

Working Paper – Element #3 Existing Conditions/Inventory

Lehigh Valley International Airport

Allentown, Pennsylvania

Airport Master Plan Update

October 30, 2017 – Final

Prepared by: C&S Engineers, Inc.



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Section 3—Existing Conditions/Inventory

3.1 Introduction

The first step in preparing an Airport Master Plan Update consists of gathering and organizing information about existing conditions at Lehigh Valley International Airport, herein referred to as “LVIA” and “the Airport,” throughout this report. In addition to documenting the physical characteristics and facilities of the Airport, the Inventory involves documenting the Airport’s local, regional, and national setting, planned development, airport policies, and environmental characteristics of the Airport.

3.2 Background

Airport System Planning Role

Airport planning occurs at the national, state/regional, and local level. The following section identifies LVIA’s role at the national and state level based on previous reports, with the goal of the master planning process to guide planning practices at the local level.

At the national level, the Airport is included in the National Plan of Integrated Airport Systems 2017-2021 (NPIAS) produced by the U.S. Department of Transportation (DOT) Federal Aviation Administration (FAA). This planning document includes 3,332 existing and eight proposed airports significant to national air transportation and estimates \$32.5 billion in infrastructure development eligible for federal aid over the next five years to meet the needs of all segments of civil aviation. In administering the Airport Improvement Program (AIP), the FAA uses the NPIAS, which supports the FAA’s strategic goals for safety, system efficiency, and environmental compatibility by identifying the specific airport improvements that will contribute to achievement of those goals.

According to the NPIAS, LVIA is classified as a primary airport and is expected to remain so through 2021. Primary airports account for approximately 11.5% of total development over the five year planning period proposed by the NPIAS, with development at the Airport estimated at approximately \$40,121,189.¹ The NPIAS also classifies airports into four categories based on an annual apportionment that is relative to the amount determined by their number of enplaned passengers. Although the Airport was designated as a small hub airport until 2012, now it is designated as a nonhub primary airport. Nonhub primary airports are commercial service airports that enplane less than 0.05% of all commercial passenger enplanements but have more than 10,000 annual enplanements. The majority of air traffic at these airports is general aviation (GA) aircraft, with an average of 95 based aircraft.² Although the Airport is forecasted to have 136 based aircraft by 2036, its classification will not change to a small hub primary airport unless it enplanes between 0.05% and 0.25% of total U.S. passenger enplanements. Since 2013, passenger enplanements at the Airport have stabilized to average 0.04% of national enplanements. This trend is expected to remain consistent through 2040, and as a result makes it likely that LVIA will remain a nonhub primary airport throughout the duration of the planning period.

¹ United States of America. U.S. Department of Transportation. Federal Aviation Administration. *National Plan of Integrated Airport Systems (NPIAS) Report Airports 2017-2021*. N.p., n.d. Web. 28 Oct. 2016.

² United States of America. U.S. Department of Transportation. Federal Aviation Administration. *National Plan of Integrated Airport Systems (NPIAS) Report Airports 2017-2021, Appendix A: List of NPIAS Airports with 5-Year Forecast Activity and Development Cost*. N.p., n.d. Web. 28 Oct. 2016.



In 2007, the Commonwealth of Pennsylvania Department of Transportation Bureau of Aviation completed a State Aviation System Plan (SASP) Update.³ The purpose of this update was to revisit the airport classifications and the state of the system for the Commonwealth of Pennsylvania in order to identify potential projects benefits and ideal funding levels.

According to the 2007 SASP, LVIA is designated as one of fifteen commercial service airports in the Commonwealth of Pennsylvania. The following table identifies the criteria for amenities and services for the classification of a commercial service airport. Key performance criteria noted in the SASP for enhancing an airport’s operational capacity includes primary runway length and parallel taxiway availability, in addition to available based and transient aircraft parking apron space.

Table. 3.2.1: 2007 SASP Commercial Service Airport Criteria

Amenity/Service	Commercial Service Airport	% of Commercial Service Airports that meet classifications	Criteria met at LVIA?
Runway Length	5,000 ft.	100	Yes
Runway Width	ARC C-II (100 ft.)	100	Yes
Runway Strength	60,000 lbs. SW	73	Yes
Taxiway	Full parallel	73	Yes
NAVAIDS	200 ft. and ½ mile	73	Yes
Approach Aids	Beacon, wind cone, REILS, PAPIs, MALSR	67	Yes
Runway Edge Lights	HIRLs	100	Yes
Weather	ASOS/AWOS	100	Yes
Facilities	FBO, phone, bathroom, jet fuel, repairs, ground transportation	100	Yes
Services	Aircraft and auto parking, storage, terminal	100	Yes

Source: C&S Engineers, Inc.; Commonwealth of Pennsylvania, Department of Transportation, Bureau of Aviation. PennDOT Multi-Modal Planning & Implementation Services, State Aviation System Plan Update. 2007

Airport History

A need for an emergency landing strip for airmail pilots prompted the designation of the LVIA’s original 50-acre parcel for aviation use by the U.S. Department of Commerce Bureau of Aviation in 1927.

³ Commonwealth of Pennsylvania, Department of Transportation, Bureau of Aviation. *PennDOT Multi-Modal Planning & Implementation Services, State Aviation System Plan Update*. 2007



Approximately two years later, Allentown Airport was opened under guidance from the Allentown Chamber of Commerce, operating its first scheduled airline flight on September 16, 1935 by a United Airlines Boeing 247.

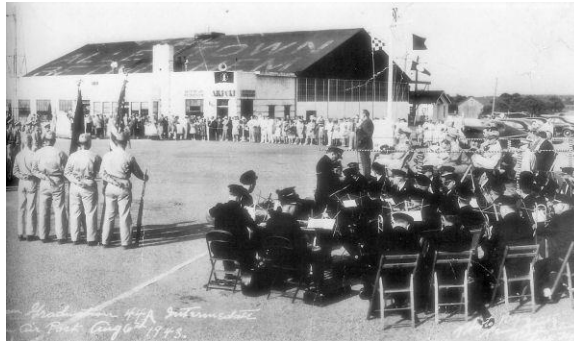
In 1937, Wilfred M. Wiley Post, Jr. formed the Lehigh Aircraft Company, which operated the Airport. One year later, the City of Bethlehem also claimed responsibility for the Airport, redesignating it as the Allentown-Bethlehem Airport. In 1938, the Airport's first terminal was built as part of the Works Project Administration program.

In 1938, the U.S. Navy began V-5 flight training at the Airport, introducing a federally supported non-profit corporation that provided volunteer emergency services and non-auxiliary missions for various governmental and private agencies. This training was conducted through the participation of Lehigh University and Muhlenberg College via Group 312 of the Civil Air Patrol. However, by 1944, the program at the Airport terminated with the relocation of all naval flight training to naval air bases. In this year, construction of a new runway at the Airport was also completed.

In 1946, the Lehigh Airport Authority was formed by the Cities of Allentown and Bethlehem and Lehigh County. By 1948 they were joined by the City of Easton and Northampton County, changing the name of the Authority to the Lehigh-Northampton Airport Authority (LNAA) as it exists today. At this time, a new \$1-million, 38,000 square-foot passenger terminal was completed, servicing Colonial, United, and Trans World Airlines.

Construction on the present terminal began in 1968 and was completed in 1975, with a new 33,000 square-foot terminal addition completed in 1997. In 1994, the Airport's name changed to Lehigh Valley International Airport. In 1999 and 2000, the Authority acquired Braden Airpark and Allentown Queen City Municipal Airport.

