Air Monitoring Site Selection and Installation Procedure

By

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For the

Air Quality Program

Washington State Department of Ecology
Olympia, Washington

Revised February 2024, Publication 16-02-021

Publication Information

This document is available on the Department of Ecology's website at:
https://apps.ecology.wa.gov/publications/summarypages/1602021.html

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Department of Ecology's Regional Offices

Map of Counties Served
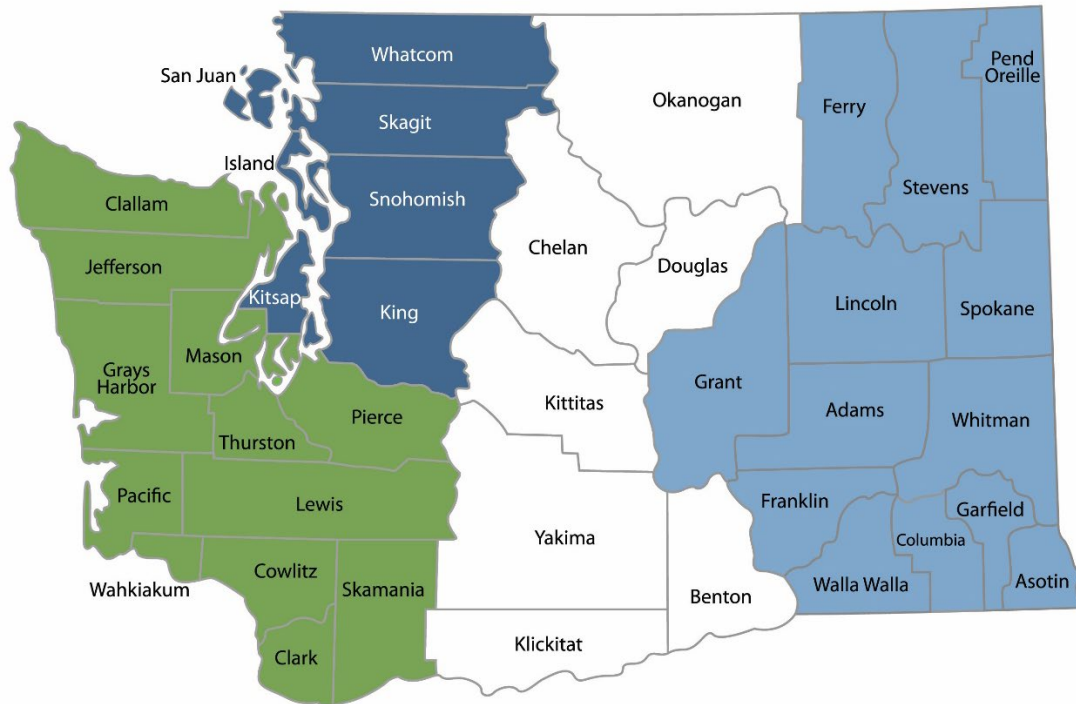
Southwest Region 360-407-6300	Northwest Region 206-594-0000	Central Region 509-575-2490	Eastern Region 509-329-3400

Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	P.O. Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	P.O. Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 West Alder Street Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 North Monroe Spokane, WA 99205	509-329-3400
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Washington State Department of Ecology

Olympia, WA

Revised February 2024 | Publication 16-02-021

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Acronyms and Abbreviations

AMTIC	Ambient Monitoring Technology Information Center
AQI	Air Quality Index
AQP	Air Quality Program
AQPLT	Air Quality Program Leadership Team
AQS	Air Quality System
CFR	Code of Federal Regulations
CRO	Central Region Office (Ecology)
CSN	Chemical Speciation Network
DQO	Data Quality Objective
Ecology	Washington State Department of Ecology
EnvistaARM	Envista Air Resources Manager
EPA	Environmental Protection Agency
ERO	Eastern Region Office (Ecology)
IMPROVE	Interagency Monitoring of Protected Visual Environments
IT	Information Technology
MAC	Monitoring Advisory Committee
NAAQS	National Ambient Air Quality Standards
NACAA	National Association of Clean Air Agencies
NATTS	National Air Toxics Trend Stations
NCore	National Core Network
NWRO	Northwest Region Office (Ecology)
OCIO	Office of the Chief Information Officer
PAMS	Photochemical Assessment Monitoring Stations
PSD	Prevention of Significant Deterioration
QA	Quality Assurance
QAP	Quality Assurance Plan
QAPP	Quality Assurance Project Plan
QC	Quality Control

