# DeKalb Peachtree Airport
# Air Quality Study


Prepared for:

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Draft

September 2018

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## Executive Summary

The principal objective of this Study was to evaluate the impacts of DeKalb Peachtree Airport (PDK) on air quality in the vicinity of the airport. The work was broken down into five tasks described below, accompanied with summary explanations of the findings.

**Task 1, Evaluate Current Air Quality Conditions:** The purpose of this task was to evaluate air quality conditions in the vicinity of PDK and the greater Atlanta metropolitan area. The results revealed two important findings: (i.) air quality in the vicinity of PDK meets national and state standards and (ii.) pollutant levels have declined significantly over the past 25 years. The only exception is the pollutant ozone for which the entire Atlanta metropolitan area (including DeKalb County) does not meet the standards for this pollutant.

**Task 2, Compare PDK Emissions to Other Nearby Sources:** The purpose of this task was twofold: (i.) to determine PDK's contribution to overall emission in DeKalb County and the Atlanta metropolitan area and (ii.) to compare PDK emissions to other sources in the airport vicinity (e.g. motor vehicles, and manufacturing industrial facilities, etc.). The results revealed that PDK contributes 1% to 8% of pollutant emissions in DeKalb County and when compared to the Atlanta metropolitan area, PDK represents less than 1% of the overall totals.

**Task 3, Compare PDK Emissions to Other Airports:** The purpose of this task was to compare the types and amounts of emissions associated with PDK to those of other general aviation (GA) airports of similar size and function. The outcome demonstrates that emissions associated with PDK are comparable in the types and amounts to similar airports.

**Task 4, Analyze PDK Emissions According to Aircraft Maximum Takeoff Weights (MTOW):** The purpose of this task was to evaluate emissions based on three categories of aircraft maximum takeoff weights (MTOWs): (i.) less than 66,000 lbs. (Category 1), (ii.) 66,000 to 75,000 lbs. (Category 2), and (iii.) greater than 75,000 lbs. (Category 3). The results demonstrated that Category 1 aircraft generate the vast majority of emissions (84% to 96%, depending on pollutant). This outcome is expected as Category 1 aircraft comprise the majority of operations at PDK. By comparison, Category 2 and 3 aircraft represent 1% to 5% - again, depending on pollutant.

**Task 5, Conduct Atmospheric Dispersion Modeling for PDK Emissions:** The purpose of this task was to quantify the contributions of PDK emissions to local air quality conditions. The results showed that pollutant concentrations around the airport's perimeter and in the surrounding communities are well within the applicable federal and state air quality standards.

Overall, this Study demonstrates that PDK's operations and resultant emissions are comparable to other similar-sized GA airports. The airport's emissions also have a relatively low impact to local air quality conditions and do not cause, or contribute to, violations of federal or state air quality conditions. Finally, Category 1 aircraft comprise the vast majority of emissions at PDK with Categories 2 and 3 representing comparatively small amounts.

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# I. Introduction & Purpose

DeKalb Peachtree Airport (PDK) is a county-owned, public-use airport located in the city of Chamblee, northeast of Atlanta, in DeKalb County, Georgia. It is classified as a general aviation (GA) airport providing service to corporate, business and personal aircraft, aircraft charters, training aircraft and helicopters. Aviation-related events such as air shows are also conducted on a periodic basis. In 2017, the airport had approximately 160,000 operations.[1]

The principal aims of this Study were threefold: (i) to determine current air quality conditions near the airport, (ii) to evaluate the airport's air quality impacts in the surrounding communities, and (iii) to determine the effects of varying aircraft weight categories on air emissions. To accomplish these objectives, this work was sub-divided into five tasks described in **Table 1**.

**Table 1. Air Quality Assessment Tasks**

| Task No. | Task | Approach |
|---|---|---|
| 1. | Evaluate current air quality conditions | Obtain and analyze air quality data in the vicinity of PDK. |
| 2. | Compare PDK emissions to other nearby sources | Quantify emissions from PDK and other sources in the vicinity of the airport and estimate PDK's contribution. |
| 3. | Compare PDK emissions to other airports | Estimate PDK and other GA airport emissions and analyze the results. |
| 4. | Analyze PDK emissions according to aircraft maximum takeoff weights (MTOW) | Estimate aircraft emissions for three aircraft MTOW categories and compare the results. |
| 5. | Conduct atmospheric dispersion modeling for PDK emissions | Estimate air pollutant concentrations in the vicinity of the airport and compare to national air quality standards. |

# II. Air Quality Assessment Tasks

For ease of understanding, the purpose, methodologies and results of the five tasks listed in **Table 1** are discussed separately in the following sections.

## A. Task 1: Evaluate Current Air Quality Conditions

### 1. Purpose

The purpose of this task was to evaluate air quality conditions in the vicinity of PDK and the greater Atlanta metropolitan area (combined called the *Study Area*). For this analysis, the *Study Area* was divided into two sub-areas, described as follows:

- **Atlanta Study Area**: This area encompasses the Atlanta metropolitan area and includes DeKalb County, Fulton County, and parts of Cobb, Rockdale and Gwinnet Counties.
- **Airport Study Area**: This area encircles PDK and extends outward from the airport about 6 miles. It includes DeKalb County and parts of Fulton County, interstate roads I85 and I285, and a number of retail, manufacturing, and industrial facilities.

[1] Reported by the Federal Aviation Administration (FAA) Operations Network (OPSNET), 2018.

This division of the *Study Area* into the *Atlanta* and *Airport Study Areas* enables a more concise and meaningful discussion of air quality conditions in the vicinity of PDK.

## 2. Methodology

Under **Task 1**, air quality data was obtained from the U.S. Environmental Protection Agency (EPA) based on air monitoring conducted by the Georgia Environmental Protection Division (EPD). From this database, the Study focused on four air quality monitoring stations located within the *Airport Study Area*. These sites are illustrated in **Figure 1**, listed in **Table 2** and described below.

These four monitoring sites are located in DeKalb and Fulton Counties and range in distance from PDK from two to six miles. Taken together, these stations produce data for the seven EPA Criteria Pollutants[2] carbon monoxide (CO), nitrogen dioxide ($NO_2$), ozone ($O_3$), and particulate matter less than 10 microns ($PM_{10}$) and less than 2.5 microns ($PM_{2.5}$). The Criteria Pollutants of lead and sulfur dioxide ($SO_2$) are not monitored at these stations[3]. Importantly, these air quality data are the most currently available, collected over different timeframes and, in some cases, reflect past conditions. This lack of continuity is not uncommon as air monitoring is often suspended after several years of operation at a site. It is also worth noting that not all pollutants are monitored at each station. That is because the purpose of each station may differ whereby collecting $PM_{10/2.5}$ concentration data on a local scale at one station may necessitate the monitoring of regional $O_3$ levels at another station.

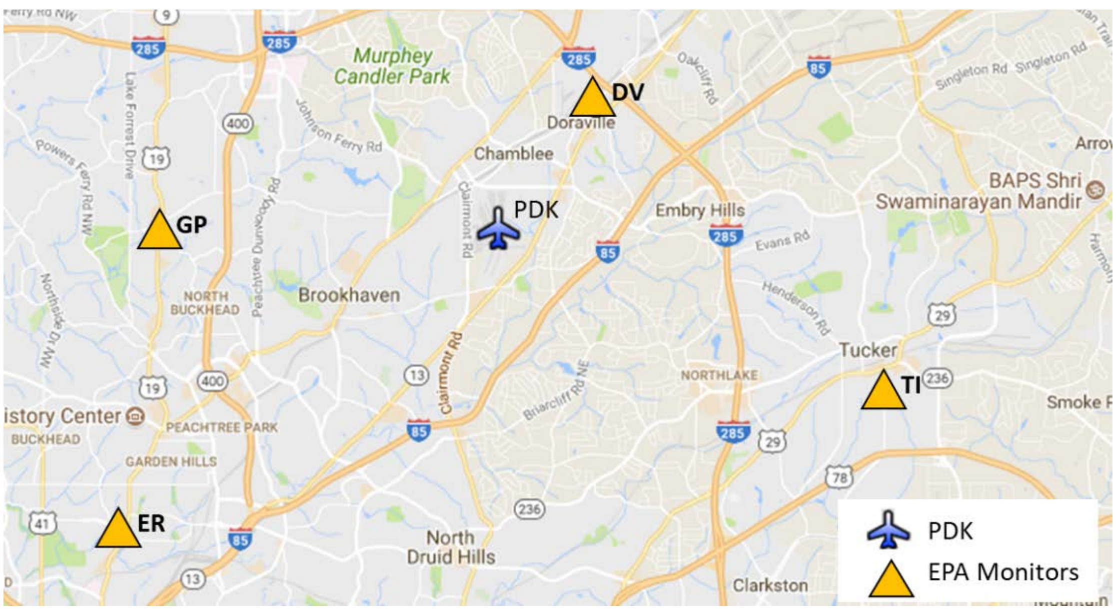


**Figure 1. Airport Study Area Air Quality Monitoring Stations**

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[2] Criteria Pollutants are those considered to be harmful for human health and the environment as determined by the EPA. They include carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), particulate matter with diameters of 10 and 2.5 microns ($PM_{10}$ and $PM_{2.5}$), ozone ($O_3$), and lead (Pb).

[3] The closest monitor to PDK reporting $SO_2$ is South DeKalb (SD) and the closest reporting lead is Panthersville Rod (PR), both about 9 miles from PDK.

**Table 2. Airport Study Area Air Quality Monitors**

| Monitors | County | Dist./Dir[1] | Timeframe | Pollutants Monitored[2] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | CO | $NO_2$ | $O_3$ | $PM_{10}$ | $PM_{2.5}$ |
| Doraville (DV) | DeKalb | 2 mi./NE | 1990-2012 | | | | ✓ | |
| | | | 1999-2012 | | | | | ✓ |
| Georgia Power Substation (GP) | DeKalb | 4 mi./W | 1994-2014 | ✓ | | | | |
| Tucker-Idlewood (TI) | DeKalb | 5 mi./SE | 1995-2006 | | ✓ | ✓ | | |
| East Rivers School (ER) | Fulton | 6 mi./SW | 1996-2012 | | | | ✓ | |
| | | | 1999-2012 | | | | | ✓ |

[1]Dist./Dir. = Distance from PDK in miles / Direction relative to PDK
[2] CO = carbon monoxide, $NO_2$ = nitrogen dioxide, $O_3$ = ozone, $PM_{10}$ and $PM_{2.5}$ = particulate matter with diameters of 10 and 2.5 micrometers. "✓" Indicates the pollutant is recorded by the monitor.

The U.S. EPA has set National Ambient Air Quality Standards (NAAQS) for Criteria Pollutants designed to help prevent harm to public health and the environment from air pollution (the Georgia EPD has adopted these same standards). The latest air quality data from the *Airport Study Area* monitors are listed in **Table 3** along with the corresponding NAAQS for each pollutant.

**Table 3. Airport Study Area Air Quality Data**

| Pollutant [a] | Averaging Period | Units [b] | NAAQS[c] | Monitored Concentrations[d] | | | | Exceeds NAAQS |
|---|---|---|---|---|---|---|---|---|
| | | | | DV | ER | GP | TI | |
| CO | 8-hour[1] | ppm | 9 | -[f] | - | 0.4 | - | no |
| | 1-hour[1] | ppm | 35 | - | - | 0.4 | - | no |
| $NO_2$ | 1-hour[2] | ppb | 100 | - | - | - | 51 | no |
| | Annual[3] | ppb | 53 | - | - | - | 26 | no |
| $O_3$ | 8-hour[4] | ppb | 75 | - | - | - | 89 | Yes[g] |
| $PM_{2.5}$ | Annual[1] | µg/m³ | 12 | 11 | 11 | - | - | no |
| | 24-hour[2] | µg/m³ | 35 | 22 | 22 | - | - | no |
| $PM_{10}$ | 24-hour[5] | µg/m³ | 150 | 62 | 50 | - | - | no |

[a] CO = carbon monoxide, $NO_2$ = nitrogen dioxide, $O_3$ = ozone, $PM_{10}$ and $PM_{2.5}$ = particulate matter with diameters of 10 and 2.5 micrometers.
[b] Units: ppm = parts per million, ppb = parts per billion, µg/m³ = micrograms per cubic meter
[c] NAAQS = National Ambient Air Quality Standards.
[d] Monitors DV= Doraville, ER=East River, GP=Georgia Power Substation, TI=Tucker-Idlewood Road. Data for the most recent year being: DV = 2012, ER = 2012, GP = 2014, TI = 2006
[f] "-" = no measurement available, ppb = parts per billion, ppm = parts per million, µg/m³ = micrograms per cubic meter.
[g] Exceedances occur for ozone, which is a regional pollutant for which the entire Atlanta Metropolitan Area reports exceedances.
[1] Annual mean, averaged over 3 years.
[2] 98th Percentile, averaged over 3 years.
[3] Annual mean.
[4] Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years.
[5] Not to be exceeded more than once per year on average over 3 years.

Among the four air quality monitoring stations, the two most relevant to this Study are the City of Doraville (DV) and Tucker-Idlewood Road (TI) stations located approximately two and five miles east and southeast of the airport, respectively.

Pollutant data from the Doraville site is for $PM_{2.5}$ and from the Tucker–Idlewood Road site is for ozone. These are two pollutants for which the *Atlanta Study Area* (including the area surrounding PDK) has been designated as not meeting the NAAQS. The monitoring data from these two sites are discussed below:

- **Doraville $PM_{2.5}$ Data**: As shown in **Figure 2**, $PM_{2.5}$ levels at this location declined steadily over a 12-year period from 2001 to 2012. This downward trend is typical for $PM_{2.5}$ as emission control measures for this pollutant have also improved over this timeframe. It is important to note that these values came into full compliance with the NAAQS.

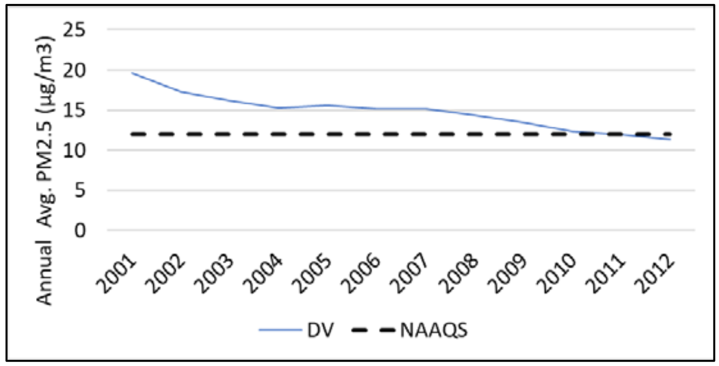


**Figure 2: Doraville Monitor $PM_{2.5}$ Data**

- **Tucker-Idlewood Road $O_3$ Data**: As shown in **Figure 3**, $O_3$ levels at this location also declined over the 11-year period from 1997 to 2006, but still represent violations of the NAAQS. However, it is significant that elevated $O_3$ levels occur regionally and are not isolated to city or county areas. For this reason, the elevated $O_3$ levels at this site are representative of the entire *Atlanta Study Area* and are not unique to the *Airport Study Area*.

It is important to note that the $PM_{2.5}$ and $O_3$ data from the Doraville and Tucker-Idlewood Road monitoring stations are consistent with other sites located in the *Atlanta Study Area* (see **Appendix Tables A-1** to **A-3, A-9** to **A-10,** and **Figure A-1**).

Data from the Georgia Power Substation and East Rivers School monitors (located four and six miles from PDK) are available for CO and $PM_{2.5}$/$PM_{10}$, respectively. In both cases, the pollutant levels are also well within the NAAQS.

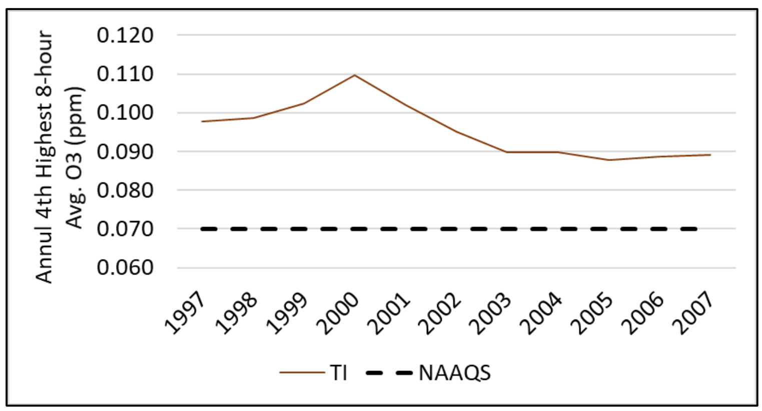


**Figure 3: Tucker-Idlewood Road Monitor Ozone Data**

This analysis revealed that annual average concentrations of $PM_{2.5}$ from the DV monitor are comparable to or less than levels reported from farther monitoring locations. Additionally, trends of $PM_{2.5}$ have been decreasing over time, as shown in **Figure 2**.

## 3. Results

Based upon the evaluation of air quality conditions in the vicinity of PDK, the following results are noteworthy:

- **Pollutants of Concern**: The U.S. EPA has designated the Atlanta Area (including the area around PDK) as not meeting the NAAQS for the Criteria Pollutant and ozone.
- **Air Quality Monitors**: There are 19 air quality monitoring stations located throughout the greater Atlanta metropolitan area. Among these, there are four air monitoring stations located within two to six miles from PDK.

