Technical Support Document for Attainment Area Screening Methodology

Federal Aviation Administration
Office of Environment and Energy

EXECUTIVE SUMMARY

The *Aviation Emissions and Air Quality Handbook* (the *Handbook*), published by the Federal Aviation Administration (FAA), serves as a resource for the planning and completion of air quality assessments for projects and actions under the jurisdiction of the FAA.

The purpose of this report is to document the technical analysis completed in the development of an *Attainment Area Screening Methodology* to reduce FAA workload by reducing the resources required to evaluate air quality impacts in Attainment Areas. The Methodology provides clarification on what to evaluate when an air quality assessment is warranted in an Attainment Area. Furthermore, it simplifies environmental review of air quality impacts from projects that occur in attainment areas by screening out such projects that have little chance of causing an adverse impact on air quality. This screening methodology screens out pollutants in attainment areas only. However, the methodology also applies to all attainment pollutants, even if an airport is non-attainment for a particular pollutant.

For Nonattainment Areas[1], the *Handbook* identifies the General Conformity Rule *de minimis* thresholds as values below which emissions from FAA Projects and/or Actions are considered to conform to the State Implementation Plan (SIP). By comparison, within the current version of the Handbook, there are no comparable emission thresholds for FAA projects in Attainment Areas.

The principal feature of this report is the technical documentation for both the scientific and regulatory background of the *Attainment Area Screening Methodology*. This report also contains:

- **Attainment Area Screening Methodology**: A basic methodology that establishes a Screening Criteria for four parameters that accommodate the bulk of airport projects. This also provides justification for the establishment of a Screening Metric and the associated Screening Criteria. The four questions supporting the Screening Criteria are:
    - Will the FAA decision result in an increase of more than 14,000 commercial aircraft operations per year, or if the project is in an OTR, more than 5,000 general aviation aircraft operations per year?
    - Will the FAA decision result in an increase of more than 340,000 minutes of aircraft delay per year?
    - Will the FAA decision result in an additional 25 million VMT per year?
    - Will the FAA decision result in the use of more than 125 construction vehicles or GSE during a year, or if the project is in the OTR, 50 construction vehicles or GSE during a year?.
- **Air Quality Assessment Flowchart (the Flowchart)**: A decision-making process for FAA projects with respect to air quality assessments that is consistent with the National Environmental Protection Act (NEPA) and the Clean Air Act (CAA), and is applicable to both operational and construction-related emissions. For Attainment Areas, the Flowchart also includes evaluation of Exempt and Presumed to Conform (PTC) actions. For Nonattainment Areas the Flowchart includes requirements for preparing emission inventories, General Conformity Determinations, and NEPA.

[1] A Nonattainment Area is an area with concentrations of criteria pollutants that are above the levels established by the National Ambient Air Quality Standards (NAAQS).

Table of Contents

1. INTRODUCTION 1

2. REGULATORY BASIS FOR EVALUATION OF AIR QUALITY IN ATTAINMENT AREAS 1

2.1. National Environmental Policy Act 2
2.2. Clean Air Act 2

3. RELEVANT ENVIRONMENTAL PROTECTION AGENCY (EPA) DEFINITIONS 3

3.1. Stationary Sources 3
3.2. Prevention of Significant Deterioration 3
3.3. Significant Emission Rate (SER) 3
3.4. Nonattainment New Source Review 3
3.5. Ozone Transport Region 4
3.6. General Conformity 4
3.7. Greenhouse Gas Regulations 4
3.8. Findings and Interpretation 4

4. EPA EXPECTATIONS FOR MAJOR STATIONARY SOURCES IN ATTAINMENT AREAS 4

4.1. Best Available Control Technology (BACT) 5
4.2. Increment 5
4.3. Class I Areas 5

5. UNDERSTANDING TYPICAL AIRPORT PROJECTS 5

5.1. Project Parameters (that can be readily equated to emissions) 6
5.1.1. Increased Aircraft Operations 6
5.1.2. Changes in Operational Efficiency (Taxi/Idle/Delay) 6
5.1.3. Changes in Vehicle Activity 6
5.1.4. Construction 6
5.2. Project Types (that do not have parameters suitable for screening) 7
5.2.1. Aircraft Fleet Mix Changes 7
5.2.2. Impacts to Passenger Levels 7
5.2.3. Relocation of Emission Sources 8
5.3. Suitability of Exempt and Presumed to Conform Lists (PTC) 8

6. ACTIVITY LEVELS THAT CAN SERVE AS SCREENING CRITERIA 9

6.1. Aircraft Operations 10
6.2. Operational Efficiency 12
6.3. Vehicle Activity 14
6.4. Construction and GSE Activity 15

7. SUGGESTED QUESTIONS FOR FOUR SELECTED SCREENING PARAMETERS 18

7.1. Questions 18
7.2. Emissions from More Than Screening Parameter in a Given Year 18
7.2.1. Example Emissions Aggregation 19

8. WHAT TO DO IF FAA DECISION EXCEEDS SCREENING CRITERIA 21

8.1. Pollutant Quantification 21
8.2. Temporal Disaggregation 22
8.3. Air Quality Analysis Flowchart 23

STEP 1: DETERMINE IF THE FEDERAL ACTION FALLS WITHIN AN EXEMPTION TO GENERAL CONFORMITY 24
STEP 2: DOES THE FEDERAL ACTION QUALIFY AS PRESUMED TO CONFORM? 25
STEP 3: DETERMINE IF THE FEDERAL ACTION IS IN AN EPA-DESIGNATED NONATTAINMENT AREA OR MAINTENANCE AREA 25
STEP 4: EVALUATE IF ATTAINMENT SCREENING CRITERIA IS EXCEEDED 26
STEP 5: IF FEDERAL ACTION EXCEEDS SCREENING CRITERIA OR WAS SUBJECT TO GENERAL CONFORMITY 26
8.4. ATTAINMENT AREA SCREENING METHODOLOGY 27

List of Tables

Table 1. NUMBER OF AIRPORTS IN ATTAINMENT AND NONATTAINMENT/MAINTENANCE AREAS 2
Table 2. EXEMPT PROJECTS AND/OR ACTION ITEMS 8
Table 3. PRESUMED TO CONFORM PROJECTS AND/OR ACTION ITEMS (2007) 9
Table 4. REPRESENTATIVE AIRCRAFT USED FOR CALCULATING LTO EMISSIONS 10
Table 5. CHARACTERISTIC EMISSIONS INCLUDING AIRCRAFT, APU, AND GSE (POUNDS PER LTO CYCLE) 10
Table 6. NUMBER OF LTOS AND ASSOCIATED LIMITING POLLUTANT THAT CAN BE ACCOMMODATED BY THE SCREENING METRIC 11
Table 7. SCREENING METRICS IN ATTAINMENT AREAS 11

List of Figures

Figure 1: Air quality assessment process for a Federal Action 24

List of Acronyms

AARF	Aircraft Rescue and Firefighting
ACEIT	Airport Construction Emissions Inventory Tool
ACRP	Airport Cooperative Research Program
AEDT	Aviation Environmental Design Tool
AIP	Airport Improvement Program
APU	Auxiliary Power Unit
BACT	Best Available Control Technology
CAA	Clean Air Act
CATEX	Categorically Excluded (Document)
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact (document)
GAV	Ground Access Vehicle
GHG	Greenhouse Gas
GSE	Ground Support Equipment
HAP	Hazardous Air Pollutant
HP	Horsepower
LTO	Landing and Takeoff Cycle
MOVES	Motor Vehicle Emission Simulator
MPH	Miles per Hour
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NMHC	Non-Methane Hydrocarbons
NO_X	Oxides of Nitrogen
NSPS	New Source Performance Standards
NSR	New Source Review
OTR	Ozone Transport Region
Pb	Lead
PM_{10}	Particulate Matter with an aerodynamic diameter of less than 10 microns
$PM_{2.5}$	Particulate Matter with an aerodynamic diameter of less than 2.5 microns
PSD	Prevention of Significant Deterioration
PTC	Presumed to Conform
RACT	Reasonably Available Control Technology
SER	Significant Emission Rate
SIP	State Implementation Plan
SO_X	Oxides of Sulfur
TPY	Tons per Year
VALE	Voluntary Airport Low Emissions Program
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

1. INTRODUCTION

The Federal Aviation Administration (FAA) *Aviation Emissions and Air Quality Handbook* (the *Air Quality Handbook* or *Handbook*) was first published in 1982, then revised in 1997 and 2004. Prepared by the Office of Environment and Energy (AEE), Emissions Division, the current version (Version 3, Update 1) is dated 2015 and obtainable on the FAA's website.[2]

The principal purpose of the *Handbook* is three-fold:

- Technical Assistance: To provide information, data and methodologies for carrying out air quality assessments prepared for FAA-supported Projects and/or Actions.
- Regulatory Support: To help ensure that the air quality assessments are properly disclosed in accordance with the National Environmental Protection Act (NEPA) and comply with the General Conformity Rule and National Ambient Air Quality Standards (NAAQS) of the Federal Clean Air Act (CAA).
- Produce Consistency: To provide an appropriate decision-making process for determining when an air quality assessment is considered necessary, the type of analysis, and the expected endpoints.

