5.5 AIR QUALITY

This section presents an assessment of the potential for significant adverse air quality impacts resulting from construction and implementation of the Sponsor's Proposed Project and its alternatives for Port Columbus International Airport (CMH or Airport). The potential air quality impacts were assessed by conducting a dispersion analysis based on an emission inventory prepared for each of the alternatives considered in this Environmental Impact Statement (EIS). The assessment was prepared according to guidelines established under Federal Aviation Administration (FAA) Order 1050.1E, *Environmental Impacts: Policies and Procedures* and FAA *Air Quality Procedures for Civilian Airports & Air Force Bases*.[1]

The results of the emission inventory prepared for each alternative were compared to the results of the baseline alternative (Alternative A: No Action or Alternative A) of the same future year to disclose the potential increase in emissions caused by each project alternative. The comparison of the emission inventories, which included an inventory of construction emissions, were used for the evaluation of General Conformity as required under the Clean Air Act (including the 1990 Amendments) (CAA).

The emission inventories were then translated to pollutant concentrations by conducting dispersion analyses for comparison to the National Ambient Air Quality Standards (NAAQS),[2] an evaluation referred to as the National Environmental Policy Act (NEPA) analysis. The results of the NEPA analysis ascertained the potential for significant adverse air quality impacts in Franklin County due to proposed development at the Airport.

The procedures and methodologies used to develop the existing and future emission database, as well as computer modeling input data, are provided in Appendix E, *Air Quality*, which includes Attachment E.1 *Draft Technical Report: Air Quality Assessment Methodology* (Air Quality Technical Report). The Air Quality Technical Report summarizes the status of Ohio's State Implementation Plan (SIP), provides an overview of the requirements under NEPA and the CAA, and documents FAA's coordination with Federal, State, and local air quality agencies. The existing air quality conditions at CMH are described in Chapter Four, *Affected Environment,* Section 4.8, *Air Quality*.

5.5.1 FUTURE CONDITIONS: 2012

A summary of the analyses of emission inventories prepared for the 2012 Alternatives is included in the following sections, including the Sponsor's Proposed Project (Alternative C3b). The inventory of construction equipment emissions include the development of the stormwater detention basin at the location of the Big Walnut Creek tributary on the east airfield south of Sawyer Road.

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1 *FAA Order 1050.1E Environmental Impacts: Policies and Procedures*, March 20, 2006, FAA; and *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997, and the Addendum dated September 2004, FAA.

2 Background concentrations were added to the modeled results (design concentrations) for the evaluation of future air quality conditions at the Airport and in the surrounding communities.

Refer to **Appendix E**, *Air Quality*, for details relating to the construction equipment emission inventory. The results of the dispersion analysis are summarized following the presentation of the results of the emission inventory for each alternative.

5.5.1.1 2012 Alternative A

The following paragraphs provide a summary of the results of the computer modeling to estimate air emissions resulting from the operation of the Airport under 2012 Alternative A and includes the results of dispersion analysis. The emission inventory prepared for the 2012 Alternative A is the baseline against which all other 2012 alternatives are evaluated.

Airfield Configuration: CMH has two east/west parallel runways (10L/28R and 10R/28L) spaced 2,800 feet apart. Chapter Three, *Alternatives*, Exhibit 3-1, *Alternative A: No Action*, shows the existing Airport layout.

Aircraft Activity Levels and Fleet Mix Characteristics: The 2012 aircraft operations and fleet mix are based on the aviation forecast prepared for the 2007 14 Code of Federal Regulations (CFR) Part 150 Study Update[3] as presented in Appendix C, *Aviation Activity Forecast*.

Other Mobile Sources and Stationary Sources: In addition to aircraft, the analysis of this alternative reflects other mobile and stationary sources that contribute to Airport emissions. These include ground support equipment (GSE) and auxiliary power units (APUs) used at the gate areas; all types of motor vehicles, including, passenger and employee vehicles, taxi cabs, parking lot shuttles, rental car (RAC) shuttles, hotel and motel shuttle buses, and visitor vehicles accessing Airport roadways and parking lots. Refer to Appendix E, *Air Quality Technical Report*, Exhibit E-6, *2012 and 2018 No Action, and 2012 Project Alternatives – Generalized Roadway Segments*, and Exhibit E-3, *2012 and 2018 No Action, and 2012 Project Alternatives –Parking Lots and Garages*.

The analysis includes emissions from stationary sources, including evaporative emissions from fuel storage tanks and painting operations; emissions from the use of deicing fluid; combustion emissions from boilers at the terminal and concourses; and emissions from the operation of emergency generators. All the 2012 alternatives include the relocated RAC facility that moves rental cars from the first two floors of the existing six-level parking garage adjacent to the existing passenger terminal to a location west of Interstate 670. Also included are the use of the crossover taxiway under construction in 2007, and the planned realignment of International Gateway. The crossover taxiway and realignment of International Gateway have received prior NEPA approval. Refer to Appendix E, *Air Quality Technical Report,* Exhibit E-9, *2012 and 2018 No Action, and 2012 Project Alternatives – Stationary Sources*.

[3] *Final 2007 Part 150 Noise Compatibility Study Update for the Port Columbus International Airport*, November 2007, Landrum & Brown. The FAA Record of Approval is anticipated in June 2008.

Computer Modeling: The emission inventories for all the 2012 and 2018 alternatives for criteria and precursor pollutants were prepared using the FAA Emissions and Dispersion Modeling System (EDMS), Version 4.5. The construction emissions inventory was prepared using U.S. Environmental Protection Agency (USEPA)-approved methodology applied through a computer spreadsheet program. The aircraft fleet used for computer-model input for the emission inventory calculations for all the 2012 and 2018 alternatives is as described in Section 5.1, *Noise*. All input data, assumptions, procedures, and methodologies used for all computer and spreadsheet modeling are provided in the *Air Quality Technical Report* in Appendix E. EDMS provides emission inventory calculations for the following pollutants:

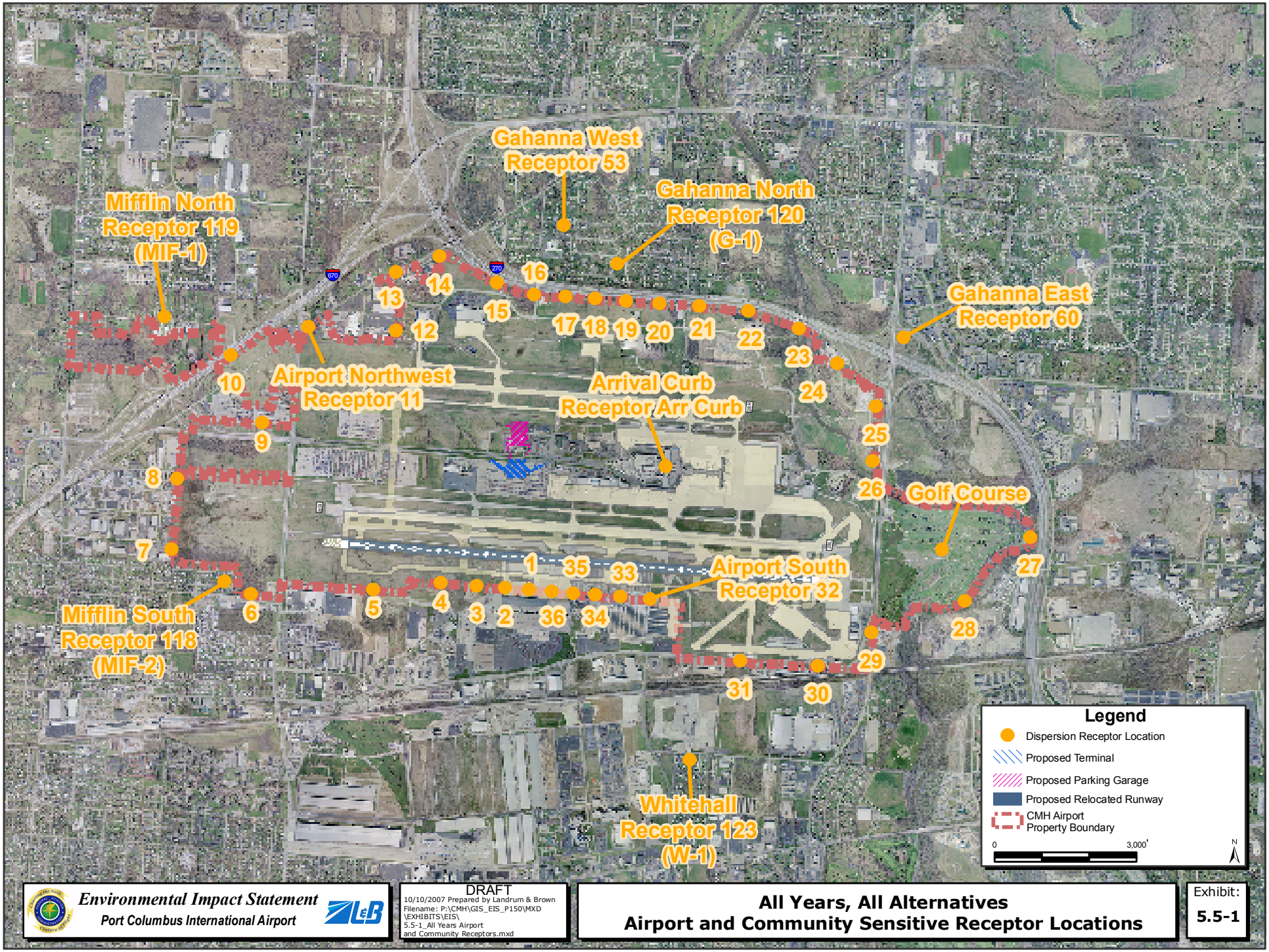
- Carbon monoxide (CO);
- Volatile organic compounds (VOCs), a precursor pollutant to ozone development[4] and particulate matter emissions;
- Nitrogen oxides (NO_x) a precursor pollutant to ozone development and particulate matter emissions;
- Sulfur oxides (SO_x), a precursor pollutant to the development of fine particulate matter ($PM_{2.5}$) emissions;
- Coarse particulate matter (PM_{10}); and
- Fine particulate matter ($PM_{2.5}$).

Dispersion analyses for all the 2012 and 2018 alternatives considered in this EIS were conducted using EDMS Version 4.5. EDMS provides calculations for pollutant concentrations for the following pollutants and averaging periods:

- CO – One-hour and eight-hour averages;
- NO_x – Annual average;
- SO_x – Three-hour, 24-hour, and annual averages;
- PM_{10} – 24-hour average; and
- $PM_{2.5}$ – 24-hour and annual averages.

For each of the 2012 and 2018 alternatives, pollutant concentrations were calculated at a total of 67 receptor locations. Of the 67 receptors, 44 are located in the communities surrounding the Airport, around the perimeter of the Airport property line, and at the arrival curb adjacent to the existing passenger terminal, as shown in **Exhibit 5.5-1, *All Years, All Alternatives Airport and Community Sensitive Receptor Locations***. The remaining 23 receptors are located within the

[4] Ozone cannot be calculated directly because ozone formation is a regional phenomenon resulting from the photochemical reaction of NO_x, VOC, and sunlight. Therefore, the USEPA has directed the evaluation of NO_x and VOC to serve as a representation of the potential for ozone development on a project-level basis.



Environmental Impact Statement
Port Columbus International Airport

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10/10/2007 Prepared by Landrum & Brown
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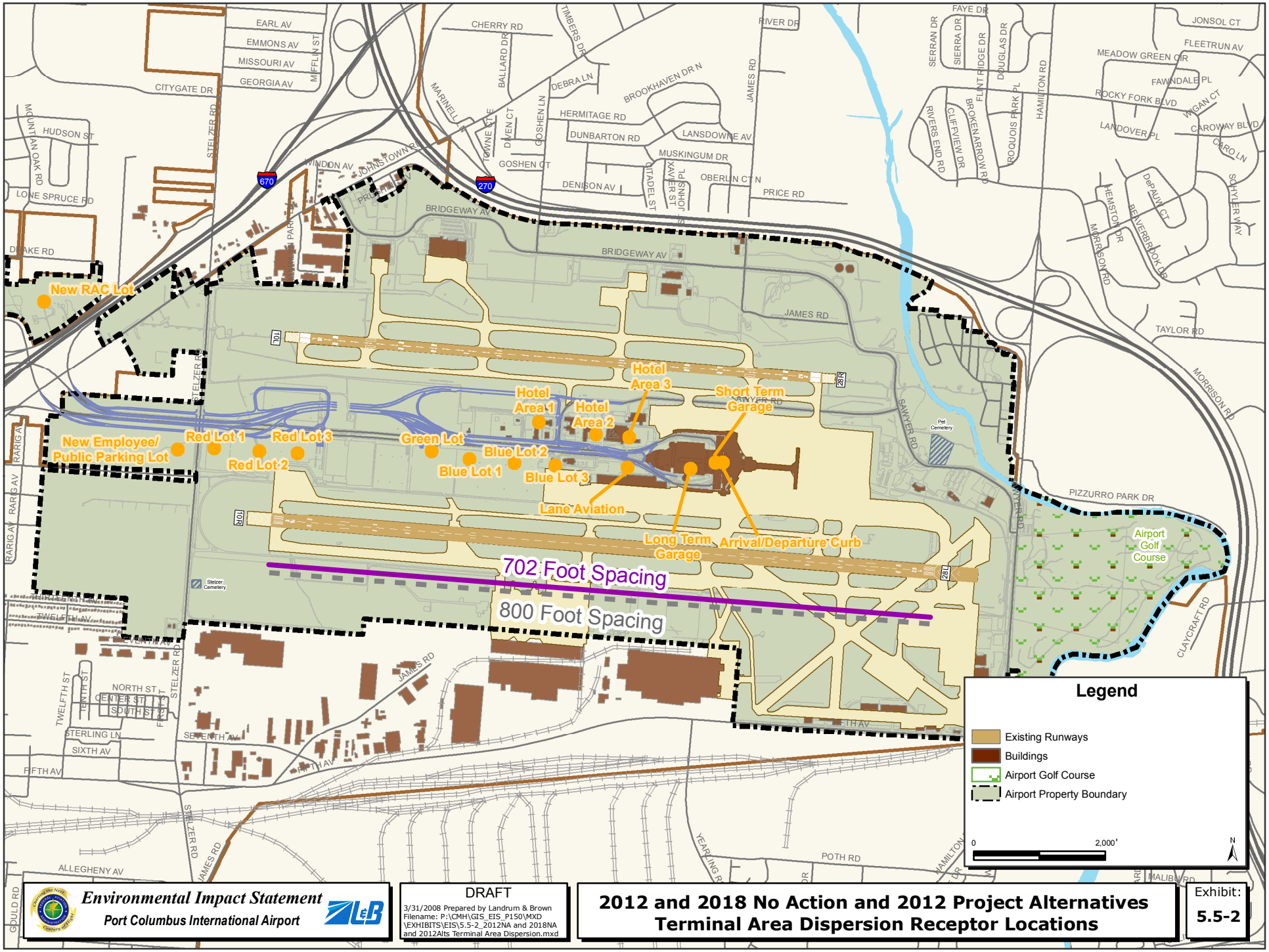
5.5-1_All Years Airport
and Community Receptors.mxd