- **Air Monitoring Data**: Air quality data for five of the Criteria Pollutants (including $PM_{2.5}$ and ozone) are available for the *Airport Study Area*. Data from the Doraville and Tucker-Idlewood Road monitors are the most relevant to this Study.
- **Airport Study Area Air Quality**: $PM_{2.5}$ levels have declined over the 12-year period (2001-2012) to below the NAAQS for this pollutant. Ozone levels also declined over the 10-year period (1997-2006) but are still above the NAAQS. This is to be expected as $O_3$ is a regional pollutant and not confined to the *Airport Study Area.*

In summary, air quality conditions in the vicinity of PDK are were found to be within standards, with the exception of ozone, for which the entire Atlanta metropolitan area is designated as not meeting the NAAQS for this pollutant.

## B. Task 2: Compare PDK Emissions to Other Nearby Sources

### 1. Purpose

The purpose of **Task 2** was twofold: (i.) to determine PDK's contribution to overall emission totals in DeKalb County and the Atlanta metropolitan area and (ii.) to compare PDK emissions to other sources in the airport vicinity such as motor vehicles, manufacturing industrial facilities, and petroleum storage facilities. With these data, the overall significance of PDK emissions is determined.

### 2. Methodology

For this analysis, PDK emissions were estimated for 2017 using the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT 2d) and included the U.S. EPA Criteria Pollutants and their precursors[4].

Mobile source emissions (e.g. passenger cars, trucks, vans, buses etc.) were estimated using EPA's MOtor Vehicle Emissions Simulator (MOVES)[5]. For all other sources (e.g. industrial, manufacturing, petroleum storage, home heating, etc.) emissions were derived from EPA's National Emissions Inventory (NEI)[6]. In all cases, the most recent model versions and databases were used. In this case, there were two Study Areas; (i.) DeKalb County and (ii.) the greater Atlanta metropolitan area.

The following sections describe the overall technical analysis and the results. Information and data considered to be too detailed or voluminous to be included in this section are provided in **Appendix B**.

### 3. Technical Analysis

The primary sources of emissions associated with PDK are typical of most GA airports of its size and function. These mainly comprise aircraft engines with other smaller sources being ground support equipment (GSE) and auxiliary power units (APUs)[7].

Other sources of emissions in DeKalb County include motor vehicles and stationary sources (see discussion above). For the most part, air emissions from these sources arise from the combustion of fossil fuels (e.g., diesel, gasoline, natural gas, etc.). **Table 4** lists the primary emission sources associated with PDK and DeKalb County.

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[4] Criteria Pollutants are considered harmful for human health and the environment by the U.S. EPA. These pollutants and their precursor emissions include Carbon Monoxide (CO), nitrogen oxides ($NO_2$), sulfur dioxide ($SO_2$), particulate matter with diameters less than 10 and 2.5 microns ($PM_{10}$ and $PM_{2.5}$), volatile organic compounds (VOCs), and Lead (Pb).

[5] EPA, MOtor Vehicle Emissions Simulator (MOVES2014a), http://www.epa.gov/oms/models/moves.

[6] EPA, National Emissions Inventory Data, https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei.

[7] Ground support equipment (GSE) service aircraft between flights, and auxiliary power units (APUs) provide power to aircraft in between flights. Both GSE and APUs are small sources of emission at GA airports.

**Table 4. Sources of Emissions**

| Source | Characteristics | Examples |
|---|---|---|
| PDK Airport | Exhaust products of fuel combustion vary depending on aircraft engine type (e.g., piston, jet, turbo-prop, etc.), fuel type (e.g., Jet-A and Avgas), number of engines, power setting (e.g., taxi/idle, take-off, cruise), and amount of fuel burned. APU and GSE emissions are also functions of fuel types and the amounts of fuel used. | Pilatus PC-12<br>Bombardier Challenger 300<br>Gulfstream V<br>Cessna Golden Eagle |
| Motor Vehicles | Exhaust products from fuel combustion in cars, trucks, vans, buses, etc. | Interstates I-85, I-285, Buford Highway, Clairmont Road, etc. |
| Stationary Sources | Emissions from fossil fuel combustion associated with industrial, and manufacturing facilities. Also includes evaporative emissions from fuel facilities and emissions from decomposition in landfills. | Citgo Petroleum Corp.<br>Motiva Enterprises<br>Trans Montaigne Operating Co. |

Source: KB Environmental Sciences, Inc., 2018.

The information and data came from a variety of resources and are the most up-to-date and appropriate for this analysis. In those instances where data were not available, it was derived from relevant databases, reasonable assumptions and professional judgment. **Table 5** summarizes the sources of data and information used for this analysis.

**Table 5. Data Sources**

| Data Source | Agency | Purpose |
|---|---|---|
| Symphony Flight Data | PDK | PDK-specific data for airport operations and aircraft types. |
| Aviation Environmental Design Tool (AEDT)[8] | FAA[a] | Used to estimate emissions from airport operations. |
| Operations Network (OPSNET)[9] | FAA | Used for aircraft taxi times. |
| MOtor Vehicle Emissions Simulator (MOVES) | EPA[b] | Used to estimate emissions from motor vehicles in DeKalb County. |
| National Emissions Inventory (NEI) | EPA | Used for emissions from stationary sources. |

[a] Federal Aviation Administration. [b] Environmental Protection Agency
Source: KB Environmental Sciences, Inc., 2018.

For estimating PDK emissions, Symphony Flight Data was used as input into AEDT. For Dekalb County mobile emissions, Georgia Environmental Protection Division (EPD) data was used as input into MOVES. For estimating DeKalb County stationary emissions and Atlanta metropolitan area emissions the EPA National Emissions Inventory (NEI) was used.

[8] FAA, Aviation Environmental Design Tool (AEDT, version 2d), https ://aedt.faa.gov/.
[9] FAA, Operations Network (OPSNET), https://aspm.faa.gov/opsnet/sys/main.asp.

## 4. Results

The results of this analysis are presented in **Table 6** and **7**. As shown, PDK's portion of emissions within DeKalb County is a relatively small when compared to the county's overall total. DeKalb's emissions are the combination of all mobile and stationary sources. In all but one case, the airport's total is 1 percent or less depending on the pollutant. The single exception is $SO_2$, comprising 8 percent of the overall total. This is due in part to the amounts of $SO_x$ in aircraft fuel compared to low sulfur fuels in motor vehicles. However, it is important to note that ambient (i.e., "outdoor") levels of $SO_2$ are consistently below the NAAQS for this pollutant (see **Appendix A**).

When compared to total emissions in the Atlanta metropolitan area, PDK's portion is less than 1 percent for all pollutants. This result is also to be expected as the airport is a comparatively small entity when compared to Atlanta Hartsfield International Airport (ATL), area wide motor vehicle traffic and other emission sources in the metro areas.

Because the greater Atlanta area (including DeKalb County and PDK) is designated by the U.S. EPA as a Nonattainment Area for ozone, emissions of $NO_x$ and VOCs are considered to be the most important as they are pre-cursors to ozone.[10,11] **Figure 4** shows the percent contributions of PDK to the area-wide totals for these pollutants. As shown, the airport represents less than 1% of $NO_x$ and VOCs within this area.

**Table 6. Emissions For PDK, DeKalb County, and Atlanta Metropolitan Area**

| Sources | Pollutants[1] | | | | | |
|---|---|---|---|---|---|---|
| | CO | VOC | $NO_X$ | $SO_2$ | $PM_{2.5}$ | $PM_{10}$ |
| PDK[2] | 726 | 204 | 78 | 12 | 4 | 4 |
| DeKalb County Total[3] | 122,514 | 19,815 | 9,366 | 146 | 2,100 | 5,446 |
| Atlanta Metropolitan Area[4] | 425,555 | 114,658 | 63,208 | 2,513 | 8,987 | 28,929 |

[1] CO = carbon monoxide, VOC = volatile organic compounds, $NO_x$ = nitrogen oxides, $SO_2$ = sulfur dioxide, $PM_{10}$ and $PM_{2.5}$ = particulate matter with diameters of 10 and 2.5 micrometers.
[2] PDK airport emissions.
[3] DeKalb County emissions include stationary sources, motor vehicles and other aviation-related sources.
[4] Atlanta Study Area includes parts of Clayton, Cobb, DeKalb, Fulton, Gwinnet, and Rockdale Counties.
Source: KB Environmental Sciences, Inc., 2018.

**Table 7. Emissions For PDK, DeKalb County, and Atlanta Metropolitan Area**

| Study Area | Pollutants[1] | | | | | |
|---|---|---|---|---|---|---|
| | CO | VOC | $NO_X$ | $SO_2$ | $PM_{2.5}$ | $PM_{10}$ |
| DeKalb County[2] | 1% | 1% | 1% | 8% | <1% | <1% |
| Atlanta Metropolitan Area[3] | <1% | <1% | <1% | <1% | <1% | <1% |

[1] CO = carbon monoxide, VOC = volatile organic compounds, $NO_x$ = nitrogen oxides, $SO_2$ = sulfur dioxide, $PM_{10}$ and $PM_{2.5}$ = particulate matter with diameters of 10 and 2.5 micrometers.
[2] DeKalb County emissions include stationary sources, motor vehicles and other aviation-related sources.
[3] Atlanta Study Area includes parts of Clayton, Cobb, DeKalb, Fulton, Gwinnet, and Rockdale Counties.
Source: KB Environmental Sciences, Inc., 2018.

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10 A nonattainment area is a region where air quality monitors have reported pollutant levels higher the EPA standards.

11 Nitrogen Oxides ($NO_x$) and Volatile Organic Compounds (VOCs) are precursors to the harmful pollutant ozone ($O_3$). This means that VOC and NOx are emitted directly into the atmosphere, then undergo chemical reactions that form $O_3$.

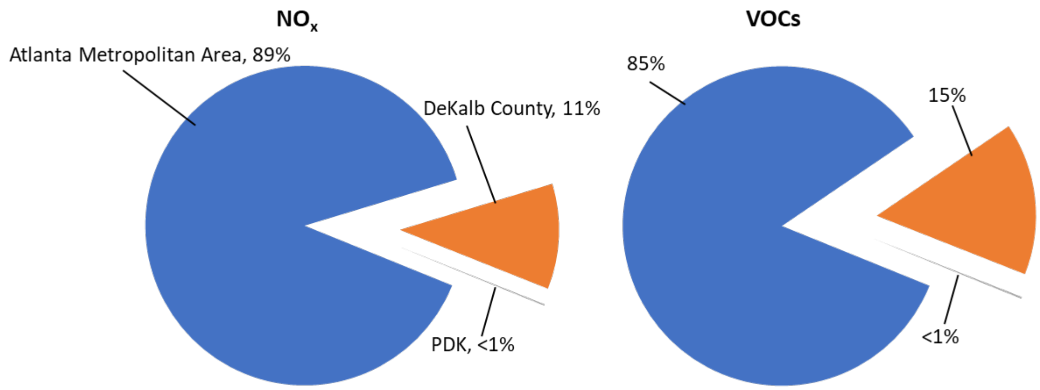


**Figure 4. $NO_x$ and VOCs Percent Contributions**

## C. Task 3: Compare PDK Emissions to Other Airports

### 1. Purpose

The purpose of **Task 3** was to compare the types and amounts of emissions associated with PDK to those of other GA airports of similar size and function. This method of benchmarking "peer" airports helps determine how PDK compares to others.

### 2. Methodology

Comparison airports were identified based on airport classifications (e.g., GA, Large-hub Commercial, etc.) and annual operational levels (i.e., annual arrivals and departures).[12] Based on these criteria, Scottsdale Airport (SDL) in Arizona and Fort Lauderdale Executive Airport (FXE) in Florida, were two GA airports selected for this analysis. ATL (the world's busiest airport) was also used for comparison. PDK and these three airports are listed in **Table 7** by classification and operational levels.

**Table 7. PDK Operations & Comparison Airports**

| Airport | Classification[a] | Operations[b] | Differences |
|---|---|---|---|
| DeKalb Peachtree (PDK) | GA Hub | 159,000 | - |
| Scottsdale (SDL) | GA Hub | 168,000 | 9,000 (+5%) |
| Ft. Lauderdale Executive (FXE) | GA Hub | 179,000 | 20,000 (+10%) |
| Atlanta Hartsfield International (ATL) | Large Hub | 879,498 | 709,000 (6X) |

[a] Classifications based on FAA categories: GA = airports that do not have scheduled service or less than 2,500 annual passenger boardings, Large Hub Commercial = having 1% or more of U.S. annual passenger boardings
[b] Operation counts are for 2017. Data Source: Federal Aviation Administration (FAA) Operations Network (OPSNET)

As shown, the 2017 operational levels for SDL and FXE are greater than PDK by about 20,000 operations (5 to 10 percent more). Operational levels at ATL are over 700,000 more than PDK (6 times more).

Total emissions for PDK were obtained from **Task 2** *Analysis of PDK Emissions Compared to Other Nearby Sources*. As discussed, these values were derived from the latest PDK data (e.g., operational levels, aircraft fleet mix, airfield operational characteristics) for 2017 and using the FAA's AEDT.

[12] Classifications based on FAA categories: GA = airports that do not have scheduled service or less than 2,500 annual passenger boardings, Large Hub Commercial = having 1% or more of U.S. annual passenger boardings.

Total 2017 emissions for SDL, FXE, and ATL were calculated following similar methodologies, types of data and the AEDT. For these airports, the FAA Traffic Flow Management System Counts (TFMSC)[13] and Operations Network (OPSNET)[14] datasets were used. The TFMSC provides the airport operational levels and aircraft fleet mix (i.e., arrival/departure) and OPSNET provides additional airport operational data (e.g., ground-based taxi times).

Further details for this analysis are contained in **Appendix B**.

## 3. Results

The results of this analysis are presented in **Table 8** and summarized below. Because DeKalb County and the greater Atlanta metropolitan area are designed as "Non-attainment" for the pollutant ozone, emissions of $NO_x$ and VOCs (the precursors to ozone) are provided.[15]

The results in **Table 8** are presented in tons/year by pollutant and arranged by airport, emission totals and percent differences compared to PDK. Using this approach, the main outcomes of this analysis are as follows:

- **$NO_x$ Emissions:** $NO_x$ associated with PDK are 10 to 12 tons/year (or 11 to 13 %) less than SDL and FXE. $NO_x$ emissions at ATL are 54 times less for PDK.
- **VOC Emissions:** VOC associated with PDK are 29 to 39 tons/year (or 12 to 16%) less than SDL and FXE. VOC emissions at ATL are 5 times more than PDK.
- **CO Emissions:** CO associated with PDK are 251 tons/year (25%) less than FXE, and 101 tons/year (14%) more than SDL. CO emissions at ATL are 11 times more than PDK.
- **$SO_2$ Emissions:** $SO_2$ associated with PDK are 2 tons/year (13%) less than SDL and FXE. $SO_2$ emissions at ATL are 40 times more than PDK.
- **$PM_{2.5}$ Emissions:** $PM_{2.5}$ associated with PDK are about equal to FXE, and 1 ton/year (25%) more than SDL. $PM_{2.5}$ emissions at ATL are 30 times more than PDK.
- **$PM_{10}$ Emissions:** $PM_{10}$ are associated with PDK are about equal to those of SDL and FXE. $PM_{10}$ emissions at ATL are 30 times more than PDK.

**Table 8. PDK Emissions Compared to Other Airports**

| Airport | Emissions (tons/year) | | | | | |
|---|---|---|---|---|---|---|
| | CO | VOC | $NO_X$ | $SO_2$ | $PM_{2.5}$ | $PM_{10}$ |
| SDL | 625 | 233 | 88 | 15 | 3 | 4 |
| FXE | 977 | 243 | 90 | 15 | 4 | 4 |
| ATL | 8,296 | 1,022 | 5,004 | 517 | 75 | 75 |
| PDK | 726 | 204 | 78 | 13 | 4 | 4 |

Notes: CO = carbon monoxide, VOC = volatile organic compounds, $NO_x$ = nitrogen oxides, $SO_2$ = sulfur dioxide, $PM_{10}$ and $PM_{2.5}$ = particulate matter with diameters of 10 and 2.5 micrometers.
ATL = Hartsfield-Jackson Atlanta International Airport, FXE = Fort Lauderdale Executive Airport, PDK= DeKalb Peachtree Airport, and SDL = Scottsdale Airport.
Sources: FAA Aviation Environmental Design Tool (AEDT), Traffic Flow Management System Counts (TFMSC), KB Environmental Sciences, Inc., 2018.

[13] FAA, Traffic Flow Management System Counts, https://aspm.faa.gov/tfms/sys/Airport.asp.
[14] FAA, Operations Network (OPSNET) https://aspm.faa.gov/opsnet/sys/main.asp
[15] See Task 1 for further information regarding Non-attainment designation.

$NO_x$ and VOC emissions are precursors to the criteria pollutant ozone for which the Atlanta area is in violation of the federal standard. The differences in $NO_x$ and VOC emissions at PDK, SDL and FXE are largely attributable to the differences in operational levels and to a lesser extent the aircraft fleet mix and airfield operational conditions. In the case of ATL, these significant differences are more highly pronounced.

