APPENDIX D SITE EVALUATION FORM FOR CARBON MONOXIDE (CO)					
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE**: 4/12/2024 **EVALUATOR:** Rochele Rodman					
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
4.2.1(a)	One CO monitor is required to operate collocated with one required near-road NO_2 monitor in CBSAs having a population of 1,000,000 or more persons. If a CBSA has more than one required near-road NO_2 monitor, only one CO monitor is required to be collocated with a near-road NO_2 monitor within that CBSA.				✓
4.2.2(a)	Has the EPA Regional Administrator required additional CO monitoring stations above the minimum number of monitors required in 4.2.1? If so, note location in comment field.		✓		
Comments: The State of Alaska has no CBSA with a population of 1,000,000. Therefore, there are no near-road collocated sites for CO and NO_2. The Garden Site (AQS ID 02-020-0018) is the single CO site currently operating in the Municipality of Anchorage for Limited Maintenance Plan compliance. A single CO SLAMS monitor operated for Limited Maintenance Plan compliance in the Fairbanks North Star Borough at the Old Post Office Building site (AQS 02-090-0002) until 4/30/2014. Since then the Fairbanks North Star Borough multi-pollutant NCore site (02-090-0034) currently is the single CO site for compliance with NCore requirements and for Limited Maintenance Plan compliance in Fairbanks.					

MSA Description[1]	CBSA population[2, 3]	Minimum required number of SLAMS CO sites	Present number of SLAMS CO sites in MSA
Municipality of Anchorage & Matanuska-Susitna Valley Borough (MSA) (combined)	401,314	0	1*
Fairbanks North Star Borough	94,840	0	1*

[1] see https://www.census.gov/geographies/reference-files/time-series/demo/metro-micro/delineation-files.html

[2] Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.

[3] Population based on population estimates for July 1, 2023 obtained from the United States Census Bureau, https://www.census.gov/quickfacts/fact/table/juneaucityandboroughcountyalaska,fairbanksnorthstarboroughalaska,matanuskasusitnaboroughalaska,anchoragemunicipalitycountyalaska,AK/PST045222

* Monitoring sites in both MSAs satisfy their respective CO Limited Maintenance Plans requirements.

Table D-4: O_3 Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR OZONE (O_3)				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE**: 4/12/2024 **EVALUATOR:** Rochele Rodman				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.1(b)	At least one O_3 site for each MSA, or CSA if multiple MSAs are involved, must be designed to record the maximum concentration (note location in comment field).	✓		
4.1(c)	The appropriate spatial scales for O_3 sites are neighborhood, urban, and regional (note deviations in comment field).	✓		
4.1(f)	Confirm that the monitoring agency consulted with EPA R10 when siting the maximum O3 concentration site.	✓		
4.1(i)	O_3 is being monitored at SLAMS monitoring sites during the "ozone season" as specified in Table D-3 of Appendix D to Part 58.	✓		
Comments: DEC received an EPA 5-Year Ozone NAAQS Monitoring Requirement Waiver for the Anchorage MSA (**Appendix C**, Waiver C-1). This waiver was extended to 2028 (**Appendix C,** Waiver C-2). Palmer O_3 was discontinued at the end of ozone season 2018. An ozone monitoring site was established in the Fairbanks North Star Borough at the multi-pollutant NCore site (AQS 02-090-0034) in August 2011 and has been operated year-round since then.				

MSA Description[1]	MSA population [2,3]	Minimum required number of SLAMS O_3 sites (from Table D-2)	Present number of SLAMS O_3 sites in CBSA	
Municipality of Anchorage & Matanuska-Susitna Valley Borough (MSA) (combined)	401,314	1	0	See EPA ozone waiver link*
Fairbanks North Star Borough	94,840	0	1**	NCore Site

[1] see https://www.census.gov/geographies/reference-files/time-series/demo/metro-micro/delineation-files.html

[2] Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.

[3] Population based on population estimates for July 1, 2023 obtained from the United States Census Bureau, https://www.census.gov/quickfacts/fact/table/juneaucityandboroughcountyalaska,fairbanksnorthstarboroughalaska,matanuskasusitnaboroughalaska,anchoragemunicipalitycountyalaska,AK/PST045222

* DEC received an EPA 5-Year Ozone NAAQS Monitoring Requirement Waiver for the Anchorage MSA (**Appendix C**, Waiver C-1), which was extended until 2028 (**Appendix C**, Waiver C-2).

