Air Management Services
Annual Report for Calendar Year 2021

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Director

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Introduction

Air Management Services (AMS), a division of the Philadelphia Department of Public Health and the air pollution control agency for the City of Philadelphia, has made great strides over the past years in protecting the people of our City from the adverse effects of air pollution. This report details our unit's goals, a summary of activities and revenues collected, and our progress in calendar year 2021 towards meeting our objectives set under the Clean Air Act.

Mission and Vision

Mission Statement: Air Management Services, a division of the Philadelphia Department of Public Health, is committed to protecting the health, well-being, and quality of life of the people who live, work and visit Philadelphia from the adverse effects of air pollution.

Vision Statement: To ensure all Philadelphia residents have access to safe, clean air.

Goals

Achieve and maintain the National Ambient Air Quality Standards (NAAQS) in Philadelphia by implementing all relevant federal, state, and local air regulations. These air quality standards may be further reduced based on updated scientific information. Among these are:

- Achieve the 2015 ambient ozone standard of 0.070 parts per million (average over eight hours) by December 31, 2022. This can only be achieved by considering the mobile sources, which AMS is working on with EPA, PA DEP and other Stakeholders.

Other agency goals include:

- The City should minimize risk to all residents from air toxics to less than one in a million (cancer risk by a source, above what would normally be seen in the general population).
- AMS will also work with EPA and other stakeholders to seek alternative funding sources for the air program from the transportation sector such as emission fees for mobile sources and/or vehicle registration fees.
- Gather the best information available to appropriately address the many factors involved in the regulation of air quality, including health, quality of life, equity, and economic impacts.
- Improve AMS' profile and its community services to Philadelphians and operate in accordance with the Pennsylvania Department of Environmental Protection's *Environmental Justice Policy* and enhance public participation.
- Streamline communication within the agency and with outside groups such as researchers and educators in order to improve the profile and public perception of the agency and to raise awareness about the importance of clean air to public health and welfare.

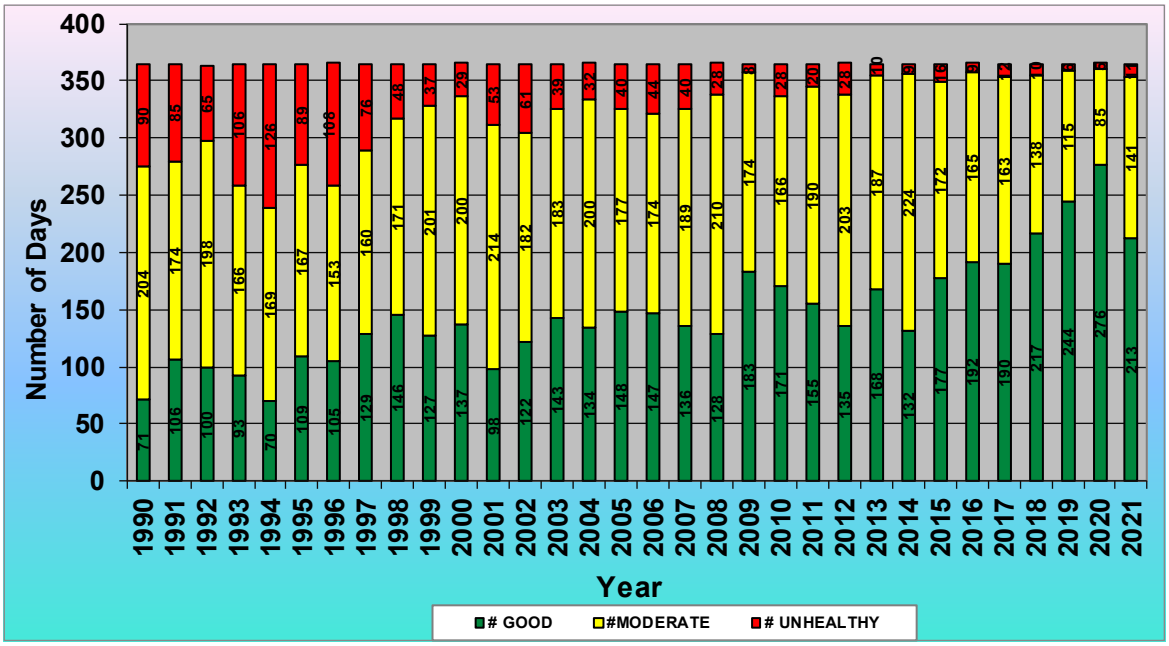
- Educate the public about air quality, energy efficiency and sustainability.
- Plan and coordinate with other authorities to reduce the impact of air pollution from the transportation sector.
- Assist businesses to help them comply with environmental regulations while being sensitive to the economic implications of these regulations.
- Coordinate with the Mayor's Office of Sustainability to support their goal of making Philadelphia the greenest city in America.
- Maintain existing resources at AMS, particularly our high-caliber knowledge and skill base, by continuing to educate and train employees.
- Coordinate with the Philadelphia Port Authority to establish a detailed and robust annual emission inventory and establish an air toxics and particulate matter monitor near the Delaware River.
- Assist business owners by establishing various web-based tools that allow the online submission of permit and license applications and fees.
- Work with the Air Pollution Control Board, the regulated community, and other stakeholders to develop or modify regulations to reduce or control emissions of criteria pollutants to help meet the NAAQS.
- Work with other stakeholders and PA DEP on VW NOx reductions calculations and cost effective analysis for the City of Philadelphia.
- Submit background document and propose update of regulation (draft AMR IX) for on-road sources (diesel trucks and buses to use Tier Four or above; or use emission control devices, retrofitting) and non-road sources (construction equipment, diesel cranes at port) to APCB after EPA, PA DEP, and Health Commissioner office agreement on the issue.
- Measure air toxics and carbonyls around PES refinery area (Grant award from EPA).
- Risk assessment for cancer and non-cancer risk implementation including methyl bromide at the Port.
- Generate air quality data from 50 locations in the Philadelphia Air Quality Survey, make analysis for all four seasons and annual data, and produce written summary report by December 2022.
- Reduce and resolve all backlogs (NOVs, conformance checking, and permits), targeting 95% by December 2022.
- Develop and implement plan for enhanced monitoring of air quality at Hilco (Former PES); Redevelopment, issuing asbestos permit (revenue close to $1 million) and inspecting the site, issuing dust permits and inspecting (revenue not yet determined for permits).
- Start working on the 2015 RACT for ozone.
- Promulgate regulations to protect the public health and the environment, discuss about mobile sources and updating non-road emission reductions from construction equipment (Executive order 1-07).
- Issue installation permits and operating licenses for unpermitted facilities.
- Issue installation permits for minor sources and start analysis for emission controls for major sources (greater or equal to 10 tons of methyl bromide/year) of fumigation at the port.
- Utilize Mobile Van Monitors throughout the city to measure real time toxics and criteria pollutants.