All Years, All Alternatives
Airport and Community Sensitive Receptor Locations

Exhibit:
5.5-1


New RAC Lot
New Employee/
Public Parking Lot
Red Lot 1
Red Lot 2
Red Lot 3
Green Lot
Blue Lot 1
Blue Lot 2
Blue Lot 3
Hotel
Area 1
Hotel
Area 2
Hotel
Area 3
Short Term
Garage
Lane Aviation
Long Term
Garage
Arrival/Departure Curb
702 Foot Spacing
800 Foot Spacing
Airport
Golf
Course
Legend
Existing Runways
Buildings
Airport Golf Course
Airport Property Boundary
0
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Environmental Impact Statement
Port Columbus International Airport
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and 2012Alts Terminal Area Dispersion.mxd
2012 and 2018 No Action and 2012 Project Alternatives
Terminal Area Dispersion Receptor Locations
Exhibit:
5.5-2

terminal area in parking lots and garages, and along International Gateway, as shown in **Exhibit 5.5-2, *2012 and 2018 No Action, and 2012 Project Alternatives Terminal Area Dispersion Receptor Locations***.[5]

Selection of the receptor locations for inclusion in the dispersion analysis was coordinated with the USEPA, the Ohio Environmental Protection Agency (OEPA) Division of Air Pollution Control (DAPC), and the Mid-Ohio Regional Planning Commission (MORPC). The receptor locations were selected based on the proximity of the receptor to sensitive public areas or facilities, as defined in Section 5.2, *Compatible Land Use*, Table 5.2-2, *Noise-Sensitive Public Facilities*. Further, selection was based on results of preliminary analysis indicating the possibility of impacts in public areas. The selected receptor locations are summarized below:

Arrival Curb: Located at the existing terminal building on the east side of the roadway, situated in front of the passenger-terminal pickup area from which arriving passengers are transported to parking areas, rental car facilities, or other destinations off-Airport. Pollutant concentrations would be expected to be highest at this receptor due to the close proximity to both motor vehicles and GSE at the terminal gate area.

Gahanna East: Located northeast of the Airport near Friendship Park, and near Wonderland Community Church, Shepherd Church of the Nazarene and Christian School, and Christian Center Church.

Gahanna North: Located north of the Airport near Denison Avenue and Goshen Lane near Victory in Pentecost Church and Goshen Lane Elementary School.

Mifflin South: Located southwest of the Airport near Krumm Park, Living Word Church, East Columbus Elementary School, Corinthian Baptist Church, and East Mount Olivet Baptist Church.

Whitehall: Located south of the Airport near Yearling Road, Holy Spirit School and Whitehall Library.

Gahanna West: Also located north of the Airport, near Hermitage Road, Victory in Pentecost Church and Goshen Lane Elementary School.

Airport South: Located south of the Airport. Selected to capture potential impacts in public access areas south of the proposed replacement runway.

Airport Northwest: Located northwest of the Airport. Selected to capture potential impacts in a public access area from pollutants evaluated as a three-hour average concentration.

Mifflin North: Located northwest of the Airport. Selected to capture potential impacts in public access areas due to the one-hour average concentration of pollutants.

[5] Receptors for the long-term parking garage levels, the RAC garage levels, and the short-term parking levels are stacked in the same location and show only one receptor on the exhibit.

Golf Course: Located east of the Airport in the public golf course near Runway 28L.

***2012 Alternative A Emission Inventory*:** The emission inventory is summarized in **Table 5.5-1**. The data shows the greatest overall emission contribution comes from GSE and APU operations, which represent 36.40 percent of total emissions under this alternative. Aircraft sources are second, representing 34.84 percent. The remaining 28.76 percent of total emissions come from sources accessing Airport-related parking lots, garages, roadways, and the operation of stationary sources, such as fuel storage tanks, boilers, incinerators, emergency generators, and painting operations. The emission inventory summarized in Table 5.5-1 represents the baseline against which each of the other 2012 alternatives were compared. Emissions from GSE, APUs, roadways, parking garages, parking lots, and stationary sources are expected to remain the same for all of the 2012 alternatives.

The emission inventory for this alternative reflects a slight decrease in average aircraft taxi time, as compared to the Existing (2006) Conditions resulting from use of the new crossover taxiway. This includes an increase in average aircraft departure delay time resulting from the increase in aircraft operations that would occur by 2012 regardless of the Sponsor's Proposed Project.

2012 Alternative A Dispersion Analysis: The pollutant concentrations estimated through dispersion analysis are summarized in **Table 5.5-2**. Refer to Exhibit 5.5-1 and Exhibit 5.5-2 for the dispersion receptor locations used for this alternative. For each pollutant-averaging period the maximum concentration was found to occur at the arrival curb. Under this alternative, the maximum values at the arrival curb are caused almost entirely by emissions of CO from GSE concentrated at the terminal gate area. All modeled concentration values summarized in Table 5.5-2 are below the NAAQS.

5.5.1.2 2012 Alternative C2a: Relocate Runway 10R/28L 800 Feet to the South – Noise Abatement Scenario A

The following paragraphs provide a summary of the results of the computer modeling to estimate air emissions resulting from the operation of the Airport under 2012 Alternative C2a, and includes the results of dispersion analysis for this alternative.

Airfield Configuration: Alternative C2a includes a replacement runway located 800 feet south of existing Runway 10R/28L. The proposed airfield layout would also include three taxiways parallel to the proposed replacement runway. Chapter Three, *Alternatives*, Exhibit 3-7 shows the airfield layout proposed for the C2 alternatives.

Aircraft Activity Levels and Fleet Mix Characteristics: The number of annual aircraft operations and fleet mix characteristics would be the same for this alternative as described for 2012 Alternative A.

Table 5.5-1
2012 ALTERNATIVE A EDMS EMISSION INVENTORY OF CRITERIA AND PRECURSOR POLLUTANTS
Port Columbus International Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	812.86	71.37	323.64	29.40	61.75	61.75	**1,360.76**
GSE/APUs	1,279.88	49.61	73.79	10.62	3.91	3.77	**1,421.57**
Roadways	690.99	48.42	68.03	0.53	2.22	1.29	**811.48**
Parking Facilities	170.88	25.33	22.18	0.08	0.35	0.20	**219.02**
Stationary Sources	21.45	14.11	35.76	16.64	2.49	2.20	**92.65**
TOTAL	**2,976.05**	**208.83**	**523.39**	**57.27**	**70.71**	**69.22**	**3,905.49**

Notes: GSE is ground support equipment. APUs are auxiliary power units. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Emissions values of $PM_{2.5}$ for aircraft were supplemented by using $PM_{2.5}$ emission data from the USEPA AP-42. Totals may not calculate exactly due to rounding.

Sources: *EDMS Version 4.5*, 2006, FAA.
Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (AP-42), Table II-1-9, January 1991, USEPA.
Landrum & Brown analysis, 2007.

Other Mobile Sources and Stationary Sources: The number of vehicles on Airport access roadways and in parking lots and garages would remain the same for all the 2012 alternatives those described for 2012 Alternative A. None of the alternatives include modifications to roadways, parking lots, or use of GSE and APUs that would be different than as described for the 2012 Alternative A. Likewise, emissions from stationary sources such as fuel storage tanks, boilers, emergency generators, and painting operations would not change as compared to the 2012 Alternative A.

Table 5.5-2
2012 ALTERNATIVE A EDMS POLLUTANT DISPERSION ANALYSIS OF CRITERIA POLLUTANTS
Port Columbus International Airport

AIR QUALITY STANDARDS AND RECEPTORS[1]		MODELED POLLUTANT CONCENTRATIONS BY NAAQS AVERAGING PERIODS ($\mu g/m^3$)								
USEPA NAAQS ($\mu g/m^3$)		CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
		1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
		40,000	10,000	100	1,300	365	80	150	35	15
Arrival Curb	Arr Curb	16,052.55	3,433.30	44.45	119.53	49.16	6.91	10.45	9.78	2.00
Gahanna East	60	5,861.17	1,278.78	1.78	25.39	4.10	0.23	2.41	2.23	0.10
Gahanna North	120/G-1	4,663.93	1,320.97	4.21	28.67	6.38	0.52	2.54	2.41	0.23
Mifflin South	118/MIF-2	2,657.53	689.39	2.72	16.79	2.79	0.16	2.49	2.29	0.08
Whitehall	123/W-1	3,951.42	639.22	1.82	18.53	5.76	0.35	1.45	1.39	0.12
Gahanna West	53	4,180.77	926.88	3.49	27.80	5.62	0.43	2.87	2.70	0.19
Airport South	32	4,245.19	1,031.07	5.40	28.23	6.84	0.93	2.78	2.64	0.32
Airport Northwest	11	4,052.61	788.01	5.74	19.47	4.27	0.25	1.50	1.39	0.17
Mifflin North	119/MIF-1	4,758.75	645.59	4.17	11.29	3.24	0.12	1.20	1.06	0.08
Golf Course		7,102.27	1,037.48	1.77	30.78	4.47	0.28	3.47	3.30	0.10

Note: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

[1] Receptors are identified by descriptive locations indicating position in relation to Airport property, communities surrounding the Airport, and by the receptor identification code names as shown on Exhibit 5.5-1 and Exhibit 5.5-2. If the receptor name used in computer modeling is different, that identification name is also given.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.

2012 Alternative C2a Emission Inventory: The emission inventory for Alternative C2a is summarized in **Table 5.5-3**. The data shows the greatest overall emission contribution comes from GSE and APU operations, which represent 36.27 percent of total emissions under this alternative. The second-greatest source of overall emissions is aircraft, which contributes 35.08 percent. The remaining 28.65 percent of total emissions comes from sources accessing Airport-related parking lots, garages, roadways, and the operation of stationary sources, such as fuel storage tanks, boilers, incinerators, emergency generators, and painting operations.

The emission inventory for this alternative reflects an increase in the average taxi time as compared to the 2012 Alternative A. The increase in average taxi time results from the additional time required for aircraft to traverse the additional 800 feet to reach the replacement runway. Emissions under this alternative increase 0.36 percent over the 2012 Alternative A.

Table 5.5-3
2012 ALTERNATIVE C2a EDMS EMISSION INVENTORY OF CRITERIA AND PRECURSOR POLLUTANTS
Port Columbus International Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	824.26	72.98	324.53	29.63	61.78	61.78	**1,374.96**
GSE/APU	1,279.95	49.60	73.79	10.60	3.91	3.78	**1,421.62**
Roadways	690.99	48.42	68.03	0.53	2.22	1.29	**811.48**
Parking Facilities	170.88	25.33	22.18	0.08	0.35	0.20	**219.02**
Stationary Sources	21.45	14.11	35.76	16.64	2.49	2.20	**92.65**
TOTAL	**2,987.53**	**210.44**	**524.29**	**57.48**	**70.74**	**69.26**	**3,919.74**

Notes: GSE is ground support equipment. APUs are auxiliary power units. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Emissions values of $PM_{2.5}$ for aircraft were supplemented by using $PM_{2.5}$ emission data from the USEPA AP-42. Totals may not calculate exactly due to rounding.

Sources: *EDMS Version 4.5*, 2006, FAA.
Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (AP-42), Table II-1-9, January 1991, USEPA.
Landrum & Brown analysis, 2007.

2012 Alternative C2a Construction Emissions: The inventory of construction emissions is summarized in **Table 5.5-4**. The data shows NO_x to be the most prominent pollutant caused by the operation of construction equipment. NO_x emissions reflect 39.31 percent of emissions from the total four-year project. Emissions of CO would constitute 37.70 percent, VOCs would be 5.67 percent, and $PM_{2.5}$ emissions account for 1.75 percent. The remaining 15.54 percent would consist of SO_x and PM_{10} emissions.