** Fulfills State of Alaska NCore requirement

Table D-2 of Appendix D to Part 58 - SLAMS O_3 Monitoring Minimum Requirements		
MSA population[1, 2]	Most recent 3-year design value concentrations ≥85% of any O_3 NAAQS[3]	Most recent 3-year design value concentrations <85% of any O_3 NAAQS[3, 4]
> 10 million	4	2
4-10 million	3	1
350,000 - < 4 million	2	1
50,000 - < 350,000[5]	1	0

[1]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.
[2]Population based on latest available census estimates.
[3]The ozone (O3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
[4]These minimum monitoring requirements apply in the absence of a design value.
[5]Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

Table D-3 of Appendix D to Part 58—Ozone Monitoring Season by State		
State	**Begin month**	**End Month**
Alaska	April	October
Idaho	May	September
Oregon	May	September
Washington	May	September

Table D-5: SO_2 Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR SULFUR DIOXIDE (SO_2)				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE**: 4/12/2024 **EVALUATOR:** Rochele Rodman				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.4.1	State and, where appropriate, local agencies must operate a minimum number of required SO_2 monitoring sites (based on PWEI calculation specified in 4.4.2 – use Table 1 and 2 below to determine minimum requirement for each CBSA)	✓		
4.4.2(a)(1)	Is the monitor sited within the boundaries of the parent CBSA and is it one of the following site types: population exposure, highest concentration, source impacts, general background, or regional transport?			✓
4.4.3(a)	Has the EPA Regional Administrator required additional SO_2 monitoring stations above the minimum number of monitors required in 4.4.2? If so, note location in comment field.		✓	
4.4.5(a)	Is your agency counting an existing SO2 monitor at an NCore site in a CBSA with a minimum monitoring requirement?			✓
Comments: As evident from the calculations shown below, the State of Alaska has no CBSAs which require SO_2 monitoring. One of the operating SO_2 monitors is located at the multi-pollutant NCore site in the Fairbanks North Star Borough operated for compliance with NCore site requirements. The other SO_2 analyzer was added to the Hurst Road site in 2021. This data will be helpful for interpreting the sulfate information gained from the speciation monitor at this site.				

Table 1.

CBSA Description[1]	CBSA population[2, 3]	Total amount of SO_2 in tons per year emitted within the CBSA (from 2017 NEI[4])	PWEI (population x total emissions ÷ 1,000,000)	Minimum required number of SO_2 monitors in CBSA (see Table 2 below)	Present number of SO_2 monitors in CBSA
Anchorage Municipality	286,075	262.0	74.9	0	0
Matanuska-Susitna Borough	115,239	326.4	37.6	0	0
Fairbanks North Star Borough	94,840	6,904.6	654.8	0	2*
Juneau City and Borough	31,555	71.7	2.3	0	0
Ketchikan Gateway Borough	13,738	37.5	0.5	0	0

[1] See https://www.census.gov/geographies/reference-files/time-series/demo/metro-micro/delineation-files.html
[2] Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.
[3] Based on population estimates for July 1, 2023 obtained from the United States Census Bureau, U.S. Census Bureau QuickFacts: Juneau City and Borough (County), Alaska; Fairbanks North Star Borough, Alaska; Matanuska-Susitna Borough, Alaska; Anchorage Municipality (County), Alaska; Alaska
[4] see 2020 National Emissions Inventory (NEI) Data | US EPA
* One monitor present to satisfy NCore requirement.