**Table 9. Emissions of NOx and VOC for PDK Compared to Other Airports**

| Airport | Pollutant (tons/year) | | PDK Comparison (Difference) | |
|---|---|---|---|---|
| | $NO_x$ | VOC | $NO_x$ | VOC |
| DeKalb Peachtree (PDK) | 78 | 204 | - | - |
| Scottsdale (SDL) | 88 | 233 | 11% | 12% |
| Fort Lauderdale Executive (FXE) | 90 | 243 | 13% | 16% |
| Atlanta Hartsfield (ATL) | 5,004 | 1,022 | 54x | 5x |

Notes: $NO_x$ = nitrogen oxides, VOC = volatile organic compounds.
Sources: FAA Aviation Environmental Design Tool (AEDT), Traffic Flow Management System Counts (TFMSC), KB Environmental Sciences, Inc., 2018.

## D. Task 4: Analyze PDK Emissions According to Aircraft Maximum Takeoff Weights

### 1. Purpose

The purpose of this task is to evaluate emissions associated with PDK based on three categories of aircraft maximum takeoff weights (MTOWs): (i.) less than 66,000 lbs, (ii.) 66,000 to 75,000 lbs, and (iii.) greater than 75,000 lbs (further described in **Table 10)**. The results help to determine the relative effects of aircraft size on potential air quality impacts.

### 2. Methodology

The estimated emissions for each aircraft category are for calendar year 2017. They include emissions from aircraft, GSE and APUs associated with PDK. The types of emissions are typical for engines burning petroleum-based fuels and include the U.S. EPA Criteria Pollutants (and their precursors, see **Sections II.A** and **II.B** for further explanation)[16]. **Table 10** includes data on number and percent of total operations for each category.

[16] Criteria Pollutants and their pre-cursors include Carbon Monoxide (CO), nitrogen oxides ($NO_x$), sulfur dioxide ($SO_2$), volatile organic compounds (VOCs), particulate matter with diameters less than 10 and 2.5 microns ($PM_{10}$ and $PM_{2.5}$), and lead (Pb).

**Table 10. Aircraft MTOW Categories**

| Category No. | MTOW Range | Operations / Percent at PDK | Example[1] | Description |
|---|---|---|---|---|
| 1. | < 66,000 lbs. | 152,000 / 96% |  Raytheon Beech Baron 55 | The most common aircraft at PDK and most General Aviation airports have MTOWs less than 66,000 lbs. These aircraft make up 96% of total operations at PDK. This category includes piston-engine aircraft that used leaded aviation fuel. |
| 2. | 66,000 to 75,000 lbs. | 3,700 / 2% | Gulfstream G400  | Aircraft with MTOW in Category 2 are infrequent at PDK and similar GA airports, making up about 2% of total operation at PDK. |
| 3. | > 75,000 lbs. | 3,300 / 2% | Bombarider Global Express  | The largest aircraft that operate at PDK, making up about 2% of total operations. Prior permission is required for these aircraft at PDK[2]. |

[1] Images are for aircraft operating at PDK. https://www.planespotters.net/photos/airport/Atlanta-Dekalb-Peachtree-Airport-PDK-KPDK
[2] According to AirNav.com, for aircraft over 75,000 lbs prior permission is required (PPR)https://www.planespotters.net/photos/airport/Atlanta-Dekalb-Peachtree-Airport-PDK-KPDK

For consistency, PDK-specific aircraft data developed under **Task 2** *Analysis of PDK Emissions Compared to Other Nearby Sources* using the same model (i.e. AEDT) were also used for this analysis. This task focuses only on aircraft emissions, so data for the other nearby sources are not included.

## 3. Results

The results of the analysis are presented in **Table 11**, arranged by aircraft weight category (i.e., MTOW), pollutant type and percent of total. As shown in, Category 1 aircraft represents the largest source of emissions at PDK (**Figure 5**). This result is expected as the vast majority of aircraft associated with PDK are within this weight category (see **Table 10**).

It is also important to note that CO is emitted in the greatest amount followed by VOCs, $NO_x$, $SO_2$ and $PM_{10/2.5}$. This outcome is also typical of airports similar in size, function, operational levels and aircraft types compared to PDK (see **Section 3** *Analysis of PDK Emissions Compared to Other Airports*).

The second largest amounts of emissions are from Category 2 aircraft (66,000 to 75,000 lbs.) butare significantly less than Category 1 (see above). These results are consistent with the percentage of operations for this category.

Finally, Category 3 (>75,000 lbs.) represents the least amounts of emissions, though nearly the same as Category 2. Again, this is consistent with the percentage of operations for this aircraft at PDK.

Considering lead, this pollutant is emitted by piston-engine GA aircraft that use aviation gasoline (avgas). These types of aircraft at PDK all fall under Category 1 and in total emit about 0.1 tons per year.

**Table 11. Air Emissions by MTOW Category**

| MTOW[1] Category | | Pollutants[2] (tons/year) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | CO | VOC | $NO_x$ | $SO_2$ | $PM_{2.5}$ | $PM_{10}$ | Pb |
| 1 | < 66,000 lbs. | 693 | 196 | 66 | 11 | 3 | 3 | 0.1 |
| 2 | 66,000-75,000 lbs. | 20 | 6 | 5 | 1 | <1 | <1 | - |
| 3 | > 75,000 lbs. | 14 | 2 | 7 | 1 | <1 | <1 | - |
| | Total PDK | 726 | 204 | 78 | 13 | 4 | 4 | 0.1 |

[1] MTOWs = maximum takeoff weights.
[2] CO = carbon monoxide, VOC = volatile organic compounds, $NO_x$ = nitrogen oxides, $SO_2$ = sulfur dioxide, $PM_{10}$ and $PM_{2.5}$ = particulate matter with diameters of 10 and 2.5 micrometers, Pb = lead.
Source: KB Environmental Sciences, Inc., 2018.

**Figures 5** show the percentage that each category contributed to pollutant emissions. Lead is not included because it is all from Category 1.

The following summarizes the results:

- **CO**: For CO, the lighter aircraft (with MTOWs <66,000 lbs.) tend to have slightly lower CO emissions per operation (13%) compared to the aircraft with MTOW between 66,000 and 75,000 lbs., and slightly higher than aircraft with MTOW greater than 75,000 lbs. (6%)
- **VOC**: Aircraft with MTOWs between 66,000 to 75,000 lbs. contribute the largest amounts of VOC emissions, followed by aircraft with MTOW less than 66,000 lbs. (23% less), and aircraft with MTOW greater than 75,000 lbs. (66% less).
- **$NO_x$ and $SO_x$**: Aircraft with MTOW over 75,000 emit the highest amount of $NO_x$ and $SO_x$, followed closely by aircraft with MTOW between 66,000 to 75,000 lbs., (3x less) and aircraft with MTOW less than 66,000 lbs. (5x less).
- **$PM_{10}$ and $PM_{2.5}$**: Aircraft with MTOWs between 66,000 to 75,000 lbs. emit the most $PM_{10}$ and $PM_{2.5}$, followed closely by aircraft with MTOW over 75,000 lbs. (31% less), with aircraft of MTOW less than 66,000 lbs. emitting 4x less.
- **Pb**: Piston engine aircraft that emit lead are only in Category 1 and therefore contribute to 100% of the lead emissions.

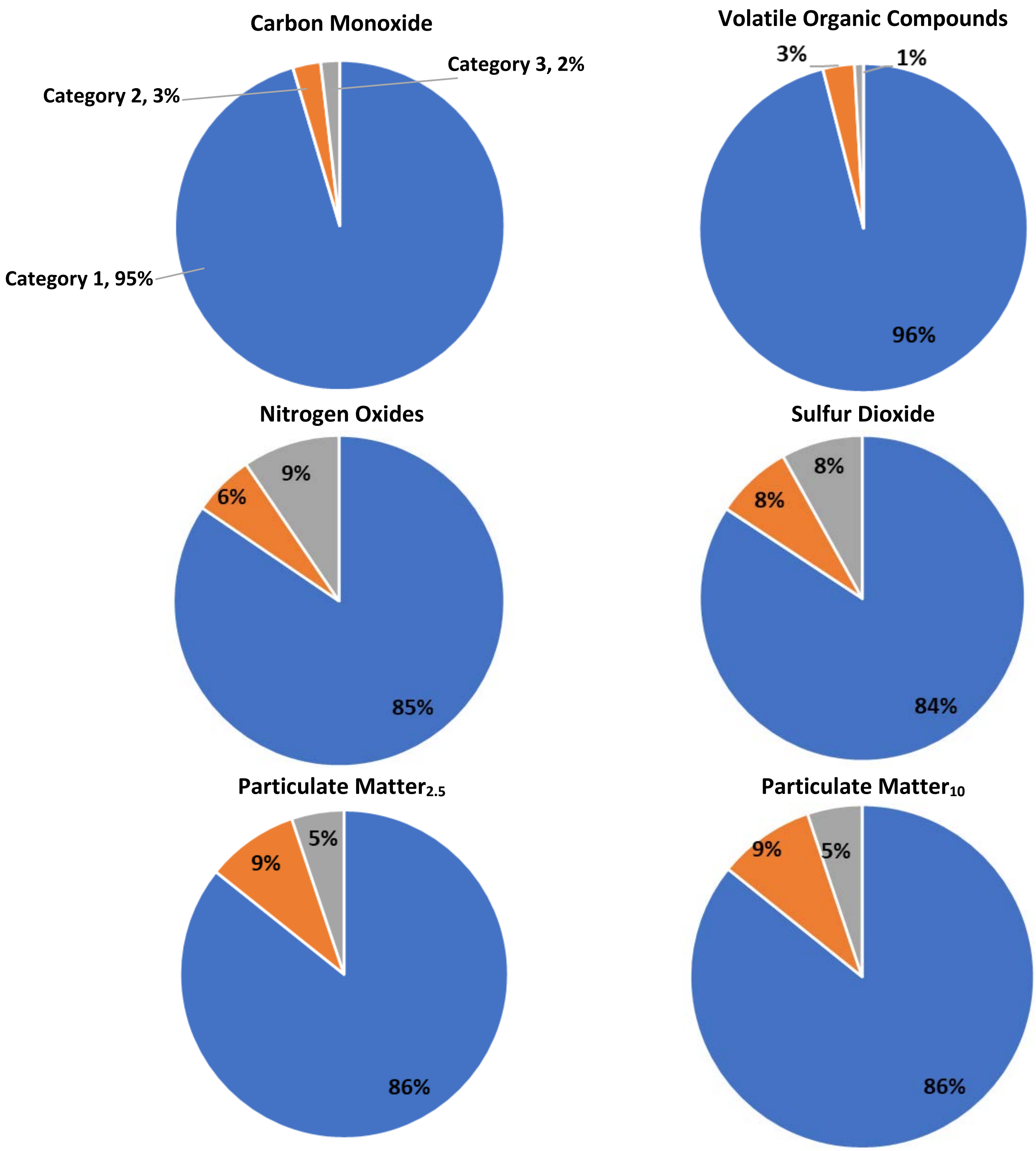


Figure 5. Percent Emissions by Aircraft Category

## E. Task 5: Dispersion Modeling for PDK Airport Specific Emissions

### 1. Purpose

The purpose of **Task 5** was to quantify the contributions of PDK emissions to local air quality. Using the data from **Tasks 2** through **4**, atmospheric dispersion modeling was completed for criteria pollutants CO,

$NO_2$, $SO_2$, and $PM_{2.5/10}$. This analysis was conducted using FAA's AEDT dispersion modeling system. The modeling period was for the year 2017.

## 2. Methodology

The pollutant concentrations were estimated at 24 locations (known as receptors) in the vicinity of the airport and its surrounding communities. Designated as Airport Boundary Receptors, 15 receptors were located along the airport's boundary and represent the nearest locations the public can get to the airport. Designated as community receptors, these nine receptors represent sensitive land uses in the communities surrounding PDK. These 24 receptors are listed in **Table 12** and **13** and are shown in **Figure 6**.

**Table 12. Airport Boundary Receptors**

| Name | Abbreviation | Location Relative to PDK |
|---|---|---|
| Boundary 1-3 and 15 | B1-B3, B15 | West boundary |
| Boundary 4 | B4 | Northwest boundary |
| Boundary 5,6 (B5) | B5-B6 | North boundary |
| Boundary 7,8 (B7) | B7-B8 | Northeast boundary |
| Boundary 9-11 (B9) | B9-B11 | East boundary |
| Boundary 12 | B12 | Southeast boundary |
| Boundary 13 | B13-B14 | South boundary |

**Table 13. Community Receptors**

| Name | Abbreviation | Location Relative to PDK |
|---|---|---|
| Ashford Park Elementary School | AP | 1 mile west |
| Chamblee High School | CH | 1 mile northwest |
| Chamblee Middle School | CM | 1 mile northwest |
| Clairmont Baptist Church | CB | 0.5 miles from south |
| Dorje Ling Budhist Center | DL | 0.7 miles east of north |
| Dresden Elementary School | DE | 0.5 miles east |
| Dresdon Park | DP | 0.5 miles east |
| Montclair Elementary School | ME | 1 mile south |
| Yeshiva Atlanta High School | YA | 1 mile northeast |

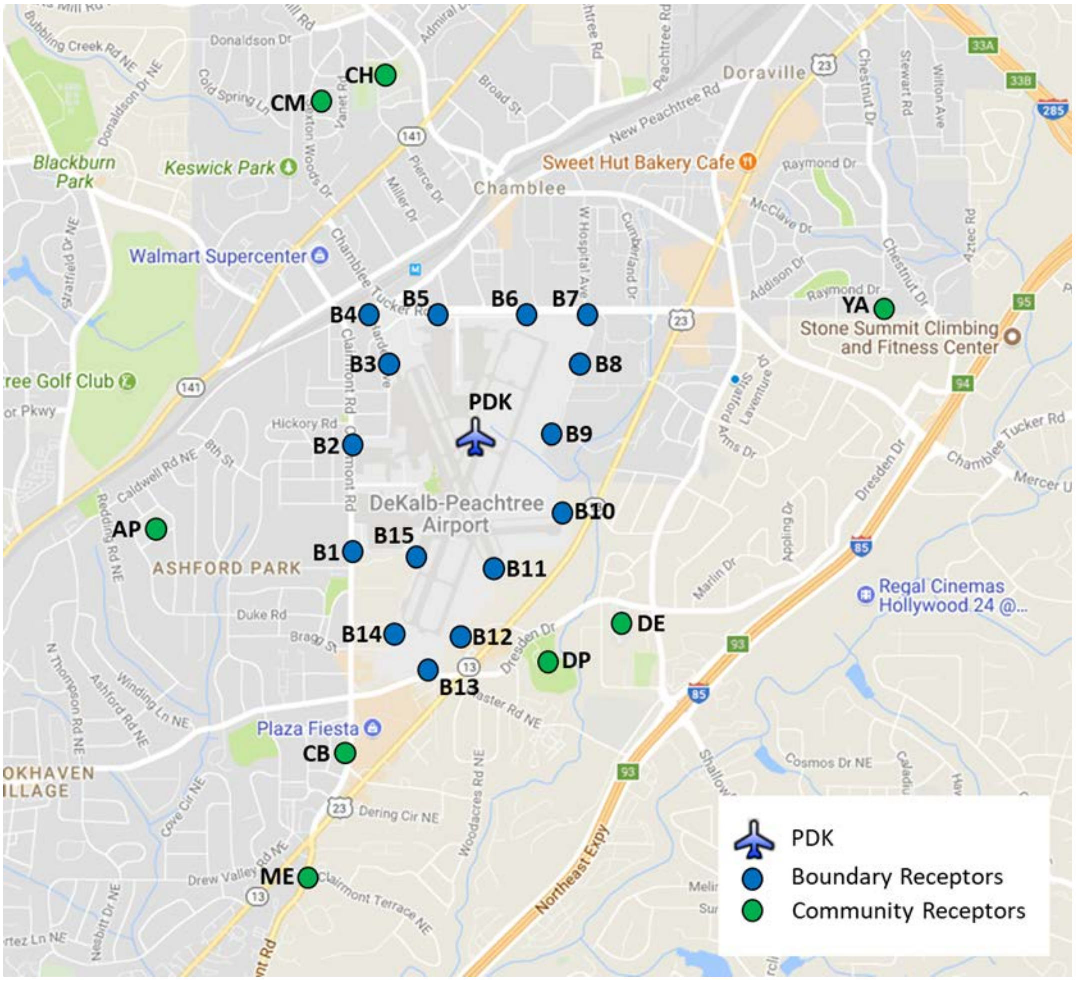


**Figure 6. Receptor Locations**

Importantly, the dispersion modeling includes emissions from aircraft MTOW Categories 1, 2, and 3. Meteorological data (e.g., wind speed, wind direction, temperature, etc.) were obtained from the National Climatic Data Center (NCDC) from weather stations closest to PDK.

In order to account for pollutant sources non-airport pollutant sources, background values were added. These values were obtained from the closest EPA air monitoring stations (See **Appendix C**). For each pollutant and time-frame, the highest value (i.e., the "worst-case") of any receptor is shown (see **Appendix C** for more details).

## 3. Results

The dispersion modelling results, reported in micrograms per cubic meter (μg/m$^3$), are shown in **Table 14**. For comparative purposes, the NAAQS are also provided.

As shown, the highest concentrations at the nine Community Receptors are well below the air quality standards for each pollutant. Although higher, the maximum concentrations at the 15 Airport Boundary Receptors are also within the standards. Additional for the dispersion modeling analysis are provided in **Appendix C**.