- Win the American Rescue Plan competitive grant for air toxics and criteria pollutants monitoring in overburden communities.
- Promulgate Environmental Justice policy for the City of Philadelphia.

Air Quality Index

Air quality in Philadelphia has dramatically improved over the past few decades, as evidenced by the relatively fewer number of unhealthy air quality days (adjusted to the current standard) during the past several years, as shown in the graphic below. It is important to note that air pollution, especially ozone which forms in the presence of heat and sunlight, is weather dependent and varies significantly from year to year depending on meteorological trends. The decrease in the number of Good days and the increase in the number of Moderate days may be attributed to changes in the AQI breakpoints due to strengthening of the NAAQS for ozone and $PM_{2.5}$. In addition, changes to $PM_{2.5}$ sampling from a filter-based to a continuous monitor also affected the number of Good and Moderate days.

Good, Moderate and Unhealthy Air Quality Days[1]

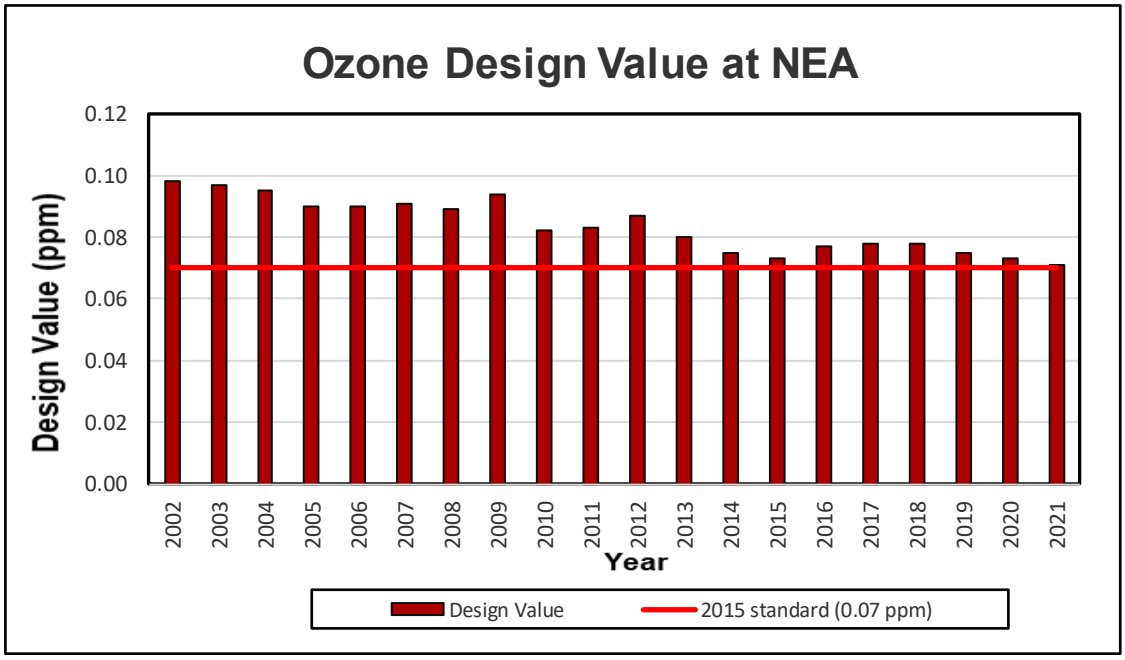


Air quality in Philadelphia has been steadily improving even for ozone and fine particulates – the region is in nonattainment only for ozone. Philadelphia is now designated as being in attainment for fine particulate matter, or $PM_{2.5}$ (particles less than 2.5 micrometers in diameter) for the 2006 24-hour and 1997 annual standards. EPA changed the annual standard for $PM_{2.5}$ from 15 micrograms per cubic meter to 12 micrograms per cubic meter in 2012. Philadelphia currently meets the 2012 annual standard for $PM_{2.5}$.

[1] Data for 2021 obtained from AMS' AirVision data and not EPA's Air Quality System.

For 2021, Philadelphia experienced 11 unhealthy AQI days, 9 from ozone and 2 from $PM_{2.5}$. For 2022, AMS expects the number of unhealthy days from ozone to increase slightly or stay the same due to the more stringent 2015 standard of 70 parts per billion of ozone over eight hours and recovery of normal activities from restrictions due to COVID-19. AMS expects long term trends for ozone to decrease due to regulations that will reduce ozone precursors.