Currently, the Handbook includes a methodology for environmental review of air quality impacts from projects that occur in Nonattainment Areas. However, there is no comparable methodology for projects that occur in Attainment Areas.

This document provides the technical analysis completed in the development of an *Attainment Area Screening Methodology* (*Screening Method*). The Screening Method provides clarification on what to evaluate when an air quality assessment is warranted in an Attainment Area. It simplifies environmental review of air quality impacts from projects that occur in attainment areas by screening out such projects that have little chance of causing an adverse impact on air quality. Therefore, the purpose of this document is to reduce the FAA workload and resources required to evaluate air quality impacts in Attainment Areas.

This document also provides an ***Air Quality Assessment Flowchart*** **(the *Flowchart*),** which outlines a decision-making process for FAA projects with respect to air quality assessments that is consistent with the National Environmental Protection Act (NEPA) and the Clean Air Act (CAA) and is applicable to both operational and construction-related emissions. For Attainment Areas, the Flowchart also includes evaluation of Exempt and Presumed to Conform (PTC) actions. For Nonattainment Areas the Flowchart includes requirements for preparing emission inventories, General Conformity Determinations, and NEPA.

Therefore, the Method and Flowchart is enhanced to include the Screening Method, for environmental review of air quality impacts from projects that occur in Attainment Areas. The Screening Method will allow FAA to focus scarce resources on projects that have greater potential to create impacts.

2. REGULATORY BASIS FOR EVALUATION OF AIR QUALITY IN ATTAINMENT AREAS

The number of airports in Attainment and Nonattainment/Maintenance areas are shown in Table 1. Of approximately 500 commercial service airports in the United States, 75% are located in Attainment Areas. However, the largest airports, and consequently the largest projects, are most commonly located in Nonattainment Areas. The preponderance of large hub airports in Attainment Areas is disproportionately small.

[2] FAA, 2015. Aviation Emissions and Air Quality Handbook.

TABLE 1

NUMBER OF AIRPORTS IN ATTAINMENT AND NONATTAINMENT/MAINTENANCE AREAS

Federal Aviation Administration

Hub Size	Number of airports in Nonattainment and Maintenance Areas	Number of airports in Attainment Areas	Number of airports	Percent of airports in Attainment Areas
Large Hub	25	5	30	17
Medium Hub	18	12	30	40
Small Hub	28	44	72	61
Non-Hub	45	205	250	82
None	9	112	121	93
TOTAL	125	378	503	75

Source: FAA, Voluntary Airport Low Emissions Program. https://www.faa.gov/airports/environmental/vale/. Updated 6/21/2017.

The Screening Method supports FAA's regulatory obligations for performing environmental reviews of air quality impacts. As such, this section provides a summary of pertinent documents, policies, regulations, guidelines, processes, data and other forms and sources of information. Wherever possible, the summary focuses on the applicability of comparable methodologies, as well as relevancy to FAA projects/actions. The key relevant regulations are provided in the subsections below.

2.1. National Environmental Policy Act

FAA's environmental review of Projects and/or Actions pursuant to NEPA is primarily focused on (1) determining if there are any significant environmental impacts, (2) disclosing impacts to the public if the review is an environmental assessment (EA) or environmental impact statement (EIS), and (3) ensuring FAA's action is consistent with all appropriate federal regulations. The FAA Orders *5050.4B* and *1050.1F* provide comprehensive guidance on preparing NEPA documents, including Categorical Exclusions (CATEXs), EAs, and EISs. It should be noted that projects requiring an EIS are subject to the most complicated environmental reviews, and therefore are not suitable for an Attainment Area Screening Methodology. However, projects/actions in attainment areas if they do not screen out, may require EIS and be subjected to comprehensive environmental reviews.

2.2. Clean Air Act

The CAA is intended to protect public health and the environment from air pollution by establishing scientifically based standards and regulating air emissions. Typical environmental reviews by FAA for projects/actions in Attainment Areas are generally not subject to regulatory review under the CAA. Projects/actions that involve stationary sources could be subject to the CAA, or similar state laws, however, these laws are more likely to apply to the project sponsor rather than the FAA. The General Conformity provisions of the CAA only apply to FAA projects/actions in Nonattainment and Maintenance Areas.

The CAA establishes NAAQS for the six criteria pollutants, which are particulate matter ($PM_{10/2.5}$), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and lead (Pb). It is incumbent on FAA to ensure that an action will not cause a violation of these standards. The Prevention of Significant Deterioration (PSD) regulations under the CAA that ensure stationary sources do not cause a violation of the NAAQS can serve as a valuable reference to FAA on how to ensure FAA actions won't cause a violation of the NAAQS.

3. RELEVANT ENVIRONMENTAL PROTECTION AGENCY (EPA) DEFINITIONS

In order for FAA to evaluate appropriate criteria for the Screening Method, it is helpful to look at definitions that EPA has created for permitting air pollutant emissions.

3.1. Stationary Sources

The CAA generally defines air pollution sources as stationary or mobile. Airport emissions are dominated by mobile sources. However, EPA's regulatory program for stationary sources is considerably more robust than for mobile sources. As such, this technical document examines stationary source regulations simply for the fact that EPA regulations are more comprehensive and have considerable documentation of their logical development.

3.2. Prevention of Significant Deterioration

Under the 1977 CAA amendments, EPA's PSD program, a subset of the New Source Review (NSR) program established major source thresholds for the permitting and modification of stationary sources in Attainment Areas (40 CFR 51.165). The Major Source definition for Attainment Areas is established as a source having the potential to emit equal to or greater than 250 tons per year (TPY) of a criteria pollutant of unnamed/unlisted categories. This regulation also defines a 100 TPY threshold for a named/listed major stationary sources or major medication sources (40 CFR 51.165).

3.3. Significant Emission Rate (SER)

The PSD program also defines a threshold to determine whether control technology should be applied to secondary pollutants emitted at a major source[3]. The SER sets a threshold for applying Best Available Control Technology (BACT) for criteria pollutants that are emitted below the Major Source threshold at sources subject to PSD regulations. SERs vary by pollutant but are all defined as less than the 250 TPY major source threshold.

3.4. Nonattainment New Source Review

EPA has established emission rates for the permitting of stationary sources subject to Nonattainment New Source Review (NNSR).[4] The emission rates are specific to the pollutant for which the region is designated as nonattainment or maintenance and are more stringent than the threshold defined under the PSD regulations. NNSR does not apply to Attainment Areas.

[3] 40 CFR 51.166(b)(23)

[4] 40 CFR 93.153(b)(1)

3.5. Ozone Transport Region

The Ozone Transport Region (OTR) is a single transport region for ozone, consisting of the Northeastern States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and the District of Columbia. States in the OTR have a special definition in the CAA for Major Sources; the threshold is defined as if the area is in a moderate (or higher) ozone Nonattainment Area.[5] Therefore, in Attainment Areas in the OTR, a Major Source is one with the potential to emit 100 TPY or more of NO_X and 50 TPY of VOCs.

3.6. General Conformity

The General Conformity regulations contain a definition of a *de minimis* change—an emissions change that is not expected to cause an adverse impact. Since the General Conformity regulations apply to actions occurring in Nonattainment or Maintenance Areas, EPA's *de minimis* definition draws upon NNSR's major source definition for permitting of stationary sources in Nonattainment Areas. The regulatory rulemaking process contemplated setting General Conformity's *de minimis* thresholds at the SER level or lower[6], but deemed that to be unnecessarily restrictive and instead EPA chose the NNSR major source definition.

3.7. Greenhouse Gas Regulations

Greenhouse Gases (GHGs) are pollutants for which there is no NAAQS but they are of concern because of their role in climate change. In recent years, the EPA's Tailoring Rule set GHG emissions thresholds that define when permits under existing permitting programs were required to consider GHG emissions from a new or modified source. In 2016 EPA adopted 75,000 TPY of GHG emissions as the threshold for reporting[7] from only 41 selected industries (which did not include airports or activities typically found at airports).

3.8. Findings and Interpretation

EPA has created a two-tier system for defining major sources—a threshold for Attainment Areas and a more stringent threshold for Nonattainment and Maintenance Areas. The SER definition was deemed to be more restrictive than the threshold EPA deemed necessary for Nonattainment Areas. Thus, FAA can embrace EPA's regulatory approach and thoughtful deliberation by adopting the PSD Major Source threshold as the basis of the development of a Screening Method. The 250 TPY value for each criteria pollutant (in OTR it is reduced to 100 TPY of NO_X and 50 TPY of VOC) will herein be defined as the Screening Metric. In other words, the Screening Metric serves as an emissions level for projects in attainment areas below which the Project or Action emissions do not cause adverse impacts on air quality.

4. EPA EXPECTATIONS FOR MAJOR STATIONARY SOURCES IN ATTAINMENT AREAS

In order to establish FAA's requirements for Projects and/or Actions in Attainment Areas that exceed the proposed Screening Metric, it is helpful to look at EPA's expectations for major stationary sources in Attainment Areas that exceed this level (i.e. EPA's PSD permitting requirements). EPA has established three key considerations for projects permitted under PSD. This section summarizes these key considerations and examines how these requirements could apply to FAA decisions.