1943 Naval Pilot Training Graduation Ceremony at the Airport



Source: Wikiwand, Lehigh Valley International Airport

Allentown-Bethlehem-Easton Airport in the 1950s



Source: Lehigh Valley History, at lehighvalleyhistory.blogspot.com



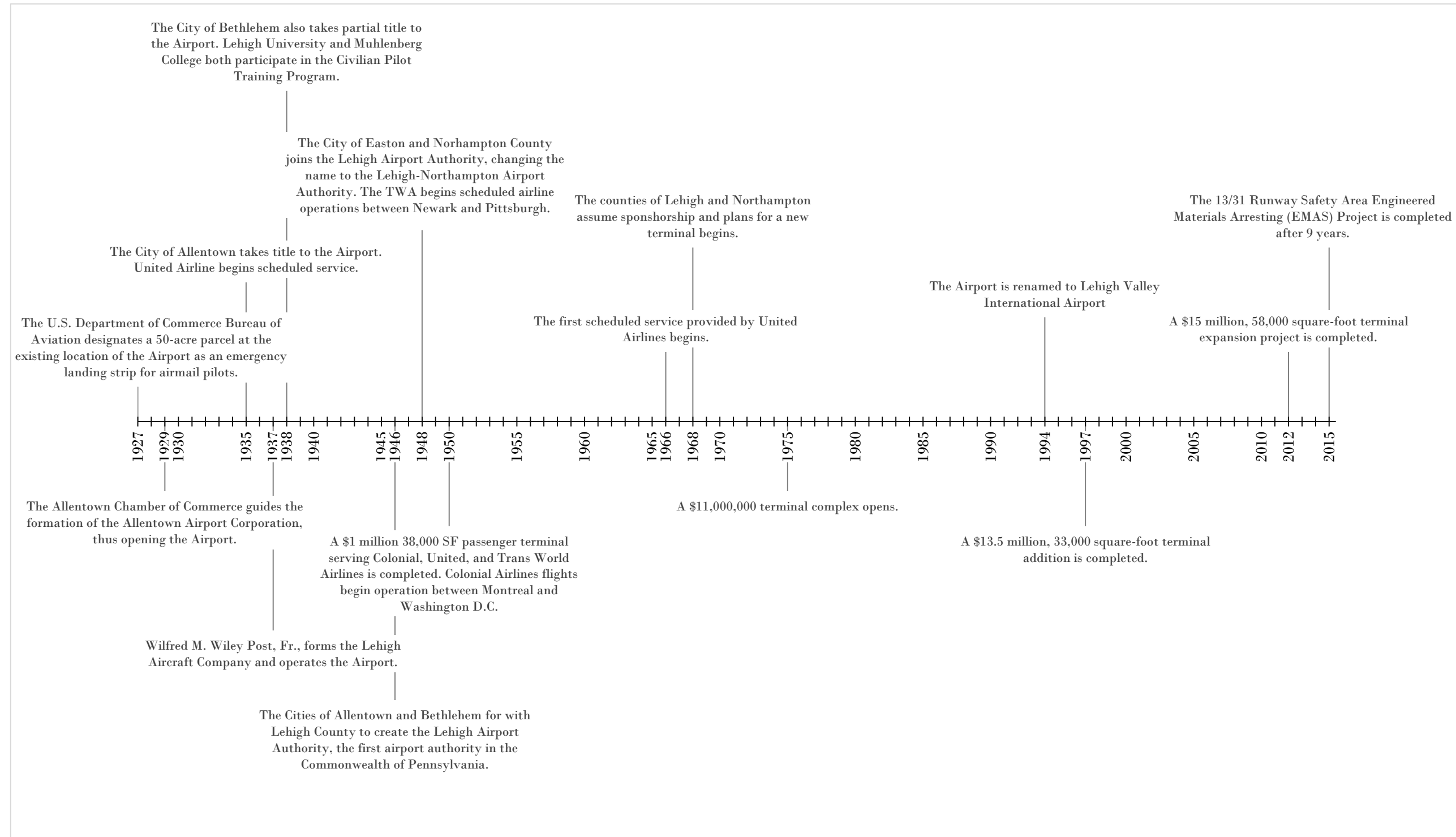
In 2012, a \$15 million, 58,000 square-foot terminal expansion project was completed at the Airport. In 2013, the Airport held the Lehigh Valley Airshow, for which 42,000 attended. This airshow was also held in 2014. In 2015, the Airport completed its \$24-million runway 13/31 Runway Safety Engineered Materials Arresting System Project. Finally, in 2016, the Airport made history as it was chosen as one of seven airports in the United States for the arrival of the Solar Impulse 2.

Solar Impulse 2 landing at LVIA



Source: Chris Knight, The Morning Call,
<http://www.mcall.com/news/breaking/mc-solar-impulse-open-house-allentown-airport-20160526-story.html>

Figure 3.2.1: Airport History Timeline



Source: C&S Engineers, Inc.; "ABE History- History of the Lehigh Valley International Airport (ABE) Lehigh Valley Airport Authority, accessible at <http://www.flylv.com/stay-connected/facts/>



Airport Setting

The Airport's geographic location is approximately 393 feet above mean sea level (MSL) at the coordinates of 40° 38' 08.5000" N and 75° 26' 25.5000" W.⁴ As seen in **Figure 3.2.2**, the Airport is primarily located in Hanover Township, Lehigh County, Pennsylvania. However, portions of airport property are also located in the Borough of Catasauqua, Allen and East Allen Townships and Hanover Township in Northampton County, Pennsylvania. The Airport's airfield is situated on 2,369 acres bound by Race Street to the north, Airport Road to the east, Postal Road to the south, and residential properties of Catasauqua to the west.

The Airport is located approximately three miles northeast of Allentown, Pennsylvania, 55 miles north of Philadelphia, Pennsylvania, 90 miles west of New York, New York, 85 miles east of Harrisburg, Pennsylvania, and 65 miles south of Wilkes-Barre, Pennsylvania. Allentown is accessible from Philadelphia via Interstate 476 North, from Scranton via Interstate 476 South, from Harrisburg via Interstate 78 East, and from New York City via Interstate 78 West. The Airport can be accessed from Allentown via the Lehigh Valley Thruway/State Route 22 East, from Easton via the Lehigh Valley Thruway/State Route 22 West, and from Bethlehem via Fred B. Rooney Highway/County Route 378 North. The Airport's location is represented in **Figure 3.2.3**.

LVIA's service area includes the counties within a two-hour drive of the Airport as well as those within the Allentown Metropolitan Statistical Area (MSA). Counties within the Allentown MSA include: Schuylkill, Carbon, Monroe, Warren, Northampton, Lehigh, and Berks. Counties outside of the Allentown MSA but within a two-hour drive of LVIA include: Wayne, Lackawanna, Luzerne, Columbia, Mentour, and Northumberland. Characteristics of this service area as well as an analysis of its geographical extents is analyzed farther in **Section 2 – Regional Context**.

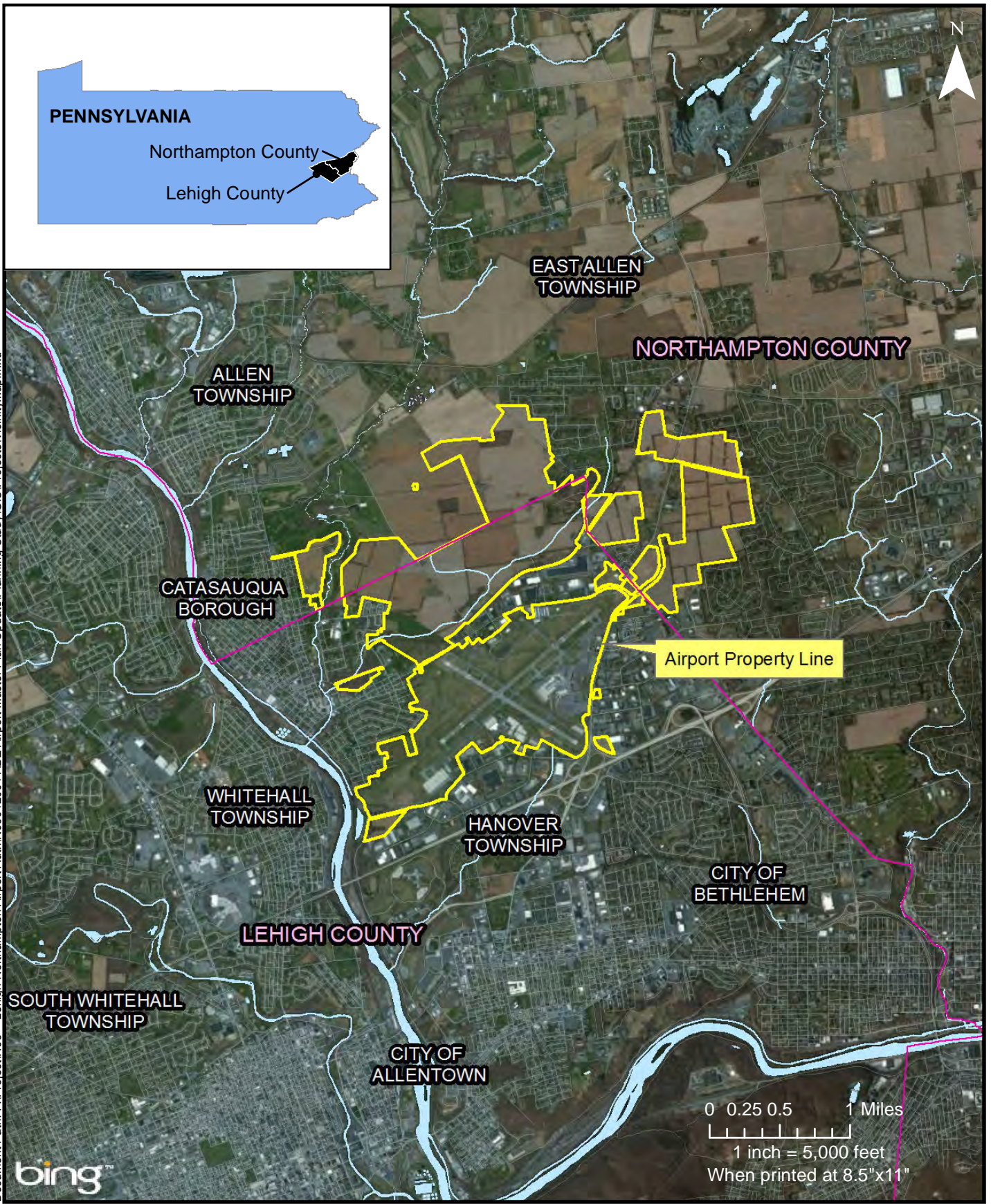
Airport Site

The Airport occupies approximately 2,369 acres consisting of multiple facilities. The Airport includes the following categories of components:

- **Airfield** – The airfield includes two runways (one southwest/northeast runway and one northwest/southeast crosswind runway). The airfield also contains 18 taxiways, aprons, safety-related protections zones, and associated navigational aids (NAVAIDs).
- **Passenger Terminal Complex** – The passenger terminal complex consists of one landside and one satellite terminal, connected by an underground tunnel. These terminals accommodate facilities for baggage claim, ticketing, rental car counters, security screening functions, and ground transportation facilities including terminal access/egress roadways and surface parking lots.
- **Rental Car Facilities** – Rental car storage and return, and associated quick turnaround (QTA) facilities are located east of the passenger terminal complex on airport property.
- **GA Facilities** – GA facilities are located at various access points throughout the airfield. The Airport's fixed base operator (FBO) is located south of Runway 31 and is accessible landside via Hayden Circle.
- **Air and Ground Cargo Facilities** – The air cargo ramp is located south-west of Runway 6, servicing FedEx, ABX Air, Air Transport International (ATI), and Atlas Air. Ground transportation facilities are located adjacent to this ramp. Air General, provides warehouse cargo services for ABX Air, ATI, and Atlas Air; located on Postal Road.