Although Philadelphia is currently in nonattainment for the 2015 8-hour ozone NAAQS, the trend shows that attainment can be achieved in the coming few years. Ozone is a pollutant that is not emitted directly by emission sources, but forms in the atmosphere in the presence of heat and sunlight as part of chemical reactions between other pollutants –specifically, oxides of nitrogen and volatile organic compounds. Ozone is very irritating to the lungs and contributes to heart and lung diseases such as asthma. The graph below shows ozone trend at the NEA monitoring site.



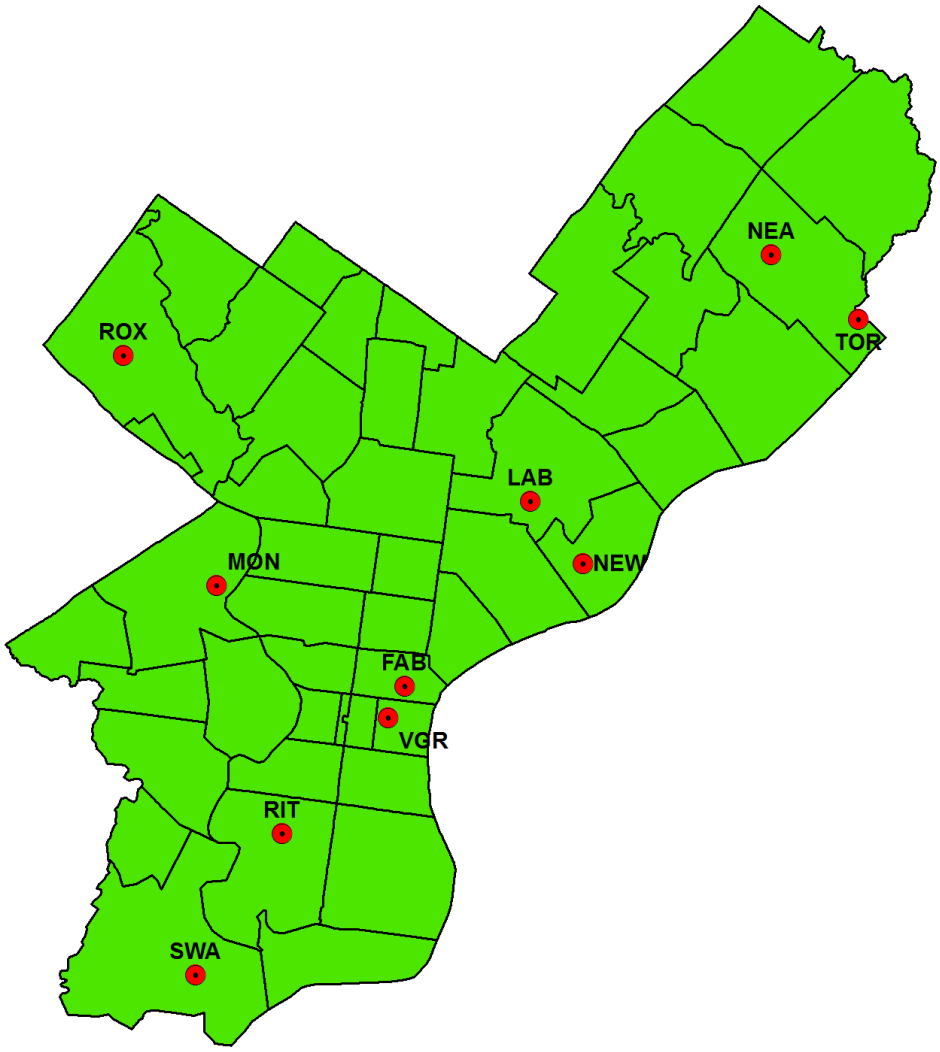
Monitoring Programs

In 2021, AMS operated an EPA-required network of ten air monitoring sites located throughout the City that measure such parameters as criteria pollutants and air toxics. Eight sites (LAB, NEA, NEW, RIT, FAB, TOR, MON, and VGR) measured a number of criteria pollutants, depending on the site: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter (PM_{10} and $PM_{2.5}$). These measurements are made in "real time", meaning that the measurements show pollution levels as they occur, instead of after the fact. Four sites (ROX, RIT, SWA, and NEW) also measured air toxics through canisters, such as

1,3-butadiene, benzene, and carbon tetrachloride. One site, VGR, measured O_3 and $PM_{2.5}$ as part of a pilot study for research and development, utilizing solar and wind turbine power. The following map shows the location of air monitors and the parameters measured at each monitoring location. AMS measures air quality for several reasons:

- To ensure that long-term goals and targets to reduce levels of air pollution are being met.
- To provide information to the public as to how good or bad the air quality is in Philadelphia.
- To ensure attainment with standards set forth by the United States Environmental Protection Agency.

2021 PHILADELPHIA
AIR MONITORING NETWORK



AMS strives to achieve a 75% or greater data quality capture rate at each quarter for each criteria pollutant monitor, per federal requirements in the Appendices in 40 CFR Part 50.

The 2021-2022 Air Monitoring Network Plan for Philadelphia is available at: https://www.phila.gov/media/20210628174821/2021-2022-AMNP-FINAL_ALL.pdf

AMS completed its seventh year of monitoring with the Village Green Park Bench Air Pollution Monitoring System at 6th and Arch Streets across from the Constitution Center, measuring $PM_{2.5}$ and ozone, as well as local wind speed, wind direction, temperature, and humidity, utilizing solar and wind turbine power, to increase community awareness of environmental conditions. Additional information about Village Green can be found here: https://archive.epa.gov/epa/air-research/village-green-project.html.