QMP   Quality Management Plan

SIMS   Site Information Management System

SLAMS   State and Local Air Monitoring Stations

SOP   Standard Operating Procedure

SPMS   Special Purpose Monitoring Stations

SWRO   Southwest Region Office (Ecology)

UPS   Uninterruptable Power Supply

WaTech   Washington Technology Solutions

1. Introduction

Ecology's Air Quality Program (AQP) implements and maintains the Washington State Ambient Air Monitoring Network (Washington Network). The AQP's mission is to equitably protect and improve air quality in Washington. A key strategic goal for the program is to *inform decisions and raise public awareness by providing accurate and timely information on ambient air pollution and its impacts*. Pursuant to the AQP's mission and strategic goal, the monitoring goal of the Washington Network is designed to provide data of sufficient quality to accomplish the following:

- Determine if the National Ambient Air Quality Standards (NAAQS) are met
- Provide near-real-time air quality information to the public
- Forecast air quality
- Make daily burn decisions and curtailment calls
- Assist with permitting activities
- Evaluate air pollution control programs
- Evaluate the effects of air pollution on public health
- Determine air quality trends
- Identify and develop cost-effective pollution control strategies
- Evaluate air quality models

While legislature determines siting for certain monitoring projects, the AQP is responsible for siting most new projects. To ensure that the Washington Network continues to meet the needs of the AQP, new monitoring projects must receive advance approval from the Monitoring Advisory Committee (MAC) prior to implementation.

This procedure describes the process for selecting and installing monitoring sites within the Washington Network. It also defines the roles and responsibilities of the organizational positions responsible for managing and implementing the Washington Network. It is designed to be used by all Washington Network partners including Ecology, local air agencies, federal agencies, and Tribal nations.

This procedure does not address site selection and installation for air sensors. The process for monitoring using air sensors is described in the AQP policy AAM 2, available on the Monitoring Advisory Committee (MAC) SharePoint site.