### Table 14. Atmospheric Dispersion Modeling Results (μg/m³)[a]

| Receptor[b] | Pollutants[c] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | $NO_2$ | | CO | | $SO_2$ | | $PM_{2.5}$ | | $PM_{10}$ |
| | 1-Hour[1] | Annual[2] | 1-Hour[1] | 8-Hour[3] | 1-Hour[4] | 3-Hour[5] | 24-Hour[6] | Annual[7] | 24-Hour[6] |
| **Community Receptors** | | | | | | | | | |
| AP | 56 | 30 | 5,351 | 2,493 | 27 | 23 | 25 | 10 | 48 |
| CB | 46 | 29 | 3,541 | 1,808 | 14 | 18 | 24 | 10 | 47 |
| CH | 67 | 29 | 3,021 | 1,737 | 15 | 15 | 24 | 10 | 47 |
| CM | 42 | 29 | 3,991 | 2,018 | 18 | 18 | 25 | 10 | 47 |
| DE | 77 | 30 | 3,802 | 1,869 | 17 | 16 | 25 | 10 | 47 |
| DL | 46 | 29 | 4,452 | 1,915 | 17 | 17 | 25 | 10 | 47 |
| DP | 86 | 30 | 3,084 | 1,805 | 14 | 15 | 24 | 10 | 47 |
| ME | 67 | 29 | 3,616 | 1,893 | 15 | 16 | 25 | 10 | 47 |
| YA | 43 | 29 | 2,888 | 1,697 | 11 | 16 | 24 | 10 | 47 |
| **Airport Boundary Receptors[b]** | | | | | | | | | |
| B1-B15 | 167 | 47 | 7,676 | 2,611 | 34 | 28 | 26 | 11 | 48 |
| *NAAQS[d]* | *188* | *100* | *40,000* | *10,000* | *196* | *1,300* | *35* | *12* | *150* |
| *Exceedances* | *None* | *None* | *None* | *None* | *None* | *None* | *None* | *None* | *None* |

[a] Micrograms per cubic meter.
[b] AP = Ashford Park Elementary School, CB = Clairmont Baptist Church, DP = Dresdon Park, etc. See Table 12 for abbreviations. [b] Reported values are the highest for all airport boundary receptors. NAAQS = National ambient air quality standards
[c] CO = carbon monoxide, VOC = volatile organic compounds, $NO_x$ = nitrogen oxides, $SO_2$ = sulfur dioxide, $PM_{10}$ and $PM_{2.5}$ = particulate matter with diameters of 10 and 2.5 micrometers.
[d] U.S. EPA National Ambient Air Quality Standards (NAAQS) in μg/m³
[1] 1-Hour maximum, [2] Annual Max, [3] Maximum 8-hour average,[4] 4th highest 1-hour average, [5] 2nd Highest 3-houir average, [6] Highest 24-hour average, [7] Highest annual average.
Notes: $NO_2$ is computed using AERMOD's ambient ratio method version 2 (ARM2) and has been temporally paired with background concentrations. This higher degree of accuracy is needed for $NO_2$ due to the complex nature of the breakdown of NOx to $NO_2$ and NO.
Source: FAA's AEDT and EPA's AERMOD, and KB Environmental Sciences, 2018.

## III. Summary and Conclusions

This section provides an overall summary and the conclusions of the Study.

- **Task 1, Evaluate Current Air Quality Conditions**: The results of this task revealed two important findings: (i.) air quality in the vicinity of PDK meets national and state standards for the U.S. EPA Criteria pollutants and (ii.) the pollutant levels have declined significantly over the past 25 years. The only exception is the pollutant ozone for which the greater metropolitan Atlanta area (including DeKalb County) does not meet the standards. However, ozone is a "regional" pollutant meaning it can extend over numerous counties and is formed from the combined emissions from numerous and many different sources (e.g. motor vehicles, industry, construction activities, etc. Atlanta is among over 200 areas nationwide that do not meet the ozone standard.
- **Task 2, Compare PDK Emissions to Other Nearby Sources:** The results of this task revealed that PDK contributes a small fraction of emissions of criteria air pollutants and their precursors, with 1% or less for most pollutants, and 8% for $SO_2$. When compared to the Atlanta area, PDK is less than 1% of all pollutants.
- **Task 3, Compare PDK Emissions to Other Airports:** The outcome of this task shows that compared to airports of similar sized and function, PDK generates the same types of emissions and in similar quantities.

- **Task 4, Analyze PDK Emissions According to Aircraft Maximum Takeoff Weights (MTOW):** The results of this task demonstrate that aircraft with MTOW less than 66,000 lbs. (Category 1) generate the vast majority (84% to 96% depending on pollutant). This outcome is expected as Category 1 aircraft comprise the majority of operations at PDK. By comparison, aircraft with MTOW 66,000 to 75,000 lbs. (Category 2) and greater than 75,000 lbs. (Category 3) represent 1% to 5%, again depending on pollutant.
- **Task 5, Conduct Atmospheric Dispersion Modeling for PDK Emissions:** The results of this task show that pollutant concentrations around the airport's perimeter and in the surrounding communities are well within the applicable federal and state air quality standards.

Overall, this Study demonstrates that PDK's operations and resultant emissions are comparable to other similar-sized GA airports. The airport's emissions also have a relatively low impact to local air quality conditions and do not cause, or contribute to, violations of federal or state air quality conditions. Finally, Category 1 aircraft comprise the vast majority of emissions at PDK with Categories 2 and 3 representing comparatively small amounts.

## List of Preparers

Mike Kenney, Air Quality Specialist, responsible for overall project management.

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# Appendix A – Monitoring Data

This Appendix details the monitoring data used to assess **Task 1** (*Evaluation of Current Air Quality Conditions*) presented in **Section II.A** of the main report. The data presented in the following tables is from the U.S. Environmental Protection Agency (EPA) ambient air quality monitoring network which monitors Criteria Air Pollutants considered harmful for human health and the environment[1]. Specifically, the data is from monitors within the *Atlanta Study Area* and the *Airport Study Area* discussed in **Section II.A** of the main report. Information on the monitors used are presented in **Table A-1** and **Figure A-1**.

**Table A-1. Study Area Monitor Details**

| Monitor (abbreviation) | County | Pollutants | Years |
|---|---|---|---|
| Bolton Road (BR) | Fulton | Lead | 1990-1997 |
| Confederate Avenue (CA) | Fulton | $SO_2$ | 1991-2017 |
| | | $O_3$ | 1991-2017 |
| DeKalb Tech (DT) | DeKalb | CO | 1990-2003 |
| Doraville (DV) | DeKalb | $PM_{10}$ | 1990-2012 |
| | | $PM_{2.5}$ | 1999-2012 |
| East Point (EP) | Clayton | $PM_{2.5}$ | 1999-2001 |
| East Rivers School (ER) | Fulton | $PM_{10}$ | 1996-2012 |
| | | $PM_{2.5}$ | 1999-2012 |
| Fire Station 8 (FS) | Fulton | $PM_{10}$ | 1990-2017 |
| | | $PM_{2.5}$ | 1999-2017 |
| Fulton Health Dept (FH) | Fulton | $PM_{10}$ | 1993-2008 |
| | | Lead | 1990-1996 |
| Georgia DOT (GD) | Clayton | $PM_{2.5}$ | 1999-2015 |
| Georgia Power Substation (GP) | DeKalb | CO | 1994-2014 |
| Georgia Tech (GT) | Fulton | $PM_{10}$ | 1998-2012 |
| | | $PM_{2.5}$ | 2006-2008 |
| | | $NO_2$ | 1990-2009 |
| | | $SO_2$ | 1990-2009 |
| Gwinnett Tech (GW) | Gwinnet | $PM_{2.5}$ | 2000-2017 |
| | | $O_3$ | 1995-2017 |
| Macland Center (MA) | Cobb | $PM_{2.5}$ | 2003-2012 |
| Monastery (MO) | Rockdale | $NO_2$ | 1994-2015 |
| | | $O_3$ | 1990-2017 |
| Panthersville Road (PR) | DeKalb | $NO_2$ | 2015-2017 |
| | | Lead | 1990-2014 |
| Sandy Springs (SS) | Fulton | $PM_{2.5}$ | 2015-2017 |
| | | $NO_2$ | 2014-2017 |
| | | CO | 2015-2017 |
| South DeKalb (SD) | DeKalb | $PM_{10}$ | 2011-2017 |
| | | $PM_{2.5}$ | 1999-2017 |
| | | $SO_2$ | 2012-2017 |
| | | $NO_2$ | 1990-2017 |
| | | $O_3$ | 1990-2017 |
| | | CO | 2003-2017 |
| Tucker-Idlewood Road (TI) | DeKalb | $NO_2$ | 1995-2006 |
| | | $O_3$ | 1995-2006 |

[1] Criteria Pollutants are considered to be harmful for human health and the environment by the U.S. EPA. They include carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), particulate matter with diameters of 10 and 2.5 microns ($PM_{10}$ and $PM_{2.5}$), ozone ($O_3$), and lead (Pb).

| Monitor (abbreviation) | County | Pollutants | Years |
|---|---|---|---|
| Utoy Creek (UC) | Fulton | Lead | 2003-2008 |
| Source: EPA, AirData, 2018. | | | |

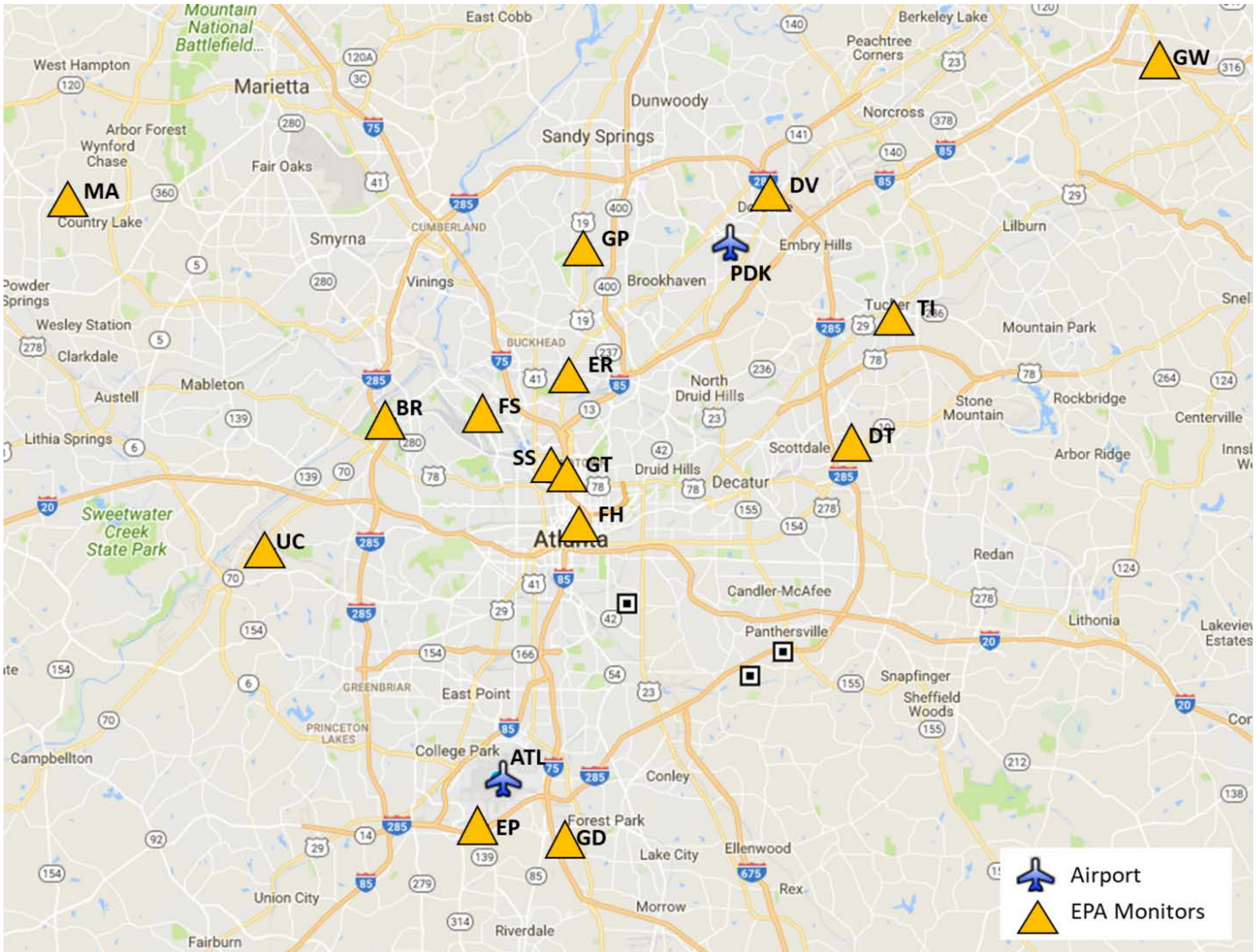


**Figure A-1. Full Study Area Monitor Locations**

The data presented in the following sections details annual average concentrations and number of exceedances of EPA's National Ambient Air Quality Standards (NAAQS) at each monitoring station by pollutant.

## A-1. Particulate Matter ($PM_{10/2.5}$)

EPA monitors report data for particulate matter with aerodynamic diameters of 10 and 2.5 micrometers ($PM_{10}$ and $PM_{2.5}$). Detailed monitoring data (i.e., concentrations and number of exceedances) for each pollutant are presented in **Tables A-2** through **A-4**.

**Tables A-2** and **A-3** present annual average concentrations in micrograms per cubic meter (µg/m$^3$) and the number of annual exceedances of the NAAQS, respectively, for monitors that report $PM_{2.5}$ in the *Atlanta Study Area*. As shown, concentrations and exceedances steadily decline at all monitors with no exceedances in 2017.

## Table A-2. $PM_{2.5}$ Annual Average Concentrations (µg/m³)

| Year | GD | EP | SD | DV | ER | FS | GT | SS | GW | MA |
|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 11 | - | 8 | - | - | 10 | - | 11 | 9 | - |
| 2016 | 9 | - | 13 | - | - | 10 | - | 11 | 8 | - |
| 2015 | 10 | - | 9 | - | - | 10 | - | 10 | 9 | - |
| 2014 | 11 | - | 10 | - | - | 11 | - | - | 9 | - |
| 2013 | 10 | - | 9 | - | - | 10 | - | - | 9 | - |
| 2012 | 11 | - | 10 | 10 | 10 | 11 | - | - | 10 | 10 |
| 2011 | 13 | - | 12 | 12 | 12 | 13 | - | - | 11 | 11 |
| 2010 | 13 | - | 12 | 12 | 12 | 14 | - | - | 12 | 12 |
| 2009 | 12 | - | 11 | 12 | 12 | 12 | - | - | 12 | 10 |
| 2008 | 14 | - | 13 | 13 | 13 | 8 | 14 | - | 13 | 13 |
| 2007 | 16 | - | 15 | 16 | 16 | - | 16 | - | 14 | 15 |
| 2006 | 17 | - | 15 | 14 | 15 | 18 | 15 | - | 17 | 16 |
| 2005 | 17 | - | 15 | 16 | 16 | 17 | - | - | 16 | 15 |
| 2004 | 17 | - | 16 | 15 | 16 | 18 | - | - | 16 | 15 |
| 2003 | 16 | - | 15 | 15 | 16 | 18 | - | - | 16 | 15 |
| 2002 | 15 | - | 15 | 15 | 16 | 17 | - | - | 16 | - |
| 2001 | 17 | 16 | 17 | 18 | 17 | 19 | - | - | 16 | - |
| 2000 | 19 | 20 | 17 | 19 | 19 | 21 | - | - | 19 | - |
| 1999 | 21 | 19 | 21 | 22 | 21 | 23 | - | - | - | - |

Note: "-" signifies no data available.
Source: EPA, AirData, 2018.

## Table A-3. $PM_{2.5}$ Annual Number of Exceedances

| Year | GD | EP | SD | DV | ER | FS | GT | SS | GW | MA |
|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 0 | - | 0 | - | - | 0 | - | 0 | 0 | - |
| 2016 | 1 | - | 2 | - | - | 1 | - | 1 | 1 | - |
| 2015 | 0 | - | 0 | - | - | 0 | - | 0 | 0 | - |
| 2014 | 0 | - | 0 | - | - | 0 | - | - | 0 | - |
| 2013 | 0 | - | 0 | - | - | 0 | - | - | 0 | - |
| 2012 | 0 | - | 0 | 0 | 0 | 0 | - | - | 1 | 0 |
| 2011 | 0 | - | 0 | 0 | 0 | 0 | - | - | 0 | 0 |
| 2010 | 0 | - | 1 | 0 | 1 | 1 | - | - | 0 | 0 |
| 2009 | 0 | - | 1 | 1 | 0 | 0 | - | - | 0 | 0 |
| 2008 | 1 | - | 1 | 0 | 1 | 0 | 1 | - | 0 | 1 |
| 2007 | 3 | - | 5 | 7 | 7 | - | 3 | - | 1 | 2 |
| 2006 | 0 | - | 0 | 0 | 2 | 1 | 0 | - | 0 | 2 |
| 2005 | 3 | - | 5 | 7 | 6 | 1 | - | - | 1 | 1 |
| 2004 | 5 | - | 6 | 4 | 6 | 7 | - | - | 1 | 3 |
| 2003 | 4 | - | 3 | 7 | 8 | 7 | - | - | 3 | 3 |
| 2002 | 1 | - | 4 | 2 | 2 | 2 | - | - | 0 | - |
| 2001 | 4 | 3 | 10 | 13 | 9 | 8 | - | - | 2 | - |
| 2000 | 4 | 8 | 10 | 14 | 12 | 9 | - | - | 3 | - |
| 1999 | 10 | 5 | 22 | 30 | 16 | 16 | - | - | - | - |

Note: "-" signifies no data available.
Source: EPA, AirData, 2018.