Table 2. Minimum SO_2 Monitoring Requirements (Section 4.4.2 of App D to Part 58)

PWEI (Population weighted Emission Index) Value	Required number of SO_2 monitors
>= 1,000,000	3
>= 100,000 but < 1,000,000	2
>= 5,000 but < 100,000	1

Table D-6: NO_2 Network Evaluation Form

PART 58 APPENDIX D NETWORK EVALUATION FORM FOR NITROGEN DIOXIDE (NO_2)				
STATE: ALASKA **AGENCY:** DEPARTMENT OF ENVIRONMENTAL CONSERVATION **AQS AGENCY CODE:** 02 **EVALUATION DATE**: 4/15/2024 **EVALUATOR:** Rochele Rodman				
APPLICABLE SECTION	REQUIREMENT	CRITERIA MET?		
		YES	NO	N/A
4.3.2(a)	Near-road NO2 Monitors: One microscale near-road NO_2 monitoring station in each CBSA with a population of 1,000,000 or more persons.			✓
4.3.2(a)	Near-road NO2 Monitors: An additional near-road NO_2monitoring station is required for any CBSA with a population of 2,500,000 persons, or in any CBSA with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater AADT count.			✓
4.3.2(b)	Near-road NO2 Monitors: Measurements at required near-road NO_2 monitor sites utilizing chemiluminescence FRMs must include at a minimum: NO, NO_2, and NO_X			✓
4.3.3(a)	Area-wide NO2 Monitoring: One monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest NO_2 concentrations representing the neighborhood or larger spatial scales.			✓
Comments: The State of Alaska has no CBSA with a population of 1,000,000. The Fairbanks North Star Borough is currently analyzing for NO, NOy, and Difference, which satisfies the NCore requirement for NO2.				

Table 1

CBSA Description[1]	CBSA population[2, 3]	Required number of Near-road NO_2 sites	Present number of Near-road NO_2 sites	Required number of Area-wide NO_2 sites	Present number of Area-wide NO_2 sites
Municipality of Anchorage & Matanuska-Susitna Valley Borough (MSA) (combined)	401,314	0	0	0	0
Fairbanks North Star Borough (MSA)	94,840	0	0	0	0*
City and Borough of Juneau (µSA)	31,555	0	0	0	0

[1] see https://www.census.gov/geographies/reference-files/time-series/demo/metro-micro/delineation-files.html

[2] Minimum monitoring requirements apply to the Metropolitan statistical area (MSA). CBSA includes both MSAs and micropolitan statistical areas.

[3] Population based on population estimates for July 1, 2023 obtained from the United States Census Bureau, https://www.census.gov/quickfacts/fact/table/juneaucityandboroughcountyalaska,fairbanksnorthstarboroughalaska,matanuskasusitnaboroughalaska,anchoragemunicipalitycountyalaska,AK/PST045222

* NCore site requirement is satisfied with NOy monitoring

Appendix E
Summary of Monitoring Path & Siting Criteria Evaluation Forms

Table E-1: Summary of Appendix E Forms: $PM_{2.5}$, PM_{10}, & $PM_{10-2.5}$

	Garden	Parkgate	Laurel*	PMC	Hurst Road	A Street	NCore	Floyd Dryden
Parameter(s)	$PM_{2.5}$ & PM_{10}	PM_{10}	PM_{10}	$PM_{2.5}$ & PM_{10}	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$, PM_{10} & $PM_{10-2.5}$	$PM_{2.5}$ & PM_{10}
Address	3000 E 16th Ave, Anchorage	11723 Old Glenn Hwy, Eagle River	4335 Laurel St, Anchorage	5310 Bodenburg Spur Rd., Palmer	3288 Hurst Rd, North Pole	397 Hamilton Ave, Fairbanks	907 Terminal St., Fairbanks	3800 Mendenhall Loop Rd., Juneau
AQS ID	02-020-0018	02-020-1004	02-020-0045	02-170-0010	02-090-0035	02-090-0040	02-090-0034	02-110-0004
2. HORIZONTAL AND VERTICAL PLACEMENT	Criteria met, 11 m	Criteria met, 10 m	Criteria met, 6 m	Criteria met, 4.3 m	Criteria met, 4 m	Criteria met, 4 m	Criteria met, 4 m	Criteria met, 7 m
3. SPACING FROM MINOR SOURCES (a)	Criteria met, chimney 3.8 m away	Criteria met, paved parking lot >10 m away	Criteria met, max impact site, winter graveled streets	Criteria met, 17 m from gravel road	Criteria met	Criteria met, near a school and a neighborhood	Criteria met, ~ 260 m to Aurora Wood Processing[1], ~400 m to power plant[2]	Criteria met, ~15 to kitchen vent, ~20 m to furnace flue
4. SPACING FROM OBSTRUCTIONS (a)	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted
4. SPACING FROM OBSTRUCTIONS (b)	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, >20 m to nearest building	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, unrestricted	Criteria met, ~8 m to Hi-Vol RadNet Monitor
5. SPACING FROM TREES (a)	Criteria met, >10 m	Criteria met, >10 m	Criteria met, >20 m	Criteria met, >40 m	Criteria met, >10 m	Criteria met, >10 m	Criteria met, >10 m	Criteria met, >20 m
5. SPACING FROM TREES (c)*	NA	NA	Criteria met	NA	NA	NA	NA	NA
6. SPACING FROM ROADWAYS	Criteria met, >10 m to road	Criteria met, >25 m to paved roads	Criteria met, 11 m to road, maximum exposure site	Criteria met, >10 m to road	Criteria met, >20 m to road	Criteria **not** met, <10 m to road[+]	Criteria met, 10 m to road	Criteria met, ~100 m to road
Changes that might compromise siting?	No	No	No	No	No	No	No	No