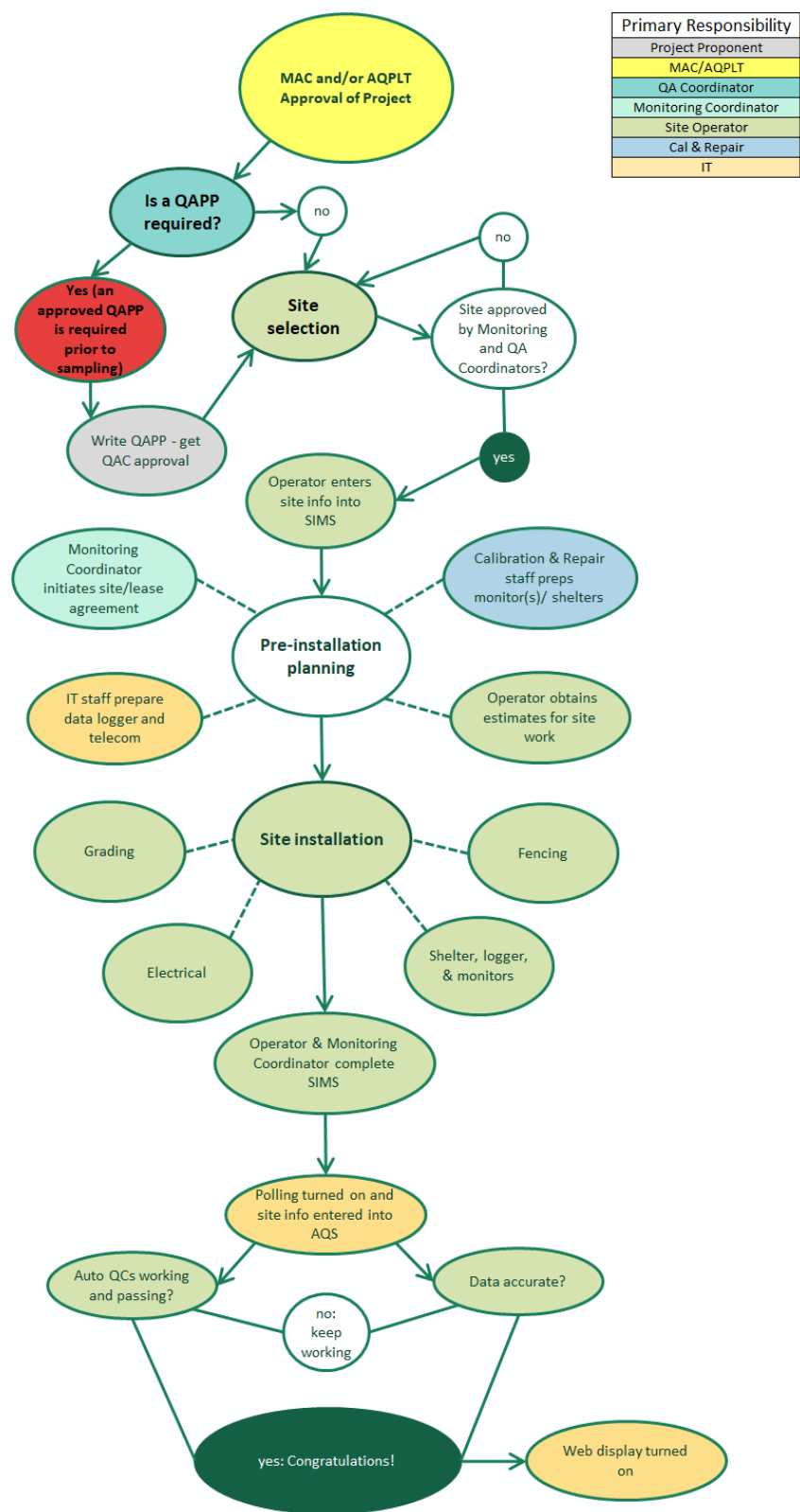Figure 1-1 presents the flow of a monitoring project from approval to data collection.

Figure 1-1. Air monitoring project flow chart

2. Roles and Responsibilities

This section outlines the roles and responsibilities of AQP staff and its partner agencies in relation to monitoring site selection and installation.

2.1   Monitoring Advisory Committee

The Monitoring Advisory Committee (MAC) serves as Ecology's advisory body for monitoring within the Washington Network. Its primary role is to design and implement the Washington Network in alignment with the strategic goals of the AQP.

The MAC meets monthly to review monitoring project proposals, establish monitoring policies, and guide the implementation of monitoring projects.

The MAC, empowered by the Air Quality Program Leadership Team (AQPLT), has the authority to approve or reject monitoring proposals. However, the AQPLT allocates resources to monitoring projects. The Deputy and Program Managers have ultimate approval authority for monitoring projects within the Washington Network.

For more details on the role and decision-making processes of the MAC, refer to the MAC charter available on the [MAC SharePoint site](#).

The MAC is comprised of the following AQP personnel:

- **Executive sponsor:** Deputy Program Manager
- **AQPLT Lead:** Technical Services Section Manager
- **MAC Meeting Lead:** Air Monitoring Coordinator
- **Team members:**
    - Central Region representative*
    - Eastern Region representative*
    - Rules & Planning Unit representative*
    - Science & Analysis Section Manager
    - Modeling/meteorology representative*
    - Climate Commitment Act data user representative*
    - NWRO/SWRO & Air Quality Operations Unit Supervisor
    - Quality Assurance Coordinator
    - Air monitoring operator*

* Managers can rotate MAC representation among staff. These positions should be rotated at a frequency of no less than 1 year to ensure reasonable continuity.