[5] Section 184(a) of the CAA (42 U.S.C. sec. 7511c)
[6] 45 FR 52676
[7] 81 FR 89188

4.1. Best Available Control Technology (BACT)

EPA requires that air pollution sources in Attainment Areas use the BACT as a pollution control requirement during permitting under the PSD program. The PSD program also requires that any modified sources meet applicable New Source Performance Standards (NSPS), thus ensuring that pollution is minimized. Since BACT is determined on a case-by-case basis it may be equal to or more stringent than NSPS standards[8]. There is not an explicit description of what is and what is not categorized as BACT. However, the increased cost of deploying BACT is weighed against the anticipated reduction in emissions relative to an uncontrolled emission source.

Understanding EPA's application of BACT to stationary sources provides an important reference for FAA. Most FAA decisions involve mobile sources (aircraft, on-road vehicles, and off-road vehicles) that all have stringent regulations on emissions. The economic and technical feasibility that is evaluated when developing emission standards for mobile sources can be considered comparable to the process used by EPA to develop NSPS and BACT for stationary sources. Thus, FAA decisions typically involve emissions from sources that have 'BACT-like' pollution controls already in place.

4.2. Increment

Each state is responsible for establishing an Increment for each criteria pollutant for each area that is in attainment. The Increment is the amount of additional pollutant emissions in a geographic region that would cause an area to violate the NAAQS. When a PSD permit is sought, the permit requestor needs to demonstrate that the increase in pollution is less than the state calculated Increment.

4.3. Class I Areas

Class I areas are lands with special national or regional scenic, recreational or historic value. When a PSD permit is sought, an evaluation is required to determine the potential impact on nearby Class I areas. The EPA requires quantitative analysis (i.e. emission modeling) for PSD permit requests that seek to locate emission sources within 50, or 100 km of a designated Class I area[9].

5. UNDERSTANDING TYPICAL AIRPORT PROJECTS

The FAA is responsible for completing NEPA reviews, including a review of the CAA and other special purpose laws, for a broad range of airport projects. These projects include airfield improvements, terminal improvements, commercial development of airport land, and ground transportation projects. While no two projects are identical, there are some common characteristics of projects that could serve as suitable screening criteria. Understanding how those characteristics are likely to impact air quality allows the development of suitable Screening Parameters. In other words, the Screening Parameters represent activities common to most airport projects while Screening Criteria check if the associated activity levels of these parameters are below the Screening Metric. This allows selection of activity levels that ensure project emissions do not exceed the Screening Metric.

[8] https://www.epa.gov/sites/default/files/2015-07/documents/bactupsd.pdf

[9] U.S. EPA: Memorandum on "Clarification of Prevention of Significant Deterioration (PSD) Guidance for Modeling Class I Area Impacts, October 19, 1992"

5.1. Project Parameters (that can be readily equated to emissions)

The purpose of the Screening Method is to simplify analysis of projects that have little chance of causing an adverse impact on air quality. As such, the Screening Method needs to rely on simple and readily available project parameters, or variables. This section looks at common parameters of Projects and/or Actions that can be used to quickly estimate emissions from the Project and/or Action so the emissions can be evaluated relative to the Screening Metric. The intent is to select parameters for screening that are commonly tracked and easily understood by non-environmental professionals.

5.1.1. Increased Aircraft Operations

Projects and/or Actions that directly affect the number of aircraft operations are relatively infrequent. Typically, passenger demand (and supporting aircraft operations) would occur with or without a specific improvement project. However, there are some Projects and/or Actions where the number of aircraft operations is dependent on a specific improvement. Examples of Projects and/or Actions that increase aircraft operations could include additional cargo hangars, aircraft maintenance hangars, or flight training facilities. It is less common that terminal expansions, or airfield enhancements would cause any change in aircraft operations. Terminal expansions are more commonly intended to provide passenger convenience and accommodate passenger demand. Only in unique circumstances is additional aircraft demand stimulated by such a Project and/or Action. It is important to note that the only aircraft operations that should be included in the assessment are those that are the result of an FAA decision, excluding increases resulting from natural growth.

5.1.2. Changes in Operational Efficiency (Taxi/Idle/Delay)

Many FAA approvals are for Projects and/or Actions that enhance operational efficiency, which generally improve air quality. However, some projects may create substantial operational delays during the construction period and there are Projects and/or Actions that have a secondary effect of increasing airfield delay (e.g. new terminal gates that may result in more congestion at or around the terminal). Examining the anticipated change in operational delay that results from the Project and/or Action could serve as a suitable Screening Parameter. It is important to note that the only operational delays that should be included in the assessment are those that are the consequence of an FAA decision, excluding changes resulting from natural growth.

5.1.3. Changes in Vehicle Activity

FAA decisions that impact vehicle activity such as Ground Access Vehicles (GAVs) and Ground Support Equipment (GSE) can generally be categorized in one of two ways: change in activity level or change in vehicle type. A change in activity level encompasses changes in total number of vehicles, total duration of vehicle usage, routing of vehicles, speed of vehicles, and distance traveled. A change in vehicle type covers a diverse set of potential changes that generally reflects modifications to the vehicle fleet. This includes changes driven by mode hare, infrastructure modifications, changing fuel type, or any other change that affects which vehicles are used and how they are needed.

5.1.4. Construction

FAA decisions that cause changes in airport emissions often involve construction equipment, on-/off-road vehicles used for transport and delivery, and on-road vehicles used by construction workers. FAA's emissions evaluations of airport projects for the purpose of General Conformity (i.e. *de minimis* findings) have often been focused exclusively on construction emissions. As such, it is important to look at what types of construction emissions are well suited to a screening methodology.

Constructing Structures

Emissions associated with building structures such as terminals, retail, office, and hotels most commonly involve equipment used for site preparation and receiving and handling materials. Focusing on these aspects can be somewhat counterintuitive because much of the cost and time is associated with the interior work. However, the equipment used for interior work is typically powered by electricity due to the fact that connecting electricity is often a first priority, and therefore available after site preparation.

Constructing Runway/Taxiway/Apron Pavement

Constructing runway/taxiway/apron pavement is the emissions-generating activity that is most likely to dominate emissions during the construction of a Project and/or Action. Earthwork or demolition may require large earth-moving equipment that can produce substantial emissions. It is also important to consider the age of equipment that would potentially be used at a site--emissions from older equipment can be as much as 20 times the emissions of newer equipment in otherwise similar units.

Constructing Roadways

Airports undertake a variety of roadway projects that range from building simple gravel roads to elevated high-speed roadways. Similar to airfield pavement projects, the emissions impacts of roadway projects are typically dominated by earth-moving equipment. It is also common for roadway projects to cause a change in GAV activity.

Maintenance and Refurbishment

Airports are constantly performing maintenance and repair activities. Aside from airfield refurbishment projects that receive Airport Improvement Program (AIP) funding, much of this activity is not subject to FAA review. While this type of FAA decision is infrequent, this activity is common and thus, well suited to serve as a Screening Parameter.

5.2. Project Types (that do not have parameters suitable for screening)

The Screening Method is meant to cover FAA decisions that are common and share parameters that provide a relatively high confidence that the resulting emissions are understood. This ensures that by only looking at the Screening Parameters there will not be an adverse air quality impact. That framework results in some types of FAA Projects and/or Actions that are not well suited to serve as Screening Parameters, this includes:

5.2.1. Aircraft Fleet Mix Changes

Projects that involve a change in fleet mix are relatively infrequent and typically unique to specific local conditions. That is not to say that these decisions often cause a meaningful increase in emissions. Rather, it is hard to create a common framework to evaluate this type of impact from an FAA decision. However, these decisions could be conservatively evaluated by using the Screening Parameter associated with increased aircraft operations.

5.2.2. Impacts to Passenger Levels

Experience has shown that most FAA decisions are intended to accommodate the convenience of passengers, while demand changes occur independent of an FAA decision. The types of projects where an FAA decision causes a change in passenger level are often associated with passenger leakage between air service regions, passenger selection of competing airports within a region, airline changes to hub operational structure, or come from the relaxation of capacity constraints. This complexity and uniqueness of this type of Project and/or Action makes it difficult to find a suitable Screening Parameter. However,

these projects could be conservatively evaluated by using the Screening Parameters for increased aircraft operations.

5.2.3. Relocation of Emission Sources

Projects and/or Actions that relocate a substantial amount of emissions from one location to another on an airport would be suitable for a unique Screening Parameter. Instead, this type of project could be evaluated via the Screening Parameter for increased aircraft operations, using an assumption that the relocated emissions are all new emissions.

5.3. Suitability of Exempt and Presumed to Conform Lists (PTC)

The FAA published the PTC List in 2007 in the Federal Register (72 FR 41565) for the purpose of screening projects in Nonattainment Areas. In that notice, FAA also identified activities that mat qualify for an existing exemption from General Conformity. In developing it's PTC list, FAA reviewed over 600 studies (mostly being CATEXs and Findings of No Significant Impacts [FONSI]) to develop a list of project-types that were consistently below *de minimis* or negligible. Given that anything included on the list was unlikely to cause a significant impact in a Nonattainment Area, it is safe to conclude these project types would not cause a significant impact in an Attainment Area. Therefore, the Exempt and PTC Lists should be available for screening purposes in Attainment Areas.