⁴ Airport IQ 5010, Airport Master Records and Reports for Lehigh Valley International Airport, accessed 10/24/16 at <http://www.gcr1.com/5010web/airport.cfm?Site=ABE&CFID=470213&CFTOKEN=72644774>

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Sources: County Subdivisions, Counties, Water & Streets from the US Census Bureau 2016 TIGER files; Base Map: Bing Maps Aerial; Created by C&S Engineers, Inc.

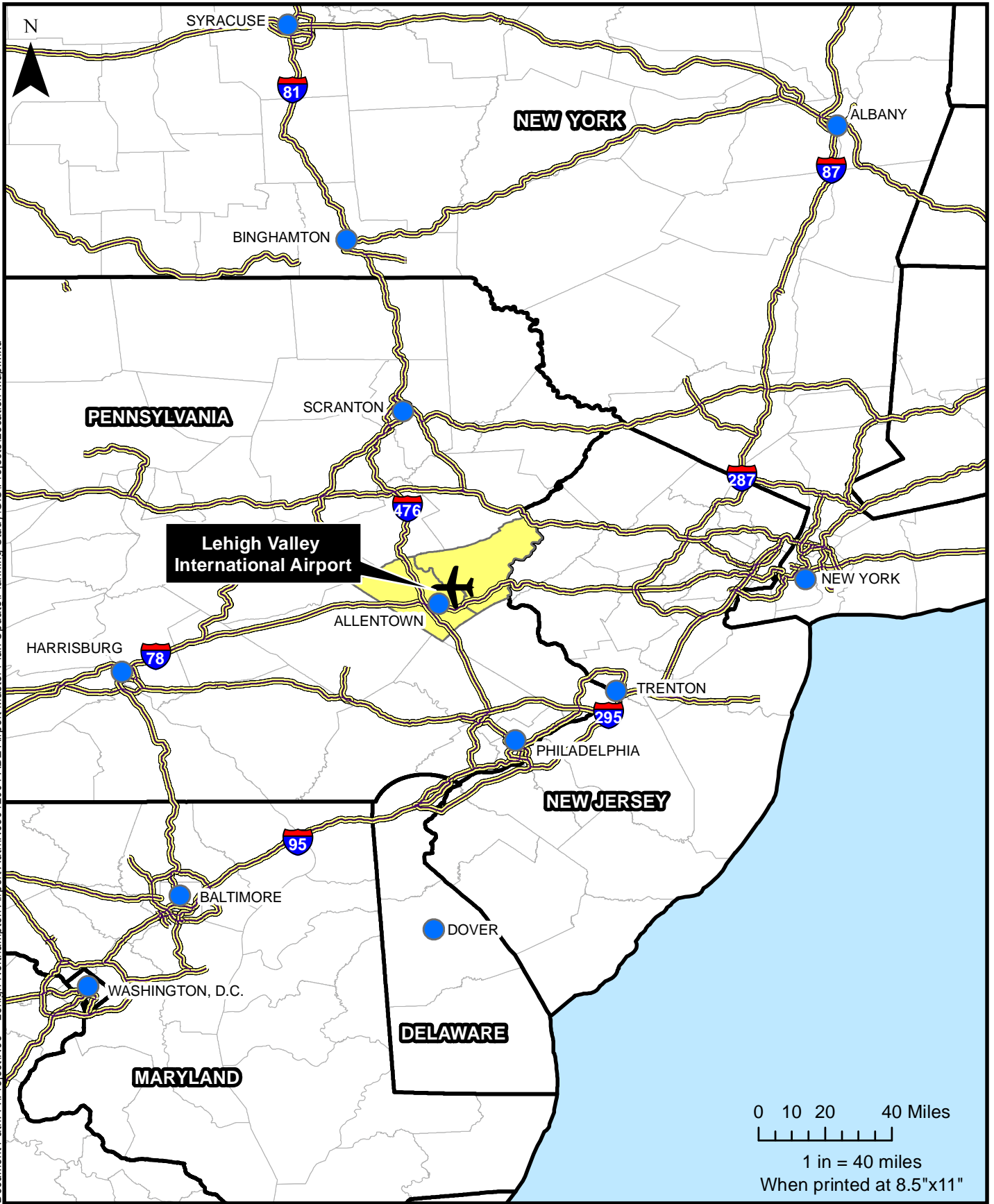


Vicinity Map

Lehigh Valley International Airport
Master Plan Update

Figure 3.2.2

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Sources: Streets and Counties from the US Census Bureau 2016 TIGER files. Created by C&S Engineers, Inc.



Location Map

Lehigh Valley International Airport
Master Plan Update

Figure 3.2.3



- **Support Facilities** – The Airport has multiple support facilities located throughout the site. Facilities include those relating to aircraft maintenance, ground service equipment, fuel farms, Aircraft Rescue and Firefighting (ARFF), Airport Police, and the FAA Air Traffic Control Tower (ATCT).

Figure 3.2.4 illustrates the Airport Site.

Surrounding Airports

To provide context of the Airport’s role within the regional setting, there are forty-five privately owned and private-use and thirteen public-use airports currently operational within a 25-nautical mile (NM) radius of the Airport, as shown on **Figure 3.2.5**. Descriptions of the thirteen public-use airports are included in **Table 3.2.2**. A public-use airport located just outside of the radius is Perkiomen Valley Airport at 27 NM from LVIA and Blairstown Airport and Stroudsburg-Pocono Airport at 28 NM. Other nearby public-use airports includes Wilkes-Barre/Scranton International Airport at 43 NM, Philadelphia International Airport at 48 NM, and Newark Liberty International Airport at 58 NM.

Table 3.2.2: Surrounding Public-Use Airports

Airport Name (Location Identifier)	Location	Distance from LVIA	NPIAS Airport Classification	Ownership/Use
Allentown Queen City Municipal (KXLL)	Allentown, PA	5 NM SW	GA	Public/ Public
Braden Airpark (N43)	Easton, PA	10 NM NE	N/A	Public/ Public
Slatington Airport (69N)	Slatington, PA	10 NM NW	N/A	Private/ Public
Quakertown Airport (KUKT)	Quakertown, PA	13 NM SE	GA	Public/ Public
Flying M Aerodrome Airport (P91)	Germansville, PA	13 NM NW	N/A	Private/ Public
Beltzville Airport (14N)	Lehighton, PA	15 NM NW	N/A	Private/ Public
Butter Valley Golf Port Airport (7N8)	Bally, PA	16 NM S	N/A	Private/ Public
Jake Arner Memorial Airport (22N)	Lehighton, PA	17 NM NW	GA	Public/ Public
Pennridge Airport (CKZ)	Perkasie, PA	17 NM SE	N/A	Private/ Public
Vansant Airport (9N1)	Erwinna, PA	19 NM SE	N/A	Public/ Public
Alexandria Airport (N85)	Pittstown, NJ	20 NM east	N/A	Private/ Public
Sky Manor Airport (N40)	Pittstown, NJ	22 NM east	N/A	Private/ Public
Heritage Field Airport (PTW)	Pottstown, PA	25 NM south	Reliever	Private/ Public

Source: C&S Engineers, Inc., and 5010 Master Records and AirNav.com for instrument approaches