Table 5.5-4
2012 ALTERNATIVE C2a AND C2b CONSTRUCTION EMISSIONS INVENTORY
Port Columbus International Airport

CONSTRUCTION YEARS	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$	TOTAL
2009	11.80	1.92	13.22	4.21	0.70	0.70	**32.54**
2010	15.59	2.32	16.01	5.64	0.92	0.92	**41.40**
2011	27.98	4.18	28.86	10.34	1.65	1.65	**74.66**
2012	25.77	3.85	26.53	9.50	0.50	0.50	**66.64**
TOTAL	**81.15**	**12.26**	**84.62**	**29.69**	**3.76**	**3.76**	**215.25**

Notes: CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Totals may not calculate exactly due to rounding.

Source: *Landrum & Brown analysis*, 2007.

***2012 Alternative C2a Dispersion Analysis*:** The maximum concentrations estimated through dispersion analysis are summarized in **Table 5.5-5**. Refer to Exhibit 5.5-1 and Exhibit 5.5-2 for the dispersion receptor locations used for this alternative. For each pollutant-averaging period the maximum concentration was found to occur at the arrival curb. All modeled concentration values summarized in Table 5.5-5 are below the NAAQS.

5.5.1.3 2012 Alternative C2b: Relocate Runway 10R/28L 800 Feet to the South – Noise Abatement Scenario B

The following paragraphs provide a summary of the results of the computer modeling to estimate air emissions resulting from the operation of the Airport under 2012 Alternative C2b, and includes the results of dispersion analysis.

Airfield Configuration: Alternative C2b includes a replacement runway located 800 feet south of existing Runway 10R/28L. The proposed airfield layout would be the same as described under the 2012 Alternative C2a.

Aircraft Activity Levels and Fleet Mix Characteristics: The number of annual aircraft operations and fleet mix characteristics would be the same for this alternative as that described for 2012 Alternative A.

Other Mobile Sources and Stationary Sources: Assessment of mobile and stationary sources for this alternative would be the same as described for 2012 Alternative C2a.

Noise Abatement Scenario B: This alternative includes the noise abatement measures recommended in the 2007 Part 150 Noise Compatibility Study Update (2007 Part 150 Study). These measures would increase aircraft taxi time because the recommendations result in an increase in the use of east flow (Runways 10R/10L).

Table 5.5-5
2012 ALTERNATIVE C2a EDMS POLLUTANT DISPERSION ANALYSIS OF CRITERIA POLLUTANTS
Port Columbus International Airport

AIR QUALITY STANDARDS AND RECEPTORS[1]		MODELED POLLUTANT CONCENTRATIONS BY NAAQS AVERAGING PERIODS ($\mu g/m^3$)								
USEPA NAAQS ($\mu g/m^3$)		CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
		1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
		40,000	10,000	100	1300	365	80	150	35	15
Arrival Curb	Arr Curb	14,223.26	3,199.78	45.08	119.78	49.51	7.04	10.92	10.23	2.05
Gahanna East	60	6,193.30	1,243.70	1.72	26.15	4.20	0.23	2.42	2.25	0.10
Gahanna North	120/G-1	4,915.37	1,414.34	4.17	29.46	6.49	0.51	2.57	2.44	0.23
Mifflin South	118/MIF-2	2,556.80	674.34	2.76	16.51	2.73	0.16	2.48	2.29	0.08
Whitehall	123/W-1	4,233.94	678.41	1.90	18.72	5.83	0.37	1.59	1.52	0.13
Gahanna West	53	4,435.36	963.97	3.46	28.47	5.75	0.42	2.88	2.71	0.18
Airport South	32	4,597.40	1,088.52	6.06	29.72	7.19	1.01	3.09	2.96	0.36
Airport Northwest	11	4,069.80	764.77	5.65	19.05	4.13	0.24	1.42	1.31	0.16
Mifflin North	119/MIF-1	4,443.90	606.51	4.17	11.17	2.73	0.12	1.09	0.94	0.08
Golf Course		6,720.59	981.38	1.66	29.92	4.37	0.27	2.57	2.41	0.09

Note: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

[1] Receptors are identified by descriptive locations indicating position in relation to Airport property, communities surrounding the Airport, and by the receptor identification code names as shown on Exhibit 5.5-1 and Exhibit 5.5-2. If the receptor name used in computer modeling is different, that identification name is also given.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.

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2012 Alternative C2b Emission Inventory: The emission inventory is summarized in **Table 5.5-6**. The data shows the greatest overall emission contribution comes from GSE and APU operations, which represent 36.22 percent of total emissions under this alternative. The second-greatest source of overall emissions is aircraft, which contributes 35.16 percent. The remaining 28.62 percent of total emissions comes from sources accessing Airport-related parking lots, garages, roadways, and the operation of stationary sources, such as fuel storage tanks, boilers, incinerators, emergency generators, and painting operations.

The emission inventory for this alternative reflects an increase in the average taxi time as compared to the 2012 Alternative A. The increase in taxi time results from runway use prescribed under Noise Abatement Scenario B. Emissions under this alternative increase 0.50 percent over the 2012 Alternative A.

Table 5.5-6
2012 ALTERNATIVE C2b EDMS EMISSION INVENTORY OF CRITERIA AND PRECURSOR POLLUTANTS
Port Columbus International Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	828.48	73.58	324.85	29.72	61.79	61.79	**1,380.19**
GSE/APUs	1,280.03	49.60	73.80	10.62	3.91	3.77	**1,421.72**
Roadways	690.99	48.42	68.03	0.53	2.22	1.29	**811.48**
Parking Facilities	170.88	25.33	22.18	0.08	0.35	0.20	**219.02**
Stationary Sources	21.45	14.11	35.76	16.64	2.49	2.20	**92.65**
TOTAL	**2,991.82**	**211.04**	**524.61**	**57.59**	**70.75**	**69.26**	**3,925.07**

Notes: GSE is ground support equipment. APUs are auxiliary power units. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Emissions values of $PM_{2.5}$ for aircraft were supplemented by using $PM_{2.5}$ emission data from the USEPA AP-42. Totals may not calculate exactly due to rounding.

Sources: *EDMS Version 4.5*, 2006, FAA.
Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (AP-42), Table II-1-9, January 1991, USEPA.
Landrum & Brown analysis, 2007.

2012 Alternative C2b Construction Emissions: Construction emissions under this alternative would be the same as the 2012 Alternative C2a.

***2012 Alternative C2b Dispersion Analysis*:** The maximum concentrations estimated through dispersion analysis are summarized in **Table 5.5-7**. Refer to Exhibit 5.5-1 and Exhibit 5.5-2 for the dispersion receptor locations used for this alternative. For each pollutant averaging period, the maximum concentration was found to occur at the arrival curb, as described for 2012 Alternative C2a. All modeled concentration values summarized in Table 5.5-7 are below the NAAQS.

Table 5.5-7
2012 ALTERNATIVE C2b EDMS POLLUTANT DISPERSION ANALYSIS OF CRITERIA POLLUTANTS
Port Columbus International Airport

AIR QUALITY STANDARDS AND RECEPTORS[1]		MODELED POLLUTANT CONCENTRATIONS BY NAAQS AVERAGING PERIODS ($\mu g/m^3$)								
USEPA NAAQS ($\mu g/m^3$)		CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
		1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
		40,000	10,000	100	1300	365	80	150	35	15
Arrival Curb	Arr Curb	14,183.62	3,185.79	44.32	119.18	49.18	6.86	10.81	10.12	1.94
Gahanna East	60	6,048.80	1,206.32	1.62	24.87	3.97	0.21	2.25	2.07	0.08
Gahanna North	120/G-1	4,779.50	1,375.75	3.96	27.71	6.03	0.47	2.33	2.19	0.20
Mifflin South	118/MIF-2	2,492.19	645.21	2.73	15.85	2.60	0.15	2.15	1.95	0.07
Whitehall	123/W-1	4,087.30	648.07	1.78	17.47	5.44	0.33	1.42	1.36	0.11
Gahanna West	53	4,326.37	931.93	3.30	27.30	5.45	0.39	2.61	2.44	0.16
Airport South	32	4,471.94	1,060.37	5.67	28.57	6.76	0.91	2.77	2.64	0.31
Airport Northwest	11	3,926.79	729.57	5.59	18.20	3.82	0.22	1.29	1.18	0.14
Mifflin North	119/MIF-1	4,289.27	585.57	4.12	10.39	2.88	0.11	0.95	0.81	0.07
Golf Course		6,597.75	963.18	1.53	28.46	4.13	0.24	2.15	1.98	0.08

Note: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

[1] Receptors are identified by descriptive locations indicating position in relation to Airport property, communities surrounding the Airport, and by the receptor identification code names as shown on Exhibit 5.5-1 and Exhibit 5.5-2. If the receptor name used in computer modeling is different, that identification name is also given.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.

5.5.1.4 2012 Alternative C3a: Relocate Runway 10R/28L 702 Feet to the South – Noise Abatement Scenario A

The following paragraphs provide a summary of the results of the computer modeling to estimate air emissions resulting from the operation of the Airport under 2012 Alternative C3a, and includes the results of dispersion analysis.

Airfield Configuration: Alternative C3a includes a replacement runway located 702 feet south of existing Runway 10R/28L. The proposed airfield layout also includes three taxiways parallel to the proposed replacement runway. Chapter Three, *Alternatives*, Exhibit 3-9, shows the airfield layout proposed for the C3 alternatives.

Aircraft Activity Levels and Fleet Mix Characteristics: The number of annual aircraft operations and fleet mix characteristics would be the same for this alternative as those described for 2012 Alternative A.

Other Mobile Sources and Stationary Sources: Assessment of mobile and stationary sources for Alternative C3a would be the same as described for 2012 Alternative C2a.

2012 Alternative C3a Emission Inventory: The emission inventory is summarized in **Table 5.5-8**. The data shows the greatest overall emission contribution comes from GSE and APU operations, which represent 36.30 percent of total emissions under this alternative. The second-greatest source of overall emissions is aircraft, which contributes 35.02 percent. The remaining 28.68 percent of total emissions comes from sources accessing Airport-related parking lots, garages, roadways, and the operation of stationary sources, such as fuel storage tanks, boilers, incinerators, emergency generators, and painting operations.

The emission inventory for this alternative reflects the increase in average taxi time as compared to the 2012 Alternative A. However, the average taxi time would be less than that projected for either 2012 Alternative C2a or Alternative C2b because this alternative places the proposed replacement runway 98 feet closer to existing Runway 10R/28L – a 702-foot separation versus the 800-foot separation under the C2 alternatives. The shorter taxi distance accounts for the decrease in average taxi time as compared to 2012 Alternative C2a. Emissions under this alternative increase 0.27 percent over the 2012 Alternative A.

Table 5.5-8
2012 ALTERNATIVE C3a EDMS EMISSION INVENTORY OF CRITERIA AND PRECURSOR POLLUTANTS
Port Columbus International Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	821.29	72.18	324.64	29.58	61.77	61.77	**1,371.23**
GSE/APUs	1,279.95	49.60	73.79	10.60	3.91	3.78	**1,421.62**
Roadways	690.99	48.42	68.03	0.53	2.22	1.29	**811.48**
Parking Facilities	170.88	25.33	22.18	0.08	0.35	0.20	**219.02**
Stationary Sources	21.45	14.11	35.76	16.64	2.49	2.20	**92.65**
TOTAL	**2,984.56**	**209.63**	**524.39**	**57.43**	**70.74**	**69.25**	**3,916.00**

Notes: GSE is ground support equipment. APUs are auxiliary power units. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Emissions values of $PM_{2.5}$ for aircraft were supplemented by using $PM_{2.5}$ emission data from the USEPA AP-42. Totals may not calculate exactly due to rounding.

Sources: *EDMS Version 4.5*, 2006, FAA.
Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (AP-42), Table II-1-9, January 1991, USEPA.
Landrum & Brown analysis, 2007.

2012 Alternative C3a Construction Emissions: The inventory of construction emissions is summarized in **Table 5.5-9**. The data shows NO_x to be the most prominent pollutant caused by the operation of construction equipment. NO_x emissions reflect 38.94 percent of emissions from the total four-year project. Emissions of CO would constitute 37.34 percent of total project emissions, 5.64 percent would be VOCs, and 2.20 percent would be $PM_{2.5}$ emissions. The remaining 15.87 percent would consist of SO_x and PM_{10} emissions.

***2012 Alternative C3a Dispersion Analysis*:** The maximum concentrations projected through dispersion analysis are summarized in **Table 5.5-10**. Refer to Exhibit 5.5-1 and Exhibit 5.5-2 for the dispersion receptor locations used for this alternative. For each pollutant-averaging period, the maximum concentration was found to occur at the arrival curb. All modeled concentration values summarized in Table 5.5-10 are below the NAAQS.

Table 5.5-9
2012 ALTERNATIVE C3a AND C3b CONSTRUCTION EMISSIONS INVENTORY
Port Columbus International Airport

CONSTRUCTION YEARS	ANNUAL NET EMISSIONS (tons per year)						
	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$	TOTAL
2009	11.77	1.91	13.19	4.20	0.69	0.69	**32.45**
2010	14.89	2.22	15.31	5.39	0.88	0.88	**39.56**
2011	27.58	4.12	28.41	10.20	1.63	1.63	**73.56**
2012	25.51	3.81	26.26	9.40	1.50	1.50	**67.99**
TOTAL	**79.74**	**12.05**	**83.17**	**29.19**	**4.70**	**4.70**	**213.56**

Notes: CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Totals may not calculate exactly due to rounding.