Table 2 and Table 3 list the Projects and/or Actions that were found to be exempt or PTC, respectively.

TABLE 2

EXEMPT PROJECTS AND/OR ACTION ITEMS

Federal Aviation Administration

Number	Project/Action
1	Rulemaking and policy development.
2	Routine maintenance and repair activities.
3	Planning, studies and provisions of technical assistance.
4	Transfers of ownership, interests and titles in land, facilities and real and personal properties.
5	Actions associated with transfers of land, facilities title, and real properties that do not increase the capacity of the airport or change the operational environment affecting air emissions.
6	Alterations and additions of existing structures as specifically required by new or existing applicable environmental legislation or environmental regulations.
7	Federal Actions that are part of a continuing response to an emergency or disaster.

Note: See Federal Register 41565, Volume 72 (2007) for further specifications associated with each Project and/or Action.

Source: RoVolus, 2018.

TABLE 3

PRESUMED TO CONFORM PROJECTS AND/OR ACTION ITEMS (2007)

Federal Aviation Administration

Number	Project/Action
1	Pavement markings.
2	Pavement monitoring systems.
3	Non-runway pavement work.
4	Upgrades to aircraft gate areas on airside.
5	New lighting systems or upgrades/mechanical work.
6	Terminal and concourse upgrades which do not have the effect of attracting more passengers or accommodate additional aircraft.
7	New Heating, Ventilation and Air Conditioning (HVAC) Systems, upgrades and expansions.
8	Airport security.
9	Airport safety (i.e., runway safety area enhancements, Aircraft Rescue & Fire Fighting (ARFF) modifications or upgrades, etc.).
10	Airport maintenance facilities that house the equipment necessary to run, service, and maintain the airport environs.
11	Airport signage.
12	Commercial vehicle staging.
13	Low-Emission technology and alternative fuel vehicles.
14	Air Traffic Control activities and adopting approach, departure, and enroute procedures for air operations.
15	Routine installation and operation of aviation navigational aids.

Note: See Federal Register 41565, Volume 72 (2007) for further specifications associated with each Project and/or Action.

Source: RoVolus, 2018.

6. ACTIVITY LEVELS THAT CAN SERVE AS SCREENING CRITERIA

Representative emissions for each Screening Parameter need to be evaluated for each criteria pollutant to determine activity levels that result in emissions below the Screening Metric. This will allow for the selection of activity levels that will be designated as Screening Criteria – these will be activity levels that safely ensure emissions do not exceed the Screening Metric. For this analysis lead will be omitted from the list of criteria pollutants and from calculations since the total 2020 annual lead emissions from airports has been estimated at less than 176.2 TPY[10], making it unlikely any individual Project and/or Action could exceed the Screening Metric.

Emissions will be quantified for each criteria pollutant but only a single Screening Criterion will be selected for each Screening Parameter. Essentially, the pollutant that causes the lowest activity level to exceed the

[10] 2020 National Emissions Inventory: Aviation Component, Prepared for U.S. EPA by Eastern Research Group, Inc., ERG No. 0393.05.019, October 25, 2022.

Screening Metric will be the '*controlling pollutant*' and serve as the basis for the Screening Criterion. There will be a Screening Criterion established for each of the four Screening Parameters. The purpose of this analysis is to examine if it is possible to establish an activity level that would cause emissions less than the Screening Metric.

6.1. Aircraft Operations

Projects and/or Actions that affect aircraft operations may target a specific airframe type. However, the Screening Criteria needs to apply to a range of possible Projects and/or Actions and consider a broad range of airframe types. In order to examine the emissions associated with additional aircraft operations, the Aviation Emission Design Tool (AEDT) was used to estimate emissions per Landing Take-Off (LTO) cycles for a number of common airframe types. This included the direct aircraft emissions, as well as Auxiliary Power Unit (APU) and GSE emissions based on default assumptions established within AEDT. The emissions estimate did not include GAV emissions. The representative aircraft for the emissions estimate were selected to represent the breadth of the current commercial fleet and are shown in Table 4.

TABLE 4

REPRESENTATIVE AIRCRAFT USED FOR CALCULATING LTO EMISSIONS

Federal Aviation Administration

Category	Aircraft Type
Wide Body	Airbus A330-200 Series
	Boeing 777-200-LR Freighter
Narrow Body	Airbus A320-200 Series
	Boeing 737-800 with winglets
Regional Jet	Bombardier CRJ-200-LR
	Embraer ERJ135
General Aviation	Cessna 560 Citation V
	Piper PA-32 Cherokee Six

Source: RoVolus, 2018.

The emissions for all pollutants were estimated using AEDT's default modeling assumptions (e.g. 27 minutes of taxi/idle), and then compared to the Screening Metric. The aggregate emissions per LTO cycle are shown in Table 5 and the number of LTOs that could be accommodated within the Screening Metric are shown in Table 6.

TABLE 5

CHARACTERISTIC EMISSIONS INCLUDING AIRCRAFT, APU, AND GSE (POUNDS PER LTO CYCLE)

Federal Aviation Administration

Category	CO	VOC	NO_x	SO_x	$PM_{2.5}$
Wide Body	83.76	9.23	64.44	6.06	0.84

Narrow Body	38.16	6.76	19.71	2.29	0.58
Regional Jet	19.43	2.42	4.96	0.94	0.20
General Aviation	33.48	17.85	0.71	0.25	0.38

Source: RoVolus, 2018.

TABLE 6

NUMBER OF LTOS AND ASSOCIATED LIMITING POLLUTANT THAT CAN BE ACCOMMODATED BY THE SCREENING METRIC

Federal Aviation Administration

	Standard		Ozone Transport Region	
Category	Annual LTOs	Limiting Pollutant	Annual LTOs	Limiting Pollutant
Wide Body	5,969	CO	3,104	NO_x
Narrow Body	13,103	CO	10,147	NO_x
Regional Jet	25,733	CO	25,733	CO
General Aviation	14,934	CO	5,602	VOC

Source: RoVolus, 2018.

It is clear from this analysis that CO, NO_x, and VOC are controlling pollutants and their screening metrics are summarized in Table 7.

TABLE 7

SCREENING METRICS IN ATTAINMENT AREAS

Pollutant	Screening Metric (TPY)
CO	250
NO_x	100
VOC	50

Determining an appropriate activity level based on the Screening Metric is clearly dependent on assumptions regarding fleet mix. It is also worth noting that general aviation aircraft are the only fleet limited by VOC.

The most conservative approach for identifying Screening Criteria would be to take the most restrictive series of assumptions – effectively assuming that only wide body operations would increase when an FAA action results in an increase in aircraft activity. This level of caution may not be necessary since there are only five large hub airports located in Attainment Areas. In fact, the vast majority of the 378 commercial service airports in Attainment Areas are small and non-hub airports that rarely see wide body aircraft.

Alternatively, a more accurate approach would be to look at the increase in activity by airframe type for each Project and/or Action and calculate a blended activity level that meets the Screening Metric. This would require a considerable effort and would be inconsistent with the purpose of the Screening Method to reduce workload.

In balancing the need for accuracy with efficiency, it is recommended that for Projects and/or Actions at airports in Attainment Areas that are not in the ozone transport region use a representative mix of aircraft, conservatively weighted to heavier airframes. This fleet mix assumption will serve as the basis of the Screening Criteria. However, when an airport is in the ozone transport region, it is appropriate to consider different activity levels for commercial aircraft projects and general aviation aircraft projects. This is due to the stark differences in emissions profiles of these two airframes. This is appropriate since most Projects and/or Actions would primarily impact either commercial aircraft or general aviation aircraft.

The representative mix for commercial aircraft projects was arbitrarily selected to be 5% wide body aircraft, 60% narrow body aircraft, 30% regional jets, and 5% general aviation aircraft. Based on this fleet mix, it was estimated that the Screening Metric would not be exceeded if the Project and/or Action resulted in an increase of 16,600 LTOs per year. If the airport is in the OTR, the Screening Metric would not be exceeded if the Project and/or Action resulted in an increase of 14,200 LTOs per year. Coincidentally, the Screening Metric is not exceeded by 14,900 LTOs of general aviation aircraft outside the OTR. However, inside the OTR, the Screening Metric is exceeded by 5,600 LTOs of general aviation aircraft.

In the interest of being conservative, and minimizing complexity, it is recommended that there be two Screening Criteria for this Screening Parameter:

- Projects and/or Actions that increase aircraft operations by more than 14,000 operations per year
- Projects and/or Actions that specifically increase general aviation operations in the OTR by more than 5,000 LTOs

6.2. Operational Efficiency

Projects that affect airfield delay may be targeted to affect a specific aircraft type (e.g. taxiway change that only affects Group V operations). However, the screening criteria need to apply to a range of possible actions and consider a broad range of airframe types. In order to examine the emissions associated with changes to airfield delay, AEDT was used to estimate emissions from taxi/idle/delay for a number of common airframe types. Only main engine emissions were included. This is a conservative approach, since any extended delays that could cause the main engines to be shut down, resulting in the operation of APUs, which have lower emissions. The representative aircraft for the emissions estimation were selected and are intended to represent the breadth of the current commercial fleet and are shown in Table 8.