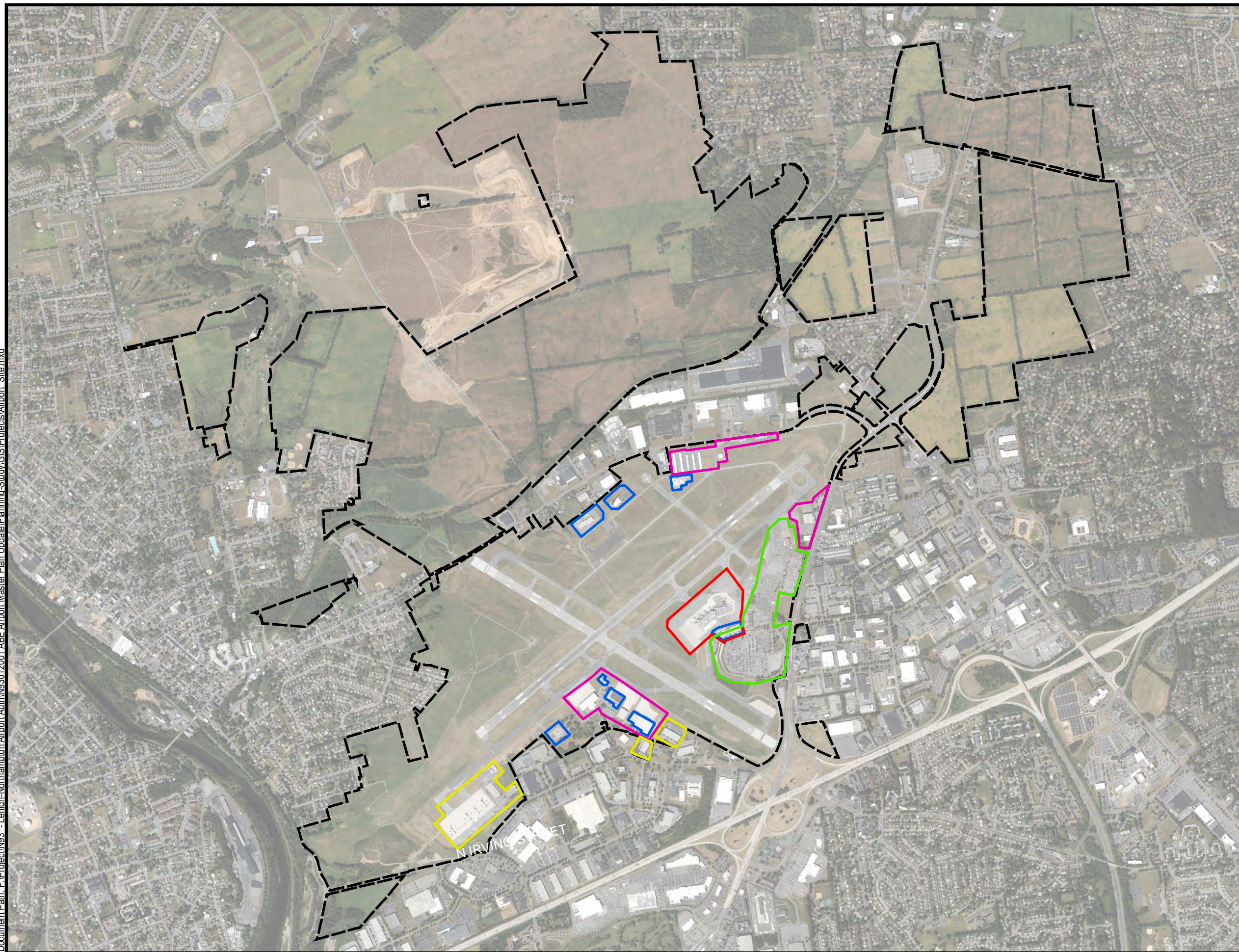
Ownership and Operations

LVIA is a publicly-owned airport under the ownership of the Lehigh- Northampton Airport Authority (LNAA), a Municipal Authority of the Commonwealth of Pennsylvania. The Authority, originally formed in 1946 as the Lehigh Airport Authority, was organized under the Municipal Authorities Act, 53 PA. C. S., and is the oldest airport authority in the Commonwealth. The Authority as it exists today consists of the City of Allentown, the City of Bethlehem, the City of Easton, Lehigh County, and Northampton County. Other Airports acquired under control of the Authority include Braden Airpark in Forks Township, Northampton County, in 1999 and Queen City Municipal Airport in Allentown, Lehigh County, in 2000.⁵

Lehigh Valley Aviation Services is the FBO at the Airport and is located in Hangar 7, accessible landside via Hayden Circle or airside via Taxiway J. The FBO provides de-icing, full service fueling of Jet A and Avgas, ground handling, quick-turn services, on-site maintenance, and potable water service.

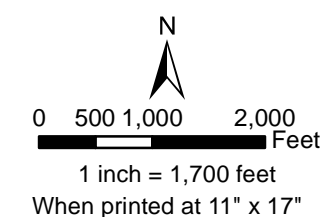
⁵ “Financial Statement” Lehigh Northampton Airport Authority, December 31, 2015. Accessible at <http://www.flylv.com/public-info/2016-documents/2016-operating-budget/>

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Legend

- Airport Property Line
- Air and Ground Cargo
- General Aviation
- Landside
- Support
- Terminal

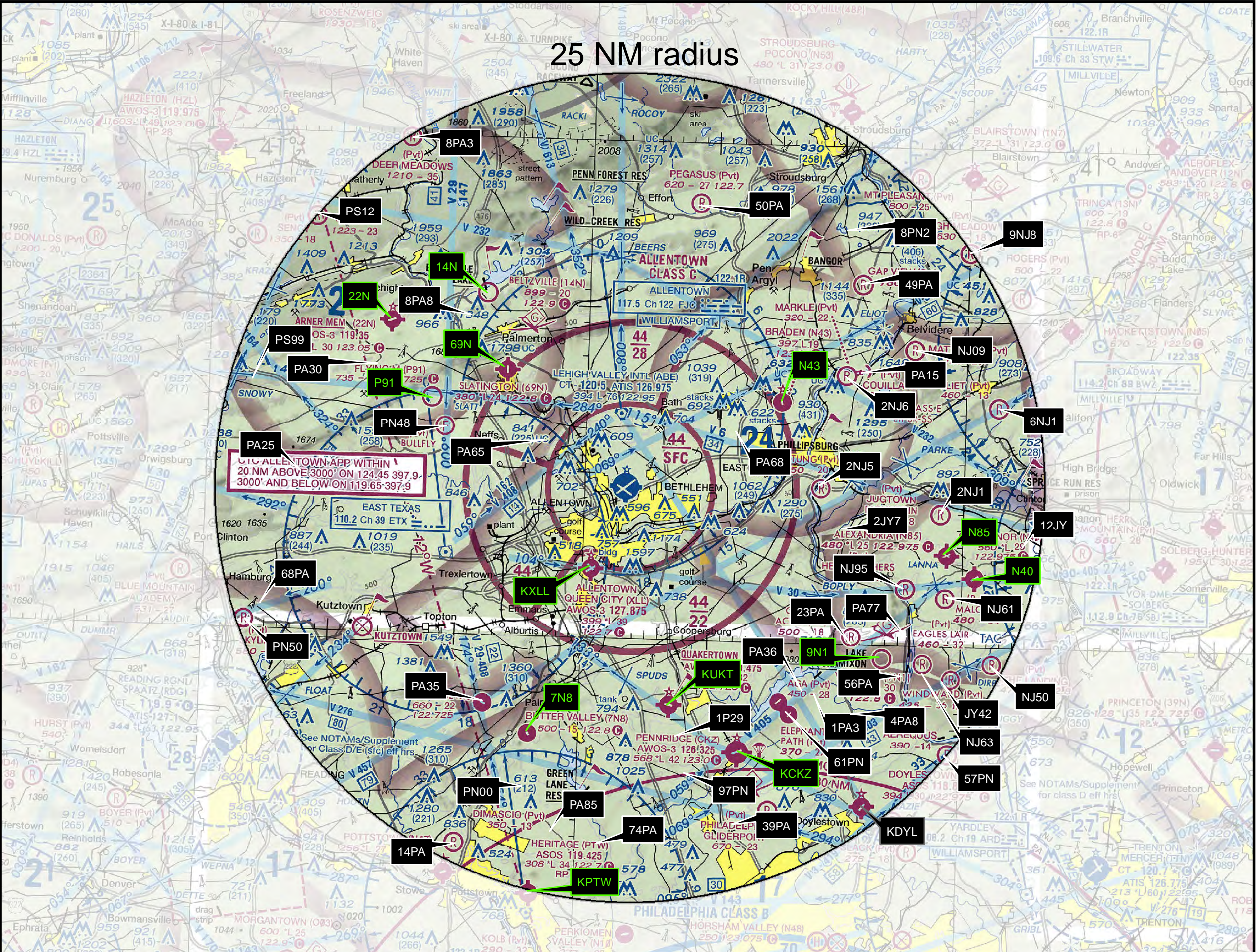


Lehigh Valley International Airport
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Airport Site

Figure 3.2.4

25 NM radius



Key

AIRPORTS	AIRPORT DATA
Other than Private Use airports	Private Use Airports Class E Airports Class G Airports Class D Airports Class C Airports Class B Airports Class A Airports
Public Use Airports	Public Use Airports Class E Airports Class G Airports Class D Airports Class C Airports Class B Airports Class A Airports

COMMUNICATION BOXES

OBSTRUCTIONS

MISCELLANEOUS

TOPOGRAPHIC INFORMATION

0 1 2 4 6 NM
1 inch = 6 nautical miles
When printed at 11" x 17"



Lehigh Valley International Airport
Master Plan Update
Airspace Environment & Adjacent Airports

Figure 3.2.5

SOURCES: "New York SEC 93.tif" Sectional VFR Raster Aeronautical Chart, published 04-28-16, originated from the Federal Aviation Administration, Mission Support Services, Aeronautical Information Services (AUV-5) and accessed on 10-05-16 at https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/vfr/. ICAO ID and distance from ABE obtained from SkyVector Aeronautical Charts. CREATED BY: C&S Engineers



In 2015, the Authority released 260 acres of airport property to the Rockefeller Group Development Corporation (RDG) for the development of a FedEx Ground Distribution Center. A need for the sale of this property was identified to pay off the judgement resulting from the litigation regarding the Authority's purchase of this land and 345 additional acres in 1990 in pursuit for the development of a parallel runway. The sale of this property did not inhibit the Airport's development plans. This release of property generated approximately \$8 million in revenue.⁶

A number of tenants own and lease facilities at the Airport. Tenants provide a variety of services such as aircraft maintenance, pilot training, air charter service, avionics services, aircraft inspections, and ground handling. Current tenants include:

- Ace Pilot Training, Inc.
- Lehigh Carbon Community College (LCCC)
- LV Avionics
- MedEscort International, Inc.
- Paragon Jets
- Saker Aviation Services
- Scott Richard Aviation/Aircraft Maintenance
- Air Products
- DV Integrations
- Inflight Training Solutions, Inc.
- Lehigh Valley Flying Club
- New World Aviation, Inc.
- Dumont Aircraft Charter
- East Coast Jets
- JET-A
- LR Services
- Flight Management Services LLC
- LV Avionics
- New World Aviation
- FedEx Express and FedEx Ground
- Air General

A number of tenants occupy space in the terminal to provide airline ticketing, concession services, and rental car counters. Current airlines, rental car companies, and vendors leasing terminal space include:

- Airlines:
 - Allegiant Air
 - American Airlines
 - Delta Airlines (ExpressJet, Endeavor Airlines, and Delta Mainline)
 - United Express (United Shuttle, Trans States Airlines, and Express Jet)
- Car Rental Companies:
 - Hertz
 - National
 - Alamo
 - Budget
 - Avis
 - Enterprise
 - Dollar Rent A Car
 - Thrifty Car Rental
- First Class Concessions:
 - The Lehigh Valley Café
 - PA Pub Café & Spirits
 - Java Joint
 - Spirit of Lehigh News & Gifts

⁶ "Financial Statement" Lehigh Northampton Airport Authority, December 31, 2015. Accessible at <http://www.flylv.com/public-info/2016-documents/2016-operating-budget/>



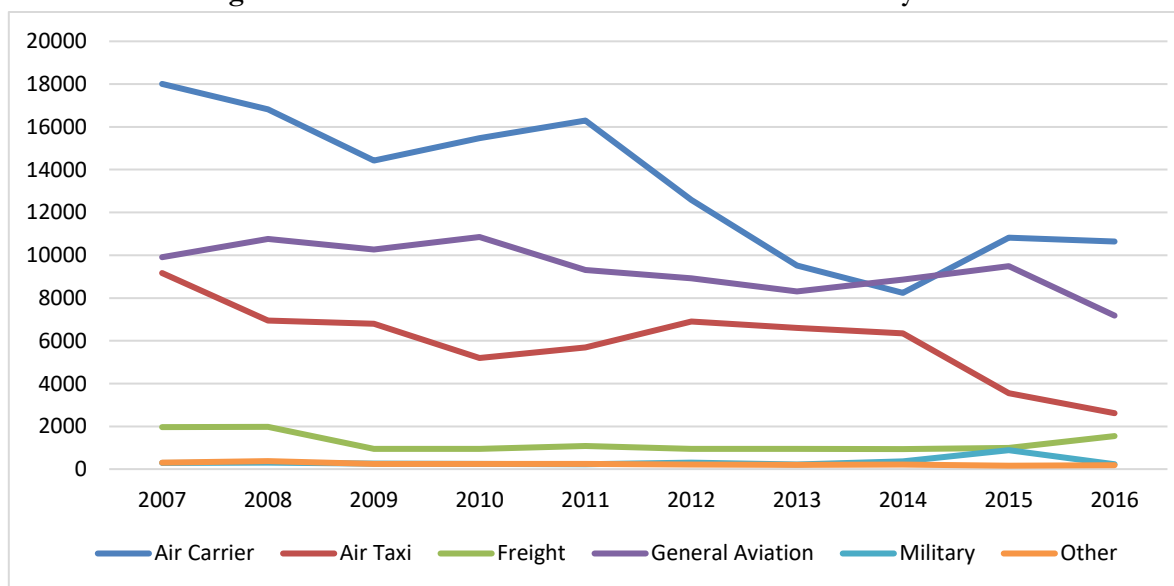
Airport Economic Benefits

Airports provide an economic benefit to their communities through direct and indirect impacts, in addition to serving as a vital community asset. Direct impacts include those related to on-airport businesses and government agencies and those attributed to visitor spending and tourism. Indirect impacts mainly include the re-circulation of employees spending their earnings locally and the on-airport businesses purchasing goods and services locally. In addition, all airports in the state of Pennsylvania are used for air ambulance service, law enforcement, natural resource management, education, and community events. These benefits are presented in **Section 2 – Regional Context**.

Historical Aircraft Operations

Historical aviation activity at the Airport has been gathered using the FAA’s Traffic Flow Management System Counts (TFMSC) data. Historical activity by user class, as summarized in **Figure 3.2.6**, indicates an overall decrease in total aviation activity from the year 2007. Air Carrier, followed by GA, continues to be the two largest user class groups generating activity, although there continues to be a gradual decrease in their operations. The only user class showing a steady increase is that of Freight, which has doubled since 2015.

Figure 3.2.6: LVIA User Class Historical Aviation Activity



Source: FAA Traffic Flow Management System Counts (TFMSC) data from 01/01/2007 to 12/31/2016.

Detailed historical airport activity is documented **Section 4 – Forecasts of Aviation Demand**.

3.3 Regional Setting and Land Use

The Airport is located in Northampton County and Lehigh County, Pennsylvania. The following sections provide information regarding land use, zoning, and climatological setting.

Land Use

It is commonplace to encourage the development of compatible land uses near airports through municipal



zoning laws. Compatible land uses generally include properties with an industrial and/or commercial land use while incompatible land uses generally include residential areas or areas likely to pose wildlife hazards. Additional common incompatible land uses include public facilities such as schools, hospitals, and places of worship.

Land-uses surrounding the Airport were inventoried to ensure compatible use. **Figure 3.3.1** presents the variety of land-uses surrounding the Airport. The Airport is designated as a Transportation, Utilities, and Communications land-use. Located immediately off of the Runway-13 end is property with Agriculture and Vacant uses and immediately off of the Runway-31 end is property with Right-of-way and Retail/Commercial uses. The Runway-6 end is encompassed by Transportation, Utilities, and Communications land-uses as is the Runway-24 end, with additional Agriculture and Vacant land-uses located with the Runway Protection Zone (RPZ). Residential land-uses exist immediately west of Airport property, and in close proximity to the southwest, southeast and northeast of Airport Property. A mixture of Manufacturing, Industrial, Office, and Business land-uses dominate the immediate vicinity of the airfield.

As indicated by guidance provided in FAA Advisory Circular (AC) 150/5070-6B, public facilities within the vicinity of the Airport were identified. Located within one half mile of the Airport are two police stations, the Pennsylvania State Police – Troop M of Bethlehem and the Catasauqua Police Office; one school, Francis H. Sheckler Elementary; one United States Post Office; four fire departments/stations, the Han-Le Co Fire Department, Fullerton Fire Company #1, the Catasauqua Fire Department, and the Charotin Hose Company No. 1; and fourteen places of worship. Within one additional half mile of the Airport are four additional fire stations, the Hokendauqua Fire Co., the West Catasauqua Fire Department; the Coplay Fire Department, and the Northampton Fire Department. There are also two additional schools, Clearview Elementary School and the Lehigh Valley Academy Regional Charter School; and seven additional places of worship. Additional facilities of importance located within one mile of the Airport include St. Luke’s Hospital, Good Shepherd Specialty Hospital, and Lehigh Valley Hospital-Muhlenberg.

Incompatible land uses as they relate to LVIA’s Runway Protection Zones (RPZ) are discussed further in **Section 5 – Demand/Capacity and Facility Requirements**.

Zoning

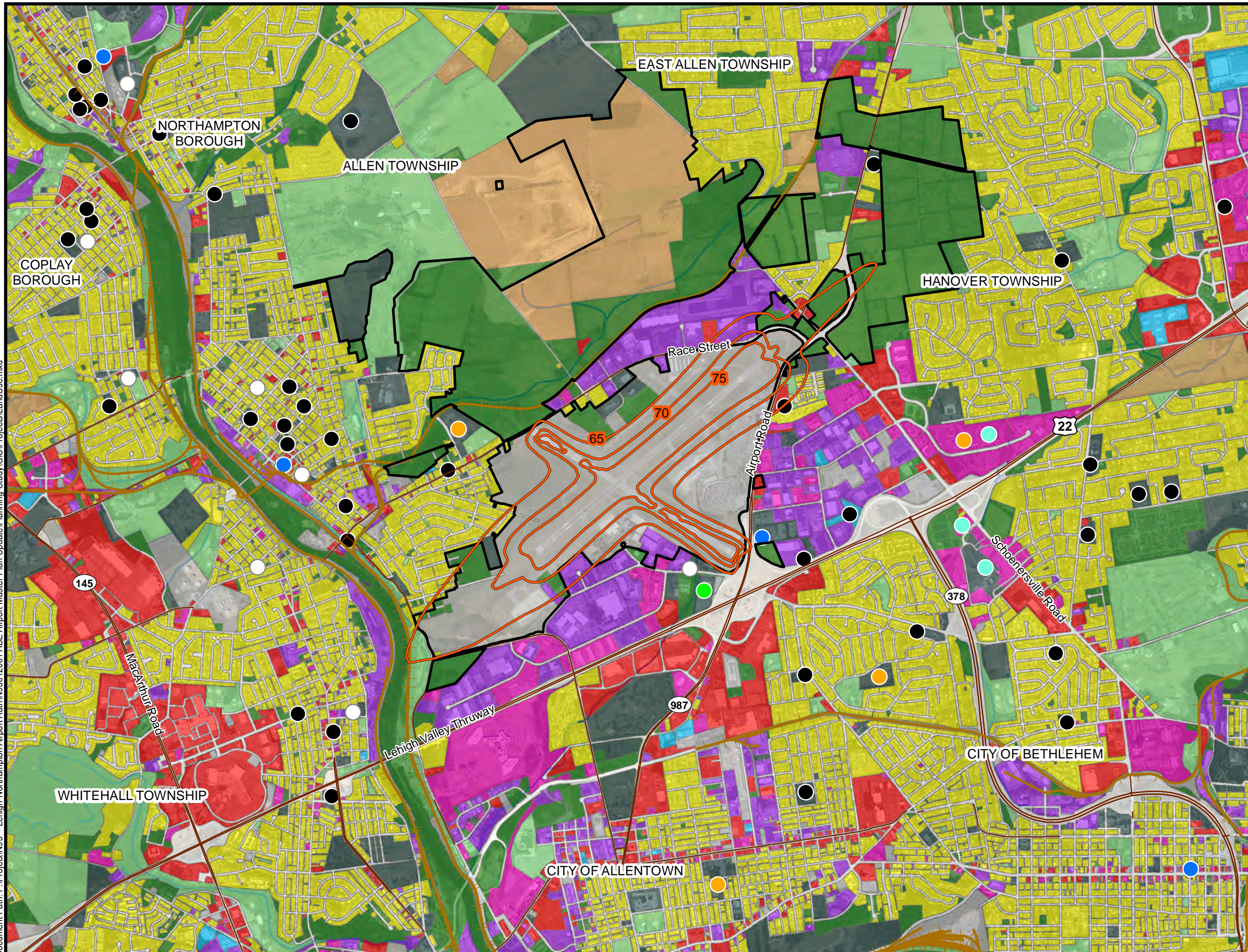
The Airport is zoned under the authority of various municipalities, including the Boroughs of Catasauqua and North Catasauqua, the Townships of East Allen, Allen, and Hanover (Lehigh and Northampton), and the City of Bethlehem. The purpose of zoning and its regulations is to guide urban growth and development by insuring the compatibility of land-uses, building dimensions, parking requirements, and landscaping within a district or municipality. **Figure 3.3.2** presents existing zoning within the Airport vicinity. The majority of the airfield is zoned as Light Industrial, as is the majority of off-airport property south of the airfield and north of Lehigh Valley Thruway. For Airport property along Willow Brook Road, the majority is zoned as Suburban Residential, Retail Commercial, and Agricultural Preservation. Zoning patterns around the Airport are predominantly for Suburban or Urban Residential uses, with pockets of Retail Commercial and Institutional uses along primary roadways.