*Laurel is the only microscale site in Alaska's PM network

[+]This site is located on a low-volume roadway that is paved and covered with snow and ice for six months of the year.

[1]Aurora Energy Solutions is a wood processing and kiln drying operation which began approximately in 2020.

[2] Coal power plant stack emits emissions above and outside of ground-surface monitoring. No observed bias upon the collection of Air Quality data.

Table E-2: Summary of Appendix E Forms: CO

	Garden	NCore
Parameter(s)	CO	CO
Address	3000 E 16th Ave, Anchorage	907 Terminal St., Fairbanks
AQS ID	02-020-0018	02-090-0034
2. HORIZONTAL AND VERTICAL PLACEMENT	Criteria met, 2.6 m	Criteria met, 3 m
3. SPACING FROM MINOR SOURCES	Criteria met, residential	Criteria met, ~260 m to Aurora Wood Processing[2], ~400 m to coal power plant[3]
4. SPACING FROM OBSTRUCTIONS (a)	Criteria met, no obstacles	Criteria met, no obstacles
4. SPACING FROM OBSTRUCTIONS (b)	Criteria met, 180°	Criteria met, unrestricted
5. SPACING FROM TREES (a)	Criteria met, although there is a tree 2.7 m NE of probe, but airflow is still available around and through the tree	Criteria met
5. SPACING FROM TREES (c)	NA	NA
6. SPACING FROM ROADWAYS	NA, Neighborhood scale but 7.6 m from roadway[1]	NA, Neighborhood scale but 85 m from roadway
9. PROBE MATERIAL & RESIDENCE TIME (a)	FEP Teflon	Glass w/ FEP sample lines
9. PROBE MATERIAL & RESIDENCE TIME (c)	Criteria met, < 20 seconds	Criteria met, < 20 seconds
Changes that might compromise siting?	No	No

[1]This site was originally set up as a microscale site by the Municipality of Anchorage which would require the close (<10 m) proximity to the road.
[2]Aurora Energy Solutions is a wood processing and kiln drying operation which began in approximately 2020.
[3]Coal power plant stack emits emissions above and outside of ground-surface monitoring.