TABLE 8

REPRESENTATIVE AIRCRAFT USED FOR CALCULATING LTO EMISSIONS

Federal Aviation Administration

Category	Aircraft Type
Wide Body	Airbus A330-200 Series Boeing 777-200-LR Freighter
Narrow Body	Airbus A320-200 Series Boeing 737-800 with winglets

Regional Jet	Bombardier CRJ-200-LR
	Embraer ERJ135
General Aviation	BAE Jetstream 41
	Bombardier de Havilland Dash 8 Q200
	Bombardier Learjet 55
	Cessna 402
	Cessna 560 Citation V
	Fairchild SA-227-AC Metro III
	Hawker HS-125 Series 400
	Piper PA-32 Cherokee Six

Source: RoVolus, 2018.

The emissions were estimated using AEDT's default modeling assumptions and then compared to the Screening Metric. The aggregate emissions per minute of taxi/idle/delay are shown in Table 9. The number of minutes of taxi/idle/delay that could be accommodated within the screening criteria are shown in Table 10.

TABLE 9

CHARACTERISTIC EMISSIONS PER MINUTE OF TAXI/IDLE/DELAY (LBS)

Federal Aviation Administration

Category	CO	VOC	NO_x	SO_x	$PM_{2.5}$
Wide Body	3.984	0.404	0.613	0.165	0.020
Narrow Body	1.456	0.272	0.178	0.057	0.009
Regional Jet	0.874	0.097	0.072	0.025	0.004
General Aviation	0.741	0.267	0.033	0.011	0.006

Source: RoVolus, 2018.

TABLE 10

MINUTES OF DELAY THAT RESULT IN EMISSIONS LESS THAN THE SCREENING METRIC

Federal Aviation Administration

	Standard		Ozone Transport Region	
Category	Annual minutes of delay	Limiting Pollutant	Annual minutes of delay	Limiting Pollutant
Wide Body	125,507	CO	125,507	CO
Narrow Body	343,370	CO	343,370	CO

Regional Jet	572,183	CO	572,183	CO
General Aviation	674,974	CO	374,101	VOC

Source: RoVolus, 2018.

Determining an appropriate activity level based on the Screening Metric is clearly dependent on assumptions regarding fleet mix. It is also worth noting that general aviation aircraft clearly have different emission profiles than commercial aircraft.

The most conservative approach for identifying Screening Criteria would be to take the most restrictive series of assumptions – effectively assuming that only wide body operations delay increases when an FAA action results in an increase in aircraft delay. This level of caution may not be necessary since there are only five large hub airports located in Attainment Areas. In fact, the vast majority of the 378 commercial service airports in Attainment Areas are small and non-hub airports that rarely see wide body aircraft activity.

Alternatively, the most accurate approach would be to look at the increase in delay related emissions by each airframe type for each Project and/or Action and calculate a blended activity level that meets the Screening Metric. This would require airport sponsors to effectively perform a calculation to determine if another calculation is required. This would require a considerable effort and would be inconsistent with the purpose of the Screening Method to reduce workload.

In balancing the need for accuracy with efficiency, it is recommended that a representative mix of aircraft, conservatively weighted to heavier airframes. This fleet mix assumption will serve as the basis of the Screening Criteria. The representative mix for commercial aircraft projects was arbitrarily selected to be 5% wide body aircraft, 60% narrow body aircraft, 30% regional jets, and 5% general aviation aircraft. Based on this fleet mix, it was calculated that the Screening Metric is not exceeded by 417,000 minutes of aircraft delay per year and the OTR Screening Metric is not exceeded by 402,000 minutes of aircraft delay per year. Likewise, the Screening Metric is not exceeded by 674,000 minutes of aircraft delay from general aviation aircraft and the OTR Screening Metric is not exceeded by 374,000 minutes of aircraft delay of general aviation aircraft. It is also worth noting that there was relatively little difference between the emissions associated with the delay of regional jets and narrow body aircraft. Narrow body aircraft were the greater constraint, but you could have 342,000 minutes of annual aircraft delay comprised entirely of narrow body aircraft and not exceed the Screening Metric.

In the interest of being conservative, and minimizing complexity, it is recommended that a single operational delay level of 340,000 minutes be set as the Screening Criteria. This will ensure that all FAA actions, unless they target wide body aircraft, will not cause an emission increase that exceeds the Screening Metric.

6.3. Vehicle Activity

The emissions from vehicles were estimated using EPA's Mobile 6. The model's default assumptions on vehicle fleet mix and vehicle age were used to calculate criteria pollutant emissions from three vehicle speeds. Tailpipe emissions per 10,000 miles driven are reported in Table 11.

TABLE 11

CRITERIA POLLUTANT EMISSIONS FROM GROUND ACCESS VEHICLES

Federal Aviation Administration

Speed (mph)	CO	VOC	NO_x	SO_x	$PM_{2.5}$

	Tailpipe Emissions (lbs/10,000 mi)				
10	183.336	16.226	15.697	0.196	0.326
35	131.925	9.017	11.398	0.198	0.326
50	147.379	8.333	12.500	0.198	0.326

Source: RoVolus, 2018.

For this default fleet mix, CO is clearly the controlling pollutant. To be conservative, CO emissions at 10 mph (i.e., the highest emission rate) were compared to the Screening Metric. At this conservative rate, more than 27.2 million vehicle miles could be traveled without exceeding the Screening Metric. Therefore, after rounding, it is recommended that the Screening Criteria for ground access vehicles be set at 25 million vehicle miles traveled (VMT) per year.

6.4. Construction and GSE Activity

Construction activities are temporary and variable depending on location, duration, and level of activity and are generally confined to a construction site and access/egress roadways. These emissions occur predominantly from the operation of heavy construction equipment (e.g., backhoes, bulldozers), on- and off-road vehicles used for the transport and delivery of supplies and material (e.g., cement trucks, dump trucks), and on-road vehicles used by construction workers getting to and from a construction site (e.g., cars, pick-up trucks). Setting Screening Criteria for construction emissions is difficult because of the wide range of types of equipment, the duty cycle of equipment, and the range in age of equipment. One caveat on this parameter is that GSE inventories should also be included in this Screening Parameter. Both construction equipment and GSE are dominated by off-road diesel vehicles. Thus, any reference to pieces of construction equipment should also be read to include pieces of GSE. It is important to note that additional GSE associated with increased aircraft operations is already covered by that Screening Parameter.

In determining a conservative estimate of equipment emissions, two approaches were examined:

1. **NonRoad**—EPA's preferred model for off-road equipment, including construction equipment.
2. **Tier II Emission Factors**—EPA's emission factors for relatively old off-road equipment, and therefore the highest emitters of pollution.

There are additional tools and models that could be used. However, some tools, such as the Airport Cooperative Research Project's (ACRP) Airport Construction Emission Inventory Tool (ACEIT), are simply techniques to apply emission factors from the above models to minimize the detail needed for calculations required when preparing an emission inventory. Other models such as the California OFFROAD model produce emission inventories that have narrower applicability than the two approaches described above.

NonRoad is the EPA's preferred model for off-road equipment. It was used to estimate emission rates per unit, by equipment type, for the 2018 equipment inventory initially developed for use in the Philadelphia Capacity Enhancement Program EIS. These emission rates for an array of construction equipment are shown in Table 12.

The highest emission rate of 856 grams per hour (g/hr) is for NO_X emissions from Diesel Off-Highway Trucks. When this emission rate is applied to the number of business hours in a year (i.e., 2,080 hours) the annualized emissions are 1.96 tons per year (TPY).

The EPA has progressively mandated cleaner and cleaner emissions standards for on- and off-road vehicles. In the case of construction equipment (generally off-road diesel vehicles), the Tier II Emission Factors have been required for off-road equipment starting in 2003. Therefore, any equipment manufactured since 2003 (i.e., within the last 15 years) has emission rates equal to, or better than, the Tier II standards. The standards specify a blended NO_X and Nonmethane Hydrocarbon (NMHC) emission factor, so for this calculation, NO_X emissions were assumed to be 5.32 grams per brake horsepower hour (g/BHP hr). This is greater than the CO emission factor, so NO_X is the limiting pollutant. This emission factor was applied to a relatively large piece of construction equipment (i.e., one with a 300 hp engine). This resulted in 1.82 TPY of NO_X, assuming a 50% load factor and 2,080 hours of use per year.

The two approaches to establishing a Screening Criteria clearly show that while there is a tremendous range in equipment size and emissions, the highest emitting piece of construction equipment would likely emit less than 2 TPY of NO_X. Therefore, it is recommended that the Screening Criteria for construction equipment be set at 125 pieces of equipment per year (250 TPY divided by 2 TPY per piece of equipment) outside the OTR and 50 pieces inside the OTR. As with other Screening Criteria, concerns regarding the suitability of the assumptions regarding equipment age, duty cycle, types of equipment need to be considered the closer the estimate is to the Screening Criteria.