Catasauqua Borough

The Borough of Catasauqua currently zones the area encompassed by the Airport as Airport District (A). The Borough defines an Airport District as a zone “to provide for a range of airport uses, related uses and industrial uses, particularly in land areas that can be accessed from the interior road system of the airport or from major highways.”⁷ Special restrictions are imposed upon development in this zone, including stringent height restrictions for obstructions located within Airport visual approach, instrument procedure approach,

⁷ The Borough of Catasauqua, Lehigh County PA, Code Chapter 280: Zoning, Article III: Establishment and Regulation of Districts. Accessed 1/17/17. Accessible at: <http://ecode360.com/10691686>

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Legend

- Airport Property Line
- Roads
- Railroads
- 2015 DNL Contour (dB)

Land-Uses

- Agriculture & Vacant
- Manufacturing & Industrial
- Office & Business
- Parks, Recreation & Open Space
- Public & Quasi-Public
- Residential
- Retail & Commercial
- Right-of-way
- Rural Residential
- Transportation, Utilities & Communication
- Warehousing & Distribution

Places

- Fire Station
- Police Station
- School
- U.S. Post Office
- Place of Worship
- Hospital

N

0 1,250 2,500 5,000 Feet

1 inch = 2,500 feet
When printed at 11" x 17"



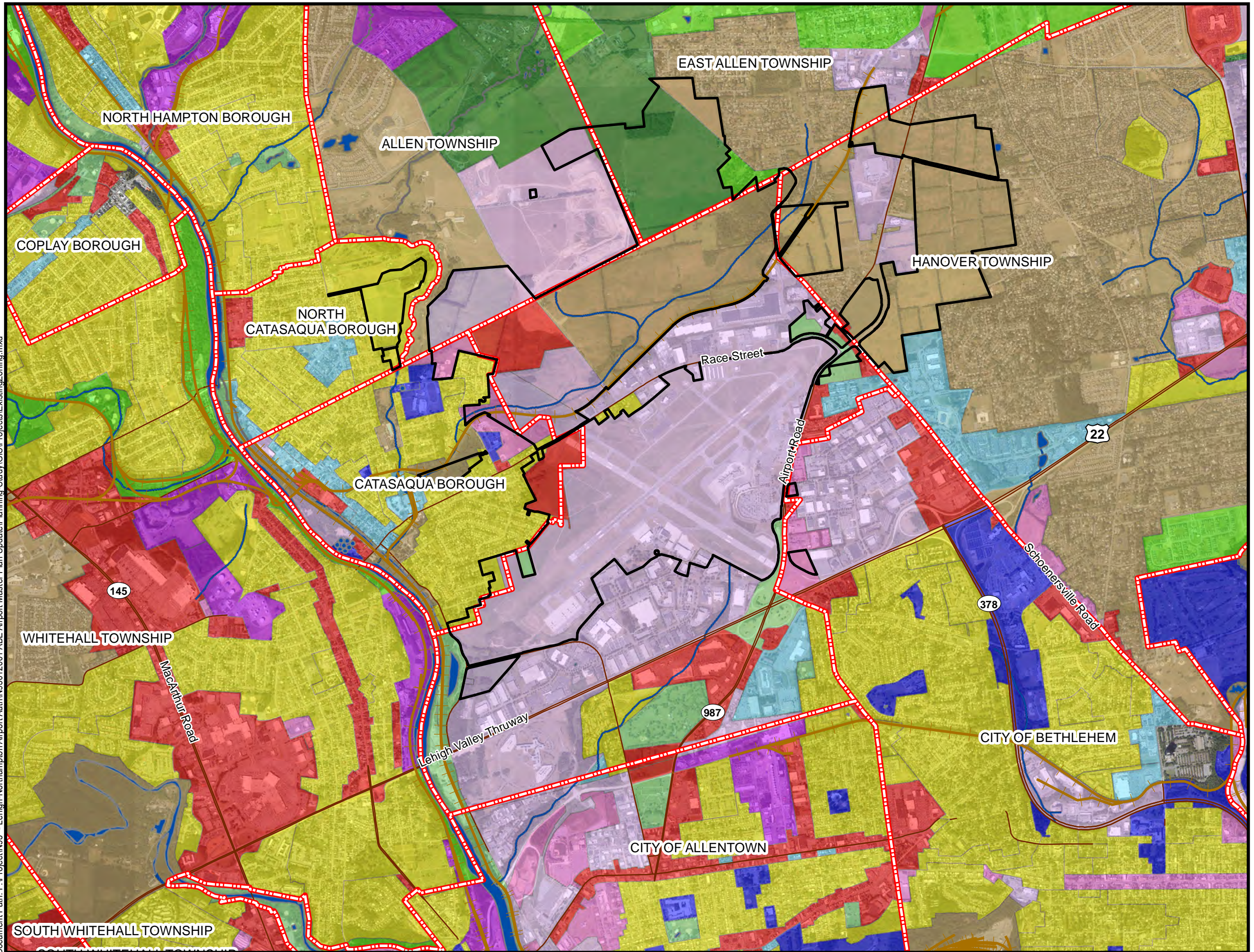
Lehigh Valley International Airport
Master Plan Update

Land Use

Figure 3.3.1

SOURCES: 2014 Parcel Data from Lehigh and Northampton Counties, Airport Property Line from Lehigh Northampton Airport Authority, County Subdivisions & Water Features from Census Bureau 2016 TIGER files Places taken from GoogleEarth. Noise Contours (2015) from LNAA for Final Part 150 NEM - August 2016.
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Legend

- Airport Property Line
- Municipal Boundaries
- Roads
- Railroads
- Streams and Rivers
- Lakes and Ponds

Zoning

- Agricultural Preservation
- Environmental Protection
- Heavy Industrial
- Institutional
- Light Industrial
- Mixed-Use
- Office/Business
- Retail Commercial
- Rural
- Suburban Residential
- Urban Residential

0 1,250 2,500 5,000 Feet

1 inch = 2,500 feet
When printed at 11" x 17"



Lehigh Valley International Airport
Master Plan Update

Existing Zoning Map

Figure 3.3.2

SOURCES: 2014 Parcel Data from Lehigh and Northampton Counties, Airport Property Line from Lehigh Northampton Airport Authority, County Subdivisions & Water Features from Census Bureau 2016 TIGER files Places taken from GoogleEarth. CREATED: November 2016 by C&S Engineers



and landing and take-off zones. There is also an excepted height limitation of 45 feet above the surface of the land for all other structures or trees located outside of these special restricted zones within an Airport District. Additional restrictions set forth by the Borough’s zoning code include any uses that may create electrical interferences with navigational signals or radio communications at the airport, create a difficulty in distinguishing between airport lights, produces considerable glare, impairs visibility within the airport vicinity, can create bird strike hazards, or can otherwise in any way endanger or interfere with the landing, takeoff, or maneuvering of aircraft intending to use the airport.⁸

North Catasauqua Borough

Currently, all Airport property located in North Catasauqua Borough is zoned as Urban Residential.

East Allen Township

Airport property located within East Allen Township is zoned as Light Industrial (LI), Agricultural Preservation (AG), and Suburban Residential (SR).

The primary purpose of an Agricultural District is to promote the continued preservation of agricultural activities by eliminating uses that are incompatible with farming but permitting limited agricultural support businesses. Uses permitted include those for general agriculture, forestry, greenhouses/nurseries, orchards, or parks. There are no special exception uses although acceptable conditional uses can be obtained for uses relating to intensive agriculture, farm-related businesses, single-family detached dwellings, commercial communication towers and antennas, schools, and solar energy farms. Parcels encompassed by this type of zoning are also subject to lot area, width, building coverage, height, minimum yard requirements, and buffer requirements.⁹

LI Districts contain an assortment of uses permitted by right in addition to multiple special exception and conditional uses. Dimensional restrictions apply with a restriction of 3 stories in height and building footprints are restricted in terms of impervious surface coverage in relation to lot size. Development also includes minimum yard requirements of at least 40 feet in addition to buffer/shrubbery requirements.¹⁰

SR Districts are characterized by their low to moderate densities with a predominant residential use. Uses permitted by right include general agriculture, forestry, mobile homes, parks, single-family detached cluster development, single-family detached dwellings, and communication towers mounted on an existing public utility transmission tower, building, or other structure. Special exception uses include cemeteries, nurseries/day-care centers, swimming clubs, and rooming/boardingshouses. Building heights are restricted in these areas at 2.5 stories and land coverage is restricted based on total impervious surface cover in proportion to lot size. Minimum yard requirements are in place for all uses.¹¹

Allen Township

Allen Township has jurisdiction over airport property located along Willowbrook Road. This property is zoned as LI.