Table E-3: Summary of Appendix E Forms: O_3, SO_2, NO, Diff, and NO_y

	NCore			Hurst Road
Parameter(s)	O_3	SO_2	NO, Diff, & NO_y	SO_2
AQS ID	02-090-0034			02-090-0035
Address	907 Terminal St., Fairbanks			3288 Hurst Rd, North Pole
2. HORIZONTAL AND VERTICAL PLACEMENT	Criteria met, 3 m	Criteria met, 3 m	Criteria met, 3 m	Criteria met, 3 m
3. SPACING FROM MINOR SOURCES	Criteria met, ~ 260 m to Aurora Wood Processing[1], ~400 m to power plant[2]	Criteria met, ~ 260 m to Aurora Wood Processing[1], ~400 m to power plant[2]	Criteria met, ~ 260 m to Aurora Wood Processing[1], ~400 m to power plant[2]	Criteria met
3. SPACING FROM MINOR SOURCES (b)	Criteria met, no furnaces/flues			
4. SPACING FROM OBSTRUCTIONS (a)	Criteria met, no obstacles	Criteria met, no obstacles	Criteria met, no obstacles	Criteria met, no obstacles
4. SPACING FROM OBSTRUCTIONS (b)	Criteria met, unrestricted 360° airflow	Criteria met, unrestricted 360° airflow	Criteria met, unrestricted 360° airflow	Criteria met, unrestricted 360° airflow
4. SPACING FROM OBSTRUCTIONS (d)			NA	
5. SPACING FROM TREES (a)	Criteria met, >10 m	Criteria met, > 10 m	Criteria met, >10 m	Criteria met, >10 m
5. SPACING FROM TREES (c)	NA	NA	NA	NA
6. SPACING FROM ROADWAYS	Criteria met, >10 m to road	NA	Criteria met, >10 m to road	
9. PROBE MATERIAL & RESIDENCE TIME (a)	Borosilicate glass w/ FEP Teflon sample lines	Borosilicate glass w/ FEP Teflon sample lines	Borosilicate glass w/ FEP Teflon sample lines	FEP Teflon sample lines
9. PROBE MATERIAL & RESIDENCE TIME (c)	< 5 seconds	< 5 seconds	< 20 seconds	Not an NCore site, < 20 seconds
Changes that might compromise siting?	No	No	No	No

[1]Aurora Energy Solutions is a wood processing and kiln drying operation which began approximately in 2020.
[2] Coal power plant stack emits emissions above and outside of ground-surface monitoring. No observed bias upon the collection of Air Quality data.

Table E-4: Blank Part 58 Appendix E Form for PM

PART 58 APPENDIX E SITE EVALUATION FORM FOR PM2.5, PM10, PM10-2.5, and Pb					
SITE NAME:	SITE ADDRESS:				
AQS ID:	EVALUATION DATE:	EVALUATOR:			
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	2-15 meters above ground level for neighborhood or larger spatial scale, 2-7 meters for microscale spatial scale sites and middle spatial scale $PM_{10-2.5}$ sties. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.,* and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.	.			
3. SPACING FROM MINOR SOURCES	(a) For neighborhood or larger spatial scales avoid placing the monitor near local, minor sources. The source plume should not be allowed to inappropriately impact the air quality data collected at a site. Particulate matter sites should not be located in an unpaved area unless there is vegetative ground cover year-round.				
4. SPACING FROM OBSTRUCTIONS	(a) To avoid scavenging, the inlet must have unrestricted airflow and be located away from obstacles. The separation distance must be at least twice the height that the obstacle protrudes above the probe inlet.				
	(b) The inlet must have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential. For particle sampling, a minimum of 2 meters of separation from walls, parapets, and structures is required for rooftop site placement.				
5. SPACING FROM TREES	(a) To reduce possible interference the inlet must be at least 10 meters or further from the drip line of trees.				
	(c) No trees should be between source and probe inlet for microscale sites.				
6. SPACING FROM ROADWAYS	Spacing from roadways is dependent on the spatial scale and ADT count. See section 6.3(b) and figure E-1 for specific requirements.				
Are there any changes that might compromise original siting criteria?					
Other Comments:					

Table E-5: Blank Part 58 Appendix E Form for CO

PART 58 APPENDIX E SITE EVALUATION FORM FOR CO					
SITE NAME:	SITE ADDRESS:				
AQS ID:	EVALUATION DATE:	EVALUATOR:			
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	For neighborhood or larger spatial scale sites the probe must be located 2-15 meters above ground level and must be at least 1 meter vertically or horizontally away from any supporting structure, walls, *etc.,* and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.				
3. SPACING FROM MINOR SOURCES	(a) For neighborhood scale avoid placing the monitor probe inlet near local, minor sources. The source plume should not be allowed to inappropriately impact the air quality data collected at a site.				
4. SPACING FROM OBSTRUCTIONS	(a) To avoid scavenging, the probe inlet must have unrestricted airflow and be located away from obstacles. The separation distance must be at least twice the height that the obstacle protrudes above the probe inlet (exception is street canyon or source-oriented sites where buildings and other structures are unavoidable).				
	(b) The probe inlet must have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential.				
5. SPACING FROM TREES	(a) To reduce possible interference the probe inlet must be at least 10 meters or further from the drip line of trees.				
	(c) No trees should be between source and probe inlet for microscale sites.				
6. SPACING FROM ROADWAYS	2. (b) Microscale CO monitor probes in downtown areas or urban street canyon locations shall be located a minimum distance of 2 meters and a maximum distance of 10 meters from the edge of the nearest traffic lane.				
	2. (c) Microscale CO monitor inlet probes in downtown areas or urban street canyon locations shall be located at least 10 meters from an intersection and preferably at a midblock location.				
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex) for reactive gases.				
	(c) Sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.				
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.					
Other Comments:					