**Table A-4** presents annual average concentrations (in μg/m$^3$) for monitors that report $PM_{10}$ in the *Atlanta Study Area*. There have not been any recorded exceedances of the NAAQS for $PM_{10}$ at these monitors, therefore, an exceedance table is not provided.

**Table A-4. $PM_{10}$ Annual Average Concentrations (μg/m$^3$)**

| Year | SD | DV | ER | FS | GT | FH |
|---|---|---|---|---|---|---|
| 2017 | - | - | - | 18 | - | - |
| 2016 | - | - | - | 16 | - | - |
| 2015 | 17 | - | - | - | - | - |
| 2014 | 18 | - | - | 6 | - | - |
| 2013 | 18 | - | - | 6 | - | - |
| 2012 | 20 | 16 | 15 | - | 19 | - |
| 2011 | 21 | 17 | 17 | - | 20 | - |
| 2010 | - | 19 | 18 | - | 18 | - |
| 2009 | - | 21 | 21 | - | 18 | - |
| 2008 | - | 21 | 21 | - | 22 | 22 |
| 2007 | - | 28 | 29 | - | 27 | 24 |
| 2006 | - | 23 | 26 | 12 | 23 | 23 |
| 2005 | - | 23 | 25 | 12 | 25 | 23 |
| 2004 | - | 25 | 26 | 13 | 22 | 22 |
| 2003 | - | 26 | 25 | 10 | 22 | 24 |
| 2002 | - | 18 | 19 | 13 | 23 | 25 |
| 2001 | - | 20 | 21 | 27 | 27 | 36 |
| 2000 | - | 20 | 23 | 13 | 27 | 35 |
| 1999 | - | 23 | 25 | 15 | 22 | 30 |
| 1998 | - | 30 | - | 14 | 30 | 28 |
| 1997 | - | 27 | - | 17 | - | 30 |
| 1996 | - | 27 | - | 13 | - | 28 |
| 1995 | - | 28 | - | 15 | - | 30 |
| 1994 | - | 27 | - | 14 | - | 28 |
| 1993 | - | 28 | - | 17 | - | 36 |
| 1992 | - | 28 | - | 15 | - | - |
| 1991 | - | 36 | - | 17 | - | - |
| 1990 | - | 50 | - | 20 | - | - |

Note: "-" signifies no data available.
Source: EPA, AirData, 2018.

## A-2. Nitrogen Dioxide ($NO_2$)

EPA monitors report data for $NO_2$ and **Tables A-5** and **A-6** present annual average $NO_2$ concentrations in parts per billion (ppb) and the number of annual exceedances of the NAAQS for those monitoring stations within the *Atlanta Study Area*. As shown, concentrations have decreased over time and there have been no exceedances since 2004.

**Table A-5. $NO_2$ Annual Average Concentrations (ppb)**

| Year | PR | SD | TI | GT | SS | MO |
|---|---|---|---|---|---|---|
| 2017 | 35 | 27 | - | - | 32 | - |
| 2016 | 34 | 25 | - | - | 32 | - |
| 2015 | 31 | 23 | - | - | 30 | 7 |
| 2014 | - | 25 | - | - | 31 | 8 |
| 2013 | - | 22 | - | - | - | 8 |

| Year | PR | SD | TI | GT | SS | MO |
| --- | --- | --- | --- | --- | --- | --- |
| 2012 | - | 27 | - | - | - | 8 |
| 2011 | - | 31 | - | - | - | 8 |
| 2010 | - | 31 | - | - | - | 9 |
| 2009 | - | 24 | - | 31 | - | 7 |
| 2008 | - | 29 | - | 31 | - | 10 |
| 2007 | - | 32 | - | 34 | - | 11 |
| 2006 | - | 33 | 26 | 36 | - | 12 |
| 2005 | - | 30 | 28 | 36 | - | 13 |
| 2004 | - | 31 | 30 | 35 | - | 12 |
| 2003 | - | 30 | 30 | 34 | - | 13 |
| 2002 | - | 31 | 30 | 38 | - | 14 |
| 2001 | - | 36 | 33 | 44 | - | 16 |
| 2000 | - | 38 | 34 | 44 | - | 16 |
| 1999 | - | 41 | 40 | 46 | - | 16 |
| 1998 | - | 38 | 32 | 45 | - | 16 |
| 1997 | - | 32 | 29 | 48 | - | 15 |
| 1996 | - | 33 | 35 | 49 | - | 12 |
| 1995 | - | 30 | 30 | 37 | - | 13 |
| 1994 | - | 28 | - | 43 | - | 13 |
| 1993 | - | 30 | - | 45 | - | - |
| 1992 | - | 30 | - | 47 | - | - |
| 1991 | - | 30 | - | 45 | - | - |
| 1990 | - | 32 | - | 48 | - | - |

Note: “-” signifies no data available.
Source: EPA, AirData, 2018.

### Table A-6. $NO_2$ Annual Number of Exceedances

| Year | PR | SD | TI | GT | SS | MO |
| --- | --- | --- | --- | --- | --- | --- |
| 2017 | 0 | 0 | - | - | 0 | - |
| 2016 | 0 | 0 | - | - | 0 | - |
| 2015 | 0 | 0 | - | - | 0 | 0 |
| 2014 | - | 0 | - | - | 0 | 0 |
| 2013 | - | 0 | - | - | - | 0 |
| 2012 | - | 0 | - | - | - | 0 |
| 2011 | - | 0 | - | - | - | 0 |
| 2010 | - | 0 | - | - | - | 0 |
| 2009 | - | 0 | - | 0 | - | 0 |
| 2008 | - | 0 | - | 0 | - | 0 |
| 2007 | - | 0 | - | 0 | - | 0 |
| 2006 | - | 0 | 0 | 0 | - | 0 |
| 2005 | - | 0 | 0 | 0 | - | 0 |
| 2004 | - | 0 | 0 | 1 | - | 0 |
| 2003 | - | 0 | 0 | 0 | - | 0 |
| 2002 | - | 0 | 0 | 1 | - | 0 |
| 2001 | - | 1 | 0 | 3 | - | 0 |
| 2000 | - | 0 | 0 | 5 | - | 0 |
| 1999 | - | 1 | 0 | 3 | - | 1 |
| 1998 | - | 3 | 0 | 1 | - | 0 |

| Year | PR | SD | TI | GT | SS | MO |
|---|---|---|---|---|---|---|
| 1997 | - | 0 | 0 | 4 | - | 0 |
| 1996 | - | 0 | 0 | 4 | - | 0 |
| 1995 | - | 0 | 0 | 0 | - | 0 |
| 1994 | - | 0 | - | 2 | - | 0 |
| 1993 | - | 0 | - | 1 | - | - |
| 1992 | - | 0 | - | 2 | - | - |
| 1991 | - | 0 | - | 3 | - | - |
| 1990 | - | 0 | - | 2 | - | - |
| Note: "-" signifies no data available.<br>Source: EPA, AirData, 2018. | | | | | | |

## A-3. Sulfur Dioxide ($SO_2$)

EPA monitors in the Study Area report data for $SO_2$ and **Tables A-7** and **A-8** present annual average $SO_2$ concentrations (in ppb) and the number of annual exceedances of the NAAQS for these monitors. As shown by the three monitors, concentrations have significantly decreased over time, with no exceedances since 2009.

**Table A-7. $SO_2$ Annual Average Concentrations (ppb)**

| Year | SD | GT | CA |
|---|---|---|---|
| 2017 | 1 | - | 2 |
| 2016 | 1 | - | 2 |
| 2015 | 1 | - | 1 |
| 2014 | 1 | - | 1 |
| 2013 | 1 | - | 1 |
| 2012 | 2 | - | 2 |
| 2011 | 4 | - | 6 |
| 2010 | 4 | - | 7 |
| 2009 | - | 8 | 6 |
| 2008 | - | 13 | 10 |
| 2007 | - | 14 | 11 |
| 2006 | - | 15 | 13 |
| 2005 | - | 13 | 12 |
| 2004 | - | 12 | 11 |
| 2003 | - | 13 | 11 |
| 2002 | - | 12 | 11 |
| 2001 | - | 12 | 11 |
| 2000 | - | 15 | 11 |
| 1999 | - | 16 | 11 |
| 1998 | - | 16 | 11 |
| 1997 | - | 16 | 12 |
| 1996 | - | 14 | 12 |
| 1995 | - | 14 | 11 |
| 1994 | - | 16 | 15 |
| 1993 | - | 27 | 20 |
| 1992 | - | 27 | 21 |
| 1991 | - | 27 | 25 |
| 1990 | - | 31 | - |
| Note: "-" signifies no data available. | | | |

| Year | SD | GT | CA |
|---|---|---|---|
| Source: EPA, AirData, 2018. | | | |

**Table A-8. $SO_2$ Annual Number of Exceedances**

| Year | SD | GT | CA |
|---|---|---|---|
| 2017 | 0 | 0 | 0 |
| 2016 | 0 | - | 0 |
| 2015 | 0 | - | 0 |
| 2014 | 0 | - | 0 |
| 2013 | 0 | - | 0 |
| 2012 | 0 | - | 0 |
| 2011 | 0 | - | 0 |
| 2010 | 0 | - | 0 |
| 2009 | - | 1 | 1 |
| 2008 | - | 1 | 0 |
| 2007 | - | 2 | 2 |
| 2006 | - | 6 | 1 |
| 2005 | - | 2 | 0 |
| 2004 | - | 0 | 0 |
| 2003 | - | 1 | 1 |
| 2002 | - | 2 | 0 |
| 2001 | - | 1 | 0 |
| 2000 | - | 1 | 0 |
| 1999 | - | 6 | 0 |
| 1998 | - | 3 | 0 |
| 1997 | - | 6 | 1 |
| 1996 | - | 3 | 0 |
| 1995 | - | 4 | 1 |
| 1994 | - | 4 | 4 |
| 1993 | - | 12 | 10 |
| 1992 | - | 22 | 9 |
| 1991 | - | 28 | 5 |
| 1990 | - | 38 | - |
| Note: "-" signifies no data available. Source: EPA, AirData, 2018. | | | |

## A-4. Ozone ($O_3$)

EPA monitors report data for $O_3$ and **Tables A-9** and **A-10** present annual average $O_3$ concentrations (in ppb) and the number of annual exceedances of the NAAQS for monitors within the Study Area. As shown, concentrations and NAAQS exceedances have generally decreased over time with the fewest exceedances in 2017 compared to any prior year.

**Table A-9. $O_3$ Annual Average Concentrations (ppb)**

| Year | SD | TI | CA | GW | MO |
|---|---|---|---|---|---|
| 2017 | 0.04 | - | 0.05 | 0.04 | 0.05 |
| 2016 | 0.05 | - | 0.05 | 0.05 | 0.05 |
| 2015 | 0.04 | - | 0.05 | 0.04 | 0.04 |
| 2014 | 0.04 | - | 0.04 | 0.04 | 0.05 |
| 2013 | 0.04 | - | 0.04 | 0.04 | 0.04 |
| 2012 | 0.05 | - | 0.05 | 0.05 | 0.05 |

| Year | SD | TI | CA | GW | MO |
|---|---|---|---|---|---|
| 2011 | 0.05 | - | 0.05 | 0.05 | 0.05 |
| 2010 | 0.05 | - | 0.05 | 0.05 | 0.05 |
| 2009 | 0.04 | - | 0.04 | 0.04 | 0.04 |
| 2008 | 0.05 | - | 0.05 | 0.05 | 0.05 |
| 2007 | 0.05 | - | 0.05 | 0.06 | 0.05 |
| 2006 | 0.05 | 0.05 | 0.05 | 0.06 | 0.05 |
| 2005 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 2004 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 2003 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 2002 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 2001 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 2000 | 0.05 | 0.06 | 0.06 | 0.06 | 0.05 |
| 1999 | 0.06 | 0.06 | 0.07 | 0.06 | 0.06 |
| 1998 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| 1997 | 0.05 | 0.05 | 0.06 | 0.05 | 0.06 |
| 1996 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1995 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1994 | 0.04 | - | 0.05 | - | 0.05 |
| 1993 | 0.05 | - | 0.05 | - | 0.06 |
| 1992 | 0.04 | - | 0.04 | - | 0.05 |
| 1991 | 0.05 | - | 0.03 | - | 0.05 |
| 1990 | 0.05 | - | - | - | 0.06 |

Note: "-" signifies no data available.
Source: EPA, AirData, 2018.

### Table A-10. $O_3$ Annual Number of Exceedances

| Year | SD | TI | CA | GW | MO |
|---|---|---|---|---|---|
| 2017 | 1 | - | 6 | 0 | 1 |
| 2016 | 7 | - | 12 | 6 | 9 |
| 2015 | 4 | - | 10 | 4 | 3 |
| 2014 | 3 | - | 7 | 2 | 7 |
| 2013 | 1 | - | 3 | 1 | 4 |
| 2012 | 13 | - | 16 | 6 | 15 |
| 2011 | 18 | - | 25 | 17 | 34 |
| 2010 | 10 | - | 15 | 5 | 10 |
| 2009 | 7 | - | 11 | 4 | 3 |
| 2008 | 22 | - | 21 | 7 | 23 |
| 2007 | 35 | - | 36 | 35 | 27 |
| 2006 | 40 | 30 | 38 | 40 | 31 |
| 2005 | 19 | 26 | 36 | 24 | 29 |
| 2004 | 17 | 11 | 19 | 17 | 20 |
| 2003 | 16 | 18 | 26 | 20 | 26 |
| 2002 | 37 | 41 | 45 | 35 | 35 |
| 2001 | 23 | 33 | 30 | 12 | 26 |
| 2000 | 46 | 47 | 58 | 43 | 31 |
| 1999 | 63 | 55 | 87 | 55 | 76 |
| 1998 | 47 | 48 | 71 | 53 | 74 |
| 1997 | 26 | 27 | 52 | 31 | 43 |

| Year | SD | TI | CA | GW | MO |
|---|---|---|---|---|---|
| 1996 | 31 | 40 | 39 | 32 | 42 |
| 1995 | 60 | 45 | 53 | 34 | 52 |
| 1994 | 14 | - | 30 | - | 31 |
| 1993 | 43 | - | 59 | - | 66 |
| 1992 | 17 | - | 21 | - | 38 |
| 1991 | 28 | - | 0 | - | 51 |
| 1990 | 60 | - | - | - | 73 |
| Note: "-" signifies no data available.<br>Source: EPA, AirData, 2018. | | | | | |

## A-5. Carbon Monoxide (CO)

EPA monitors report data for CO and **Table A-11** presents annual average CO concentrations in parts per million (ppm) for reporting monitors in the Study Area. There have been no reported NAAQS exceedances for CO in the Study Area, therefore, an exceedance table is not presented. As shown, concentrations have generally decreased over time.

**Table A-11. CO Annual Average Concentrations (ppm)**

| Year | SD | DT | GP | SS |
|---|---|---|---|---|
| 2017 | 0.342 | - | - | 0.57 |
| 2016 | 0.290 | - | - | 0.80 |
| 2015 | 0.313 | - | - | 0.80 |
| 2014 | 0.314 | - | 0.34 | 0.64 |
| 2013 | 0.298 | - | 0.43 | - |
| 2012 | 0.331 | - | 0.43 | - |
| 2011 | 0.332 | - | 0.43 | - |
| 2010 | 0.345 | - | 0.40 | - |
| 2009 | - | - | 0.38 | - |
| 2008 | 0.53 | - | 0.40 | - |
| 2007 | 0.45 | - | 0.54 | - |
| 2006 | 0.58 | - | 0.61 | - |
| 2005 | 0.55 | - | 0.59 | - |
| 2004 | 0.54 | - | 0.61 | - |
| 2003 | 0.62 | 0.45 | 0.75 | - |
| 2002 | - | 0.61 | 0.67 | - |
| 2001 | - | 0.69 | 0.76 | - |
| 2000 | - | 0.50 | 0.83 | - |
| 1999 | - | 0.63 | 0.93 | - |
| 1998 | - | 0.91 | 0.98 | - |
| 1997 | - | 0.79 | 0.98 | - |
| 1996 | - | 0.76 | 1.11 | - |
| 1995 | - | 0.77 | 1.40 | - |
| 1994 | - | 0.84 | 1.34 | - |
| 1993 | - | 0.86 | - | - |
| 1992 | - | 0.88 | - | - |
| 1991 | - | 0.85 | - | - |
| 1990 | - | 0.93 | - | - |
| Note: "-" signifies no data available.<br>Source: EPA, AirData, 2018. | | | | |

## A-6. Lead

EPA monitors report data for lead and **Table A-12** presents annual average lead concentrations in µg/m$^3$. There have been no reported NAAQS exceedances for lead for the monitors within the Study Area, therefore an exceedance table is not provided. As shown, concentrations have decreased over time.