TABLE 12

EMISSIONS FROM SELECT PIECES OF CONSTRUCTION EQUIPMENT (G/HR)

Federal Aviation Administration

Equipment Type	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Diesel Pavers	52	12.6	120	0.2	8.4	8.1
Diesel Tampers/Rammers	8	1.1	8	0	0.7	0.7
Diesel Rollers	52	10.2	103	0.2	8.1	7.8
Diesel Scrapers	179	38.7	383	0.7	23.1	22.4
Diesel Paving Equipment	47	9.1	91	0.1	7.4	7.1
Diesel Surfacing Equipment	97	16.4	204	0.2	13.4	13
Diesel Trenchers	64	10.1	129	0.1	8.4	8.1
Diesel Bore/Drill Rigs	86	23.1	281	0.2	15.1	14.6
Diesel Excavators	42	15.6	113	0.3	6.7	6.5
Diesel Concrete/Industrial Saws	44	6.7	84	0.1	5.8	5.6
Diesel Cranes	49	17.6	184	0.3	8.6	8.4
Diesel Grades	50	18.9	134	0.3	8.7	8.4
Diesel Off-highway Trucks	124	84.4	856	1.2	25.6	24.9
Diesel Crushing/Proc. Equipment	50	12.5	156	0.2	7.3	7.1
Diesel Rubber Tire Loaders	111	26.5	286	0.4	17.7	17.1
Diesel Tractors/Loaders/Backhoes	66	12.8	70	0.1	10.2	9.9
Diesel Crawler Tractor/Dozers	98	25.9	247	0.4	14.8	14.4
Diesel Skid Steer Loaders	53	10.6	53	0	7.9	7.7
Diesel Other Construction Equipment	220	40.1	500	0.6	30.7	29.8
Diesel Aerial Lifts	50	11.1	51	0	7	6.8
Diesel Pumps	40	9.1	88	0.1	6.8	6.6
Diesel Welders	39	8.2	43	0	5.7	5.6
Diesel Forest Eqp - Feller/Bunch/Skidder	36	17.6	101	0.3	5.2	5
Diesel 40HP Construction Equipment	13	3.6	69	0.1	1.8	1.8
Diesel 300HP Construction Equipment	83	26.1	244	0.6	15.8	15.4

Source: Appendix G, Tables G-5, G-6, G-7, G-8, G-9, and G-10, Final Environmental Impact Statement, Philadelphia Capacity Enhancement Program, 2010.

7. SUGGESTED QUESTIONS FOR FOUR SELECTED SCREENING PARAMETERS

There are two key time periods to evaluate the Screening Criteria—the construction period and the operational period.

The screening questions evaluate the four Screening Parameters that could cause (or contribute to) changes in airport emissions. The variables are defined as: (A) increase in aircraft operations, (B) new aircraft taxi/delay/idle, (C) GAV trips, and (D) construction equipment and GSE. Each variable has a corresponding letter (A, B, C, and D) for representation in emissions computations.

- **Variable A (Aircraft Operations)**. Increase in number of aircraft LTOs (including supporting changes in GSE and APUs) as a result of the project.
- **Variable B (Aircraft Taxi Time)**. Increase in delay or changes to the taxi-in and -out times and/or taxi distances by on-ground aircraft as a result of the project.
- **Variable C (GAVs)**. Changes in the VMT from GAV trips on airport property driven by on-road vehicles that occur as a result of a project.
- **Variable D (Construction Equipment and GSE)**. Number of pieces of construction equipment that are active and working on the project, or number of pieces of GSE that are not associated with a change in aircraft operations.

7.1. Questions

The following questions comprise the necessary information to make an evaluation of the Screening Criteria:

A. Will the FAA decision result in an increase of more than 14,000 commercial aircraft operations per year, or if the project is in an OTR, more than 5,000 general aviation aircraft operations per year?

B. Will the FAA decision result in an increase of more than 340,000 minutes of aircraft delay per year?

C. Will the FAA decision result in an additional 25 million VMT per year?

D. Will the FAA decision result in the use of more than 125 construction vehicles or GSE during a year, or if the project is in the OTR, 50 construction vehicles or GSE during a year?

7.2. Emissions from More Than Screening Parameter in a Given Year

In the case that there are emissions associated with more than one of the four Screening Parameters in a given year, it is necessary to aggregate those emissions for comparison to the Screening Criteria. It is important to note that this analysis should be aggregated by calendar year. For example, it is uncommon for emissions from construction equipment and emissions from increased aircraft operations to occur in the same year.

When aggregating emissions, each of the four Screening Parameters should be normalized, i.e., divide the anticipated activity level by the Screening Criteria for that Screening Parameter. As an example, for construction equipment, if there were 25 units expected to be on site outside the OTR, this would be divided by the 125-unit Screening Criteria resulting in a normalized value of 0.2.

Each of the normalized values would be added together and if the sum exceeds 1.0, an emission inventory would be required (the same as if one of the screening questions had been exceeded). The formula for this aggregation is shown below:

*In a given year, if **A' + B' + C' + D' ≥ 1.0**, prepare emissions inventory.*

Where:

A' = Increase in Aircraft LTO's / 14,000*

B' = Increase in Aircraft Taxi/Idle/Delay (minutes) / 340,000

C' = GAV Trips (VMT) / 25,000,000

D' = Number of pieces of GSE and Construction Equipment / 125**

*- 5,000 if the project primarily involves GA aircraft AND is in the OTR
** - 50 if in the OTR

7.2.1. Example Emissions Aggregation

Based on the proposed *Attainment Area Screening Methodology* and the input variables described, it is instructive to apply the method to some example applications.

For the purposes of demonstration, two scenarios are examined:

Scenario I - Airport "QRS" – Construction of a new terminal at an airport outside the OTR that enhances customer service experience but doesn't cause a change in aircraft activity. This is expected to cause (A) no additional aircraft operations, (B) 10,000 minutes of additional aircraft taxi time after the construction of the new terminal is complete (i.e., 1 minute of taxi delay for each of the 10,000 LTOs that are expected to use the new terminal), (C) 300,000 additional VMT after the construction of the new terminal is complete, and (D) 50 pieces of construction equipment. Tables 13 and 14 show the aggregation results for construction years and operational years, respectively.

TABLE 13

AIRPORT "QRS" AGGREGATION RESULTS—CONSTRUCTION YEARS

Federal Aviation Administration

Variable	Variable Description	Project-Specific Change	Normalization
A	Aircraft Operations	No change	0.00
B	Aircraft Taxi/Idle/Delay	No change	0.00
C	Ground Access Vehicles	No change	0.00
D	Construction Equipment	50 pieces	0.40
Total			0.40

Source: RoVolus, 2018.

TABLE 14

AIRPORT "QRS" AGGREGATION RESULTS—OPERATIONAL YEARS

Federal Aviation Administration

Variable	Variable Description	Project-Specific Change	Normalization
A	Aircraft Operations	No change	0.00
B	Aircraft Taxi/Idle/Delay	+ 10,000 minutes	0.03
C	Ground Access Vehicles	+ 300,000 VMTs	0.01
D	Construction Equipment	No equipment	0.00
Total			0.40

Source: RoVolus, 2018.

In this example, the aggregation results are below 1.0 and therefore the project does not exceed the Screening Criteria. No further action would be required.

Scenario II - Airport "TUV" – Construction of a cargo hangar at an airport in the OTR that attracts a new carrier. This project is expected to cause a change of (A) additional 4,000 narrow body LTOs, (B) no increase in taxi/idle/delay, (C) 10 million additional VMTs, and (D) the use of 75 pieces of construction equipment.

TABLE 15

AIRPORT "QRS" AGGREGATION RESULTS—CONSTRUCTION YEARS

Federal Aviation Administration

Variable	Variable Description	Project-Specific Change	Normalization
A	Aircraft Operations	No change	0.00
B	Aircraft Taxi/Idle/Delay	No change	0.00
C	Ground Access Vehicles	No change	0.00
D	Construction Equipment	75 pieces	1.50
Total			1.50

Source: RoVolus, 2018.

TABLE 16

AIRPORT "QRS" AGGREGATION RESULTS—OPERATIONAL YEARS

Federal Aviation Administration

Variable	Variable Description	Project-Specific Change	Normalization
A	Aircraft Operations	+ 4,000 LTOs	0.29
B	Aircraft Taxi/Idle/Delay	No change	0.00
C	Ground Access Vehicles	+ 10,000,000 VMTs	0.40
D	Construction Equipment	No equipment	0.00
Total			0.69

Source: RoVolus, 2018.

In this example, the aggregation for construction equipment is greater than 1.0, even though the operational aggregation is below 1.0. Therefore, the project exceeds the Screening Criteria for the construction period and an emission inventory would be required.