Source: *Landrum & Brown analysis*, 2007.

5.5.1.5 2012 Alternative C3b: Relocate Runway 10R/28L 702 Feet to the South – Noise Abatement Scenario B

The following paragraphs provide a summary of the results of the computer modeling to estimate air emissions resulting from the operation of the Airport under 2012 Alternative C3b, and includes the results of dispersion analysis for this alternative.

Airfield Configuration: Alternative C3b includes a replacement runway located 702 feet south of existing Runway 10R/28L. The proposed airfield layout would be the same as described under the 2012 Alternative C3a.

Aircraft Activity Levels and Fleet Mix Characteristics: The number of annual aircraft operations and fleet mix characteristics would be the same for this alternative as those described for 2012 Alternative A.

Other Mobile Sources and Stationary Sources: Assessment of mobile and stationary sources for this alternative would be the same as described for 2012 Alternative C2a.

Noise Abatement Scenario B: This alternative includes the noise abatement measures recommended in the 2007 Part 150 Study. These measures would increase aircraft taxi time because the recommendations result in an increase in the use of east flow (Runways 10R/10L).

Table 5.5-10
2012 ALTERNATIVE C3a EDMS POLLUTANT DISPERSION ANALYSIS OF CRITERIA POLLUTANTS
Port Columbus International Airport

AIR QUALITY STANDARDS AND RECEPTORS[1]		MODELED POLLUTANT CONCENTRATIONS BY NAAQS AVERAGING PERIODS ($\mu g/m^3$)								
USEPA NAAQS ($\mu g/m^3$)		CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
		1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
		40,000	10,000	100	1300	365	80	150	35	15
Arrival Curb	Arr Curb	14,183.15	3,187.09	44.46	119.20	49.19	6.87	10.81	10.12	1.94
Gahanna East	60	6,051.49	1,209.68	1.65	24.91	3.98	0.21	2.25	2.07	0.08
Gahanna North	120/G-1	4,785.38	1,378.02	4.00	27.88	6.09	0.47	2.34	2.20	0.20
Mifflin South	118/MIF-2	2,482.70	642.62	2.69	15.67	2.56	0.14	2.12	1.93	0.07
Whitehall	123/W-1	4,093.89	650.39	1.79	17.63	5.48	0.33	1.43	1.37	0.11
Gahanna West	53	4,333.58	932.91	3.32	27.41	5.46	0.39	2.62	2.45	0.16
Airport South	32	4,478.00	1,060.81	5.64	28.68	6.78	0.91	2.78	2.66	0.31
Airport Northwest	11	3,932.82	730.88	5.53	18.20	3.82	0.21	1.29	1.18	0.14
Mifflin North	119/MIF-1	4,290.44	585.75	4.10	10.35	2.88	0.11	0.95	0.81	0.07
Golf Course		6,596.34	963.02	1.58	28.38	4.17	0.25	2.15	1.98	0.08

Note: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

[1] Receptors are identified by descriptive locations indicating position in relation to Airport property, communities surrounding the Airport, and by the receptor identification code names as shown on Exhibit 5.5-1 and Exhibit 5.5-2. If the receptor name used in computer modeling is different, that identification name is also given.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.

2012 Alternative C3b Emission Inventory: The emission inventory is summarized in **Table 5.5-11**. The data shows the greatest overall emission contribution comes from GSE and APU operations, which represent 36.25 percent of total emissions under this alternative. The second-greatest source of overall emissions is aircraft, which contributes 35.11 percent. The remaining 28.64 percent of total emissions comes from sources accessing Airport-related parking lots, garages, roadways, and the operation of stationary sources, such as fuel storage tanks, boilers, incinerators, emergency generators, and painting operations.

Table 5.5-11
2012 ALTERNATIVE C3b EDMS EMISSION INVENTORY OF CRITERIA AND PRECURSOR POLLUTANTS
Port Columbus International Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	825.93	73.21	324.64	29.67	61.78	61.78	**1,377.01**
GSE/APUs	1,280.03	49.60	73.80	10.62	3.91	3.77	**1,421.72**
Roadways	690.99	48.42	68.03	0.53	2.22	1.29	**811.48**
Parking Facilities	170.88	25.33	22.18	0.08	0.35	0.20	**219.02**
Stationary Sources	21.45	14.11	35.76	16.64	2.49	2.20	**92.65**
TOTAL	**2,989.28**	**210.67**	**524.41**	**57.54**	**70.74**	**69.25**	**3,921.88**

Notes: GSE is ground support equipment. APUs are auxiliary power units. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Emissions values of $PM_{2.5}$ for aircraft were supplemented by using $PM_{2.5}$ emission data from the USEPA AP-42. Totals may not calculate exactly due to rounding.

Sources: *EDMS Version 4.5*, 2006, FAA.
Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (AP-42), Table II-1-9, January 1991, USEPA.
Landrum & Brown analysis, 2007.

The emission inventory for this alternative reflects a net increase in the average taxi time as compared to the 2012 Alternative A. The net increase in taxi time results from runway use prescribed under Noise Abatement Scenario B. Emissions under this alternative increase 0.42 percent over the 2012 Alternative A.

2012 Alternative C3b Construction Emissions: Construction emissions under this alternative would be the same as the 2012 Alternative C3a.

***2012 Alternative C3b Dispersion Analysis*:** The maximum concentrations projected through dispersion analysis are summarized in **Table 5.5-12**. Refer to Exhibit 5.5-1 and Exhibit 5.5-2 for the dispersion receptor locations used for this alternative. For each pollutant-averaging period, the maximum concentration was found to occur at the arrival curb. All modeled concentration values summarized in Table 5.5-12 are below the NAAQS.

Table 5.5-12
2012 ALTERNATIVE C3b EDMS POLLUTANT DISPERSION ANALYSIS OF CRITERIA POLLUTANTS
Port Columbus International Airport

AIR QUALITY STANDARDS AND RECEPTORS[1]		MODELED POLLUTANT CONCENTRATIONS BY NAAQS AVERAGING PERIODS ($\mu g/m^3$)								
USEPA NAAQS ($\mu g/m^3$)		CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
		1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
		40,000	10,000	100	1300	365	80	150	35	15
Arrival Curb	Arr Curb	14,183.94	3,185.44	44.28	119.19	49.18	6.85	10.81	10.12	1.92
Gahanna East	60	6,042.60	1,204.73	1.61	24.73	3.94	0.21	2.24	2.06	0.08
Gahanna North	120/G-1	4,778.28	1,371.61	3.95	27.68	6.01	0.47	2.32	2.18	0.19
Mifflin South	118/MIF-2	2,487.88	642.14	2.72	15.78	2.59	0.15	2.12	1.92	0.07
Whitehall	123/W-1	4,047.88	641.83	1.75	17.43	5.41	0.33	1.37	1.31	0.10
Gahanna West	53	4,322.62	924.36	3.29	27.29	5.44	0.39	2.60	2.43	0.16
Airport South	32	4,407.13	1,052.13	5.51	28.22	6.61	0.89	2.65	2.53	0.30
Airport Northwest	11	3,928.02	725.97	5.58	18.21	3.79	0.22	1.28	1.17	0.14
Mifflin North	119/MIF-1	4,266.32	582.73	4.12	10.38	2.86	0.11	0.94	0.80	0.07
Golf Course		6,598.50	963.25	1.53	28.33	4.14	0.24	2.11	1.94	0.07

Note: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

[1] Receptors are identified by descriptive locations indicating position in relation to Airport property, communities surrounding the Airport, and by the receptor identification code names as shown on Exhibit 5.5-1 and Exhibit 5.5-2. If the receptor name used in computer modeling is different, that identification name is also given.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.

5.5.2 FUTURE CONDITIONS: 2018

A summary of the analysis of the emission inventories prepared for the 2018 alternatives is included in the following sections, including the Sponsor's Proposed Project (Alternative C3b). The results of the dispersion analysis are summarized following the presentation of the results of the emissions inventory for each alternative.

5.5.2.1 2018 Alternative A

The following paragraphs provide a summary of the results of the computer modeling to estimate air emissions resulting from the operation of the Airport under 2018 Alternative A and includes the results of dispersion analysis for this alternative. The emission inventory prepared for the 2018 Alternative A is the baseline against which all other 2018 alternatives are evaluated.

Airfield Configuration: The Airport layout would be as described for 2012 Alternative A.

Aircraft Activity Levels and Fleet Mix Characteristics: The 2018 aircraft operations are based on the aviation forecast prepared for the 2007 Part 150 Study Update[6] as presented in Appendix C, *Aviation Activity Forecast*.

Other Mobile Sources and Stationary Sources: The type and location of other mobile sources and stationary sources considered in the air quality modeling analysis would be the same as described for the 2012 Alternative A. Fuel and solvent throughput for these sources increase relative to the increase in aircraft operations in 2018, which would occur regardless of the Sponsor's Proposed Project.

Computer Modeling: The procedures and methodologies used for calculation of the criteria and precursor emission inventories under the 2018 alternatives would be the same as described for the 2012 Alternative A. Likewise, the receptors evaluated for the dispersion analysis would be the same for the 2018 alternatives as those given for 2012 Alternative A.

***2018 Alternative A Emission Inventory*:** The emission inventory is summarized in **Table 5.5-13**. The data shows the greatest overall emission contribution comes from GSE and APU operations, which represent 39.16 percent of total emissions under this alternative. The second-greatest source of overall emissions is aircraft, which contributes 34.29 percent. The remaining 26.55 percent of total emissions comes from sources accessing Airport-related parking lots, garages, roadways, and the operation of stationary sources, such as fuel storage tanks, boilers, incinerators, emergency generators, and painting operations. The emission inventory summarized in Table 5.5-13 represents the baseline against which each of the other 2018 alternatives were compared.

[6] *Draft 2007 14 CFR Part 150 Noise Compatibility Study Update for the Port Columbus International Airport*, July, 2007. The FAA Record of Approval is anticipated in 2008.

Table 5.5-13
2018 ALTERNATIVE A EDMS EMISSION INVENTORY OF CRITERIA AND PRECURSOR POLLUTANTS
Port Columbus International Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	835.89	73.64	377.42	34.08	61.97	61.97	**1,444.97**
GSE/APUs	1,491.13	56.93	79.99	12.15	5.01	4.83	**1,650.05**
Roadways	673.18	36.02	43.41	0.63	2.06	1.03	**756.33**
Parking Facilities	212.17	30.15	26.25	0.11	0.37	0.18	**269.24**
Stationary Sources	21.45	14.67	35.76	16.64	2.49	2.20	**93.21**
TOTAL	**3,233.83**	**211.41**	**562.83**	**63.61**	**71.91**	**70.22**	**4,213.81**

Notes: GSE is ground support equipment. APUs are auxiliary power units. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Emissions values of $PM_{2.5}$ for aircraft were supplemented by using $PM_{2.5}$ emission data from the USEPA AP-42. Totals may not calculate exactly due to rounding.

Sources: *EDMS Version 4.5*, 2006, FAA.
Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (AP-42), Table II-1-9, January 1991, USEPA.
Landrum & Brown analysis, 2007.

***2018 Alternative A Dispersion Analysis*:** The maximum concentrations projected through dispersion analysis are summarized in **Table 5.5-14**. For each pollutant-averaging period, the maximum concentration was found to occur at the arrival curb. All modeled concentration values summarized in Table 5.5-14 are below the NAAQS.

5.5.2.2 2018 Alternative C2a: Relocate Runway 10R/28L 800 Feet to the South and Construct Midfield Terminal (T2) – Noise Abatement Scenario A

The following paragraphs provide a summary of the results of the computer modeling to estimate air emissions resulting from the operation of the Airport under 2018 Alternative C2a, and includes the results of dispersion analysis.

Airfield Configuration: Alternative C2a includes a replacement runway located 800 feet south of existing Runway 10R/28L and is as described under 2012 Alternative C2a.

Aircraft Activity Levels and Fleet Mix Characteristics: The number of annual aircraft operations and fleet mix characteristics would be the same for this alternative as those described for 2018 Alternative A.

Table 5.5-14
2018 ALTERNATIVE A EDMS POLLUTANT DISPERSION ANALYSIS OF CRITERIA POLLUTANTS
Port Columbus International Airport

AIR QUALITY STANDARDS AND RECEPTORS[1]		MODELED POLLUTANT CONCENTRATIONS BY NAAQS AVERAGING PERIODS ($\mu g/m^3$)								
USEPA NAAQS ($\mu g/m^3$)		CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
		1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
		40,000	10,000	100	1300	365	80	150	35	15
Arrival Curb	Arr Curb	17,126.14	3,781.22	46.31	125.25	52.29	7.81	13.60	12.83	2.46
Gahanna East	60	7,176.38	1,410.20	1.82	28.88	4.66	0.25	2.91	2.71	0.11
Gahanna North	120/G-1	5,742.35	1,637.48	4.33	32.60	7.27	0.58	3.06	2.90	0.26
Mifflin South	118/MIF-2	2,892.36	740.95	2.30	17.98	3.09	0.18	2.80	2.58	0.08
Whitehall	123/W-1	4,867.54	779.90	1.88	20.78	6.37	0.39	1.82	1.75	0.14
Gahanna West	53	5,167.48	1,087.37	3.55	31.41	6.44	0.47	3.41	3.22	0.21
Airport South	32	5,276.57	1,244.83	5.51	33.41	7.68	1.02	3.45	3.31	0.37
Airport Northwest	11	4,793.50	817.85	4.74	21.93	4.62	0.27	1.75	1.63	0.16
Mifflin North	119/MIF-1	4,824.81	657.44	4.23	13.23	3.66	0.14	1.31	1.14	0.08
Golf Course		7,792.86	1,138.92	1.83	34.69	5.01	0.30	3.75	3.56	0.11

Notes: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

[1] Receptors are identified by descriptive locations indicating position in relation to Airport property, communities surrounding the Airport, and by the receptor identification code names as shown on Exhibit 5.5-1 and Exhibit 5.5-3. If the receptor name used in computer modeling is different, that identification name is also given.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.