2.2   Monitoring management and personnel

The implementation of the Washington Network is the work of a statewide team including AQP personnel, as well as station operators from local, federal, and Tribal nation air agencies.

The roles and basic responsibilities of key Washington Network Personnel are outlined below. Personnel are AQP employees unless otherwise specified.

Deputy Program Manger

- MAC Executive Sponsor
- Supervises the Technical Services Section Manger, Central Region Office (CRO) and Eastern Region Office (ERO) section managers

Technical Services Section Manager

- AQPLT Lead for MAC
- Supervises:
    - NWRO/SWRO and Air Quality Operations Unit Supervisor
    - Air Monitoring Coordinator
    - QA Coordinator and QA specialists
    - IT & Telemetry Unit Manager
- Manages statewide air monitoring budget

Air Monitoring Coordinator

- MAC Meeting Lead
- Point of contact for new monitoring requests
- Approves site and shelter rental agreements
- Writes contracts for air monitoring/QA/Telemetry System support in coordination with QA Coordinator and IT Unit Manager
- Writes and submits annual network plan to EPA
- Reviews and approves site locations in coordination with QA Coordinator
- Reviews and approves quality assurance project plans (QAPPs) and standard operating procedures (SOPs)
- Manages federal air monitoring grants
- Completes site documentation in the Site Information Management System (SIMS) in coordination with air monitoring operators prior to beginning sampling
- Leads evaluation of new air monitoring technology

ERO Section Manager

- Supervises ERO monitoring operators

CRO Section Manager

- Supervises CRO monitoring operators

NWRO/SWRO & Air Quality Operations Unit Supervisor

- Supervises monitoring operators at the NWRO and SWRO, Calibration and Repair Laboratory staff, and Air Quality System (AQS) Coordinator

Calibration and Repair Laboratory Staff

- Maintain equipment inventory
- Calibrate, maintain, and repair Washington Network monitors and equipment

- Evaluate, select, and acceptance test new monitoring equipment for use in the Washington Network
- Provide technical assistance to site operators on the installation, operation, calibration, maintenance, and repair of Washington Network monitors and equipment
- Write SOPs

QA Coordinator

- Reviews and approves the Washington Network Quality Assurance Plan (QAP), special study Quality Assurance Project Plans (QAPPS), and SOPs
- Reviews and approves site locations in coordination with Monitoring Coordinator
- QA team lead

QA Specialists

- Conduct independent performance evaluations (audits)
- Conduct site evaluations to ensure siting criteria are consistent with monitoring objectives
- Conduct final level validation of ambient air monitoring data
- Write SOPs
- Conduct special monitoring projects
- Evaluate air monitoring equipment
- Maintain QA laboratory and standards (separate from operations)

Information Technology Staff

- Responsible for the following components of the Washington Network:
  - Central servers and databases
  - Data logger hardware and software
  - Telecommunication network, contracts, services, configuration, hardware, and software
  - Ambient air monitoring and associated metadata backup
  - Public ambient air quality data website
- Submit data to EPA's AirNow system
- Define, implement, and maintain security practices for data, data loggers, other equipment, and the telecommunication network and servers
- Define procedures for requesting IT and Washington Network services including use of SIMS

Air Monitoring Site Operators (Ecology, Partner Agencies, and Tribes)

- Work with Air Monitoring Coordinator to identify and establish monitoring locations
- Obtain quotes for services (e.g., electrical, fencing, site grading, etc.) related to ambient air monitoring stations
- Install monitoring sites, shelters, and equipment
- Maintain monitoring sites (remove debris, cut grass, control weeds, keep shelter clean and dry)