Hanover Township

Airport property located in Hanover Township, Northampton County is designated as “Aircraft Flightpath

⁸ The Borough of Catasauqua, Lehigh County, PA, Chapter 280: Zoning, Article IX: Airport Hazards. Accessed 1/17/17. Accessible at: <http://ecode360.com/10692541>

⁹ Township of East Allen, Northampton County, Pennsylvania, Chapter 250: Zoning, Article III: Zoning Districts and Uses, Section 17 Agricultural Districts (AG). Accessed 1/17/17. Accessible at: <http://ecode360.com/12790324>

¹⁰ Township of East Allen, Northampton County, Pennsylvania, Chapter 250: Zoning, Article III: Zoning Districts and Uses, Section 22 Light Industrial/Business Park District. Accessed 1/17/17. Accessible at: <http://ecode360.com/12790324>

¹¹ Township of East Allen, Northampton County, Pennsylvania, Chapter 250: Zoning, Article III: Zoning Districts and Uses, Section 18 Suburban Residential District (SR) Accessed 1/17/17. Accessible at: <http://ecode360.com/12790324>



Highway Business District” (AFHBD). The purpose of this district is to allow for the design and development of selected types of business as a diversified non-residential community along portions of arterial and collector highways to the Airport as well as the Airport flightpath. All buildings located within this district are subject to FAA regulations for the maximum building height of two stories (35 feet). Buildings are also subject to minimum yard, distance between structure, and minimum lot coverage requirements.

Permitted uses within this district include: forestry, golf courses/driving ranges, general service repair shops, agriculture (excluding animal husbandry), professional practices such as law, medicine, veterinary, architecture, or engineering, business offices, real estate offices, printing and publishing plants, and light assembly.¹²

City of Bethlehem

Airport Property located under the jurisdiction of the City of Bethlehem is zoned as a General Commercial District. In a general Commercial District, residential uses are allowed. Special height restrictions exist for signage along Airport Road, as well as special restrictions for the Airport Approach Overlay Zone that is located in the City. Zoning restrictions in this area are subject to FAA and PennDOT regulations.¹³

Climatological Data

Climate

LVIA is situated within the Lehigh Valley at an elevation of 390 feet above sea level. Temperatures at the Airport are considered moderate and typical of a temperate climate with humid summers, cold winters, and mild springs and falls. Geological features such as Blue Mountain to the north and South Mountain to the south generally incur slight modifications to weather conditions.

The National Weather Service (NWS) has an ASOS (Automated Surface Observing System) based at the Airport to gather basic minute-by-minute, 24-hour weather information to be used for weather reporting. The ASOS at the Airport was installed on November 1, 1995 according to the U.S. National Climatic Data Center (NCDC) records.

According to Annual Climatological Summaries developed by the National Oceanic and Atmospheric Administration (NOAA), in 2015 the mean maximum temperature at the Airport was 85.3°F in the month of July and the mean minimum temperature at the Airport was 8.6°F in the month of February. The annual average temperature was 53.2°F with an average monthly mean maximum temperature of 64.2°F and an average monthly mean minimum temperature of 42.2°F.¹⁴

In 2015, a total of 36.32 inches of precipitation was recorded. The maximum monthly total precipitation occurred in June with a total of 7.59 inches, a +3.28 inch departure from the norm. The maximum daily precipitation total within a month was observed as 1.85 inches on the 28th of October. A total annual snowfall depth of 43.8 inches was recorded, with the monthly maximum total snow fall occurred in March at 17.8 inches with a maximum snow depth of 12 inches. Sixty-nine days throughout the entire year had greater than or equal to 0.1 inches of precipitation. Only six days throughout the entire year had greater than or equal to

¹² Chapter 185 Zoning, Article VIII Employment Districts: 38 Regulations Applicable to AFHBD Aircraft Flightpath Highway Business District. Accessed 2/16/17. Accessible at: <http://ecode360.com/6767577>

¹³ City of Bethlehem Zoning Ordinance, Part 13 of the Codified Ordinances of the City of Bethlehem, Lehigh, and Northampton Counties, Pennsylvania. Revised 6/15/12. Accessed 2/16/17. Accessible at: http://www.bethlehem-pa.gov/ordinance/zoning_ordinance_revised121515.pdf

¹⁴ U.S. Department of Commerce. National Oceanic & Atmospheric Administration. National Environmental Satellite, Data, and Information Service. National Centers for Environmental Information “Annual Climatological Summary (2015),” for Allentown Lehigh Valley International Airport, PA US COOP:360106. Accessed 09/17/16



1.0 inches of precipitation.¹⁵

Wind Coverage

FAA guidance provided in FAA AC 150/5300-13, indicates that maximal operational conditions for airport operations are dictated by the crosswind components for the airport’s design aircraft/group.

An existing wind analysis was undertaken using historical wind data obtained from the NOAA NCDC. Observations for this data were taken at the Airport for the period between January 1, 2006 and December 31, 2015. Percent wind coverage results are summarized in the following table for “AW” (All-Weather), “VFR” (Visual Flight Rule), and “IFR” (Instrument Flight Rule). Crosswind components are dictated by the airport’s Runway Design Code (RDC) with allowable crosswind components for each RDC summarized in **Table 3.3.1**. The RDC, analogous to the Airport Reference Code (ARC), signifies the design standards to which a runway is built.