Other Mobile Sources and Stationary Sources: All of the 2018 alternatives, except Alternative A, include the proposed midfield passenger terminal and parking garage. In addition, there would be modifications to International Gateway to provide ingress and egress for a proposed parking garage and the development of arrival and departure curbs for the proposed midfield terminal. The alternatives also include changes to the location and use of parking lots. The alternatives include a proposed heating, ventilating, and air conditioning (HVAC) plant adjacent to the proposed garage. The remaining sources of emissions such as fuel storage tanks, emergency generators, and painting operations would not change under the 2018 alternatives as compared to the 2018 Alternative A.

2018 Alternative C2a Emission Inventory: The emission inventory is summarized in **Table 5.5-15**. The data shows the greatest overall emission contribution comes from GSE and APU operations, which represent 39.04 percent of total emissions under this alternative. The second-greatest source of overall emissions is aircraft, which contributes 34.74 percent. The remaining 26.22 percent of total emissions comes from sources accessing Airport-related parking lots, garages, roadways, and the operation of stationary sources, such as fuel storage tanks, boilers, incinerators, emergency generators, and painting operations.

The emission inventory for this alternative reflects an increase in the average taxi time as compared to the 2018 Alternative A. The increase in average taxi time results from the additional time required for aircraft to traverse the additional 800 feet to reach the replacement runway. Emissions under this alternative increase 0.31 percent over the 2018 Alternative A.

2018 Alternative C2a Construction Emissions: The inventory of construction emissions is summarized in **Table 5.5-16**. The data shows CO to be the most prominent pollutant caused by the operation of construction equipment. CO emissions reflect 41.08 percent of emissions from the total ten-year project. Emissions of NO_x would constitute 36.35 percent, VOCs would be 5.61 percent, and $PM_{2.5}$ emissions account for 1.56 percent. The remaining 15.39 percent would consist of SO_x and PM_{10} emissions.

Table 5.5-15
2018 ALTERNATIVE C2a EDMS EMISSION INVENTORY OF CRITERIA AND PRECURSOR POLLUTANTS
Port Columbus International Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	854.67	76.14	379.09	34.48	62.01	62.01	**1,468.39**
GSE/APUs	1,491.12	56.91	80.00	12.17	5.01	4.84	**1,650.05**
Roadways	653.00	36.43	42.16	0.61	2.03	1.01	**735.25**
Parking Facilities	218.55	32.38	28.37	0.11	0.36	0.18	**279.95**
Stationary Sources	21.45	14.67	35.76	16.64	2.49	2.20	**93.21**
TOTAL	**3,238.80**	**216.53**	**565.38**	**64.01**	**71.90**	**70.24**	**4,226.84**

Notes: GSE is ground support equipment. APUs are auxiliary power units. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Emissions values of $PM_{2.5}$ for aircraft were supplemented by using $PM_{2.5}$ emission data from the USEPA AP-42. Totals may not calculate exactly due to rounding.

Sources: *EDMS Version 4.5*, 2006, FAA.
Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (AP-42), Table II-1-9, January 1991, USEPA.
Landrum & Brown analysis, 2007.

Table 5.5-16
2018 ALTERNATIVE C2a and C2b CONSTRUCTION EMISSIONS INVENTORY
Port Columbus International Airport

CONSTRUCTION YEARS	ANNUAL NET EMISSIONS (tons per year)						
	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$	TOTAL
2009	11.80	1.92	13.22	4.21	0.70	0.70	**32.54**
2010	15.59	2.32	16.01	5.64	0.92	0.92	**41.40**
2011	27.98	4.18	28.86	10.34	1.65	1.65	**74.66**
2012	25.77	3.85	26.53	9.50	0.50	0.50	**66.64**
2013	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
2014	0.55	0.09	0.61	0.17	0.03	0.03	**1.49**
2015	3.23	0.31	1.53	0.94	0.06	0.06	**6.13**
2016	4.48	0.65	3.94	1.10	0.14	0.14	**10.45**
2017	17.61	1.86	9.78	5.02	0.37	0.37	**35.00**
2018	17.44	1.84	9.63	4.98	0.36	0.36	**34.60**
TOTAL	**124.45**	**17.01**	**110.12**	**41.90**	**4.73**	**4.73**	**302.93**

Notes: CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Totals may not calculate exactly due to rounding.

Source: *Landrum & Brown analysis*, 2007.

2018 Alternative C2a Dispersion Analysis*:** The maximum concentrations projected through dispersion analysis are summarized in **Table 5.5-17**. The terminal area receptor locations applied for the 2018 alternatives, except Alternative A, are shown in **Exhibit 5.5-3, *2018 Project Alternatives Terminal Area Dispersion Receptor Locations. The Airport and community sensitive receptor locations used for the 2018 alternatives, except Alternative A, would be the same as shown in Exhibit 5.5-1. A total of 65 receptors, including 22 receptors in the terminal area, were applied in dispersion modeling for the 2018 alternatives, except Alternative A. For each pollutant-averaging period, the maximum concentration was found to occur at the existing passenger terminal arrival curb. Although the arrival and departure curbs adjacent to the proposed midfield passenger terminal were included in the modeling, the concentrations at the existing passenger terminal remained the highest. All modeled concentration values summarized in Table 5.5-17 are below the NAAQS.

5.5.2.3 2018 Alternative C2b: Relocate Runway 10R/28L 800 Feet to the South and Construct Midfield Terminal (T2) – Noise Abatement Scenario B

The following paragraphs provide a summary of the results of the computer modeling to estimate air emissions resulting from the operation of the Airport under 2018 Alternative C2b, and includes the results of dispersion analysis.

Airfield Configuration: Alternative C2b includes a replacement runway located 800 feet south of existing Runway 10R/28L. The airfield layout would be the same as that described under the 2018 Alternative C2a.

Aircraft Activity Levels and Fleet Mix Characteristics: The number of annual aircraft operations and fleet mix characteristics would be the same for this alternative as those described for 2018 Alternative A.

Other Mobile Sources and Stationary Sources: Assessment of mobile and stationary sources for Alternative C2b would be the same as described for 2018 Alternative A.

Noise Abatement Scenario B: This alternative includes the noise abatement measures recommended in the 2007 Part 150 Study. These measures would increase aircraft taxi time because the recommendations result in an increase in the use of east flow (Runways 10R/10L).

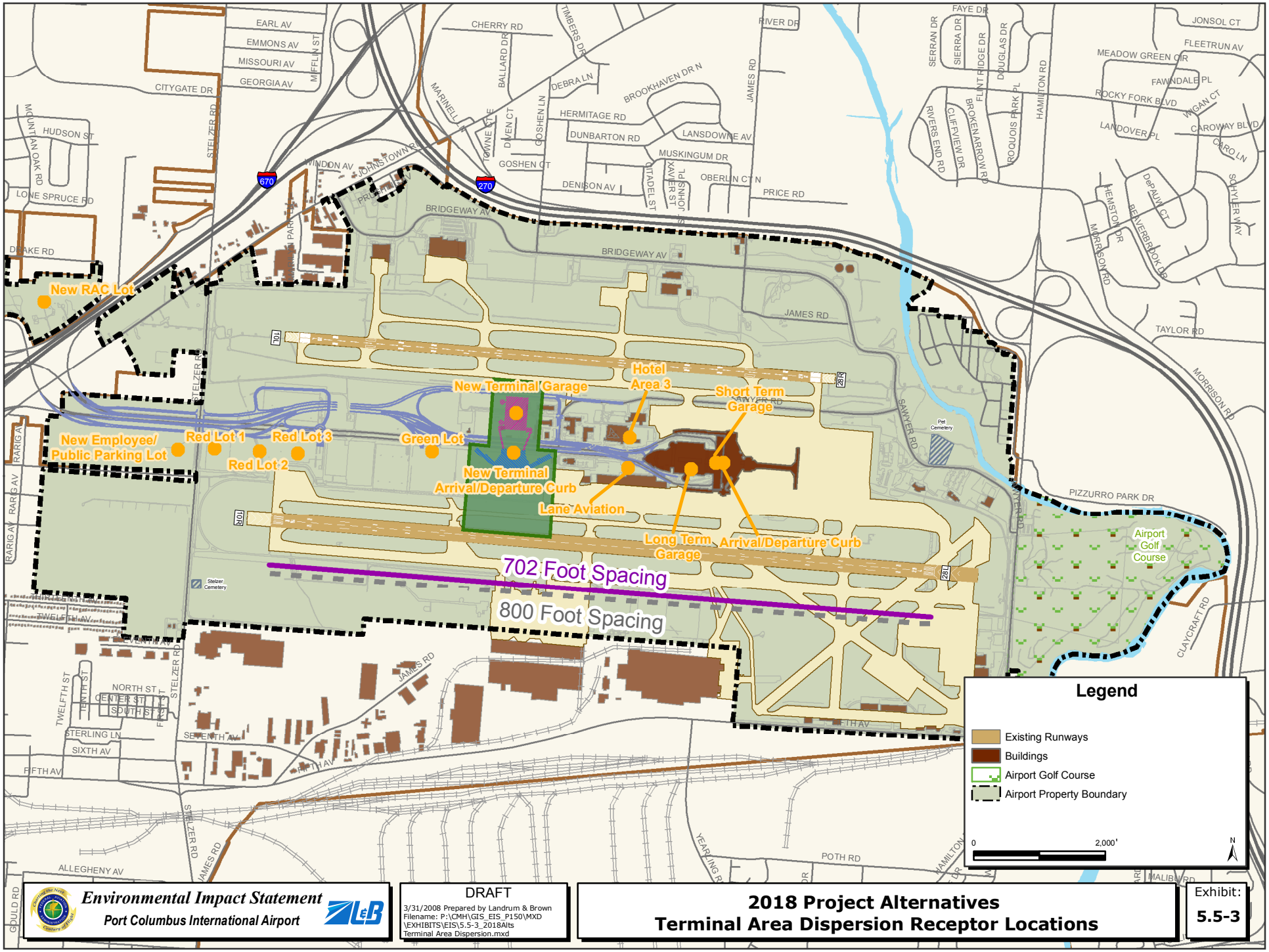
New RAC Lot
New Employee/
Public Parking Lot
Red Lot 1
Red Lot 2
Red Lot 3
Green Lot
New Terminal Garage
New Terminal
Arrival/Departure Curb
Hotel
Area 3
Short Term
Garage
Lane Aviation
Long Term
Garage
Arrival/Departure Curb
702 Foot Spacing
800 Foot Spacing
Airport
Golf
Course
Legend
Existing Runways
Buildings
Airport Golf Course
Airport Property Boundary
0
2,000'
N
Environmental Impact Statement
Port Columbus International Airport
DRAFT
3/31/2008 Prepared by Landrum & Brown
Filename: P:\CMH\GIS_EIS_P150\MXD
\EXHIBITS\EIS\5.5-3_2018Alts
Terminal Area Dispersion.mxd
2018 Project Alternatives
Terminal Area Dispersion Receptor Locations
Exhibit:
5.5-3

Table 5.5-17
2018 ALTERNATIVE C2a EDMS POLLUTANT DISPERSION ANALYSIS OF CRITERIA POLLUTANTS
Port Columbus International Airport

AIR QUALITY STANDARDS AND RECEPTORS[1]		MODELED POLLUTANT CONCENTRATIONS BY NAAQS AVERAGING PERIODS ($\mu g/m^3$)								
USEPA NAAQS ($\mu g/m^3$)		CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
		1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
		40,000	10,000	100	1300	365	80	150	35	15
Arrival Curb	Arr Curb	14,883.11	3,074.24	35.02	116.44	47.59	6.53	10.89	10.17	2.00
Gahanna East	60	5,921.03	1,240.14	1.64	24.59	3.99	0.23	2.41	2.22	0.10
Gahanna North	120/G-1	4,151.40	1,186.06	3.81	27.28	5.99	0.52	2.52	2.39	0.24
Mifflin South	118/MIF-2	3,119.97	783.05	2.73	18.87	3.67	0.20	2.98	2.77	0.10
Whitehall	123/W-1	3,519.09	574.77	1.90	17.67	5.56	0.38	1.49	1.43	0.13
Gahanna West	53	3,733.43	835.48	3.23	26.43	5.66	0.44	2.90	2.73	0.20
Airport South	32	3,793.04	915.22	6.36	26.06	6.58	1.06	2.94	2.79	0.39
Airport Northwest	11	3,572.01	994.35	4.81	17.33	4.13	0.28	1.35	1.23	0.16
Mifflin North	119/MIF-1	4,698.59	694.04	4.47	9.64	3.15	0.15	1.17	1.01	0.09
Golf Course		6,678.00	975.89	1.73	28.53	4.28	0.28	3.44	3.25	0.10

Notes: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

[1] Receptors are identified by descriptive locations indicating position in relation to Airport property, communities surrounding the Airport, and by the receptor identification code names as shown on Exhibit 5.5-1 and Exhibit 5.5-3. If the receptor name used in computer modeling is different, that identification name is also given.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.