8. WHAT TO DO IF FAA DECISION EXCEEDS SCREENING CRITERIA

FAA's key obligation for any NEPA review is to disclose potential environmental impacts and determine if they exceed a threshold of significance. The screening of air quality impacts in Attainment Areas is simply intended to identify projects that have minimal chance of adversely impacting ambient air quality, thus avoiding unnecessary analysis. The exceedance of the Screening Criteria is not comparable to exceeding a threshold of significance. In fact, no Air Quality threshold of significance has been established for Attainment Areas. Instead exceeding the Screening Criteria merely indicates that an emission inventory should be performed to determine the magnitude of the air quality impacts. However, the screening methodology will consider analysis of pollutants that are in attainment or unclassified only.

In evaluating the approach to quantitative analysis there are a couple of key questions: (1) which pollutants need to be quantified, and (2) should both operational and construction emissions increases be quantified if only one exceeds the Screening Criteria? Absent an extraordinary circumstance, dispersion modeling is never expected to be appropriate when preparing a CATEX or EA in an Attainment Area.

8.1. Pollutant Quantification

The Screening Criteria has been established based on CO, VOC, or NO_X serving as a controlling pollutant. In no cases were Pb, PM, or SO_X emissions expected to be greater than the emissions for the controlling pollutant. Regardless of this consideration, common emission models generally prepare emission inventories for all pollutants, except for Pb (these emissions are generally limited to piston aircraft). Thus, it makes sense to disclose all the pollutants that are easily calculated by the models. It is expected that AEDT would be the model that is used for aircraft operations and aircraft delay. However, EPA's MOVES model would need to be used if quantifying emissions from ground access vehicles, construction equipment, or GSE.

A separate question on pollutant quantification is if and when FAA should require the quantification of emissions of GHGs, including carbon dioxide (CO_2) and Hazardous Air Pollutants (HAPs). These are not criteria pollutants and thus are not subject to the 250 TPY major source threshold that is proposed as the Screening Metric. However for GHG reporting, as per Section 3.3.1 of 1050.1 Desk Reference (Version 3, October 2023), it is required to quantify and report carbon dioxide equivalent (CO_2e) in the NEPA document; or when fuel burn is computed and reported in the NEPA document, quantification of CO_2e calculated from the fuel burned should also be included in the NEPA document.[11]

8.2. Temporal Disaggregation

In the event that one of the Screening Criteria is exceeded, or the aggregate sum of the Screening Criteria is exceeded, the FAA needs to clearly define what is expected in the emission inventory. A key parameter in defining an emission inventory is what years should be quantified. This directly impacts the necessary resources since many projects will only have a meaningful impact on construction emissions or one operational year can be representative of all operational years. Thus, looking at all years would provide minimal benefit. On the other hand, limiting emission quantification to the years where the Screening Criteria is exceeded would diminish disclosure of impacts and does not substantially reduce resource requirements. The incremental effort of preparing the quantification of an additional year is considerably less than the effort of preparing the initial analysis year.

EPA crafted an approach on a similar issue when addressing secondary pollutants in the PSD regulations[12]. EPA's SER criteria serves as useful guidance for FAA in selecting the requirements for pollutant quantification when a Screening Criteria is exceeded. Essentially EPA set a lower emission rate for application of BACT when a different pollutant had exceeded the major source threshold. In the case of NO_X, EPA set the SER at 40 TPY, compared to the major source threshold of 250 TPY. EPA set different SERs for each criteria pollutant (e.g. SER for CO is 100 TPY).

Applying EPA's approach for the SER in the PSD program, FAA could adopt a lower threshold for emission quantification only when the Screening Criteria is exceeded. In EPA's regulations, the ratio of the major source threshold for criteria pollutants to the respective SER was the largest for NO_X (250/40 or 6.25). In other words, if the Screening Criteria is exceeded, FAA could require emission quantification for years where emissions exceed a lower threshold.

In examining a lower Screening Criteria, the ratio between major source and SER for NO_X was the greatest. Further, NO_X is also a key limiting pollutant in the Screening Criteria. Thus, it is recommended that the ratio for NO_X of the major source definition to the SER serve as the guide to determine the need to quantify emissions that are temporally separated from the emissions that exceeded the Screening Criteria. In other words, if the Screening Criteria is exceeded for construction emissions, the operational emissions outside of the construction period should be quantified if they are greater than $1/6^{th}$ of the screening threshold Attainment Area Screening Process.

This section of the report discusses the application and justification for revisions and updates to the current *Handbook*. The updates include an Air Quality Analysis Flowchart and an Attainment Area Screening Methodology. Combined, these updates provide clarity for determining when, and what types of, air quality analyses are necessary. These updates and revisions are summarized below:

[11] 1050.1 Desk Reference (Version 3, October 2023): The draft CEQ Guidance has recommended a 25,000 metric ton threshold for disclosure purposes. FAA has not adopted this disclosure threshold. FAA discloses CO2 emissions in the NEPA documentation whenever calculations are provided through modeling, regardless of whether it is above or below the 25,000 tons.

[12] 40 CFR 51.166(b)(23)

- **Air Quality Analysis Flowchart.** This decision-making flowchart enables *Handbook* users to determine the need for, and the type of, an air quality analysis for an airport action/project. Types of analyses are based on: (1) whether the project will involve operational and/or construction emissions, (2) a qualitative assessment, (3) if the airport is in an Attainment or Nonattainment/Maintenance Area, and (4) whether a project is "Exempt" or "PTC".
- **Attainment Area Screening Methodology.** This methodology describes the flowchart in order to assist staff when they are determining if a detailed air quality assessment (i.e., an emissions inventory or dispersion modeling) is needed in an Attainment Area with a two-tiered approach. The first tier uses existing procedures to quickly identify project types that require no quantitative analyses. The second tier uses readily available project information to conservatively evaluate whether project-related emissions approach a screening threshold. This methodology was designed to relieve airports from unnecessary detailed evaluations when possible. The tiers are summarized below:
  - **Tier-1: Project types that require no analysis** – The EPA and FAA have prepared lists for Nonattainment and Maintenance areas for project types that are categorized as Presumed to Conform and Exempt. If a project in an Attainment Area satisfies the criteria for one of these lists, no further air quality analysis is required for the project.
  - **Tier-2: Project-related Emissions Screening** – This method uses four Screening Criteria and the possible aggregation of the Screening Criteria to determine if a detailed air quality assessment is required.
  - **Tier-3: Emission Quantification** – AEDT and MOVES are used to quantify pollutant emissions directly resulting from a potential FAA action or decision.

8.3. Air Quality Analysis Flowchart

Figure 1 depicts a flowchart that could serve as an aid for evaluating air quality impacts associated with FAA Projects and/or Actions. The chart is a modification of the chart in Figure 4-1 of the *Airport Air Quality Handbook, Version 3 Update 1, January 2015*. The proposed revision attempts to minimize changes by limiting modifications to the Flowchart to the review of attainment areas and pollutants.

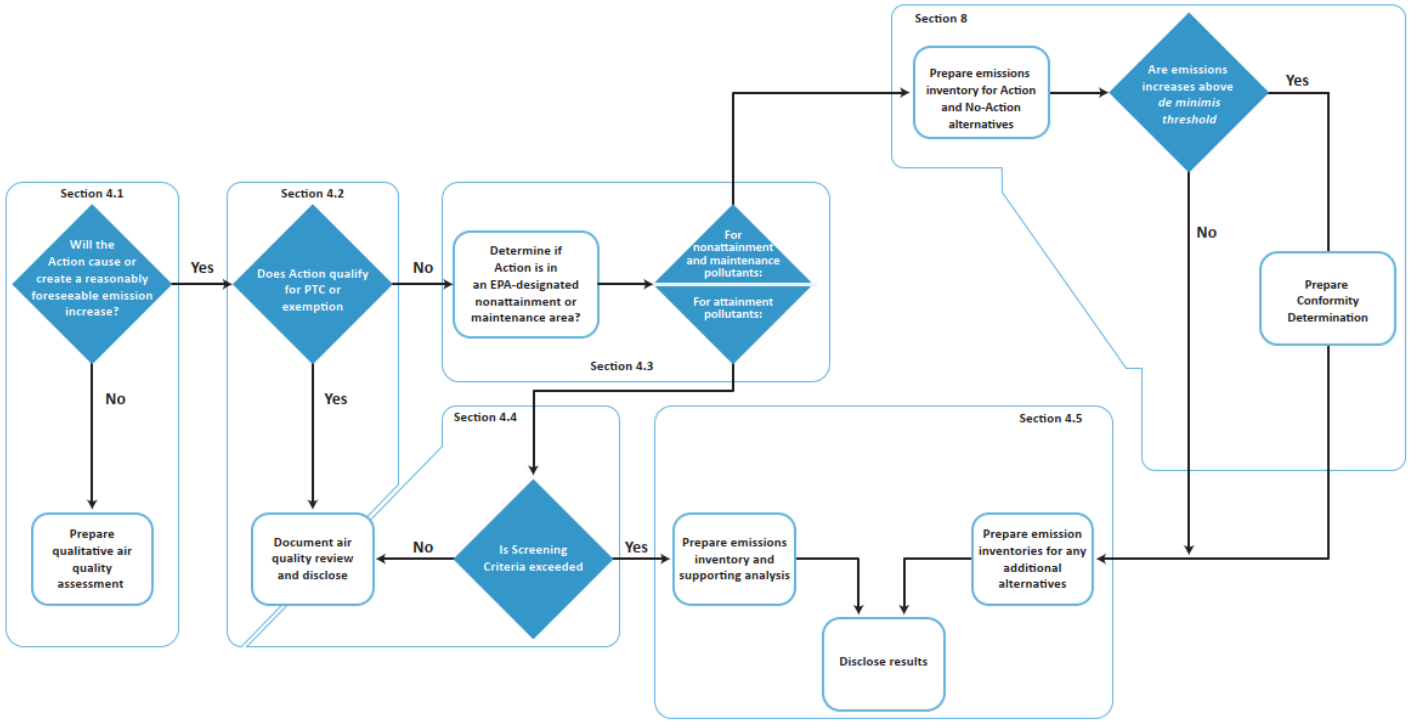

Figure 1: Air quality assessment process for a Federal Action

As shown in Figure 1, the review of attainment pollutants and areas can consist of up to five steps, reflecting the Attainment Area Screening Methodology. These steps are described individually, below.