- Conduct preliminary validation of air monitoring data
- Complete site documentation in SIMS
- Operate and maintain monitors and sites
- Perform minor repairs
- Routinely review QC results
- Write SOPs

AQS Coordinator

- Submits air monitoring, quality control (QC), and performance audit data to EPA's Air Quality System (AQS)
- Maintains site and monitor metadata in AQS

3. Quality Assurance Project Plans

EPA mandates that all projects funded by EPA involving the generation, acquisition, and use of environmental information are planned, documented, and have a QAPP that is approved by Ecology's QA Officer or their designee. To satisfy this mandate, Ecology requires QAPPs for all projects that generate or interpret environmental information. QAPPS are written and reviewed according to EPA guidance.

The AQP's Quality Assurance Plan (QAP) and its associated standard operating procedures (SOPs) describe the Washington Network quality system. The QAP specifies QA activities, data quality objectives (DQOs), and reporting requirements for most ambient monitoring conducted by the AQP and its partners. It covers the SLAMS, PSD, NCore, IMPROVE, and CSN monitoring efforts, as well as any project employing commonly used instrumentation and methods.

Monitoring projects outside the QAP's scope require a project-specific quality assurance project plan (QAPP). An approved QAPP must be in place prior to beginning any environmental monitoring. QAPPs for the PAMs and NATTS monitoring programs are available on Ecology's Air Monitoring for Professionals website.

A project's QAPP documents how QA and QC activities will be implemented throughout the project. They serve as a blueprint for program managers, project officers, and site operators responsible for designing, coordinating, and implementing monitoring projects. The QAPP outlines requirements to collect information of the correct type and of adequate quality for intended uses.

Ecology follows EPA's graded approach to writing QAPPs. This means that project managers must consider the scale and potential impacts of each project when working with the QA coordinator to determine the appropriate level of detail and DQOs contained in the QAPP. The graded approach is further discussed in Ecology's QMP.

Project managers must consult with the QA Coordinator to determine if a new monitoring project is not covered under the AQP's QAP, and therefore requires its own QAPP. If a project-specific QAPP is needed, the QA Coordinator will work with the project manager to determine the appropriate level of detail (i.e., the grade of the Graded Approach) and provide timely review of the QAPP.

4. Information Technology Requirements

Most fixed monitoring sites within the Washington Network are equipped with TCP/IP-addressable, PC-based data loggers connected to a central data acquisition system (central system) that polls hourly. BAM 1022 PM samplers are equipped with cellular modems and connect directly to the central system.

Each monitoring project within the Washington Network requires data collection, storage, web display, and records retention. It is the responsibility of the project manager to alert telemetry staff in the AQP IT & Telemetry Unit as soon as a project receives MAC approval. This ensures adequate time and funding for acquiring data collection equipment and software, and smooth setup of data collection, storage, retention, and web display processes.

The project manager or their designated site operator must update the Site Information Management System (SIMS) as soon as a monitoring site has been selected. SIMS is discussed further in Section 6 of this document.

IT security in Washington State is overseen by the Office of the Chief Information Officer (OCIO) within Washington Technology Solutions (WaTech). The OCIO's statewide IT policies, standards, and guidelines apply to Ecology, local air agencies, and other Washington Network partners and their staff. In the AQP, the IT & Telemetry Unit is responsible for ensuring the Washington Network follows OCIO requirements.

5. Site Selection

Once approved by the MAC, new projects must undergo the site selection process described in this document. This process includes steps for choosing suitable monitoring locations, installing monitoring stations, and maintaining the SIMS.

5.1 Monitoring objectives

Well-defined monitoring objectives are crucial for well-planned and cost-effective projects, ensuring the quality of collected information aligns with intended uses. EPA defines three distinct objectives for air monitoring:

- To provide air pollution information to the public in a timely manner
- To determine compliance with National Ambient Air Quality Standards (NAAQS) and emissions strategy development
- To support air pollution research

Pursuant to these categories, EPA defines six primary monitoring objectives:

- Determine the highest concentrations expected to occur in the area covered by the network
- Measure typical concentrations in areas of high population density
- Determine the impact of significant sources or source categories on air quality
- Determine general background concentration levels
- Determine the extent of regional pollutant transport between populated areas
- Measure air pollution impacts on visibility, vegetation damage, and other public welfare-based impacts in support of secondary standards

A project may encompass additional monitoring objectives beyond the EPA's primary set.