2018 Alternative C2b Emission Inventory: The emission inventory is summarized in **Table 5.5.18**. The data shows the greatest overall emission contribution comes from GSE and APU operations, which represent 39.00 percent of total emissions under this alternative. The second-greatest source of overall emissions is aircraft, which contributes 34.80 percent. The remaining 26.20 percent of total emissions comes from sources accessing Airport-related parking lots, garages, roadways, and the operation of stationary sources, such as fuel storage tanks, boilers, incinerators, emergency generators, and painting operations. Emissions from roadways, parking garages and parking lots, and stationary sources are expected to remain the same for all of the 2018 alternatives.

The emission inventory for this alternative reflects the increase in the average aircraft taxi time as compared to the 2018 Alternative A. The increase in taxi time results from runway use prescribed under Noise Abatement Scenario B. Emissions under this alternative increase 0.41 percent over the 2018 Alternative A.

2018 Alternative C2b Construction Emissions: Construction emissions under this alternative would be the same as given for 2018 Alternative C2a.

***2018 Alternative C2b Dispersion Analysis*:** The maximum concentrations projected through dispersion analysis are summarized in **Table 5.5-19**. Refer to Exhibit 5.5-1 and Exhibit 5.5-3 for the dispersion receptor locations used for this alternative. For each pollutant-averaging period, the maximum concentration was found to occur at the existing passenger terminal arrival curb. Although the arrival and departure curbs adjacent to the proposed midfield passenger terminal were included in the modeling, the concentrations at the existing passenger terminal remained the highest. All modeled concentration values summarized in Table 5.5-19 are below the NAAQS.

5.5.2.4 2018 Alternative C3a: Relocate Runway 10R/28L 702 Feet to the South and Construct Midfield Terminal (T2) – Noise Abatement Scenario A

The following paragraphs provide a summary of the results of the computer modeling to estimate air emissions resulting from the operation of the Airport under 2018 Alternative C3a, and includes the results of dispersion analysis for this alternative.

Airfield Configuration: Alternative C3a includes a replacement runway located 702 feet south of existing Runway 10R/28L. The airfield layout would be the same as that described under 2012 Alternative C3a.

Table 5.5-18
2018 ALTERNATIVE C2b EDMS EMISSION INVENTORY OF CRITERIA AND PRECURSOR POLLUTANTS
Port Columbus International Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	857.92	76.58	379.41	34.54	62.02	62.02	**1,472.50**
GSE/APUs	1,491.07	56.91	79.98	12.16	5.01	4.85	**1,649.98**
Roadways	653.00	36.43	42.16	0.61	2.03	1.01	**735.25**
Parking Facilities	218.55	32.38	28.37	0.11	0.36	0.18	**279.95**
Stationary Sources	21.45	14.67	35.76	16.64	2.49	2.20	**93.21**
TOTAL	**3,242.00**	**216.98**	**565.68**	**64.07**	**71.91**	**70.27**	**4,230.89**

Notes: GSE is ground support equipment. APUs are auxiliary power units. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Emissions values of $PM_{2.5}$ for aircraft were supplemented by using $PM_{2.5}$ emission data from the USEPA AP-42. Totals may not calculate exactly due to rounding.

Sources: *EDMS Version 4.5*, 2006, FAA.
Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (AP-42), Table II-1-9, January 1991, USEPA.
Landrum & Brown analysis, 2007.

Aircraft Activity Levels and Fleet Mix Characteristics: The number of annual aircraft operations and fleet mix characteristics would be the same for this alternative as that described for 2018 Alternative A.

Other Mobile Sources and Stationary Sources: Assessment of mobile and stationary sources for Alternative C2b would be the same as described for 2018 Alternative A.

2018 Alternative C3a Emission Inventory: The emission inventory is summarized in **Table 5.5-20**. The data shows the greatest overall emission contribution comes from GSE and APU operations, which represent 39.08 percent of total emissions under this alternative. The second-greatest source of overall emissions is aircraft, which contributes 34.67 percent. The remaining 26.25 percent of total emissions comes from sources accessing Airport-related parking lots, garages, roadways, and the operation of stationary sources, such as fuel storage tanks, boilers, incinerators, emergency generators, and painting operations. Emissions from roadways, parking garages and parking lots, and stationary sources are expected to remain the same for all of the 2018 alternatives.

Table 5.5-19
2018 ALTERNATIVE C2b EDMS POLLUTANT DISPERSION ANALYSIS OF CRITERIA POLLUTANTS
Port Columbus International Airport

AIR QUALITY STANDARDS AND RECEPTORS[1]		MODELED POLLUTANT CONCENTRATIONS BY NAAQS AVERAGING PERIODS ($\mu g/m^3$)								
USEPA NAAQS ($\mu g/m^3$)		CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
		1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
		40,000	10,000	100	1300	365	80	150	35	15
Arrival Curb	Arr Curb	14,886.76	3,075.19	34.92	116.43	47.57	6.52	10.88	10.16	2.00
Gahanna East	60	5,909.94	1,237.51	1.61	24.57	3.98	0.23	2.41	2.22	0.10
Gahanna North	120/G-1	4,137.34	1,182.41	3.77	27.07	5.93	0.52	2.50	2.36	0.24
Mifflin South	118/MIF-2	3,131.17	786.16	2.76	19.04	3.71	0.20	3.01	2.79	0.10
Whitehall	123/W-1	3,510.15	572.15	1.86	17.50	5.52	0.38	1.48	1.42	0.13
Gahanna West	53	3,721.41	834.06	3.20	26.29	5.64	0.44	2.87	2.70	0.20
Airport South	32	3,787.89	915.15	6.24	25.99	6.55	1.05	2.92	2.78	0.39
Airport Northwest	11	3,571.88	995.05	4.84	17.32	4.12	0.28	1.34	1.22	0.16
Mifflin North	119/MIF-1	4,691.35	695.42	4.48	9.65	3.15	0.15	1.17	1.02	0.09
Golf Course		6,675.96	975.56	1.69	28.64	4.30	0.28	3.43	3.23	0.10

Notes: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

[1] Receptors are identified by descriptive locations indicating position in relation to Airport property, communities surrounding the Airport, and by the receptor identification code names as shown on Exhibit 5.5-1 and Exhibit 5.5-3. If the receptor name used in computer modeling is different, that identification name is also given.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.

Table 5.5-20
2018 ALTERNATIVE C3a EDMS EMISSION INVENTORY OF CRITERIA AND PRECURSOR POLLUTANTS
Port Columbus International Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	851.00	75.66	378.76	34.41	62.00	62.00	**1,463.82**
GSE/APUs	1,491.12	56.91	80.00	12.17	5.01	4.84	**1,650.05**
Roadways	653.00	36.43	42.16	0.61	2.03	1.01	**735.25**
Parking Facilities	218.55	32.38	28.37	0.11	0.36	0.18	**279.95**
Stationary Sources	21.45	14.67	35.76	16.64	2.49	2.20	**93.21**
TOTAL	**3,235.12**	**216.05**	**565.05**	**63.93**	**71.89**	**70.24**	**4,222.28**

Notes: GSE is ground support equipment. APUs are auxiliary power units. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Emissions values of $PM_{2.5}$ for aircraft were supplemented by using $PM_{2.5}$ emission data from the USEPA AP-42. Totals may not calculate exactly due to rounding.

Sources: *EDMS Version 4.5*, 2006, FAA.
Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (AP-42), Table II-1-9, January 1991, USEPA.
Landrum & Brown analysis, 2007.

The emission inventory for this alternative reflects a net increase in the average taxi time as compared to the 2018 Alternative A. However, the average taxi and delay time would be less than that projected for either 2018 Alternative C2a or Alternative C2b because this alternative places the proposed new runway 98 feet closer to the existing Runway 10R/28L position – a 702-foot separation versus the 800-foot separation under the C2 alternatives. The shorter taxi distance accounts for the decrease in average taxi time as compared to 2018 Alternative C2a. Emissions under this alternative increase 0.20 percent over the 2018 Alternative A.

2018 Alternative C3a Construction Emissions: The inventory of construction emissions is summarized in **Table 5.5-21**. The data shows CO to be the most prominent pollutant caused by the operation of construction equipment. CO emissions reflect 40.97 percent of emissions from the total ten-year project. Emissions of NO_x would constitute 35.93 percent of total project emissions, 5.56 percent would be VOCs, and 1.88 percent would be $PM_{2.5}$ emissions. The remaining 15.66 percent would consist of SO_x and PM_{10} emissions.

Table 5.5-21
2018 ALTERNATIVE C3a AND C3b CONSTRUCTION EMISSIONS INVENTORY
Port Columbus International Airport

CONSTRUCTION YEARS	ANNUAL NET EMISSIONS (tons per year)						
	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$	TOTAL
2009	11.77	1.91	13.19	4.20	0.69	0.69	**32.45**
2010	14.89	2.22	15.31	5.39	0.88	0.88	**39.56**
2011	27.58	4.12	28.41	10.20	1.63	1.63	**73.56**
2012	25.51	3.81	26.26	9.40	1.50	1.50	**67.99**
2013	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
2014	0.55	0.09	0.61	0.17	0.03	0.03	**1.49**
2015	3.23	0.31	1.53	0.94	0.06	0.06	**6.13**
2016	4.48	0.65	3.94	1.10	0.14	0.14	**10.45**
2017	17.61	1.86	9.78	5.02	0.37	0.37	**35.00**
2018	17.44	1.84	9.63	4.98	0.36	0.36	**34.60**
TOTAL	**123.04**	**16.80**	**108.67**	**41.39**	**5.67**	**5.67**	**301.23**

Notes: CO is carbon monoxide, VOC are volatile organic compounds, NO_X is nitrogen oxides, SO_X is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Totals may not calculate exactly due to rounding.

Source: *Landrum & Brown analysis*, 2007.

***2018 Alternative C3a Dispersion Analysis*:** The maximum concentrations projected through dispersion analysis are summarized in **Table 5.5-22**. Refer to Exhibits 5.5-1 and 5.5-3 for the dispersion receptor locations used for this alternative. For each pollutant-averaging period, the maximum concentration was found to occur at the existing passenger terminal arrival curb. Although the arrival and departure curbs adjacent to the proposed midfield passenger terminal were included in the modeling, the concentrations at the existing passenger terminal remained the highest. All modeled concentration values summarized in Table 5.5-22 are below the NAAQS.

5.5.2.5 2018 Alternative C3b: Relocate Runway 10R/28L 702 Feet to the South and Construct Midfield Terminal (T2) – Noise Abatement Scenario B (Sponsor's Proposed Project)

The following paragraphs provide a summary of the results of computer modeling to estimate air emissions resulting from the operation of the Airport under 2018 Alternative C3b, and includes the results of dispersion analysis for this alternative.

Airfield Configuration: Alternative C3b includes a replacement runway located 702 feet south of existing Runway 10R/28L. The airfield layout would be the same as that described under the 2012 Alternative C3a.

Table 5.5-22
2018 ALTERNATIVE C3a EDMS POLLUTANT DISPERSION ANALYSIS OF CRITERIA POLLUTANTS
Port Columbus International Airport

AIR QUALITY STANDARDS AND RECEPTORS[1]		MODELED POLLUTANT CONCENTRATIONS BY NAAQS AVERAGING PERIODS ($\mu g/m^3$)								
USEPA NAAQS ($\mu g/m^3$)		CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
		1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
		40,000	10,000	100	1300	365	80	150	35	15
Arrival Curb	Arr Curb	14,869.45	3,072.72	35.20	116.45	47.59	6.56	10.89	10.17	2.02
Gahanna East	60	5,913.73	1,239.03	1.65	24.90	4.04	0.23	2.41	2.22	0.10
Gahanna North	120/G-1	4,150.97	1,193.26	3.83	27.29	6.04	0.53	2.53	2.39	0.24
Mifflin South	118/MIF-2	3,110.95	783.76	2.76	18.88	3.67	0.20	2.98	2.77	0.10
Whitehall	123/W-1	3,593.13	585.81	1.90	17.70	5.63	0.39	1.57	1.51	0.14
Gahanna West	53	3,738.71	849.78	3.24	26.43	5.66	0.44	2.90	2.72	0.20
Airport South	32	3,907.62	930.53	6.30	26.81	6.85	1.09	3.11	2.98	0.41
Airport Northwest	11	3,572.01	998.72	4.82	17.35	4.20	0.28	1.36	1.24	0.16
Mifflin North	119/MIF-1	4,730.76	697.21	4.47	9.64	3.19	0.15	1.18	1.03	0.09
Golf Course		6,678.53	976.01	1.76	28.89	4.37	0.28	3.49	3.30	0.11

Notes: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

[1] Receptors are identified by descriptive locations indicating position in relation to Airport property, communities surrounding the Airport, and by the receptor identification code names as shown on Exhibit 5.5-1 and Exhibit 5.5-3. If the receptor name used in computer modeling is different, that identification name is also given.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.

Aircraft Activity Levels and Fleet Mix Characteristics: The number of annual aircraft operations and fleet mix characteristics would be the same for this alternative as that described for 2018 Alternative A.

Other Mobile Sources and Stationary Sources: Assessment of mobile and stationary sources for this alternative would be the same as described for 2018 Alternative C2a.

Noise Abatement Scenario B: This alternative includes the noise abatement measures recommended in the 2007 Part 150 Study. These measures would increase aircraft taxi time because the recommendations result in an increase in the use of east flow (Runways 10R/10L).