Step 1: Determine if the Federal Action falls within an exemption to General Conformity

The General Conformity regulations contain a list of exempt actions, including a list of 22 exempt actions that would result in no emissions increase or an increase in emissions that is clearly *de minimis.*[13] If the Federal Action is exempt, the General Conformity requirements do not apply.

If the project qualifies as exempt under 40 CFR 93.153, the NEPA analysis should document this finding in the air quality analysis. If there is a potential decrease in emissions this should likewise be documented in the NEPA analysis. It is advisable in these cases to make note that the CAA conformity requirement was reviewed, and the requirement is not applicable.

The list of exempt and clearly *de minimis* actions is specific to analysis under the General Conformity regulations (i.e. for nonattainment and maintenance pollutants). Given that anything included on the list was unlikely to cause a significant impact in a nonattainment area, it is safe to conclude these project types would not cause a significant impact in an attainment area. Therefore, the analysis of emissions for attainment pollutants (i.e. air quality analysis under NEPA) can be satisfied if a major federal action qualifies as exempt under 40 CFR 93.153. For attainment pollutants, this would be documented as described in the preceding paragraph.

In the rare case where there are scientific analyses that would provide additional information to help determine if there are significant impacts, nothing in this document precludes FAA from seeking a more comprehensive analysis. If the project is not exempt under 40 CFR 93.153, the analysis should continue to Step 2.

[13] 40 CFR 93.153(c)(2).

Step 2: Does the Federal Action qualify as Presumed to Conform?

The General Conformity regulations have detailed specifications about the applicability of the regulations to Federal Actions. It is important to be aware of the FAA's development of a Presumed to Conform list that may also exclude Federal Actions from review under the General Conformity regulations.[14] This step is deliberately set to occur before the consideration of the attainment status of the region.

In July 2007, the FAA developed a list of actions that are Presumed to Conform (PTC) pursuant to the General Conformity regulations (72 *Federal Register* 41565). The General Conformity requirements only apply to Federal Actions proposed to occur within nonattainment or maintenance areas, to ensure that a Federal Action does not cause or contribute to a violation of the NAAQS, or delay timely attainment of the NAAQS.[15] The FAA published the PTC list in 2007 in the Federal Register for the purpose of screening projects in nonattainment areas.[16] In that notice, FAA also identified activities that may qualify for an existing exemption from General Conformity. Given that anything included on the PTC list was unlikely to cause a significant impact in a nonattainment area, it is safe to conclude these project types would not cause a significant impact in an attainment area. Therefore, the analysis of emissions for attainment pollutants (i.e. air quality analysis under NEPA) can be satisfied by determining that a major federal action qualifies for the PTC list.

It is noted that there are two types of PTC actions: 1) some actions would be very unlikely to ever exceed the *de minimis* threshold and thus do not include any numeric threshold as a condition of their designation of PTC; and 2) PTC actions that have the potential to exceed the *de minimis* threshold and thus the PTC list cites a specific numeric threshold as a condition of their designation of PTC.

Step 3: Determine if the Federal Action is in an EPA-designated nonattainment area or maintenance area

This step of the assessment process is to establish the attainment/nonattainment status of the study area and, if applicable, to identify those pollutants for which the area is designated nonattainment or maintenance.

The EPA Greenbook[17] contains a current listing of nonattainment and maintenance areas for each criteria pollutant. This assessment should be made for each criteria pollutant. In other words, there are effectively six air quality reviews (one for each criteria pollutant) associated with each Federal Action. For any pollutant for which the area is classified as being in nonattainment or maintenance, further analysis of that pollutant should follow the guidelines contained in Section 8 of the Air Quality Handbook**,** unless the Federal Action has been deemed exempt or presumed to conform.[18]

For the emission of all pollutants where the area is classified as attainment or unclassified, the attainment Screening Criteria can be applied. In the case that a pollutant is classified as attainment, but another concurrently emitted pollutant has triggered an escalation of the analysis for the Federal Action to the General Conformity rules, the Federal Action may quantify attainment pollutants according to the methodology specified in the General Conformity rule, if that is more convenient. However, the General Conformity rule should not be used to determine significance of emissions of those attainment pollutants, regardless of whether they are emitted concurrently with nonattainment/maintenance pollutants.

---

[14] 40 CFR 93.153 (f)

[15] 40 CFR 93.153 (b)

[16] Federal Presumed to Conform Actions Under General Conformity, 72 FR 41565 (July 30, 2007).

[17] EPA, *Green Book*, https://www.epa.gov/green-book

[18] 40 CFR 93.153(b).

Attainment pollutants are not subject to the General Conformity rule and are only subject to NEPA (where the threshold of significance is a violation of the NAAQS).

During this step it is also necessary to determine if the Federal Action will occur in a state that is designated as an Ozone Transport Region (OTR). This is because attainment areas that are located in an OTR have more restrictive air quality requirements under the Clean Air Act. As such, the screening methodology is more cautious for these areas.

Step 4: Evaluate if Attainment Screening Criteria is exceeded

Under this step, Project and/or Action is evaluated relative to the Screening Criteria. The four screening questions presented in Section 7.1 should be assessed for every year affected by the Project and/or Action. If a representative year, or year of maximum impact can be identified, the assessed years can be limited to that representative year. If there is more than one screening question that has a response in a given year, the screening questions should be aggregated for that year. If there is no affirmative response to the screening questions, or the aggregation is less than 1.0, this determination should be documented and no further analysis is required. Otherwise, an emission inventory should be prepared.

Step 5: If Federal Action exceeds Screening Criteria or was subject to General Conformity

The FAA's key obligation for any NEPA review is to assess potential environmental impacts and determine if they exceed a threshold of significance. The screening of air quality impacts for attainment pollutants is intended to identify projects that have minimal chance of adversely impacting ambient air quality and the potential for a significant impact; therefore allowing practitioners to quickly identify those Federal Actions that are unlikely to have significant air quality impacts and avoid unnecessary analysis. Please note that exceedance of the Screening Criteria is not by itself an indication the Federal Action will exceed the FAA's threshold of significance for air quality (see FAA Order 1050.1F). Rather, exceeding the Screening Criteria merely indicates that an emission inventory should be performed to determine the magnitude of the air quality impacts. It is also important to note that if the Federal Action's emissions of nonattainment pollutants have satisfied the General Conformity requirements it inherently means that a Federal Action will not increase the frequency or severity of any NAAQS violations and the Federal Action will not delay attainment of the NAAQS. Thus, establishing that there will be no significant impacts to air quality from those pollutants.

When it is determined from the Screening Criteria that an emissions inventory is needed, two questions must be considered: (1) which pollutants need to be quantified, and (2) should both operational and construction emissions increases be quantified if only one exceeds the Screening Criteria? Analysis of nonattainment and maintenance pollutants for a Federal Action is performed pursuant to the General Conformity requirements. However, the General Conformity requirements only apply to the Proposed Action and No Action alternatives. Whereas NEPA requires disclosure of air quality impacts from all alternatives. As such, an emissions inventory needs to be prepared for any alternative in nonattainment and/or maintenance areas that has not been considered in the General Conformity analysis.

When there is an increase that exceeds the *de minimis* threshold in emissions of a non-reactive criteria pollutant, the General Conformity requirements often will call for dispersion modeling of those emissions[19] and that level of analysis would typically be appropriate for other NEPA alternatives being considered. Dispersion modeling is not expected to be appropriate for any other circumstances.

[19] 40 CFR 93.158 (a) (3)

8.4. Attainment Area Screening Methodology

The Screening Methodology is reflected in the Flow Chart and provides an opportunity for FAA staff to reduce workload for cases where there is unlikely to be an adverse air quality impact. The methodology builds on existing FAA procedures for Nonattainment and Maintenance Areas. The key new aspect is the development of the Screening Criteria. This requires collecting the data necessary to answer the four screening questions, for each year affected by an FAA Project and/or Action (typically only a representative year during the construction period and a representative year during the operational period).