[1] Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Table E-6: Blank Part 58 Appendix E Form for O_3

PART 58 APPENDIX E SITE EVALUATION FORM FOR O3					
SITE NAME:	SITE ADDRESS:				
AQS ID:	EVALUATION DATE:	EVALUATOR:			
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	2-15 meters above ground level. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.,* and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.				
3. SPACING FROM MINOR SOURCES	(a) For neighborhood scale avoid placing the monitor probe inlet near local, minor sources. The source plume should not be allowed to inappropriately impact the air quality data collected at a site.				
	(b) To minimize scavenging effects, the probe inlet must be away from furnace or incineration flues or other minor sources of SO_2 or NO.				
4. SPACING FROM OBSTRUCTIONS	(a) To avoid scavenging, the probe inlet must have unrestricted airflow and be located away from obstacles. The separation distance must be at least twice the height that the obstacle protrudes above the probe inlet.				
	(b) The probe inlet must have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential.				
5. SPACING FROM TREES	(a) To reduce possible interference the probe inlet must be at least 10 meters or further from the drip line of trees.				
	(c) No trees should be between source and probe inlet for microscale sites.				
6. SPACING FROM ROADWAYS	See spacing requirements table below				
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex).				
	(c) Sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.				
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.					
Other Comments:					

[1]Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

[2]Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Table E-7: Blank Part 58 Appendix E Form for SO_2

PART 58 APPENDIX E SITE EVALUATION FORM FOR SO2					
SITE NAME:	SITE ADDRESS:				
AQS ID:	EVALUATION DATE:	EVALUATOR:			
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	2-15 meters above ground level. 1 meter vertically or horizontally away from any supporting structure, walls, *etc.*, and away from dusty or dirty areas. If located near the side of a building or wall, then locate on the windward side relative to the prevailing wind direction during the season of highest concentration potential.				
3. SPACING FROM MINOR SOURCES	(a) For neighborhood scale avoid placing the monitor probe inlet near local, minor sources. The source plume should not be allowed to inappropriately impact the air quality data collected at a site.				
4. SPACING FROM OBSTRUCTIONS	(a) To avoid scavenging, the probe inlet must have unrestricted airflow and be located away from obstacles. The separation distance must be at least twice the height that the obstacle protrudes above the probe inlet.				
	(b) The probe inlet must have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential.				
5. SPACING FROM TREES	(a) To reduce possible interference the probe inlet must be at least 10 meters or further from the drip line of trees.				
	(c) No trees should be between source and probe inlet for microscale sites.				
6. SPACING FROM ROADWAYS	There are no roadway spacing requirements for SO2.				
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex).				
	(c) Sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.				
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.					
Other Comments:					