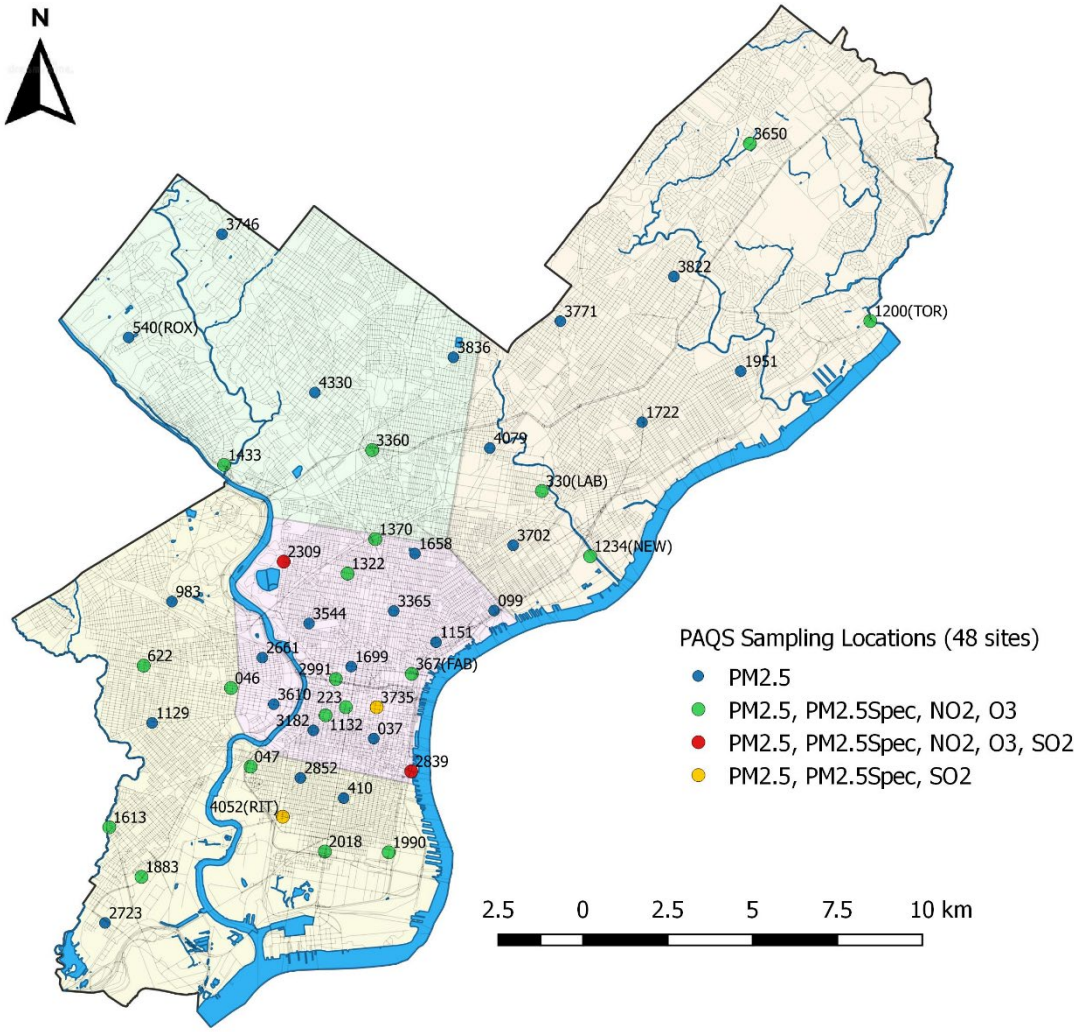
In 2022, AMS considers to install air monitoring devices similar to Village Green to measure particulate at the Port and test sensors from SCAQMD's AQ-SPEC Air Quality Sensor Performance Evaluation Center: http://www.aqmd.gov/aq-spec/evaluations. The EPA Office of Research and Development through an EPA Grant (Regional Sustainability and Environmental Sciences Regional Sensor Loan Program) would like to assess the river port. Due to COVID-19 this project was put on hold. AMS hopes to hear from EPA on the possible re-start of the program.

In June 2021, AMS strated its Photochemical Assessment Monitoring Station (PAMS) for the enhanced monitoring of ozone, oxides of nitrogen (NOx), and volatile organic compounds (VOC) to obtain more comprehensive and representative data on ozone air pollution. AMS continued testing its Auto GC, added its Mixing Layer Height measurements to the Unified Ceilometer Network (UCN; https://alg.umbc.edu/realtime-update-phil/), and ran measurements of True NO_2, NOy, Carbonyls, Temperature, Relative Humidity, Barometric Pressure, UV Radiation, Solar Radiation, Precipitation, Wind Speed, and Wind Direction.

In 2020, the EPA announced it selected 11 out of 23 air toxics monitoring projects to receive funding under the Agency's Community-Scale Air Toxics Ambient Monitoring grants. AMS was one of the winners and one of two selected in EPA Region 3. More information can be found here: https://www.epa.gov/amtic/community-scale-air-toxics-ambient-monitoring-csatam. AMS finalized preparations in 2021 to start the project implementation in 2022.

In 2018, AMS began a new project called the Philadelphia Air Quality Survey (PAQS). This project aimed to set up 50 street-level, neighborhood-oriented air sampling sites throughout the City to sample the ambient air for $PM_{2.5}$, NO_2, SO_2, and O_3. The sites are also equipped with meteorological sensors. PAQS captures the seasonal changes and neighborhood-to-neighborhood spatial variances in air quality. At the end of 2021, the project finished 57 sessions of field operation with each session being a 2-week air sampling period. Each of the 50 sites was monitored once or more during each season (3-month period). For the period from December 2020 through November 2021, the citywide all-sites 12-month average $PM_{2.5}$ concentration was 8.4 $\mu g/m^3$. When comparing 2-week average values, the PAQS data of $PM_{2.5}$, NO_2, and O_3 concentrations track closely with those of FRM/FEM based on collocated samples. A PAQS project report based on the first two years' data was posted on the AMS website at https://www.phila.gov/media/20210316150355/PAQS_Report_Sept4-2020_final.pdf . Based on