5.2 Monitoring spatial scales

Monitoring sites must be located such that the spatial scale represented by the monitor aligns with the monitoring objective. Sites in the Washington Network fall into one of the EPA's five spatial scale categories:

- **Micro**: Concentrations in areas ranging from several meters to 100 meters
- **Middle**: Concentrations typical of areas up to several city blocks in size with dimensions ranging from 100 meters to 0.5 kilometers
- **Neighborhood**: Concentrations in an extended area that has relatively uniform land use with dimensions in the range of 0.5 to 4 kilometers
- **Urban**: Citywide conditions with dimensions on the order of 4 to 50 kilometers. This scale would usually require more than one site for definition
- **Regional**: Typically, rural areas with reasonably homogeneous geography covering tens to hundreds of kilometers

Table 1 illustrates the relationship between the primary monitoring objectives and appropriate spatial scales.

Table 1. Appropriate spatial scales for monitoring objectives (from Table D-1 of 40 CR Part 58, Appendix D)

Monitoring Objective	Appropriate Siting Scale
Highest concentration	Micro, Middle, Neighborhood
Population	Neighborhood, Urban
Source impact	Micro, Middle, Neighborhood
General/background & regional transport	Urban, Regional
Welfare related	Urban, Regional

5.3   Factors in choosing a monitoring location

Washington Network monitors used to determine compliance with the NAAQS and for reporting near-real-time levels of criteria pollutants are sited in accordance with the pollutant-specific criteria detailed in 40 CFR 58, Appendices D and E, and in Ecology's instrument-specific SOPs.

Meteorological sites within the Washington Network are located consistent with PSD-quality specifications. The selection and installation of these sites follows the guidelines set out in Ecology's Meteorological Monitoring SOP and EPA's 1987 [Ambient Monitoring Guidelines for PSD](#).

For additional information on monitor siting, refer to EPA's technical assistance documents on NAAQS compliance monitoring, accessible via EPA's online Air Monitoring Technical Information Center (AMTIC).

When choosing a monitoring location, special attention should be given to the following:

- **Site Suitability and Representativeness:** The location should yield representative information that meets the monitoring objective. Factors to consider include:
  - **Spatial Scale**: The scale should align with the monitoring objective
  - **Topography**: The impact of terrain or obstructions on measured concentrations
  - **Pollutant Considerations**: The influence of nearby sources
  - **Atmospheric Conditions**: The effect of wind patterns around the site on sampling
- **Safety:** The safety of personnel at the proposed location is paramount. Important considerations include:

- o **Ladder Safety:** For rooftop monitoring installations, ladders must be safe and secure. Ground-level sites are preferred, and rooftop sites will only be considered if no suitable ground-level site is available.
  - All fixed ladders must meet Occupational Safety and Health Administration safety requirements outlined in [OSHA standard 1926.1053](#)
  - Step ladders must be appropriate for the rooftop height and the weight of the site operator, and light enough to be manageable for staff of varying physical stature and strength
  - o **Slip Hazards:** Should be identified and mitigated
- **Site Security:** The site, instruments, and equipment must be reasonably secured against theft or vandalism:
  - o Proper fencing or other barriers to vandalism/theft should be installed at sites not secured by other means
  - o Ladders must be secured against unauthorized access
- **Logistics:** The site should be easily accessible. Consider whether access is limited to certain days or hours and if personnel associated with the property must be present for operators to access the site
- **Power Availability**: Consider the cost and time required to install power in locations where not already available
- **Telecommunications**: If the location is not covered by Ecology's standard cellular service provider, special telecommunications arrangements will be needed
- **Building Considerations:**
  - o If the site will make use of an existing building, the room or shelter must be clean, dry, and maintained at a temperature between 20 and 30 °C
  - o If a new shelter will be installed, the location must accommodate a shelter of appropriate size and dimensions for the monitoring equipment
- **Cost**: Identify the most cost-effective options that meet the monitoring objectives