**Table A-12. Lead Annual Average Concentrations (µg/m$^3$)**

| Year | PR | FH | BR | UC |
|---|---|---|---|---|
| 2017 | - | - | - | - |
| 2016 | - | - | - | - |
| 2015 | 0.002 | - | - | - |
| 2014 | 0.002 | - | - | - |
| 2013 | 0.002 | - | - | - |
| 2012 | 0.003 | - | - | - |
| 2011 | 0.003 | - | - | - |
| 2010 | 0.003 | - | - | - |
| 2009 | 0.003 | - | - | - |
| 2008 | 0.067 | - | - | 0.004 |
| 2007 | - | - | - | 0.003 |
| 2006 | - | - | - | 0.003 |
| 2005 | - | - | - | 0.005 |
| 2004 | - | - | - | 0.004 |
| 2003 | - | - | - | 0.005 |
| 2002 | 0.019 | - | - | - |
| 2001 | 0.028 | - | - | - |
| 2000 | 0.021 | - | - | - |
| 1999 | 0.026 | - | - | - |
| 1998 | 0.012 | - | - | - |
| 1997 | 0.014 | - | 0.017 | - |
| 1996 | 0.018 | 0.028 | 0.023 | - |
| 1995 | 0.019 | 0.029 | 0.034 | - |
| 1994 | 0.018 | 0.026 | 0.027 | - |
| 1993 | 0.017 | 0.023 | 0.015 | - |
| 1992 | 0.022 | 0.032 | 0.025 | - |
| 1991 | 0.027 | 0.033 | 0.028 | - |
| 1990 | 0.021 | 0.039 | 0.023 | - |

Note: “-” signifies no data available.
Source: EPA, AirData, 2018.

## A-8. Pollutant Trends

Pollutant trends have been decreasing as shown in the previous tables. **Figures A-2** and **A-3** display these trends for all monitors for $PM_{2.5}$ and $O_3$.

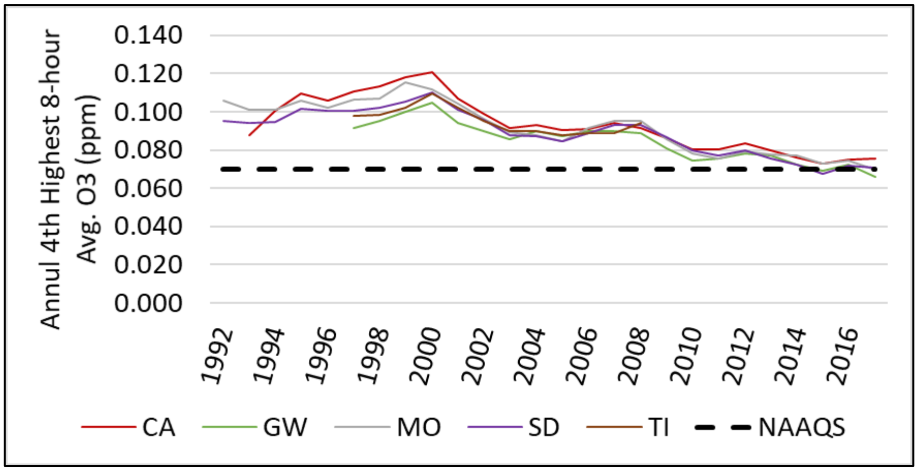


**Figure A-2: $O_3$ Annual Data from All Monitors**

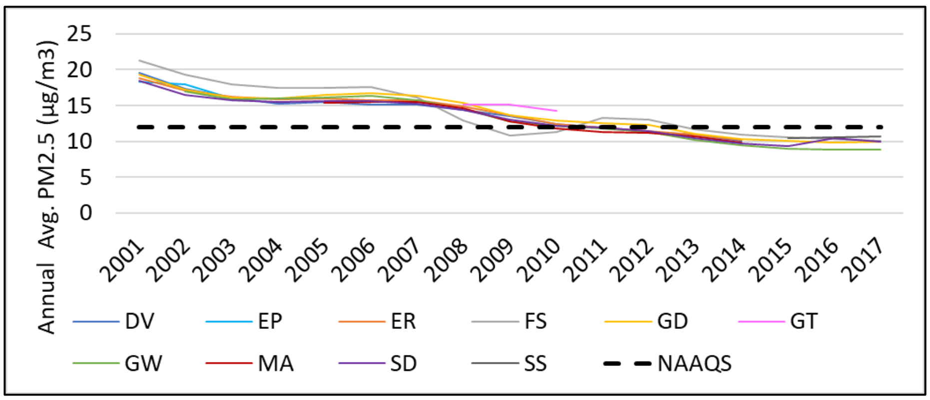


**Figure A-3: $PM_{2.5}$ Annual Data from All Monitors**

# Appendix B – Data, Assumptions, and Methodology

The materials in **Appendix B** include technical information that summarize the data, assumptions, methodology, and other information used in preparing the analyses under **Task 2** (*Analysis of PDK Emissions Compared to Other Nearby Sources*), **Task 3** (*Analysis of PDK Emissions Compared to Other Airports*), **Task 4** (*PDK Emissions Based on Aircraft Maximum Takeoff Weight*), and **Task 5** (*Dispersion Modeling for PDK Airport Specific Emissions*), provided in **Sections II.B** through **II.E**, respectively, of the main report.

## B-1. Aircraft Activity Levels

Aircraft activity levels (aircraft arrival and departure operations) were developed based on aircraft activity from the Flight Symphony Data provided by PDK. This data set includes the International Civil Aviation Organization (ICAO) aircraft code which indicates the airframe, operation type (i.e., arrival/departure), and number of operations.

Because the Symphony Flight Data does not capture 100-percent of the aircraft operations (as it is based on transponder activity for certain aircraft classes) the aircraft fleet mix was scaled to match PDK's total aircraft operations as reported by FAA's Operations Network (OPSNET). Additionally, the highest emitting engines were assigned to each aircraft.

**Table B-1** presents the aircraft operations and engine assignments at PDK for 2017.

**Table B-1. PDK Aircraft Fleet Mix and Annual Operations**

| Airframe | MTOW | Operations |
|---|---|---|
| Aerostar PA-60 | 6,100 | 107 |
| Airbus A320-100 Series | 169,756 | 4 |
| Bell 407 / Rolls-Royce 250-C47B | 5,000 | 2 |
| Boeing 737-800 Series | 174,200 | 8 |
| Boeing MD-88 | 160,000 | 2 |
| Boeing Stearman PT-17 / A75N1 | 3,000 | 2 |
| Bombardier Challenger 300 | 36,000 | 5,630 |
| Bombardier Challenger 601 | 43,100 | 2,805 |
| Bombardier CRJ-100 | 36,000 | 12 |
| Bombardier CRJ-200 | 82,500 | 244 |
| Bombardier CRJ-700 | 82,500 | 8 |
| Bombardier Global Express | 99,500 | 649 |
| Bombardier Global 5000 Business | 92,500 | 300 |
| Bombardier Learjet 24 | 15,000 | 4 |
| Bombardier Learjet 31 | 18,300 | 918 |
| Bombardier Learjet 35 | 18,300 | 1,168 |
| Bombardier Learjet 40 | 18,300 | 507 |
| Bombardier Learjet 45 | 18,300 | 3,318 |
| Bombardier Learjet 55 | 18,300 | 214 |
| Bombardier Learjet 60 | 35,700 | 1,868 |
| Bombardier Learjet 75 | 18,300 | 2,759 |
| Cessna 150 Series | 2,200 | 79 |
| Cessna 172 Skyhawk | 2,450 | 3,405 |
| Cessna 182 | 2,800 | 1,337 |

| Airframe | MTOW | Operations |
|---|---|---|
| Cessna 206 | 3,600 | 184 |
| Cessna 208 Caravan | 8,750 | 1,648 |
| Cessna 210 Centurion | 3,000 | 492 |
| Cessna 310 | 6,100 | 229 |
| Cessna 340 | 6,100 | 471 |
| Cessna 402 | 6,100 | 10 |
| Cessna 414 | 6,100 | 745 |
| Cessna 421 Golden Eagle | 6,100 | 713 |
| Cessna 425 Conquest I | 9,900 | 52 |
| Cessna 441 Conquest II | 9,900 | 158 |
| Cessna 500 Citation I | 14,700 | 154 |
| Cessna 501 Citation ISP | 14,700 | 800 |
| Cessna 525 CitationJet | 14,700 | 6,984 |
| Cessna 525C CitationJet | 14,700 | 395 |
| Cessna 550 Citation II | 14,800 | 1,913 |
| Cessna 560 Citation Excel | 16,300 | 11,489 |
| Cessna 560 Citation V | 16,300 | 4,181 |
| Cessna 650 Citation III | 20,000 | 1,209 |
| Cessna 680 Citation Sovereign | 30,000 | 3,266 |
| Cessna 680-A Citation Latitude | 30,000 | 1,106 |
| Cessna 750 Citation X | 35,700 | 2,030 |
| CESSNA CITATION 510 | 8,645 | 452 |
| Cessna S550 Citation S/II | 14,800 | 32 |
| Cirrus SR20 | 2,440 | 550 |
| Cirrus SR22 | 2,440 | 8,914 |
| COMMANDER980/1000 | 9,900 | 24 |
| Dassault Falcon 10 | 15,000 | 111 |
| Dassault Falcon 2000 | 35,700 | 2,666 |
| Dassault Falcon 20-F | 28,700 | 413 |
| Dassault Falcon 50 | 35,700 | 1,372 |
| Dassault Falcon 900 | 19,200 | 920 |
| DeHavilland DHC-2 Mk III Beaver | 3,000 | 2 |
| Dornier 328 Jet | 35,700 | 884 |
| Dornier 328-100 Series | 30,843 | 8 |
| EADS Socata TB-10 Tobago | 3,000 | 6 |
| EADS Socata TB-20 Trinidad | 3,000 | 10 |
| EADS Socata TBM-700 | 8,750 | 477 |
| Eclipse 500 / PW610F | 6,000 | 2,172 |
| Embraer 500 | 8,645 | 905 |
| Embraer 505 | 14,800 | 4,857 |
| Embraer EMB110 Bandeirante | 12,500 | 2 |
| Embraer EMB120 Brasilia | 26,433 | 30 |
| Embraer ERJ135 | 45,420 | 98 |

| Airframe | MTOW | Operations |
|---|---|---|
| Embraer Legacy | 45,420 | 531 |
| Fairchild SA-226-T Merlin III | 12,500 | 38 |
| Fairchild SA-226-TC Metro II | 12,500 | 1,466 |
| Falcon 7X | 35,700 | 203 |
| Gulfstream G650 | 90,500 | 169 |
| Gulfstream G150 | 23,500 | 599 |
| Gulfstream G200 | 36,000 | 956 |
| Gulfstream G280 | 23,500 | 645 |
| Gulfstream G300 | 74,600 | 550 |
| Gulfstream G400 | 74,600 | 3,173 |
| Gulfstream G500 | 90,500 | 1,915 |
| Gulfstream II | 64,800 | 12 |
| Hawker HS-125 Series 600 | 18,300 | 58 |
| Helio U-10 Super Courier | 3,000 | 2 |
| Honda HA-420 Hondajet | 14,100 | 257 |
| Israel IAI-1124 Westwind I | 23,500 | 84 |
| Israel IAI-1125 Astra | 23,500 | 833 |
| Lancair 360 | 2,450 | 15 |
| Lockheed L-1329 Jetstar II | 18,300 | 4 |
| Maule MT-7-235 | 3,000 | 26 |
| Mitsubishi MU-2 | 12,500 | 199 |
| Mitsubishi MU-300 Diamond | 14,100 | 50 |
| Mooney M20-K | 3,000 | 1,220 |
| Nord Transall C-160 | 46,500 | 2 |
| Partenavia P.68 Victor | 3,600 | 15 |
| Piaggio P.180 Avanti | 12,500 | 137 |
| Pilatus PC-12 | 8,750 | 13,849 |
| Pilatus Turbo Trainer PC-9 | 2,200 | 4 |
| Piper PA-23 Apache/Aztec | 6,100 | 13 |
| Piper PA-24 Comanche | 3,000 | 216 |
| Piper PA-27 Aztec | 6,100 | 90 |
| Piper PA-28 Cherokee Series | 2,200 | 3,256 |
| Piper PA-30 Twin Comanche | 3,600 | 84 |
| Piper PA-31 Navajo | 6,100 | 708 |
| Piper PA-31T Cheyenne | 9,900 | 441 |
| Piper PA-32 Cherokee Six | 3,000 | 1,818 |
| Piper PA-34 Seneca | 6,100 | 199 |
| Piper PA-42 Cheyenne Series | 11,200 | 422 |
| Piper PA46-TP Meridian | 9,900 | 1,482 |
| Raytheon Beech 1900-C | 16,950 | 115 |
| Raytheon Beech 55 Baron | 6,100 | 599 |
| Raytheon Beech 60 Duke | 6,100 | 36 |
| Raytheon Beech Baron 58 | 6,100 | 3,234 |

| Airframe | MTOW | Operations |
|---|---|---|
| Raytheon Beech Bonanza 36 | 8,750 | 4,625 |
| Raytheon Beech D17S Staggerwing | 2,450 | 18 |
| Raytheon Beechjet 400 | 14,100 | 6,167 |
| Raytheon Hawker 1000 | 18,300 | 78 |
| Raytheon Hawker 4000 Horizon | 35,700 | 285 |
| Raytheon Hawker 800 | 18,300 | 4,210 |
| Raytheon King Air 100 | 12,500 | 208 |
| Raytheon King Air 90 | 12,500 | 3,882 |
| Raytheon Premier I | 14,800 | 606 |
| Raytheon Super King Air 200 | 12,500 | 3,064 |
| Raytheon Super King Air 300 | 12,500 | 5,187 |
| Robinson R44 Raven | 2,400 | 32 |
| Rockwell Commander 500 | 6,100 | 1,085 |
| Rockwell Commander 690 | 12,500 | 70 |
| Rockwell Sabreliner 60 | 15,000 | 296 |
| Rockwell Sabreliner 75 | 15,000 | 4 |
| Ryan Navion B | 3,000 | 6 |
| Saab 340-A | 27,300 | 2 |
| Sikorsky S-76 Spirit | 10,000 | 56 |
| Sikorsky SH-60 Sea Hawk | 20,250 | 2 |
| SOCATA TBM 850 | 9,900 | 976 |
| | **Total** | **159,066** |

Note: MTOW = Maximum TakeOff Weights.
Source: PDK Symphony Flight Database, FAA's OPSNET, and KB Environmental Sciences, 2018.

Two airports with similar hub size and general aviation (GA) operations were also chosen for evaluation being Fort Lauderdale Executive Airport (FXE) in Florida and Scottsdale Airport (SDL) in Arizona. Operational data for these airports were obtained from the FAA Traffic Flow management System Counts (TFMSC) database. Similar to PDK's Symphony Flight dataset, the TFMSC does not capture every operation, therefore, operations were scaled up using FAA's OPSNET for accuracy. Again, the highest emitting engines were applied. The same methodology was applied to Atlanta Hartsfield International Airport (ATL). **Tables B-2** through **B-4** present the fleet mixes for FXE, SDL and ATL, respectively. MTOW was not used for the analysis of other airports and is not included in the tables.

**Table B-2. FXE Aircraft Fleet Mix and Annual Operations**

| Airframe | Operations |
|---|---|
| Aerostar PA-60 | 1,109 |
| Boeing DC-3 | 1,885 |
| Bombardier Challenger 300 | 2,877 |
| Bombardier Challenger 601 | 322 |
| Bombardier CRJ-200 | 1,870 |
| Bombardier Global 5000 Business | 302 |
| Bombardier Global Express | 6,569 |
| Bombardier Learjet 31 | 1,246 |

| Airframe | Operations |
|---|---|
| Bombardier Learjet 35 | 280 |
| Bombardier Learjet 40 | 458 |
| Bombardier Learjet 45 | 12,220 |
| Bombardier Learjet 55 | 439 |
| Bombardier Learjet 60 | 5,050 |
| Cessna 150 Series | 1,813 |
| Cessna 172 Skyhawk | 511 |
| Cessna 182 | 1,632 |
| Cessna 206 | 1,159 |
| Cessna 208 Caravan | 488 |
| Cessna 210 Centurion | 4,024 |
| Cessna 310 | 3,476 |
| Cessna 340 | 220 |
| Cessna 402 | 4,183 |
| Cessna 414 | 261 |
| Cessna 421 Golden Eagle | 337 |
| Cessna 441 Conquest II | 1,627 |
| Cessna 500 Citation I | 1,732 |
| Cessna 501 Citation ISP | 2,020 |
| Cessna 525 CitationJet | 1,136 |
| Cessna 525C CitationJet | 258 |
| Cessna 550 Citation II | 901 |
| Cessna 560 Citation Excel | 11,289 |
| Cessna 560 Citation V | 16,525 |
| Cessna 650 Citation III | 4,001 |
| Cessna 680 Citation Sovereign | 3,843 |
| Cessna 680-A Citation Latitude | 866 |
| Cessna 750 Citation X | 1,601 |
| CESSNA CITATION 510 | 606 |
| Cirrus SR20 | 875 |
| Cirrus SR22 | 3,134 |
| Dassault Falcon 10 | 2,195 |
| Dassault Falcon 2000 | 598 |
| Dassault Falcon 20-C | 545 |
| Dassault Falcon 50 | 711 |
| Dassault Falcon 900 | 3,918 |
| EADS Socata TBM-700 | 515 |
| Eclipse 500 / PW610F | 1,738 |
| Embraer 500 | 700 |
| Embraer 505 | 450 |
| Embraer EMB120 Brasilia | 208 |
| Falcon 7X | 4,016 |
| Gulfstream G150 | 560 |

| Airframe | Operations |
|---|---|
| Gulfstream G280 | 1,605 |
| Gulfstream G300 | 386 |
| Gulfstream G400 | 538 |
| Gulfstream V-SP | 352 |
| Hawker HS-125 Series 1 | 1,647 |
| Hawker HS-125 Series 700 | 6,845 |
| Honda HA-420 Hondajet | 7,322 |
| Israel IAI-1124 Westwind I | 727 |
| Israel IAI-1125 Astra | 1,412 |
| Israel IAI-1126 Galaxy | 599 |
| Mitsubishi MU-2 | 6,531 |
| Mooney M20-K | 1,536 |
| Partenavia P.68 Victor | 454 |
| Piaggio P.180 Avanti | 1,075 |
| Pilatus PC-12 | 299 |
| Piper PA-27 Aztec | 1,960 |
| Piper PA-28 Cherokee Series | 667 |
| Piper PA-31 Navajo | 348 |
| Piper PA-31T Cheyenne | 719 |
| Piper PA-32 Cherokee Six | 3,846 |
| Piper PA-34 Seneca | 208 |
| Piper PA46-TP Meridian | 329 |
| Raytheon Beech 55 Baron | 2,321 |
| Raytheon Beech Baron 58 | 295 |
| Raytheon Beech Bonanza 36 | 1,412 |
| Raytheon Beechjet 400 | 5,414 |
| Raytheon Hawker 1000 | 2,386 |
| Raytheon Hawker 4000 Horizon | 276 |
| Raytheon King Air 100 | 416 |
| Raytheon King Air 90 | 651 |
| Raytheon Premier I | 946 |
| Raytheon Super King Air 200 | 235 |
| Raytheon Super King Air 300 | 4,445 |
| Rockwell Commander 690 | 458 |
| Rockwell Sabreliner 60 | 723 |
| SOCATA TBM 850 | 341 |
| **Total** | **179,023** |

Source: FAA’s TFMSC and OPSNET, and KB Environmental Sciences, 2018.