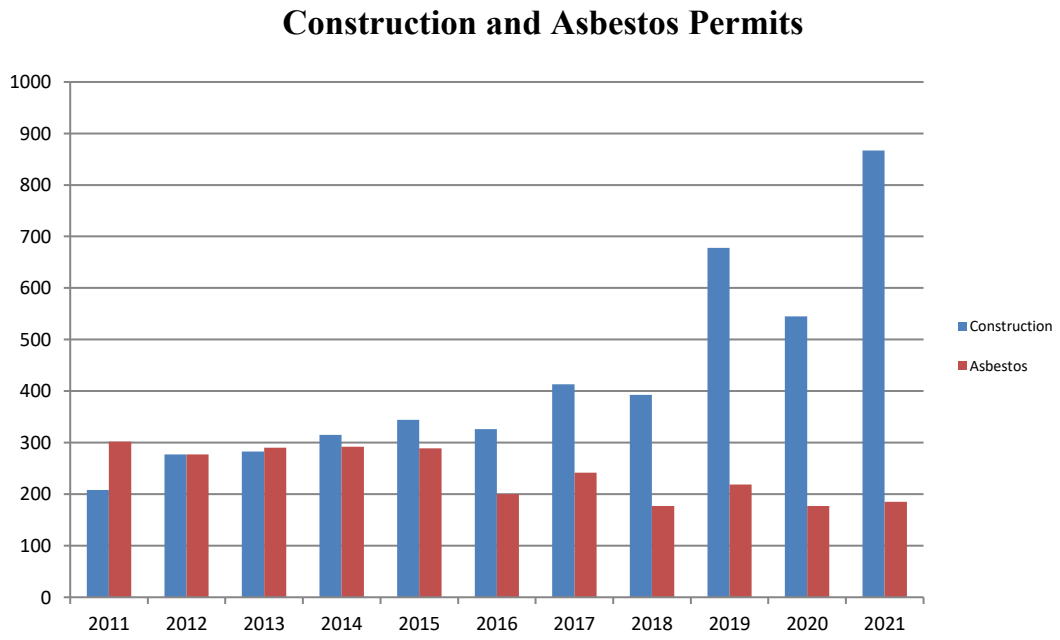
data analysis of the first two years' measurements, adjustments were made in the monitoring site network in order to: 1) add sampling sites where local communities had significant air quality concerns but monitoring data were unavailable or insufficient, and 2) discontinue sites where both the air pollution levels and the population density were relatively low. After these adjustments, the PAQS project currently maintains 48 sampling sites, as shown in the map below.



Permitting Activities

In 2021, AMS issued 867 construction and 185 asbestos permits. This is higher than 2020, likely due to increased activities of companies and businesses and the ongoing project to find unpermitted sources. AMS expects similar performance in the year 2022.

The chart below lists the number of construction permits (installation permits, plan approvals, and general permits) to install or modify sources of air pollution and the number of asbestos abatement permits issued from 2011 to 2021.



Enforcement Activities

AMS handles citizen complaints, periodic inspections of regulated facilities, and enforces state, local and federal laws related to air quality in the City of Philadelphia. In 2021, the enforcement of violations continued to be distributed amongst AMS Enforcement Engineers and the Enforcement Specialist. Having additional staff trained in the enforcement process will help improve efficiency of enforcement. On average, violations issued in 2021 are being resolved within our goal of 180 days from the date of issuance. Enforcement is strained due to staff turnovers and orientation needed for new staff. Two inspector supervisors and two inspectors left AMS in 2021. Violations issued prior to 2021 are being addressed on a priority to clear up the backlog.

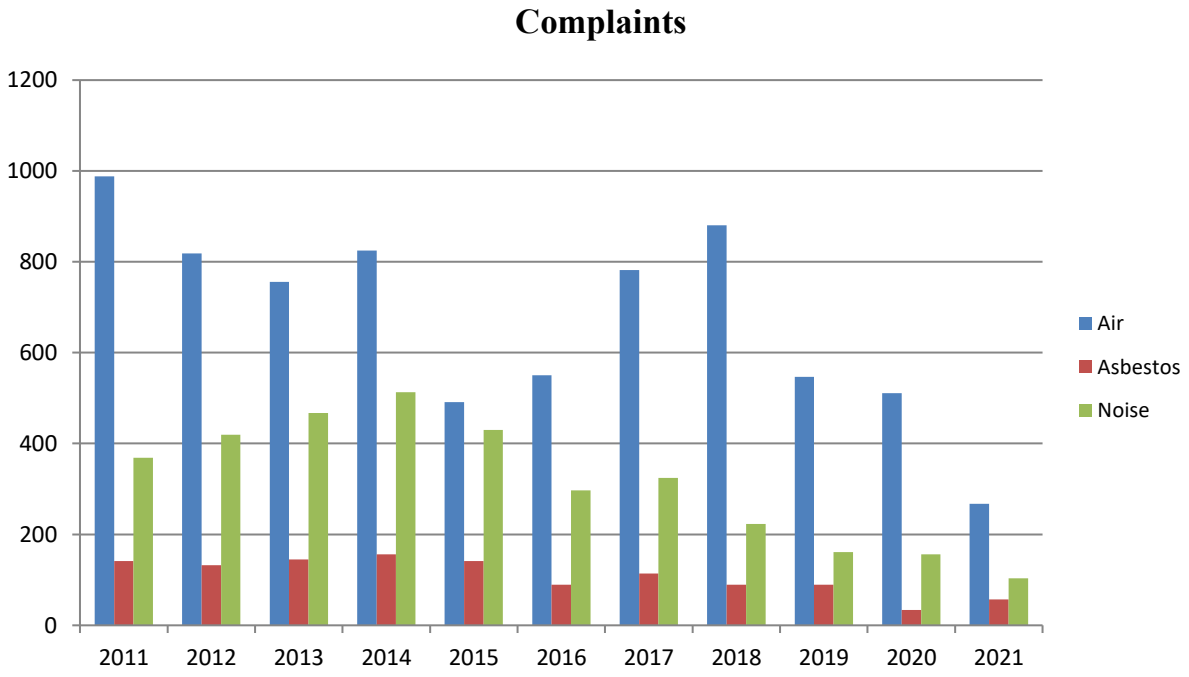
AMS fully implemented the online cloud based Citizenserve system to monitor and track inspections and enforcement activities for the Asbestos and Facility Compliance & Enforcement units. In 2021, AMS continued to use the enforcement timeline and routing system within Citizenserve to assign and track enforcement activities. In 2022, AMS will continue to make changes to the system to tailor it to specific needs and improve user friendliness.