5.3.1 Identifying an appropriate site

The Air Monitoring Coordinator will assist the project manager or designated site operator in identifying a suitable appropriate site that aligns with the monitoring objectives through:

- The use of online mapping software, such as Google Maps
- Evaluation of available modeling data in collaboration with Ecology modelers
- In-person visits of trained air monitoring personnel to evaluate potential sites

Upon identifying a potential site, the project manager should work with the Air Monitoring Coordinator to secure permission from property owners for land or facility use. The Air Monitoring Coordinator can arrange necessary evaluations of site installations, such as obtaining an engineering assessment for a rooftop met tower.

Site operators must provide basic site location information (e.g., address, latitude and longitudinal coordinates) to the Air Monitoring and QA Coordinators via email before site installation.

Personnel responsible for installing the site will evaluate the proposed location for compliance with the siting criteria defined in 40 CFR 58, Appendices D and E, for the specific parameter(s) being monitored. Locations will only be approved by the Air Monitoring and QA Coordinators when the location is consistent with monitoring objectives and meets siting criteria.

Once a site location has been approved, the Air Monitoring Coordinator will work with the property owner to establish a site/lease agreement if necessary.

6. Site Information Management System

EPA requires states to record metadata related to monitoring locations. The AQP records this information in the Site Information Management System (SIMS).

Station operators update SIMS when a site is established or discontinued, and when monitored parameters or physical conditions at the site change.

IT staff uses the information in SIMS to configure data loggers and their telemetry systems.

The AQS Coordinator provides SIMS information to EPA. This information is necessary for submitting data from Ecology's telemetry system to EPA's AQS.

SIMS also serves as the air monitoring and IT equipment inventory, fulfilling state and federal requirements for equipment tracking. IT and Calibration & Repair staff maintain the Equipment Inventory section of SIMS.

SIMS encompasses:

- **Site Information:** Address, physical location, type of monitoring site, probe information, monitored parameters
- **Geographical Information:** Latitude, longitude, elevation
- **Monitor/Station Type:** SLAMS, NCore, Near-road, SPMS, etc.
- **Instrumentation and Methods:** Pollutants measured, equipment make and model, etc.
- **Measurement Scale:** Micro, middle, neighborhood, etc.
- **Land Use:** Industrial, commercial, etc.
- **Location Setting:** Urban or rural
- **Monitoring Objective**
- **Telemetry and Telecommunication Information:** Central setup, data logger channel mapping
- **Probe Location:** Top of building, ground level, etc.
- **Equipment Inventory**

Additional site info is available via Ecology's Envidas ambient air monitoring website, including:
- Site photos, including photos facing the 8 compass cardinal points (N, NE, E, SE, etc.)
- A Microsoft Bing map showing the location of all monitoring locations in the state
- Air Quality Index (AQI) information

7. Site Installation

Once a site location is approved, the project manager or site operator is responsible for the following steps:

- **Equipment acquisition**
  - Contact the Calibration & Repair Laboratory to procure monitoring equipment. Notice of at least 60 days is required. Allow for additional time if new instruments or equipment are needed, as purchases exceeding $30,000 typically require a competitive bidding process
  - Contact the IT Unit to procure data logging and telecommunication equipment. Prior notice of at least 30 days is required
- **Contracting.** Obtain bids and schedule contractors. Ecology staff must collaborate with their Purchasing Coordinators to ensure that all work complies with legal requirements and agency contract rules
  - Electrical Installation. Electrical power must be installed by a licensed and bonded electrician. Figure 7-1 shows a new electrical installation
  - Site Grading
  - Fencing and Site Security Measures
  - Crane Services required for lifting monitors/shelters onto rooftops
- **Site installation**
  - Install and secure site shelter and platform, if applicable
  - Install adequate shelter temperature controls
  - Ensure the site is secure through fencing or other means
  - Install necessary safety equipment, such as mats to prevent slips
  - Install monitoring instruments and ancillary equipment such as probes, sample lines, pumps
  - Install data logger, modem, router, and uninterruptible power supply (UPS)
- **IT coordination**
  - Enter all necessary site information into SIMS before data collection
    Note: IT staff will not configure sites or initiate data collection in the central system until SIMS has been updated
  - Ensure that Ecology IT security policies are followed. Non-Ecology keyboards, mice, and monitors are not allowed
- **Data quality verification**
  - Conduct initial QC checks on all instruments and ensure that monitors are operating properly before sampling begins
  - Confirm that any automated QC checks are occurring on the required schedule and that sequence phases are correctly programmed per the SOP
  - Verify that all QC results are being correctly captured by the logger and reported to EnvistaARM.
  - Confirm that diagnostic data are being correctly captured by the logger and reported to EnvistaARM

Figure 7-1. Electrical installation at the Tacoma-S. 36th St. near-road location

Prior to site installation, IT staff will:

- Provide a data logger that has been configured for the parameters being measured. This includes:
    - Installation of Ecology IT security software
    - Configuration of data channels
    - Setup of diagnostic data polling
    - Programming of automated QC sequences and control limits
- Supply all telecommunications equipment.

After the operator enters required site installation information into SIMS, monitors will be set up in the central telemetry system and AQS.

IT staff are responsible for ensuring that:

- Results are being collected by the data logger
- All diagnostic data are being polled
- The data logger is being polled by the central system
- Data are displayed on Ecology's air monitoring website and submitted to EPA's AirNow system

The AQS Coordinator is responsible for:

- Assigning an AQS ID number
- Entering site information in AQS

8. Example Timeline

Following project approval, a typical site installation will take 3 to 6 months. Complicated projects, such as Near-road or NCore, may require additional time. The addition of a single monitor at an existing site should be considerably shorter, ranging from a few days to weeks.

Project managers and site operators should use the following example timeline for planning purposes. Note that many of these tasks can occur concurrently.

Site Selection Process for MAC-Approved Projects

- Completion of proposed site selection forms   15 days
- Approval by Air Monitoring and QA Coordinators   15 days
- Establishment of site/lease agreement   60 days

Monitor and Equipment Procurement

- If monitors and equipment are already owned   60 days
- For new monitors and/or equipment   90 days or more

Telemetry and Telecommunication Setup

- Acquisition of telecommunication services   30 days
- Telemetry setup (after SIMS is updated)   15 days
- Establishment of data logger to analyzer communications
  (new manufacturer, new type of analyzer)   30-60 days
- Ordering of new IT and telecommunication equipment   30-90 days

Site Installation

- Site grading, electrical work, shelter setup, fencing   30-120 days
- Installation of monitors, sample lines, and equipment   15 days
- Post-installation QC and troubleshooting   15 days

9. References

"Network Design Criteria for Ambient Air Quality Monitoring." *Code of Federal Regulations* Title 40, Pt. 58, Appendix D, current through November 30, 2023.

"Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring." *Code of Federal Regulations* Title 40, Pt. 58, Appendix E, current through November 30, 2023.

U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*, Research Triangle Park, 1987 (EPA/450/4-87-007).

U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards. *Quality Assurance Handbook for Air Pollution Measurement Systems Volume II: Ambient Air Quality Monitoring Program.* Research Triangle Park, 2017 (EPA-454/B-17-001).

U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards. *Quality Assurance Handbook for Air Pollution Measurement Systems Volume IV: Meteorological Measurements Version 2.0*. Research Triangle Park, 2008 (EPA-454/B-08-002).