**Table B-3. SDL Aircraft Fleet Mix and Annual Operations**

| Airframe | Operations |
|---|---|
| Bombardier Challenger 300 | 3,878 |
| Bombardier Challenger 600 | 2,855 |
| Bombardier Global 5000 Business | 1,868 |

| Airframe | Operations |
|---|---|
| Bombardier Global Express | 3,099 |
| Bombardier Learjet 31 | 5,128 |
| Bombardier Learjet 35 | 4,739 |
| Bombardier Learjet 40 | 755 |
| Bombardier Learjet 45 | 406 |
| Bombardier Learjet 55 | 657 |
| Bombardier Learjet 60 | 4,090 |
| Bombardier Learjet 75 | 472 |
| Cessna 172 Skyhawk | 354 |
| Cessna 182 | 3,335 |
| Cessna 414 | 2,708 |
| Cessna 421 Golden Eagle | 5,179 |
| Cessna 441 Conquest II | 1,219 |
| Cessna 501 Citation ISP | 500 |
| Cessna 525 CitationJet | 755 |
| Cessna 525C CitationJet | 1,325 |
| Cessna 550 Citation II | 869 |
| Cessna 560 Citation V | 3,458 |
| Cessna 560 Citation XLS | 9,349 |
| Cessna 650 Citation III | 386 |
| Cessna 680 Citation Sovereign | 374 |
| Cessna 680-A Citation Latitude | 314 |
| Cessna 750 Citation X | 716 |
| CESSNA CITATION 510 | 5,085 |
| Cirrus SR22 | 6,167 |
| Dassault Falcon 2000 | 398 |
| Dassault Falcon 20-C | 5,152 |
| Dassault Falcon 50 | 1,062 |
| Dassault Falcon 900 | 4,878 |
| EADS Socata TBM-700 | 1,758 |
| Eclipse 500 / PW610F | 984 |
| Embraer 500 | 2,658 |
| Embraer 505 | 778 |
| Embraer ERJ135 | 1,844 |
| Embraer Legacy 450 (EMB-545) | 920 |
| Fairchild SA-226-T Merlin III | 503 |
| Falcon 7X | 468 |
| Gulfstream G150 | 6,344 |
| Gulfstream G280 | 3,331 |
| Gulfstream G300 | 700 |
| Gulfstream G400 | 2,482 |
| Gulfstream G500 | 1,950 |
| Hawker HS-125 Series 700 | 6,178 |

| Airframe | Operations |
|---|---|
| Honda HA-420 Hondajet | 2,919 |
| Israel IAI-1125 Astra | 1,215 |
| Israel IAI-1126 Galaxy | 2,155 |
| Pilatus PC-12 | 1,321 |
| Piper PA-34 Seneca | 1,062 |
| Piper PA46-TP Meridian | 1,204 |
| Raytheon Beech Baron 58 | 6,367 |
| Raytheon Beechjet 400 | 350 |
| Raytheon Hawker 1000 | 653 |
| Raytheon Hawker 4000 Horizon | 7,173 |
| Raytheon King Air 90 | 1,892 |
| Raytheon Premier I | 10,894 |
| Raytheon Super King Air 200 | 15,864 |
| Raytheon Super King Air 300 | 366 |
| Rockwell Commander 690 | 1,848 |
| SOCATA TBM 850 | 420 |
| **Total** | **168,131** |
| Source: FAA's TFMSC and OPSNET, and KB Environmental Sciences, 2018. | |

**Table B-4. ATL Aircraft Fleet Mix and Annual Operations**

| Aircraft | Operations |
|---|---|
| Boeing MD-88 | 183,983 |
| Bombardier CRJ-200 | 81,094 |
| Boeing 717-200 Series | 69,962 |
| Boeing 737-700 Series | 68,047 |
| Boeing 737-900 Series | 55,105 |
| Boeing 757-200 Series | 54,212 |
| Boeing 737-800 Series | 53,968 |
| Boeing MD-90 | 46,151 |
| Bombardier CRJ-900 | 41,990 |
| Airbus A320-100 Series | 41,238 |
| Airbus A321-100 Series | 39,820 |
| Airbus A319-100 Series | 29,421 |
| Bombardier CRJ-700 | 16,042 |
| Boeing 737-400 Series | 12,783 |
| Embraer ERJ175 | 13,272 |
| Boeing 767-300 Series | 9,583 |
| Airbus A330-300 Series | 7,968 |
| Boeing 767-400 Series | 6,956 |
| Boeing 757-300 Series | 6,889 |
| Embraer ERJ170 | 5,176 |
| Embraer ERJ190 | 4,758 |
| Boeing 777-200 Series | 5,675 |

| | |
|---|---|
| Boeing 777-300 Series | 2,683 |
| Boeing 747-400 Series | 2,620 |
| Pilatus PC-12 | 2,088 |
| Boeing 747-SP | 1,456 |
| Raytheon Beech 1900-C | 1,236 |
| Airbus A300B4-600 Series | 1,009 |
| Cessna 208 Caravan | 964 |
| Boeing MD-11 Freighter | 789 |
| Raytheon Super King Air 200 | 749 |
| Cessna 560 Citation Excel | 717 |
| Boeing DC-10-10 Series | 658 |
| Airbus A340-300 Series | 527 |
| Airbus A340-600 Series | 390 |
| Raytheon Hawker 800 | 385 |
| Raytheon Beechjet 400 | 337 |
| Embraer 505 | 322 |
| Bombardier Challenger 600 | 309 |
| Bombardier Challenger 300 | 424 |
| Boeing 737-500 Series | 284 |
| Boeing 767-200 Series | 282 |
| Gulfstream G400 | 282 |
| Cessna 680 Citation Sovereign | 275 |
| Bombardier Learjet 35 | 265 |
| Cessna 750 Citation X | 246 |
| Airbus A330-200 Series | 240 |
| Dassault Falcon 2000 | 235 |
| Raytheon Super King Air 300 | 246 |
| Boeing MD-83 | 218 |
| Cessna 560 Citation V | 211 |
| Cessna 525 CitationJet | 239 |
| Rockwell Commander 500 | 192 |
| Bombardier Learjet 60 | 197 |
| Gulfstream G500 | 191 |
| Cirrus SR22 | 154 |
| Raytheon Beech Baron 58 | 153 |
| Bombardier Learjet 45 | 142 |
| Raytheon King Air 90 | 139 |
| Embraer ERJ145 | 143 |
| Bombardier Global Express | 119 |
| Bombardier CRJ-100 | 153 |
| Gulfstream G150 | 113 |
| Cessna 525A CitationJet | 112 |
| Fairchild SA-226-T Merlin III | 110 |
| Cessna 525B CitationJet | 108 |

| | |
|---|---|
| Gulfstream G200 | 104 |
| Israel IAI-1125 Astra | 103 |
| Cessna 550 Citation II | 102 |
| Dassault Falcon 900 | 97 |
| Boeing 727-200 Series | 94 |
| Dassault Falcon 50 | 86 |
| Cessna 680-A Citation Latitude | 77 |
| Boeing 787-10 Dreamliner | 78 |
| Boeing MD-82 | 77 |
| Boeing 737-800 MAX | 73 |
| Dassault Falcon 20-C | 68 |
| Gulfstream G280 | 67 |
| Embraer 500 | 66 |
| Boeing DC-9-10 Series | 62 |
| Airbus A380-800 series | 60 |
| Raytheon Hawker 4000 Horizon | 59 |
| Eclipse 500 / PW610F | 52 |
| Dassault Falcon 50-EX | 52 |
| Cessna 525C CitationJet | 46 |
| Bombardier Learjet 40 | 46 |
| Piper PA46-TP Meridian | 65 |
| Bombardier Learjet 75 | 45 |
| Airbus A350-900 series | 41 |
| Sikorsky S-92 | 22 |
| Cessna 650 Citation III | 36 |
| Raytheon Premier I | 36 |
| Dassault Falcon 10 | 35 |
| Raytheon Beech Bonanza 36 | 36 |
| Gulfstream I | 34 |
| Piper PA-31 Navajo | 32 |
| Bombardier Learjet 31 | 29 |
| Fairchild SA-26-T Merlin II | 28 |
| Sikorsky S-76 Spirit | 19 |
| Cessna 421 Golden Eagle | 29 |
| Cessna 501 Citation ISP | 29 |
| Embraer Legacy | 46 |
| Bombardier Global 5000 Business | 22 |
| Gulfstream G300 | 22 |
| T-38 Talon | 16 |
| Lockheed C-130 Hercules | 25 |
| Cessna 172 Skyhawk | 16 |
| Raytheon King Air 100 | 18 |
| Raytheon King Air 91 | 18 |
| Boeing DC-9-30 Series | 18 |

| | |
|---|---|
| Piper PA-42 Cheyenne Series | 35 |
| Boeing MD-81 | 12 |
| Cessna 425 Conquest I | 21 |
| COMMANDER980/1000 | 15 |
| Antonov 124 Ruslan | 14 |
| Raytheon Hawker 1000 | 16 |
| EADS Socata TBM-700 | 14 |
| Bombardier Learjet 55 | 12 |
| Embraer Legacy 500 (EMB-550) | 12 |
| Honda HA-420 Hondajet | 12 |
| BAE Jetstream 41 | 12 |
| Israel IAI-1124 Westwind I | 12 |
| BOEING 737-800 Poseidon | 11 |
| SOCATA TBM 850 | 11 |
| Piper PA-34 Seneca | 10 |
| Embraer ERJ135-LR | 10 |
| Hawker HS-125 Series 1 | 10 |
| Boeing F/A-18 Hornet | 8 |
| Piaggio P.180 Avanti | 9 |
| Mooney M20-K | 8 |
| Boeing 737-600 Series | 8 |
| Raytheon Beech 55 Baron | 8 |
| Cessna 414 | 8 |
| Embraer EMB120 Brasilia | 8 |
| Bombardier Learjet 70 | 8 |
| Mitsubishi MU-2 | 8 |
| Piper PA-28 Cherokee Series | 16 |
| Lockheed Martin F-16 Fighting Falcon | 5 |
| Agusta A-109 | 4 |
| Antonov 12 Cub | 7 |
| Cessna 340 | 7 |
| Boeing C-17A | 6 |
| Cessna 210 Centurion | 6 |
| Embraer EMB110 Bandeirante | 6 |
| Ilyushin 76 Candid | 6 |
| Fairchild A-10A Thunderbolt II | 5 |
| Lancair 360 | 7 |
| Cirrus SR20 | 5 |
| Boeing F-15 Eagle | 4 |
| Lockheed P-3 Orion | 5 |
| Cessna 310 | 7 |
| Sikorsky SH-60 Sea Hawk | 5 |
| Piper PA-32 Cherokee Six | 9 |
| Cessna 182 | 7 |

| | |
|---|---|
| Boeing 767-200 ER | 3 |
| COMMANDER980/1001 | 4 |
| Boeing 737-200 Series | 4 |
| Raytheon Beech 60 Duke | 4 |
| Cessna 500 Citation I | 4 |
| Boeing DC-8 Series 70 | 4 |
| Dornier 328 Jet | 4 |
| Piper PA-24 Comanche | 4 |
| Piper PA-30 Twin Comanche | 4 |
| Cessna 402 | 3 |
| Bombardier Learjet 36 | 2 |
| Airbus A310-200 Series | 2 |
| Antonov 74 Coaler | 2 |
| Aerospatiale SA-350D Astar | 2 |
| Rockwell T-2 Buckeye | 2 |
| Boeing 747-200 Series | 2 |
| Raytheon Beech 99 | 2 |
| Aerospatiale SA-355F Twin Star | 2 |
| DeHavilland DHC-6-100 Twin Otter | 2 |
| Boeing KC-135 Stratotanker | 2 |
| Rockwell Sabreliner 40 | 2 |
| CIRRUS SF-50 Vision | 2 |
| Shorts 330 | 2 |
| Bell 412 SP | 1 |
| Lockheed S-3 Viking | 1 |
| Grumman C-1 Trader | 1 |
| Grumman A-6 Intruder | 1 |
| Lockheed ES-3A Shadow | 1 |
| Hawker Hunter | 2 |
| Robinson R44 Raven | 1 |
| Rockwell 1121 Jet Commander | 1 |
| Boeing B-52 Stratofortress | 1 |
| Boeing DC-6 | 1 |
| McDonnell Douglas 600N | 1 |
| Bell 206B-3 | 1 |
| Bell 222 | 1 |
| **Total** | **879,498** |

## B-2. Aircraft Emission Factors

FAA's Aviation Environmental Design Tool (AEDT, version 2d) contains a database of aircraft/engine-specific criteria pollutant[2] emission factors based on engine manufacturer, model, and operational mode. The level of aircraft-related emissions is reflective of the time that an aircraft operates in each of the operational modes with the entire cycle referred to as a landing/take-off (LTO) cycle. An LTO cycle consists of the following four operational modes, with specific emission factors in AEDT:

- Taxi/idle - includes the time an aircraft taxies between the runway and a terminal, and all ground-based delay incurred through the aircraft route.
- Approach - begins when an aircraft descends below the atmospheric mixing height and ends when an aircraft touches down on a runway.
- Takeoff - begins when full power is applied to an aircraft and ends when an aircraft reaches approximately 500 to 1,000 feet. At this altitude, pilots typically power back for a gradual ascent.
- Climb out - begins when an aircraft powers back from the takeoff mode and ascends above the atmospheric mixing height. A mixing height of 3,000 was used for this assessment.

## B-3. Aircraft Taxi Times

PDK-specific taxi-in and -out times, and delay periods were derived from FAA's Aviation System Performance Metrics (ASPM).[3] An airfield taxi-in of 4.96 minutes and taxi-out of 12.53 minutes were used for PDK for 2017. For FXE, an airfield taxi-in of 4.97 minutes and taxi-out of 12.69 minutes were used. For SDL, an airfield taxi-in of 4.98 minutes and taxi-out of 12.54 minutes were used.

## B-4. Auxiliary Power Units (APUs)

APUs are on-board engines that provide power to an aircraft while taxiing or at the terminal gate. Larger aircraft use an APU to run heat and air conditioning, and to provide electrical power for the aircraft. The APU can also be used to restart the engines before departing from the gate area. For this assessment, AEDT default aircraft/APU combinations with an operating time of 26 minutes, where applicable, were used.

## B-5. Ground support equipment (GSE)

GSE is a term used to describe the equipment that service aircraft after arrival and before departure at an airport. Types of GSE include, but are not limited to, aircraft tugs, baggage tugs, belt loaders, fuel or hydrant trucks, water trucks, lavatory trucks, and cargo loaders, among others. Air emissions resulting from the operation of GSE vary depending on the type of equipment, fuel type (gasoline, diesel, propane, electric, etc.) and the duration of equipment operation (engine run time).

For this assessment, the GSE population, including equipment type, fuel type, and operational data were assigned using AEDT defaults.

## B-6. Motor Vehicles

The level of emissions that would result from motor vehicles depends on several factors including the population of vehicles, the vehicle fleet mix, the motor vehicle emission rates, travel distance, the year of

---

[2] Criteria Pollutants are considered to be harmful for human health and the environment by the U.S. EPA. They include carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), particulate matter with diameters of 10 and 2.5 microns ($PM_{10}$ and $PM_{2.5}$), ozone ($O_3$), and lead (Pb).
[3] FAA, Aviation System Performance Metrics (ASPM), https://aspm.faa.gov.

analysis, and meteorological factors. All motor vehicles travelling on roadways within DeKalb County were included in this assessment.

The EPA's MOtor Vehicle Emissions Simulator (MOVES, version 2014a) was used to estimate emissions from motor vehicles. MOVES input data was obtained from the Georgia Environmental Protection Division (EPD) and are specific to DeKalb County. The output is based on the following functional components: (i) total population of vehicles in the year 2017, (ii) distance traveled, and (iii) the types of vehicles.