In 2022, AMS anticipates the number of inspections and number of violations to increase as a direct result of a staff increase of air pollution control inspectors and filling vacant enforcement

engineer positions. The staff increase is needed to inspect new air pollution sources for the dust control and parking garage regulations and to increase inspections of unpermitted facilities.

Complaint Response

AMS responds to complaints from the public regarding various nuisance and air pollution issues, such as noise, vibration, odor, smoke, idling vehicles, dust, asbestos, and carbon monoxide. Below is a summary of recent activities.

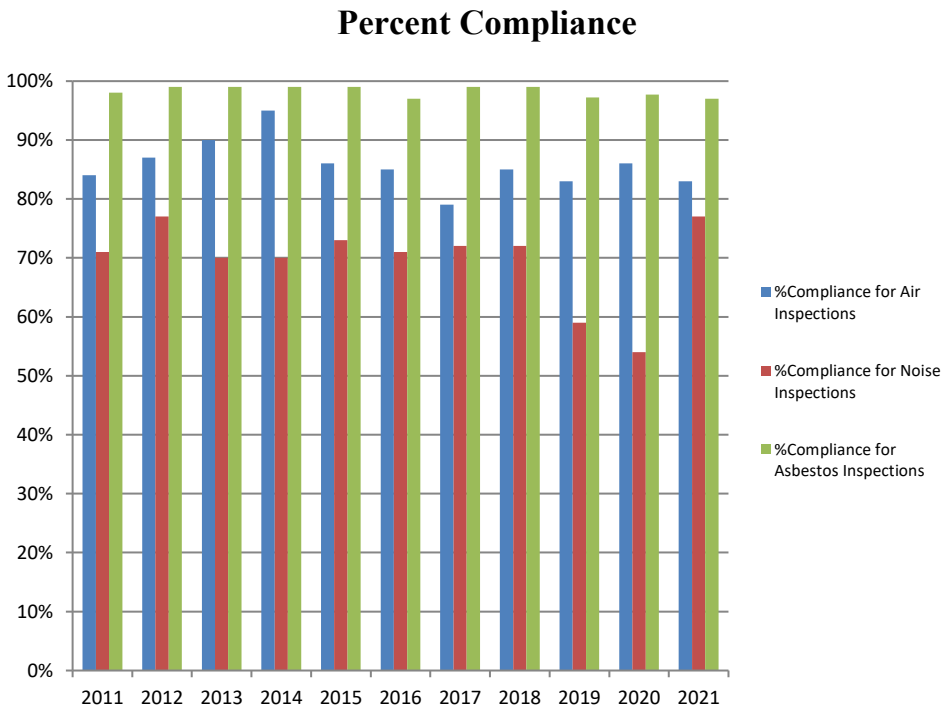


In 2021, there were 267 air complaints, 103 noise complaints, and 57 asbestos complaints,. As illustrated above, asbestos has tended to stay relatively consistent over time. It is anticipated the total number of asbestos complaints received and serviced will remain consistent on an annual basis. Air and Noise complaints tend to be more variable, and depend on weather and other factors like COVID related reduction in business activities. Complaints are sometimes clustered when there is a significant issue in a particular community, and may decline once that problem is resolved. The decrease in noise complaints in 2021 was due to more monitoring and new violations being corrected in a timely manner. When violations are unresolved, AMS would receive multiple complaints until the case is closed.

Inspection Activities

AMS is supported by a team of well-trained engineers and inspectors who enforce state, local and federal laws related to air quality and noise. They respond to citizen complaints and conduct periodic inspections of regulated facilities. When necessary, they issue Notices of Violation (NOVs) when regulation or permit deviations are observed.