Table E-8: Blank Part 58 Appendix E Form for NO, NOx, NO_2, and NO_y

PART 58 APPENDIX E SITE EVALUATION FORM FOR NO, NOx, NO2, and NOy					
SITE NAME:	SITE ADDRESS:				
AQS ID:	EVALUATION DATE:	EVALUATOR:			
APPLICABLE SECTION	REQUIREMENT	OBSERVED	CRITERIA MET?		
			YES	NO	N/A
2. HORIZONTAL AND VERTICAL PLACEMENT	For neighborhood or larger spatial scale sites the probe must be located 2-15 meters above ground level and must be at least 1 meter vertically or horizontally away from any supporting structure, walls, *etc.,* and away from dusty or dirty areas. Microscale near-road NO_2 monitoring sites are required to have sampler inlets between 2 and 7 meters above ground level. If located near the side of a building or wall, then locate the sampler probe on the windward side relative to the prevailing wind direction during the season of highest concentration potential.				
3. SPACING FROM MINOR SOURCES	(a) For neighborhood scale and larger avoid placing the monitor probe inlet near local, minor sources. The source plume should not be allowed to inappropriately impact the air quality data collected at a site.				
4. SPACING FROM OBSTRUCTIONS	(a) To avoid scavenging, the probe inlet must have unrestricted airflow and be located away from obstacles. The separation distance must be at least twice the height that the obstacle protrudes above the probe inlet.				
	(b) The probe inlet must have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential.				
	(d) For near-road NO_2 monitoring stations, the monitor probe shall have an unobstructed air flow, where no obstacles exist at or above the height of the monitor probe, between the monitor probe and the outside nearest edge of the traffic lanes of the target road segment.				
5. SPACING FROM TREES	(a) To reduce possible interference the probe inlet must be at least 10 meters or further from the drip line of trees.				
	(c) No trees should be between source and probe inlet for microscale sites.				
6. SPACING FROM ROADWAYS	See spacing requirements table below				
9. PROBE MATERIAL & RESIDENCE TIME	(a) Sampling train material must be FEP Teflon or borosilicate glass (e.g., Pyrex).				
	(c) Sampling probes for reactive gas monitors at NCore and at NO_2 sites must have a sample residence time less than 20 seconds.				
Are there any changes that might compromise original siting criteria? If so, provide detail in comment section.					
Other Comments:					

Table E-9: Roadway ADT for CO, O_3, SO_2, and NO suite Part 58 Appendix E Forms

Roadway average daily traffic, vehicles per day	Minimum distance[1] (meters)
≤10,000	10
15,000	25
20,000	45
30,000	80
40,000	115
50,000	135
≥60,000	150

Appendix F
Additional Monitoring Projects

SMOKE MONITORING FOR AIR QUALITY ADVISORIES

Smoke from wildland fires can affect large areas and impact air quality in regions both close to and far away from the burning fire. Almost every summer, large areas of the state are impacted by smoke from wildland fires, with air quality degrading into the very unhealthy to hazardous range. The DEC assists the Alaska Fire Service in assessing air quality impacts in areas affected by wildland fires and provides information needed to protect public health. Specifically, the DEC Air Quality Division uses two separate methods to assess air quality impacts and issue air quality advisories statewide: monitoring data (if available) and visibility information. During 2025 wildland fire season DEC will partner with other agencies to expand the network of low-cost sensors, as necessary. In addition, the DEC meteorologist or air quality staff, with assistance from the National Weather Service (NWS), will use meteorological and air monitoring data to forecast smoke movement and predict where air quality impacts might occur.

VOLCANIC ASH MONITORING

In the event of an active volcano eruption, DEC will cooperate with the Alaska Volcano Observatory on volcanic ash monitoring. The DEC meteorologist will use a PM_{10} Met One E-BAM with an AIRSIS communication system to review data in near real time and issue air quality advisories for affected areas during volcanic eruptions.

RADIATION MONITORING

The state has three radiation monitoring network sites (RadNet) located in Anchorage, Fairbanks, and Juneau. The RadNet monitor in Anchorage was moved from the Alaska State Public Health Laboratory (5455 Doctor M.L.K. Jr. Ave.) to the Garden site (3000 E 16th Ave.) on August 30, 2021 and operation of the site shifted from the Alaska Department of Health and Social Services to the DEC Air Quality Division. Currently, DEC operates the RadNet equipment at all three sites.

Appendix G
Improve Network

The Alaska Regional Haze State Implementation Plan (SIP) includes a monitoring plan for measuring, estimating, and characterizing air quality and visibility impairment at Alaska's four Class I areas. The haze species concentrations are measured as part of the IMPROVE monitoring network deployed throughout the United States. Alaska uses four IMPROVE monitoring stations representing three of the four Class I Areas. Three of these areas (Denali National Park and Preserve, Simeonof and Tuxedni National Wildlife Refuges) have monitors deployed specifically in response to Regional Haze Rule requirements. There is no air monitoring being conducted at the Bering Sea Wilderness Area due to its remote location.

Monitoring site information and additional Regional Haze information are available at DEC's Regional Haze website, http://dec.alaska.gov/air/anpms/regional-haze. Monitoring data and additional information for the Alaskan IMPROVE sites are available from the EPA website, http://vista.cira.colostate.edu/improve.