2018 Alternative C3b Emission Inventory: The emission inventory is summarized in **Table 5.5-23**. The data shows the greatest overall emission contribution comes from GSE and APU operations, which represent 39.04 percent of total emissions under this alternative. The second-greatest source of overall emissions is aircraft, which contributes 34.73 percent. The remaining 26.23 percent of total emissions comes from sources accessing Airport-related parking lots, garages, and roadways, and the operation of stationary sources, such as fuel storage tanks, boilers, incinerators, emergency generators, and painting operations.

The emission inventory for this alternative reflects a net increase in average taxi time as compared to the 2018 Alternative A. The net increase in taxi time results from runway use prescribed under Noise Abatement Scenario B. Emissions under this alternative increase 0.30 percent over the 2018 Alternative A.

2018 Alternative C3b Construction Emissions: Construction emissions under this alternative would be the same as those given for 2018 Alternative C3a.

***2018 Alternative C3b Dispersion Analysis*:** The maximum concentrations projected through dispersion analysis are summarized in **Table 5.5-24**. Refer to Exhibits 5.5-1 and 5.5-3 for the dispersion receptor locations used for this alternative. For each pollutant-averaging period, the maximum concentration was found to occur at the existing passenger terminal arrival curb. Although the arrival and departure curbs adjacent to the proposed midfield passenger terminal were included in the modeling, the concentrations at the existing passenger terminal remained the highest. All modeled concentration values summarized in Table 5.5-24 are below the NAAQS.

Table 5.5-23
2018 ALTERNATIVE C3b EDMS EMISSION INVENTORY OF CRITERIA AND PRECURSOR POLLUTANTS
Port Columbus International Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	854.25	76.09	379.08	34.47	62.01	62.01	**1,467.93**
GSE/APUs	1,491.07	56.91	79.98	12.16	5.01	4.85	**1,649.98**
Roadways	653.00	36.43	42.16	0.61	2.03	1.01	**735.25**
Parking Facilities	218.55	32.38	28.37	0.11	0.36	0.18	**279.95**
Stationary Sources	21.45	14.67	35.76	16.64	2.49	2.20	**93.21**
TOTAL	**3,238.32**	**216.49**	**565.35**	**64.00**	**71.90**	**70.25**	**4,226.31**

Notes: GSE is ground support equipment. APUs are auxiliary power units. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Emissions values of $PM_{2.5}$ for aircraft were supplemented by using $PM_{2.5}$ emission data from the USEPA AP-42. Totals may not calculate exactly due to rounding.

Sources: *EDMS Version 4.5*, 2006, FAA.
Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (AP-42), Table II-1-9, January 1991, USEPA.
Landrum & Brown analysis, 2007.

Table 5.5-24
2018 ALTERNATIVE C3b EDMS DISPERSION ANALYSIS OF CRITERIA POLLUTANTS
Port Columbus International Airport

AIR QUALITY STANDARDS AND RECEPTORS[1]		MODELED POLLUTANT CONCENTRATIONS BY NAAQS AVERAGING PERIODS ($\mu g/m^3$)								
USEPA NAAQS ($\mu g/m^3$)		CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
		1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
		40,000	10,000	100	1300	365	80	150	35	15
Arrival Curb	Arr Curb	14,874.08	3,073.80	34.76	116.42	47.57	6.53	10.88	10.16	2.02
Gahanna East	60	5,887.46	1,233.75	1.52	24.77	4.00	0.22	2.40	2.22	0.10
Gahanna North	120/G-1	4,135.77	1,189.16	3.63	26.81	5.88	0.51	2.49	2.36	0.24
Mifflin South	118/MIF-2	3,115.78	785.46	2.65	18.71	3.63	0.20	2.99	2.77	0.10
Whitehall	123/W-1	3,583.14	582.31	1.76	17.30	5.52	0.37	1.56	1.50	0.13
Gahanna West	53	3,725.20	848.13	3.08	26.11	5.58	0.43	2.86	2.69	0.20
Airport South	32	3,898.76	929.84	5.83	26.56	6.76	1.06	3.08	2.94	0.40
Airport Northwest	11	3,571.88	1,000.20	4.71	17.24	4.14	0.28	1.34	1.23	0.16
Mifflin North	119/MIF-1	4,722.06	698.53	4.40	9.52	3.12	0.15	1.18	1.02	0.09
Golf Course		6,678.10	975.88	1.59	28.86	4.34	0.27	3.46	3.27	0.10

Notes: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

[1] Receptors are identified by descriptive locations indicating position in relation to Airport property, communities surrounding the Airport, and by the receptor identification code names as shown on Exhibit 5.5-1 and Exhibit 5.5-3. If the receptor name used in computer modeling is different, that identification name is also given.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.

5.5.3 GENERAL CONFORMITY EVALUATION AND SIP COMPLIANCE EVALUATION

Two evaluations were performed with respect to the emission inventories prepared for the alternatives under 2012 and 2018 conditions. These are the General Conformity Evaluation and the SIP Compliance Evaluation. An airport project is subject to the General Conformity regulations when the project is located within a nonattainment area, such as in the case of Franklin County. An evaluation of the inventory comparison is performed to be certain the project's net emissions would not delay timely attainment of the NAAQS as planned in the SIP.

5.5.3.1 General Conformity Evaluation

According to the General Conformity regulations, when the total of direct and indirect emissions (net emissions, which includes construction emissions) due to the proposed action equal or exceed the applicable General Conformity *de minimis* thresholds, a General Conformity Determination is required to demonstrate compliance with the State SIP. Franklin County is included in an area designated by the USEPA as nonattainment for ozone and $PM_{2.5}$ emissions. As such, the pollutants of concern include $PM_{2.5}$, the precursor pollutants for ozone development, NO_x and VOC, and the $PM_{2.5}$ precursor pollutant, SO_x. These four pollutants are the "pollutants of concern" for the CMH EIS and the applicable *de minimis* threshold is 100 tons per year for each pollutant for each alternative. As such, the net emissions increase under each 2012 and 2018 project alternative would be limited to less than 100 tons per year for each of the four pollutants of concern to be compliant under General Conformity. When net emissions are less than the *de minimis* the project is assumed to conform and there would be no potential for adverse air quality impacts.

The data in **Table 5.5-25** show the comparative analysis for purposes of General Conformity. The table includes the net emissions due to construction and the increase in emissions associated with each of the 2012 and 2018 project alternatives. The data in Table 5.5-25 show that none of the CMH project alternatives, including the Sponsor's Proposed Project (Alternative C3b), would cause net emissions that would equal or exceed the applicable *de minimis* threshold for NO_x, VOC, SO_x, or $PM_{2.5}$. Therefore, the CMH Sponsor's Proposed Project is assumed to conform to the Ohio SIP and the project would not have the potential to cause significant adverse air quality impacts in Franklin County. Consequently, a General Conformity Determination is not necessary to demonstrate conformity under the CAA, and the project alternatives are assumed to comply under the Ohio SIP, as long as net emissions are not regionally significant.[7]

[7] *Air Quality Procedures for Civilian Airports & Air Force Bases*, Section 2.1.5, *NAAQS Assessment*, April 1997, FAA.

Table 5.5-25
2012 & 2018 GENERAL CONFORMITY COMPARATIVE ANALYSIS FOR PROJECT AND CONSTRUCTION EMISSIONS
Port Columbus International Airport

CONSTRUCTION YEARS AND PROJECT ALTERNATIVE YEARS	ANNUAL NET EMISSIONS (tons per year)					
	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
2012 C2 ALTERNATIVES						
2009 Construction Emissions	11.80	1.92	13.22	4.21	0.70	0.70
2010 Construction Emissions	15.59	2.32	16.01	5.64	0.92	0.92
2011 Construction Emissions	27.98	4.18	28.86	10.34	1.65	1.65
2012 Construction & Project Emissions						
C2a 2012 Net Emissions	37.25	5.45	27.42	9.71	0.53	0.53
C2b 2012 Net Emissions	41.54	6.05	27.75	9.82	0.53	0.53
2012 C3 ALTERNATIVES						
2009 Construction Emissions	11.77	1.91	13.19	4.20	0.69	0.69
2010 Construction Emissions	14.89	2.22	15.31	5.39	0.88	0.88
2011 Construction Emissions	27.58	4.12	28.41	10.20	1.63	1.63
2012 Construction & Project Emissions						
C3a 2012 Net Emissions	34.02	4.61	27.26	9.56	1.53	1.53
C3b 2012 Net Emissions	38.74	5.65	27.28	9.67	1.53	1.53
2018 C2 ALTERNATIVES						
2009 Construction Emissions	11.80	1.92	13.22	4.21	0.70	0.70
2010 Construction Emissions	15.59	2.32	16.01	5.64	0.92	0.92
2011 Construction Emissions	27.87	4.16	28.71	10.31	1.64	1.64
2012 Construction & Project Emissions						
C2a 2012 Net Emissions	37.25	5.45	27.42	9.71	0.53	0.53
C2b 2012 Net Emissions	41.54	6.05	27.75	9.82	0.53	0.53
2013 Construction Emissions	0.00	0.00	0.00	0.00	0.00	0.00
2014 Construction Emissions	0.55	0.09	0.61	0.17	0.03	0.03
2015 Construction Emissions	3.23	0.31	1.53	0.94	0.06	0.06
2016 Construction Emissions	4.48	0.65	3.94	1.10	0.14	0.14
2017 Construction Emissions	17.61	1.86	9.78	5.02	0.37	0.37
2018 Project Emissions						
C2a 2018 Net Emissions	22.41	6.96	12.18	5.38	0.35	0.38
C2b 2018 Net Emissions	25.61	7.41	12.48	5.44	0.36	0.41

Table 5.5-25, *Continued*
2012 & 2018 GENERAL CONFORMITY COMPARATIVE ANALYSIS FOR PROJECT AND CONSTRUCTION EMISSIONS
Port Columbus International Airport

CONSTRUCTION YEARS AND PROJECT ALTERNATIVE YEARS	ANNUAL NET EMISSIONS (tons per year)					
	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
2018 C3 ALTERNATIVES						
2009 Construction Emissions	11.77	1.91	13.19	4.20	0.69	0.69
2010 Construction Emissions	14.89	2.22	15.31	5.39	0.88	0.88
2011 Construction Emissions	27.58	4.12	28.41	10.20	1.63	1.63
2012 Construction & Project Emissions						
C3a 2012 Net Emissions	34.02	4.61	27.26	9.56	1.53	1.53
C3b 2012 Net Emissions	38.74	5.65	27.28	9.67	1.53	1.53
2013 Construction Emissions	0.00	0.00	0.00	0.00	0.00	0.00
2014 Construction Emissions	0.55	0.09	0.61	0.17	0.03	0.03
2015 Construction Emissions	3.23	0.31	1.53	0.94	0.06	0.06
2016 Construction Emissions	4.48	0.65	3.94	1.10	0.14	0.14
2017 Construction Emissions	17.61	1.86	9.78	5.02	0.37	0.37
2018 Construction & Project Emissions						
C3a 2018 Net Emissions	18.73	6.48	11.85	5.30	0.34	0.38
C3b 2018 Net Emissions	21.93	6.92	12.15	5.37	0.35	0.39

Notes: Data is extracted from tables presented in Section 5.5.1 and 5.5.2. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Totals may not calculate exactly due to rounding.

Source: *Landrum & Brown analysis*, 2007.

Under General Conformity, net emissions due to a Federal action are regionally significant when the net emissions exceed 10 percent of the regional total emissions inventory for a particular criteria pollutant in the nonattainment or maintenance area.[8] The regional emissions inventory for the nonattainment area that includes Franklin County is given in **Table 5.5-26**. The table includes the calculation of the 10-percent limit defining regional significance under General Conformity. An evaluation of the data summarized in Table 5.5-25 as compared to Table 5.5-26 shows that net emissions from all 2012 and 2018 alternatives would be far less than 10 percent of the emission budget given in the TIP. Therefore, the Sponsor's Proposed Project would not be considered regionally significant as given under General Conformity, and the project complies with the plan included in the Ohio SIP to reduce emissions in Franklin County.

Table 5.5-26
MORPC TRANSPORTATION IMPROVEMENT PROGRAM (TIP) AIR QUALITY ANALYSIS FOR THE COLUMBUS OZONE AND $PM_{2.5}$ NONATTAINMENT AREAS

YEAR	ANNUAL BUDGETED EMISSIONS (tons per year)			
DATA FROM THE MAY 2007 TIP REPORT TABLE 10 AND TABLE 15				
YEAR	OZONE EMISSIONS		$PM_{2.5}$ EMISSIONS	
	VOC	NO_X	NO_X	$PM_{2.5}$
2009	26,338	39,615	36,172	583
2018	15,148	17,808	16,298	347
2020	15,148	15,392	13,947	346
2030	15,148	12,094	10,884	367
TEN PERCENT LIMIT FOR REGIONAL SIGNIFICANCE				
YEAR	OZONE EMISSIONS		$PM_{2.5}$ EMISSIONS	
	VOC	NO_X	NO_X	$PM_{2.5}$
2009	2,634	3,961	3,617	58
2018	1,515	1,781	1,630	35
2020	1,515	1,539	1,395	35
2030	1,515	1,209	1,088	37

Note: MORPC is Mid-Ohio Regional Planning Commission.

Source: Mid-Ohio Regional Planning Commission (MORPC), *Central Ohio Air Quality Analysis: Air Quality Conformity Determination Documentation for the: Franklin, Delaware, Licking, Fairfield, Madison and Knox County Ozone Non-Attainment Area and the Franklin, Delaware, Licking, Fairfield, and Coshocton (Franklin Twp) County $PM_{2.5}$ Non-Attainment Area*, Table 10 and Table 15, VOC and NO_x data for ozone converted to tons per year, May 10, 2007.