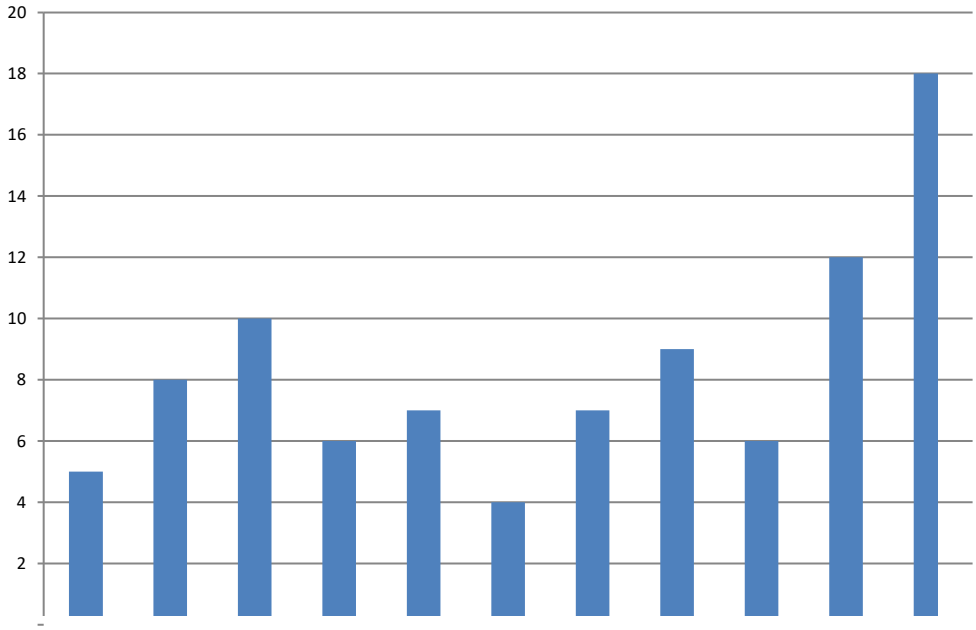
In 2021, 1994 air inspections were conducted resulting in 340 air violations, and 231 noise inspections conducted resulting in 54 violations. The number of air inspections should continue to increase in 2022 due to new sources needing permits to comply with the dust control, parking garage regulations and more inspections of unpermitted sources. AMS is planning to hire two more inspectors to address the increased workload. The compliance rate in 2021 for air inspections was 83%, which is the average over the past nine years. The noise compliance rate increased from around 54% to 77% in 2021 even with the amount of noise complaints decreasing probably due to COVID related reduction in business activities. As for noise inspections, the compliance rate is generally lower than air inspections due to the longer time frame to resolve violations, which often involves installing and/or repairing equipment to come into compliance with the restrictions of the Code.



AMS issued 66 asbestos violations as a result of inspecting 1,629 total projects in 2021. The compliance rate is 97.4 % , which is relatively consistent with previous years in Philadelphia. The increase in the number of asbestos violations issued from 2020 to 2021 is directly attributed to the economy recovering and COVID-19 restrictions receding. The asbestos inspectors continued to inspect properly notified asbestos projects as much as possible in order to bring increased awareness of project compliance oversight. The Asbestos Unit has functioned in much of 2021 with one inspector and one inspector supervisor. A new APC I candidate was retained in 2021 but the unit also lost another inspector to injury for most of the year. For 2022, it is

anticipated that the total number of asbestos violations resulting from inspections will increase as the economy and staffing recover.

Title V Facilities with Emissions Related Violations

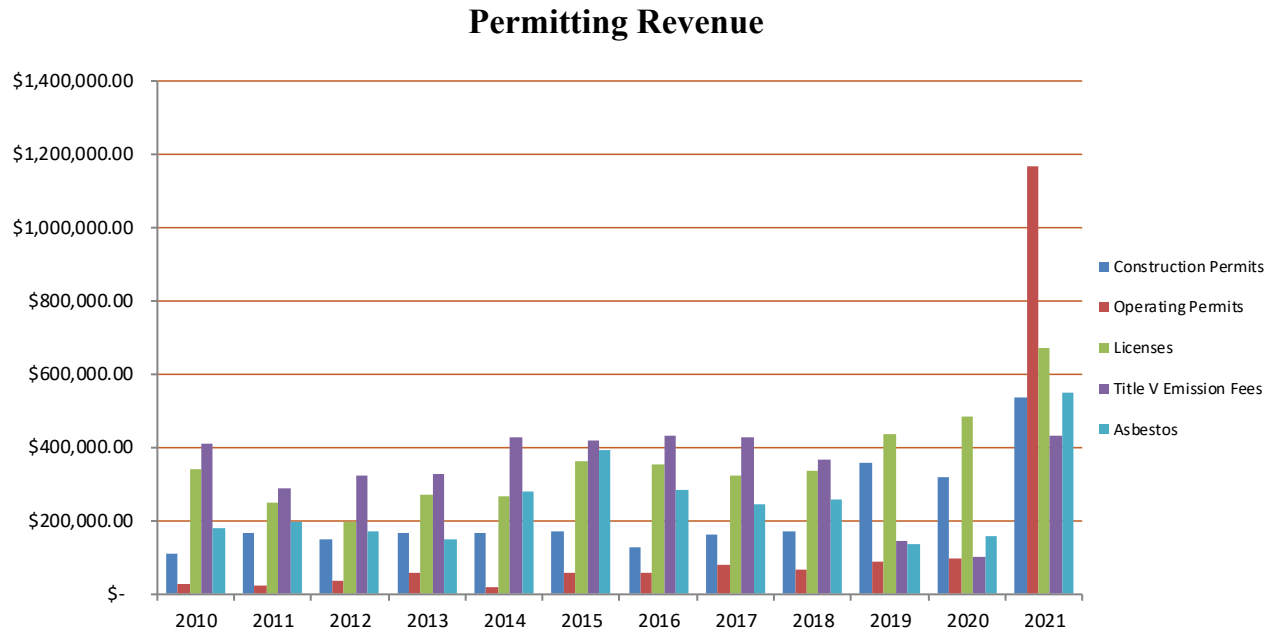


A Title V facility is a major source of pollution that is required to have air quality permits to operate under Title V of the 1990 Federal Clean Air Act Amendments. In 2021, AMS issued emission-related violations to eighteen Title V facilities. The variation from year to year is is due to an increase in compliance awareness resulting from thorough inspections.