## B-7. Stationary Sources

Emissions resulting from stationary sources such as industrial and commercial facilities, fuel facilities, and landfills were obtained from the most recent EPA National Emissions Inventory (NEI 2014). Stationary sources located on DeKalb County were extracted and used for comparison to PDK emissions.

# Appendix C – Emissions Inventory and Dispersion Analysis Results

This Appendix presents the detailed emissions inventory and dispersion modeling results.

## C-1. Emissions Inventory Results

The results of the Criteria Air Pollutants (and their precursors)[4] inventories segregated by source for PDK and DeKalb County are presented in **Tables C-1**. **Table C-2** presents the emissions at PDK by source for each maximum takeoff weight (MTOW) category. **Table C-3** present PDK emissions compared to other airports.

**Table C-1. PDK Criteria Air Pollutant Emissions Inventory by Source (tons/year)**

| Source | CO | VOC | $NO_x$ | $SO_x$ | $PM_{2.5}$ | $PM_{10}$ |
|---|---|---|---|---|---|---|
| PDK Aircraft | 623 | 200 | 68 | 12 | 3 | 3 |
| PDK GSE | 98 | 3 | 9 | <1 | <1 | <1 |
| PDK APU | 5 | <1 | 1 | <1 | <1 | <1 |
| Dekalb Stationary | 36,564 | 15,160 | 3,106 | 97 | 1,274 | 4,544 |
| DeKalb Motor Vehicles | 85,950 | 4,656 | 6,260 | 49 | 826 | 902 |
| **Total PDK** | **726** | **203** | **78** | **13** | **4** | **4** |
| **Total Dekalb County** | **122,514** | **19,815** | **9,366** | **146** | **2,100** | **5,446** |
| **Atlanta Study Area[3]** | **425,555** | **114,658** | **63,208** | **2,513** | **8,987** | **28,929** |

Notes: CO = carbon monoxide, VOC = volatile organic compounds, $NO_x$ = nitrogen oxides, $SO_2$ = sulfur dioxide, $PM_{10}$ and $PM_{2.5}$ = particulate matter with diameters of 10 and 2.5 micrometers.
Source: KB Environmental Sciences, Inc., 2018.

**Table C-2. PDK Emissions by Aircraft MTOW Category (tons/year)**

| Category | Emissions (tons) | | | | | | |
|---|---|---|---|---|---|---|---|
| | CO | VOC | $NO_x$ | $SO_2$ | $PM_{2.5}$ | $PM_{10}$ | Pb |
| < 66,000 lbs. | 693 | 196 | 66 | 11 | 3 | 3 | 0.1 |
| 66,000-75,000 lbs. | 20 | 6 | 5 | 1 | <1 | <1 | - |
| > 75,000 lbs. | 14 | 2 | 7 | 1 | <1 | <1 | - |
| **Total PDK** | **726** | **204** | **78** | **13** | **4** | **4** | **0.1** |

Notes: MTOWs = maximum takeoff weights and PDK= DeKalb Peachtree Airport.
Notes: CO = carbon monoxide, VOC = volatile organic compounds, $NO_x$ = nitrogen oxides, $SO_2$ = sulfur dioxide, $PM_{10}$ and $PM_{2.5}$ = particulate matter with diameters of 10 and 2.5 micrometers, Pb = lead.
Source: KB Environmental Sciences, Inc., 2018.

[4] Criteria Pollutants emissions lead to air pollutants that are considered to be harmful for human health and the environment by the U.S. EPA. Emitted pollutants and their pre-cursors include carbon monoxide (CO), Volatile Organic Carbons (VOCs), nitrogen oxides ($NO_x$), sulfur oxides ($SO_x$), particulate matter with diameters of 10 and 2.5 microns ($PM_{10}$ and $PM_{2.5}$), ozone ($O_3$), and lead (Pb).

**Table C-3. PDK Emissions Compared to Other Airports**

| Airport | Emissions (tons/year) | | | | | | |
|---|---|---|---|---|---|---|---|
| | CO | VOC | $NO_X$ | $SO_2$ | $PM_{2.5}$ | $PM_{10}$ | Pb |
| SDL | 625 | 233 | 88 | 15 | 3 | 4 | 0.03 |
| FXE | 977 | 243 | 90 | 15 | 4 | 4 | 0.10 |
| ATL | 8,296 | 1,022 | 5,004 | 517 | 75 | 75 | .0003[a] |
| PDK | 726 | 204 | 78 | 13 | 4 | 4 | 0.10 |

Notes: [a] The relatively low amount of Pb emissions is due to a small number of general aviation piston engine aircraft operating at the commercial airport ATL.
CO = carbon monoxide, VOC = volatile organic compounds, $NO_x$ = nitrogen oxides, $SO_2$ = sulfur dioxide, $PM_{10}$ and $PM_{2.5}$ = particulate matter with diameters of 10 and 2.5 micrometers.
ATL = Hartsfield-Jackson Atlanta International Airport, FXE = Fort Lauderdale Executive Airport, PDK= DeKalb Peachtree Airport, and SDL = Scottsdale Airport.
Sources: FAA Aviation Environmental Design Tool (AEDT), Traffic Flow Management System Counts (TFMSC), KB Environmental Sciences, Inc., 2018.

## C-2. Dispersion Modeling Results

FAA's Aviation Environmental Design Tool (AEDT 2d) and the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) tools were used to perform a year-long dispersion modeling simulation for 2017. The modeling was performed to quantify the contributions of PDK on local air quality. Concentrations for criteria pollutants CO, $NO_2$, $SO_2$, $PM_{10}$ and $PM_{2.5}$ were computed for this analysis.

Concentrations are reported at receptors located along the airport boundary and at various sensitive locations in the vicinity of the airport, such as, schools, parks, and religious institutions. **Table C-6** shows the receptor names, locations, and distances to PDK. The receptors correspond to those in **Figure 6** of the main report and shown again in **Figure C-1**.

**Table C-7** shows a summary of the highest concentrations at PDK for all receptors during the modeling period. The concentrations are broken down into predicted (modeled using AEDT/AERMOD), background (reported by EPA monitoring data), and the combined total used to compare to the NAAQS. The EPA monitor used for background concentrations for all receptors is the South Dekalb (SD). The SD monitor was chosen because it is located outside of urban areas, twelve miles south of PDK, and is the only site reporting data until 2017 for all modelled criteria pollutants.

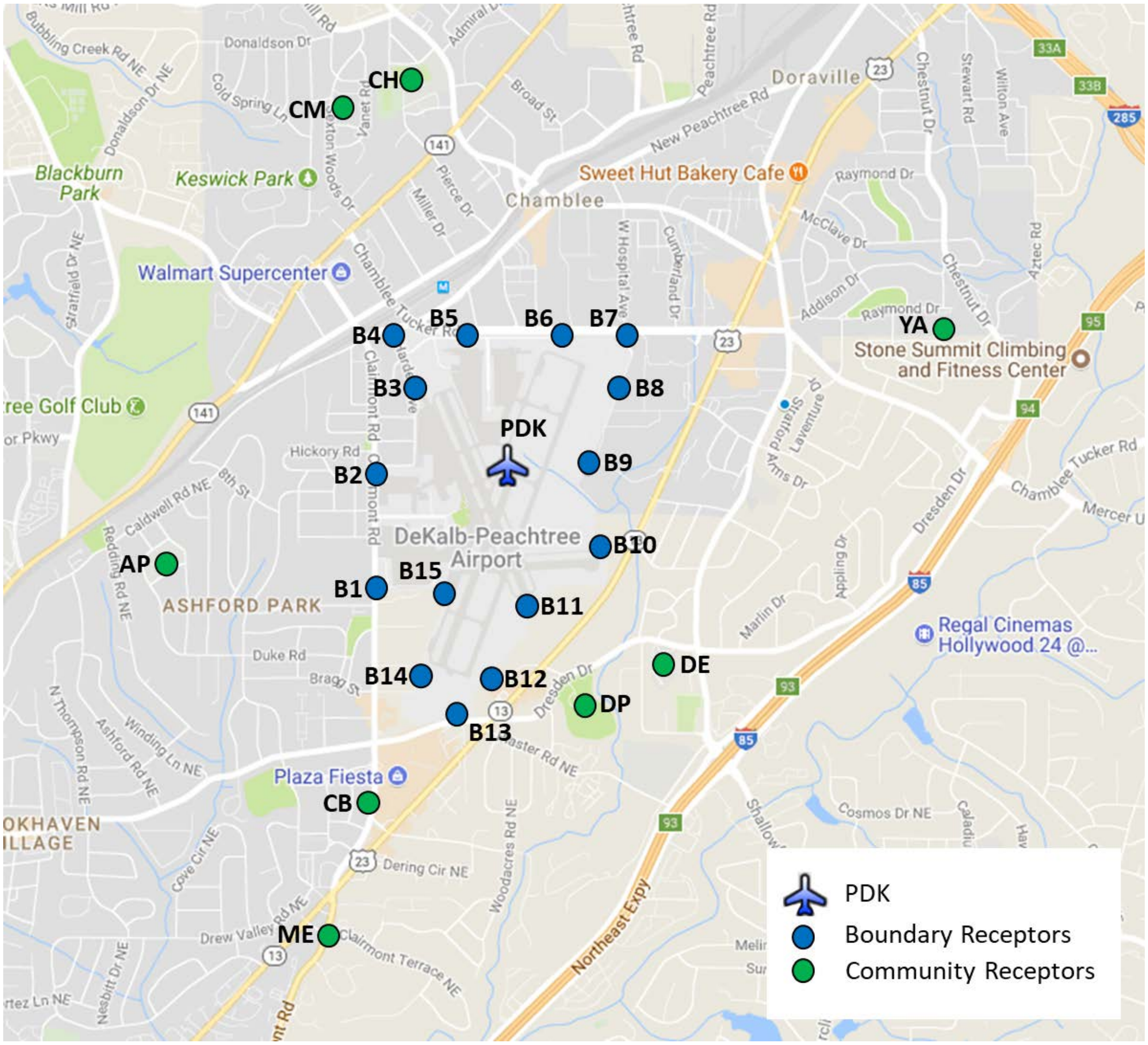


**Figure C-1. Receptor Locations**

**Table C-6. Receptor Locations**

| Name | Location Relative to PDK | Latitude | Longitude |
|---|---|---|---|
| Ashford Park Elementary School (AP) | 1 mile west of PDK | 33.87421 | -84.3217 |
| Chamblee High School (CH) | 1 mile northeast of north runway end | 33.89806 | -84.3072 |
| Chamblee Middle School (CM) | 1 mile northwest of PDK | 33.8965 | -84.3114 |
| Clairmont Baptist Church (CB) | 0.5 miles from south runway end | 33.86242 | -84.31 |
| Dorje Ling Budhist Center (DL) | 0.7 miles east of north runway end | 33.88202 | -84.2852 |
| Dresden Elementary School (DE) | 0.5 miles east of PDK | 33.86934 | -84.2923 |
| Dresdon Park (DP) | 0.5 miles east of south runway end | 33.86714 | -84.2971 |
| Montclair Elementary School | 1 mile south of PDK | 33.85577 | -84.3121 |
| Yeshivia Atlanta High School (YA) | 1 mile northeast of north runway end | 33.88583 | -84.2759 |
| Boundary 1 (B1) | West boundary | 33.873016 | -84.30933 |
| Boundary 2 (B2) | West boundary | 33.878769 | -84.30937 |

| Name | Location Relative to PDK | Latitude | Longitude |
|---|---|---|---|
| Boundary 3 (B3) | West boundary | 33.882736 | -84.30701 |
| Boundary 4 (B4) | Northwest boundary | 33.8855 | -84.30834 |
| Boundary 5 (B5) | North boundary | 33.885449 | -84.30391 |
| Boundary 6 (B6) | North boundary | 33.885416 | -84.29797 |
| Boundary 7 (B7) | Northeast boundary | 33.885431 | -84.29484 |
| Boundary 8 (B8) | Northeast boundary | 33.882984 | -84.29495 |
| Boundary 9 (B9) | East boundary | 33.878916 | -84.29684 |
| Boundary 10 (B10) | East boundary | 33.874975 | -84.29596 |
| Boundary 11 (B11) | East boundary | 33.872026 | -84.30019 |
| Boundary 12 (B12) | Southeast boundary | 33.868481 | -84.30275 |
| Boundary 13 (B13) | South boundary | 33.866621 | -84.3045 |
| Boundary 14 (B14) | South boundary | 33.868668 | -84.3065 |
| Boundary 15 (B15) | West boundary | 33.872484 | -84.3054 |

**Table C-7. PDK Dispersion Modeling Results (μg/m³)**

| Pollutant | Averaging Time | Form | Concentrations (μg/m³) | | | | Below NAAQS? |
|---|---|---|---|---|---|---|---|
| | | | Predicted | Background | Total | NAAQS | |
| $NO_2$[a] | 1-Hour | 8th Highest of daily max. | 152 | 15 | 167 | 188 | yes |
| | Annual | Highest | 4 | 15 | 19 | 100 | yes |
| CO | 1-Hour | Highest | 5,499 | 2,177 | 7,676 | 40,000 | yes |
| | 8-Hour | Highest | 1,045 | 1,566 | 2,611 | 10,000 | yes |
| $SO_2$ | 1-Hour | 4th Highest of 1-hour daily max. | 26 | 8 | 34 | 196 | yes |
| | 3-Hour | 2nd Highest | 16 | 12 | 28 | 1300 | yes |
| $PM_{2.5}$ | 24-Hour | 8th Highest | 1 | 24 | 26 | 35 | yes |
| | Annual | Highest | 0.2 | 10 | 11 | 12 | yes |
| $PM_{10}$ | 24-Hour | 2nd Highest | 2 | 46 | 48 | 150 | yes |
| Note: Total Concentrations = Predicted + Background. | | | | | | | |

A further detailed breakdown of dispersion results is presented in **Table C-7**, which shows the highest concentrations of each modelled pollutant at each receptor location.

**Table C-8. Highest AEDT Model Values at Each Receptor Location (μg/m³)**

| Receptor | $NO_2$ | | CO | | $SO_2$ | | $PM_{2.5}$ | | $PM_{10}$ |
|---|---|---|---|---|---|---|---|---|---|
| | 8th Highest 1-Hour | Highest Annual | Highest 1-Hour | Highest 8-Hour | 4th Highest 1-Hour | 2nd Highest 3-Hour | Highest 24-Hour | Highest Annual | Highest 24-Hour |
| CB | 56 | 30 | 5,351 | 2,493 | 27 | 23 | 25 | 10 | 48 |
| DP | 46 | 29 | 3,541 | 1,808 | 14 | 18 | 24 | 10 | 47 |
| YA | 67 | 29 | 3,021 | 1,737 | 15 | 15 | 24 | 10 | 47 |
| CH | 42 | 29 | 3,991 | 2,018 | 18 | 18 | 25 | 10 | 47 |
| ME | 77 | 30 | 3,802 | 1,869 | 17 | 16 | 25 | 10 | 47 |
| AP | 46 | 29 | 4,452 | 1,915 | 17 | 17 | 25 | 10 | 47 |
| CM | 86 | 30 | 3,084 | 1,805 | 14 | 15 | 24 | 10 | 47 |
| DE | 67 | 29 | 3,616 | 1,893 | 15 | 16 | 25 | 10 | 47 |

| Receptor | $NO_2$ | | CO | | $SO_2$ | | $PM_{2.5}$ | | $PM_{10}$ |
|---|---|---|---|---|---|---|---|---|---|
| | 8th Highest 1-Hour | Highest Annual | Highest 1-Hour | Highest 8-Hour | 4th Highest 1-Hour | 2nd Highest 3-Hour | Highest 24-Hour | Highest Annual | Highest 24-Hour |
| DL | 43 | 29 | 2,888 | 1,697 | 11 | 16 | 24 | 10 | 47 |
| B1 | 77 | 30 | 6,446 | 2,278 | 26 | 20 | 25 | 10 | 47 |
| B2 | 133 | 31 | 4,515 | 2,046 | 20 | 19 | 25 | 10 | 47 |
| B3 | 115 | 30 | 3,848 | 1,905 | 18 | 19 | 25 | 10 | 47 |
| B4 | 97 | 30 | 4,510 | 2,191 | 16 | 16 | 25 | 10 | 47 |
| B5 | 59 | 30 | 3,190 | 1,792 | 13 | 15 | 24 | 10 | 47 |
| B6 | 88 | 30 | 4,025 | 2,100 | 18 | 17 | 25 | 10 | 47 |
| B7 | 74 | 30 | 3,944 | 1,894 | 17 | 18 | 25 | 10 | 47 |
| B8 | 83 | 30 | 7,676 | 2,501 | 19 | 19 | 25 | 10 | 48 |
| B9 | 122 | 30 | 4,415 | 2,206 | 22 | 19 | 25 | 10 | 47 |
| B10 | 116 | 31 | 3,803 | 1,925 | 18 | 17 | 25 | 10 | 47 |
| B11 | 142 | 32 | 3,974 | 1,866 | 16 | 16 | 25 | 10 | 47 |
| B12 | 97 | 31 | 6,185 | 2,338 | 24 | 20 | 25 | 10 | 47 |
| B13 | 101 | 30 | 5,411 | 2,303 | 27 | 21 | 25 | 11 | 47 |
| B14 | 107 | 30 | 3,698 | 1,921 | 18 | 17 | 25 | 10 | 47 |
| B15 | 152 | 33 | 6,994 | 2,611 | 34 | 28 | 26 | 11 | 48 |

Source: FAA's AEDT and EPA's AERMOD, and KB Environmental Sciences, 2018.

[End of Appendices]