[8] *Air Quality Procedures for Civilian Airports & Air Force Bases*, p. xxii, *NAAQS Assessment*, April 1997, FAA.

5.5.3.2 SIP Compliance Evaluation

The nonattainment status of Franklin County required the MORPC to prepare an air quality General Conformity Determination for ozone and $PM_{2.5}$ emissions. Data from that report, dated May 2007,[9] is referenced in this discussion. According to the MORPC document, the eight-hour ozone attainment year is 2009, and the one-hour ozone budget (milestone) year is 2010. The 2009 budgets for the ozone and $PM_{2.5}$ nonattainment areas presented in the document are given in Table 5.5-26. There is no emission budget for the 2010 milestone year in the TIP.

During scoping coordination meetings, OEPA DAPC requested that an inventory for the 2009 attainment year and the 2010 budget year be included in the air quality assessment. This data is presented in **Table 5.5-27**. OEPA DAPC also requested the identification of the year where emissions due to the Sponsor's Proposed Project are expected to be the greatest on an annual basis.

Although construction is expected to begin in 2009, the first year of full operation of the CMH Sponsor's Proposed Project is 2012. The year of greatest emissions, calculated as the combination of construction emissions and net emissions from the Sponsor's Proposed Project, is expected to be 2012 under the C2b Alternative, as shown in Table 5.5-25. Emissions estimated for 2012 would not have the potential to exceed the applicable *de minimis* threshold for the pollutants of concern.

5.5.4 NEPA ANALYSIS

For a Federal action, an air quality NEPA analysis is needed to determine the proposed action's potential impact on air quality. Therefore, emission inventories were prepared for each reasonable alternative being considered in this EIS, including Alternative A. The inventories were then compared to the Alternative A emissions to discern the net emissions from the action. Refer to Section 5.5.3, *CAA General Conformity Evaluation and SIP Compliance Evaluation*, for the net emissions for each 2012 and 2018 alternative and emissions during each proposed construction year.[10] The evaluation showed that the net emissions increase for each project alternative would be below the General Conformity thresholds.

[9] *Central Ohio Air Quality Analysis: Air Quality Conformity Determination Documentation for the: Franklin, Delaware, Licking, Fairfield, Madison and Knox County Ozone Non-Attainment Area and the Franklin, Delaware, Licking, Fairfield, and Coshocton (Franklin Twp) County PM2.5 Non-Attainment Area*, Table 10 and Table 15, May 10, 2007, Mid-Ohio Regional Planning Commission (MORPC).

[10] Construction emissions would be considered entirely as net emissions.

Table 5.5-27
2009 & 2010 EDMS AIRPORT EMISSIONS INVENTORY AND CONSTRUCTION EMISSIONS INVENTORY
Port Columbus International Airport

EMISSION SOURCES	2009 ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	741.34	65.94	300.94	27.10	54.11	54.11	**1,243.55**
GSE/APUs	1,097.09	43.21	69.38	9.27	3.14	3.03	**1,225.14**
Roadways	690.99	48.41	68.03	0.53	2.21	1.29	**811.48**
Parking Facilities	170.88	25.32	22.17	0.08	0.34	0.20	**219.02**
Stationary Sources	21.45	14.11	35.75	16.63	2.49	2.20	**92.65**
Construction Emissions[1]	11.80	1.92	13.22	4.21	0.70	0.70	**32.54**
TOTAL	**2,733.55**	**198.94**	**509.52**	**57.84**	**63.00**	**61.54**	**3,624.39**

EMISSION SOURCES	2010 ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	TOTAL
Aircraft	765.83	67.84	309.04	27.91	56.71	56.71	**1,284.07**
GSE/APUs	1,111.58	43.82	70.85	9.50	3.19	3.08	**1,242.06**
Roadways	690.99	48.41	68.03	0.53	2.21	1.29	**811.48**
Parking Facilities	170.88	25.32	22.17	0.08	0.34	0.20	**219.02**
Stationary Sources	21.45	14.11	35.75	16.63	2.49	2.20	**92.65**
Construction Emissions[1]	15.59	2.32	16.01	5.64	0.92	0.92	**15.59**
TOTAL	**2,776.33**	**201.85**	**521.87**	**60.31**	**65.89**	**64.43**	**2,776.33**

Notes: GSE is ground support equipment. APUs are auxiliary power units. CO is carbon monoxide, VOC are volatile organic compounds, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter. Emissions values of $PM_{2.5}$ for aircraft were supplemented by using $PM_{2.5}$ emission data from the USEPA AP-42. Totals may not calculate exactly due to rounding.

[1] Construction emissions for Alternative C2 were used for the SIP year inventories. Construction emissions under Alternative 2 are greater than for Alternative C3 for either the 2012 or 2018 alternatives. Therefore construction emissions for Alternative C2 are the most conservative.

Sources: *EDMS Version 4.5*, 2006, FAA.
Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (AP-42), Table II-1-9, January 1991, USEPA.
Landrum & Brown analysis, 2007.

Usually no further analysis is required where the action's emissions do not exceed the General Conformity threshold levels as such an action would be unlikely to cause significant adverse air quality impacts or exceed the NAAQS.[11] However, when deemed appropriate due to the size of the airport and after consultation with regional, State, and local air quality agencies, a dispersion analysis may be conducted. When local-area dispersion modeling is conducted and the modeled concentrations do not result in projected exceedances of the NAAQS, then the analysis is complete.[12]

A dispersion analysis was conducted for the CMH EIS due to the size of the Airport and consultation with air agencies including USEPA Region 5, OEPA DAPC, and MORPC. The results of the dispersion analysis are given in Section 5.5.1 and Section 5.5.2. To determine whether any of the modeled concentrations would exceed the NAAQS, the maximum modeled concentration for each pollutant-averaging period under each project alternative was extracted from the tables presented in this section and summarized in **Table 5.5-28**. Pollutant concentrations for all the 2012 and 2018 alternatives were highest at the arrival curb adjacent to the existing passenger terminal and parking garage. The NEPA analysis demonstrated that none of the modeled pollutant concentrations under the 2012 and 2018 project alternatives would have the potential to exceed the NAAQS, as shown in Table 5.5-28.

Regional background concentrations were added to the modeled concentrations to reflect the "design concentrations." These were compared to the NAAQS to discern the air quality conditions within public access areas in and around the Airport as a result of the Sponsor's Proposed Project. A discussion of the background concentrations used for the CMH EIS is given in the *Draft Air Quality Technical Report*, Appendix E. The background concentrations are summarized below in **Table 5.5-29**.

The Airport is located in a county with background concentrations of $PM_{2.5}$ that exceed the NAAQS. Therefore, regardless of the Sponsor's Proposed Project, the area is in violation of the average 24-hour and average annual $PM_{2.5}$ standards. As such, the $PM_{2.5}$ NAAQS are also exceeded under the 2012 and 2018 Alternative A conditions, as well as under the Existing (2006) Conditions. The design concentrations are given in **Table 5.5-30**.

Concentrations of $PM_{2.5}$ emissions are projected to increase slightly under the 2012 Sponsor's Proposed Project as compared to the 2012 Alternative A, particularly for the 24-hour average concentration. However, the Sponsor's Proposed Project would cause $PM_{2.5}$ concentrations to decrease under the 2018 alternatives for both the 24-hour and annual average concentrations.

[11] *FAA Order 1050.1E Environmental Impacts: Policies and Procedures*, March 20, 2006, FAA; and *Air Quality Procedures for Civilian Airports & Air Force Bases*, Section 2.1.5, *NAAQS Assessment*, April 1997 and Addendum dated September 2004, FAA.

[12] *FAA Order 1050.1E*, Appendix A, Paragraph 2.1c, March 20, 2006, FAA.

Table 5.5-28
MAXIMUM MODELED POLLUTANT CONCENTRATIONS
Port Columbus International Airport

USEPA STANDARDS AND ALTERNATIVES	MODELED POLLUTANT CONCENTRATIONS BY NAAQS AVERAGING PERIODS ($\mu g/m^3$)								
	CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
USEPA NAAQS ($\mu g/m^3$)	1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
	40,000	10,000	100	1,300	365	80	150	35	15
2012 ALTERNATIVES									
Alternative A	16,052.55	3,433.30	44.45	119.53	49.16	6.91	10.45	9.78	2.00
Alternative C2a	14,223.26	3,199.78	45.08	119.78	49.51	7.04	10.92	10.23	2.05
Alternative C2b	14,183.62	3,185.79	44.32	119.18	49.18	6.86	10.81	10.12	1.94
Alternative C3a	14,183.15	3,187.09	44.46	119.20	49.19	6.87	10.81	10.12	1.94
Alternative C3b	14,183.94	3,185.44	44.28	119.19	49.18	6.85	10.81	10.12	1.92
2018 ALTERNATIVES									
Alternative A	17,126.14	3,781.22	46.31	125.25	52.29	7.81	13.60	12.83	2.46
Alternative C2a	14,883.11	3,074.24	35.02	116.44	47.59	6.53	10.89	10.17	2.00
Alternative C2b	14,886.76	3,075.19	34.92	116.43	47.57	6.52	10.88	10.16	2.00
Alternative C3a	14,869.45	3,072.72	35.20	116.45	47.59	6.56	10.89	10.17	2.02
Alternative C3b	14,874.08	3,073.80	34.76	116.42	47.57	6.53	10.88	10.16	2.02

Notes: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.

Table 5.5-29
BACKGROUND CONCENTRATIONS FOR FRANKLIN COUNTY

CRITERIA POLLUTANT	AVERAGING PEROD	USEPA NAAQS STANDARDS ($\mu g/m^3$)	REGIONAL BACKGROUND CONCENTRATION ($\mu g/m^3$)
CO	1-Hour	40,000	4,796.40
	8-Hour	10,000	2,284
NO_x	Annual	100	39.0
SO_x	3-Hour	1,300	138.86
	24-Hour	365	73.36
	Annual	80	10.74
PM_{10}	24-Hour	150	85
$PM_{2.5}$	24-Hour	35	52.1
	Annual	15	16.67

Notes: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

Source: Background concentration data were provided to Landrum & Brown, via e-mail transmissions from Ms. Sarah Hedlund, Ohio EPA, September 28, 2006, May 21, 2007, and May 29, 2007. These values are valid for 2006 Existing Conditions and all the project alternative and no-action alternatives for 2012 and 2018.

The relatively low increase in concentrations of $PM_{2.5}$ emissions caused by the Sponsor's Proposed Project would not constitute a new violation. Neither would the project make an existing violation worse or impede the timely attainment of $PM_{2.5}$ emissions as required by the Ohio SIP. Therefore, the Sponsor's Proposed Project would not have the potential to cause significant adverse air quality impacts and the project complies under CAA Section 176(c)(1) and would not:

- Cause or contribute to any new violation of any standard; or
- Increase the frequency or severity of any existing violation of any standard.[13]

While emissions from the Airport are not causing the exceedance of the $PM_{2.5}$ standards, the Airport contributes to the emissions of $PM_{2.5}$ in Franklin County due mainly to the operation of gasoline- and diesel-powered GSE in the gate area. The Airport may want to consider converting a portion of the GSE to electric units or alternative fuels, which would decrease the pollutant concentrations at the Airport and assist in the reductions of $PM_{2.5}$ emissions in Franklin County.

[13] 40 CFR Part 93.158(b).

Table 5.5-30
MAXIMUM DESIGN CONCENTRATIONS
Port Columbus International Airport

STANDARDS AND ALTERNATIVES	DESIGN CONCENTRATIONS ($\mu g/m^3$)								
	CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
	1-HR	8-HR	ANNUAL	3-HR	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
USEPA NAAQS	**40,000**	**10,000**	**100**	**1,300**	**365**	**80**	**150**	**35**	**15**
2012 ALTERNATIVES									
Alternative A	20,848.95	5,717.30	83.45	258.39	122.52	17.65	95.45	61.88	18.67
Alternative C2a	19,019.66	5,483.78	84.08	258.64	122.87	17.78	95.92	62.33	18.72
Alternative C2b	18,980.02	5,469.79	83.32	258.04	122.54	17.60	95.81	62.22	18.61
Alternative C3a	18,979.55	5,471.09	83.46	258.06	122.55	17.61	95.81	62.22	18.61
Alternative C3b	18,980.34	5,469.44	83.28	258.05	122.54	17.59	95.81	62.22	18.59
2018 ALTERNATIVES									
Alternative A	21,922.54	6,065.22	85.31	264.11	125.65	18.55	98.60	64.93	19.13
Alternative C2a	19,679.51	5,358.24	74.02	255.30	120.95	17.27	95.89	62.27	18.67
Alternative C2b	19,683.16	5,359.19	73.92	255.29	120.93	17.26	95.88	62.26	18.67
Alternative C3a	19,665.85	5,356.72	74.20	255.31	120.95	17.30	95.89	62.27	18.69
Alternative C3b	19,670.48	5,357.80	73.76	255.28	120.93	17.27	95.88	62.26	18.69

Notes: Pollutant concentrations are given in micrograms per cubic meter, $\mu g/m^3$. USEPA is the U.S. Environmental Protection Agency. NAAQS are the National Ambient Air Quality Standards. CO is carbon monoxide, NO_x is nitrogen oxides, SO_x is sulfur oxides, PM_{10} is coarse particulate matter, and $PM_{2.5}$ is fine particulate matter.

Sources: *EDMS Version 4.5*, 2006, FAA.
Landrum & Brown analysis, 2007.