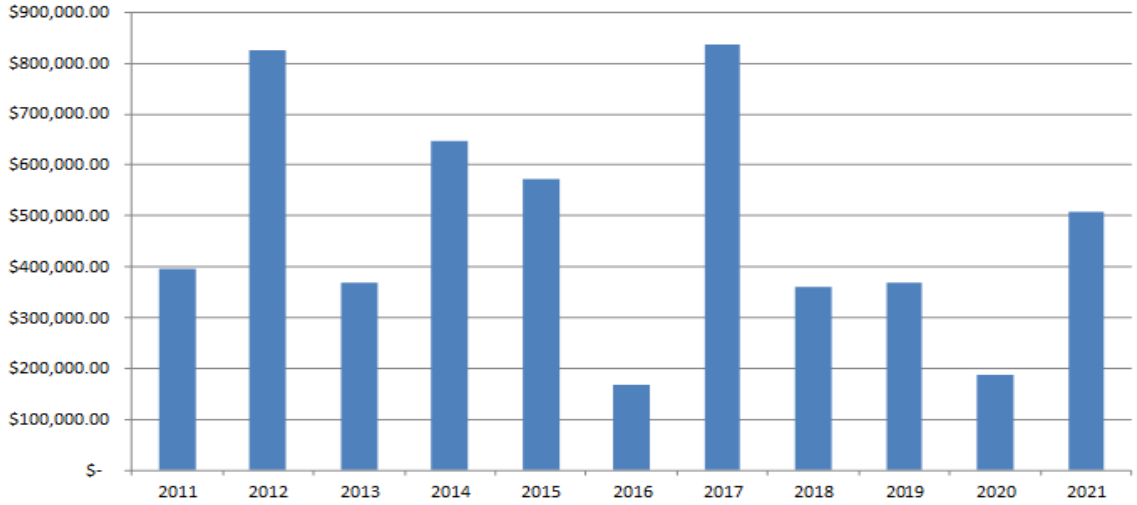
Revenue Generation

The chart below shows the fees received from construction permits (application fees), operating permits (application and annual administration fees), licenses including asbestos (application and renewal fees), and Title V permits (emission fees) in the years 2010-2021. In 2021, Construction Permit fees totaled $537,570, higher than 2020 due to economic and business recovery and a similar number is expected in 2022. Asbestos fees from licensing and certifications in CY 2021 was $168,450.00 and Asbestos Permit Fees was $549,780. AMS expected a potentially large fee increase in 2021 due to an expected increase in applications and a large increase in plan approval application (a type of construction permit) fees under Pennsylvania regulations in January 2021. Operating permit fees ($1,168,319) siginificantly increased from the 2020 value. This is due to the higher application and annual fee introduced in 2021. Title V Operating Permit holders also started to pay additional annual fees in 2021. License fees increased a little over 2020, likely due to unpermitted air pollution sources discovered in the past getting a license for the first time. Another factor for the increase in 2021 was due to projects to find more unpermitted sources. It is expected to remain similar in 2022. AMS generated $477,498 during 2021 from permitting and licensing of unpermitted sources. Title V emission fees in CY 2021 increased to $433,033.

This is largely due to PES payment of fees from last year which was held up due to bankruptcy. Without PES, emission fees will be declining in the future.



Below is the sum of fines and penalties revenue collected from 2011 to 2021. In 2021, AMS collected $507,531 in penalties. Asbestos penalty revenue (for CY 2021 - $44,800.00) has been trending lower and more inline with routine asbestos related violations and fewer NESHAP related violations. Other penalties were higher in 2021 due to the PES Refinery shutdown. The enforcement of violations are currently distributed amongst enforcement engineers and the Asbestos Program Manager.



Conclusion

AMS has implemented its agency-wide Strategic Plan to review its operations for improving air quality and reducing the impact of nuisances while promoting sustainability and job creation as well as outreach and education on air quality issues. It has been focused on finding ways to allow permit and license applicants to submit forms and pay fees online, investigating ways to improve staff training and exploring ways to connect more closely to the public as well as partners such as universities and nonprofits. In addition, AMS has been working to educate the public about the importance of air quality. These are the major AMS accomplishments throughout the years:

- The Asbestos, Source Registration, and Facility Compliances & Enforcement sections continue to utilize a cloud based permit, license, and enforcement system. The system allows the online submission of asbestos notifications, license applications, and fees. It also allowed inspectors to use (internet and VPN capable lap tops in the field to document their inspections.
- AMS completed 3.5 years' air monitoring data collection at 50 locations with the PAQS project and finalized a report. The project is ongoing. AMS is also in the process of purchasing new monitors that will measure the ambient air for the next 5-10 years. AMS will also focus on EJ communities to measure air pollutants.
- Banning of heavy fuel oils took effect on December 4, 2019. Starting April 1, 2020, no person may deliver, exchange in trade, or sell heavy fuel oil to be burned or used in Philadelphia (AMC 3-207). The Air Pollution Control Board amended Air Management Regulation III (Heavy Fuel Oil) in July 2021 that no person may deliver, exchange in trade, or sell heavy fuel oil to be burned or used in Philadelphia (AMR III).
- AMS received additional money from the General Fund to hire three engineers and four inspectors.
- AMS has found more than 3,000 emission sources that generate revenue to the city and reduce emission by permitting sources, inspections, conduction maintences, and limiting emissions.
- Issued temporary installation permits for minor sources and started analysis for emission controls for major sources (greater or equal to 10 tons of methyl bromide/year) of fumigation at the port.
- AMS received a grant from EPA to purchase equipment to measure toxics including benzene, toluene, and others. AMS will located passive toxics samplers at five locations around the former PES refinery area and the measurement will start in 2022.
- AMS will utilize mobile van monitor to measure toxics and criteria pollutants in real time in 2022. Particular focus areas will be around the refinery and overbundoned communities. This will enable AMS in implementing a rapid response to emergency and citize's complaints.
- AMS continues to measure air toxics in the former refinery area.
- AMS utilizes satellite air monitoring data with the help of NASA.

AMS will continue to gear its work in the future providing outreach to affected populations that may experience adverse human health effects from air emissions. This will include building relationships with the University of Pennsylvania, Drexel University, and community groups.