Table 3.3.1: Allowable Crosswind Component per RDC

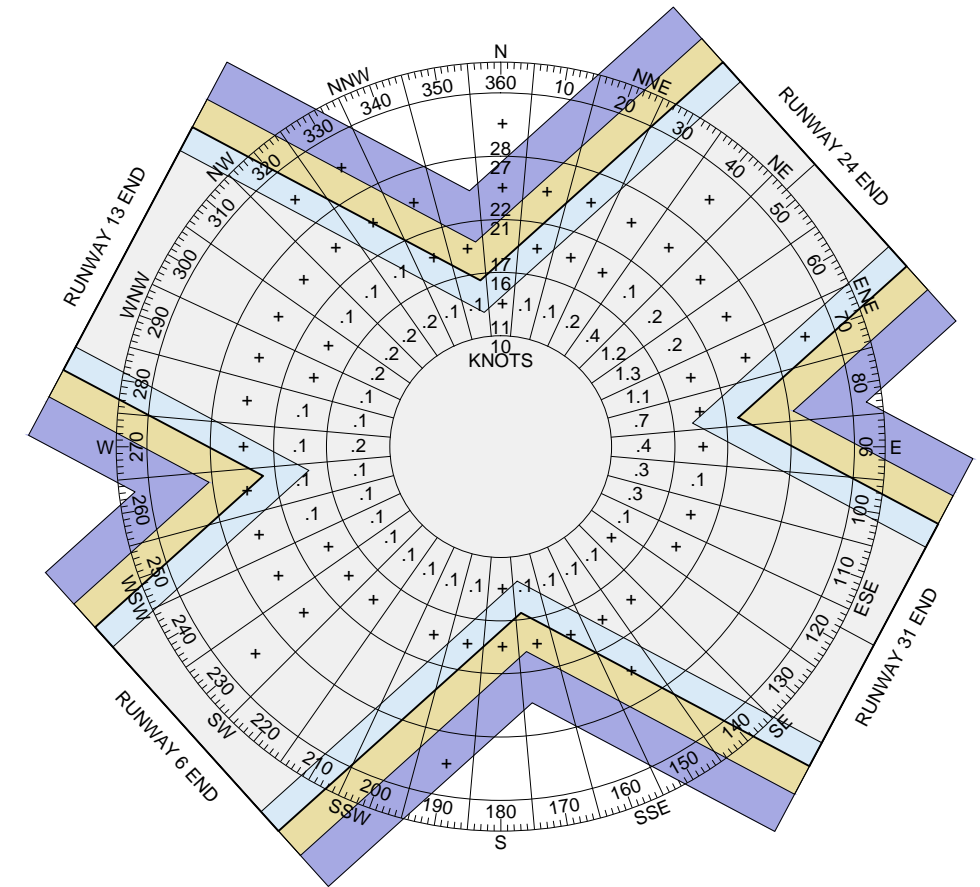
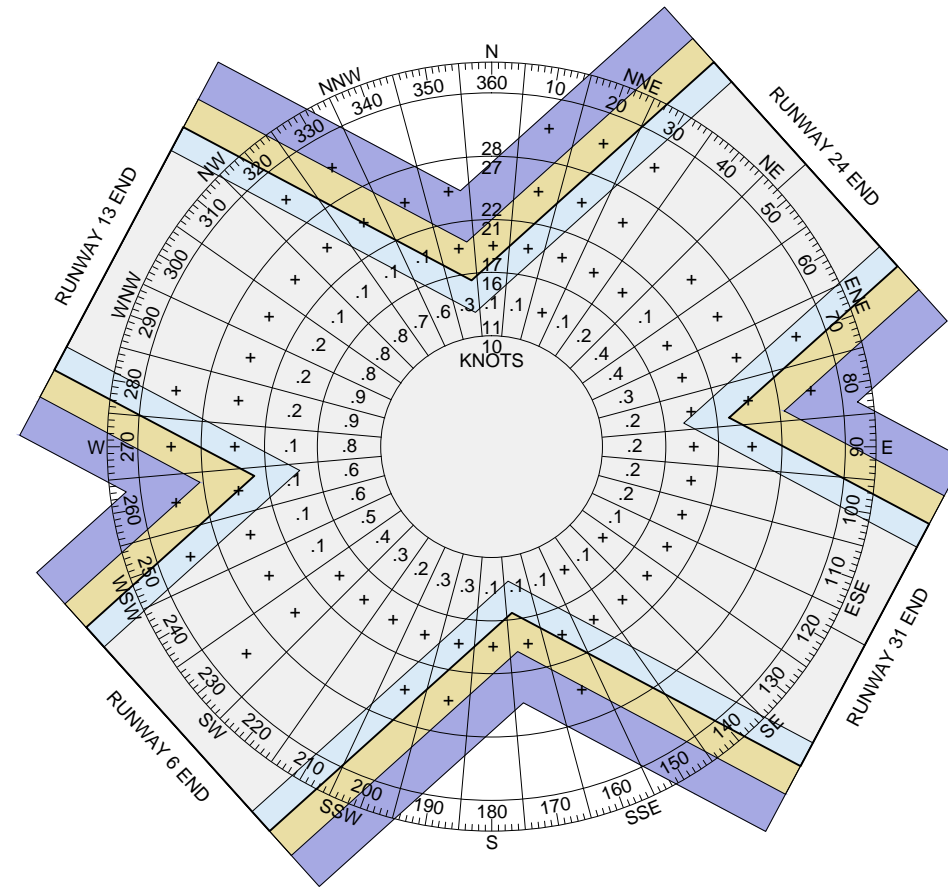
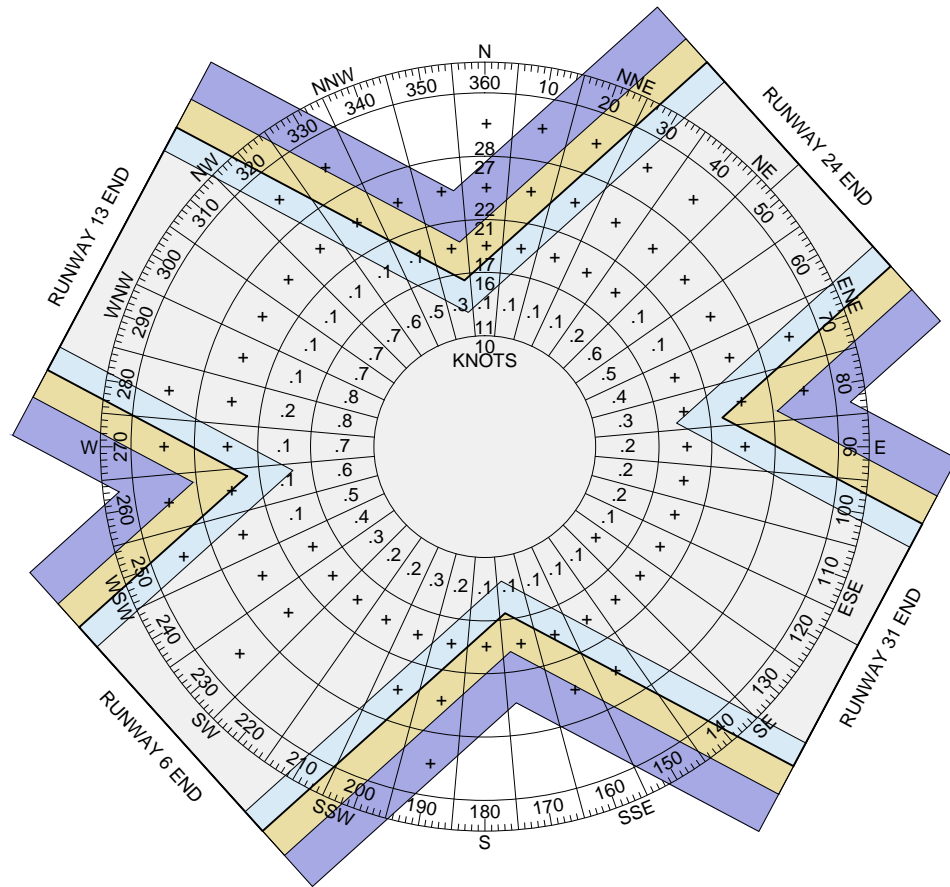
Allowable Crosswind Component (knots)	RDC
10.5	A-1 and B-I*
13	A-II and B-II
16	A-III, B-III C-I through D-III D-I through D-III
20	A-IV through B-IV C-IV through C-VI D-IV through D-VI E-I through E-VI

* Includes A-I and B-I small aircraft

Source: FAA AC 150-5300-13A

A wind rose figure for the Airport is presented in **Figure 3.3.3** and percent wind coverages are outlined in **Table 3.3.2**.

¹⁵ U.S. Department of Commerce. National Oceanic & Atmospheric Administration. National Environmental Satellite, Data, and Information Service. National Centers for Environmental Information “Annual Climatological Summary (2015),” for Allentown Lehigh Valley International Airport, PA US COOP:360106. Accessed 09/17/16



ALL WEATHER WIND COVERAGE			
CROSSWIND COMPONENT	PERCENT COVERAGE		
	RUNWAY 6-24	RUNWAY 13-31	COMBINED
10.5 KNOTS	93.50%	95.44%	99.24%
13 KNOTS	96.44%	97.88%	99.87%
16 KNOTS	99.04%	99.58%	99.98%
20 KNOTS	99.80%	99.92%	100.00%

VFR WIND COVERAGE			
CROSSWIND COMPONENT	PERCENT COVERAGE		
	RUNWAY 6-24	RUNWAY 13-31	COMBINED
10.5 KNOTS	92.77%	95.56%	99.19%
13 KNOTS	96.05%	97.97%	99.87%
16 KNOTS	98.95%	99.64%	99.98%
20 KNOTS	99.80%	99.94%	100.00%

IFR WIND COVERAGE			
CROSSWIND COMPONENT	PERCENT COVERAGE		
	RUNWAY 6-24	RUNWAY 13-31	COMBINED
10.5 KNOTS	97.16%	94.89%	99.51%
13 KNOTS	98.38%	97.46%	99.87%
16 KNOTS	99.40%	99.31%	99.96%
20 KNOTS	99.82%	99.83%	99.98%

Source: National Oceanic & Atmospheric Administration, National Climatic Data Center, Asheville, North Carolina. Observations taken at Lehigh Valley International Airport for the period between 2006 - 2015.



Table. 3.3.2: Percent Wind Coverage

Crosswind Component (knots)	Weather Conditions	Runway(s)		
		6-24	13-31	Combined
10.5	AW	93.50%	95.44%	99.24%
	VFR	92.77%	95.56%	99.19%
	IFR	97.16%	94.89%	99.51%
13	AW	96.44%	97.88%	99.87%
	VFR	96.05%	97.97%	99.87%
	IFR	98.38%	97.46%	99.87%
16	AW	99.04%	99.58%	99.98%
	VFR	98.95%	99.64%	99.98%
	IFR	99.40%	99.31%	99.96%
20	AW	99.80%	99.80%	99.82%
	VFR	99.92%	99.94%	99.83%
	IFR	100.00%	100.00%	99.98%

Source: C&S Engineers, Inc.; National Oceanic & Atmospheric Administration, National Climatic Data Center, Asheville, North Carolina. Observations taken at Lehigh Valley International Airport for the period between 2006-2015

A crosswind runway is recommended when the airport’s primary runway orientation provides less than 95% wind coverage. Due to the Airport’s existing crosswind runway, the percent wind coverage is sufficient under AW, VFR, and IFR conditions for all crosswind components for Runway 6/24 and Runway 13/31 combined.

An additional weather analysis was conducted using 2014 and 2015 data acquired from the Allentown weather station through the Northeast Regional Climatic Center (NRCC) at Cornell University to determine the occurrence of weather categories. The data was filtered based on the weather categories defined in **Table 3.3.3** and illustrates the percentage of time and number of hours under each category. Flight categories are derived from ceiling and visibility conditions, with ceiling values referring to the height above ground or water of the lowest layer of clouds below 6,000 meters covering more than half the sky and visibility values referring to the distance at which prominent objects or lights can be clearly discerned. This data indicates that approximately 93% of the time, weather conditions at the Airport are consistent with VFR ceiling and visibility indexes.



Table 3.3.3: Occurrence of Weather Categories (2011 – 2015)

Category	Ceiling (in feet)	Visibility (in miles)	2014-2015 Occurrence %	2014-2015 Hours in Categories	Two-Year Average Annual Hours
VFR	>=1,000	>=3	93.02%	40,763	8,153
IFR					
CAT I	>=200 & <1,000	>=1/2 & <3	6.27%	2,749	550
CAT II	>=100 & <200	>=1/4 & <1/2	0.62%	272	54
CAT IIIa	<100	>=700 feet & <1/4	0.06%	28	6
CAT IIIb	<100	>=150 feet & <700 feet	0.03%	12	2
CAT IIIc	<100	<150 feet	0.00%	-	-
Total CAT II and CAT III Conditions			0.71%	312	62
Total IFR			6.98%	3,061	612
Total			100.00%	43,824	8,765

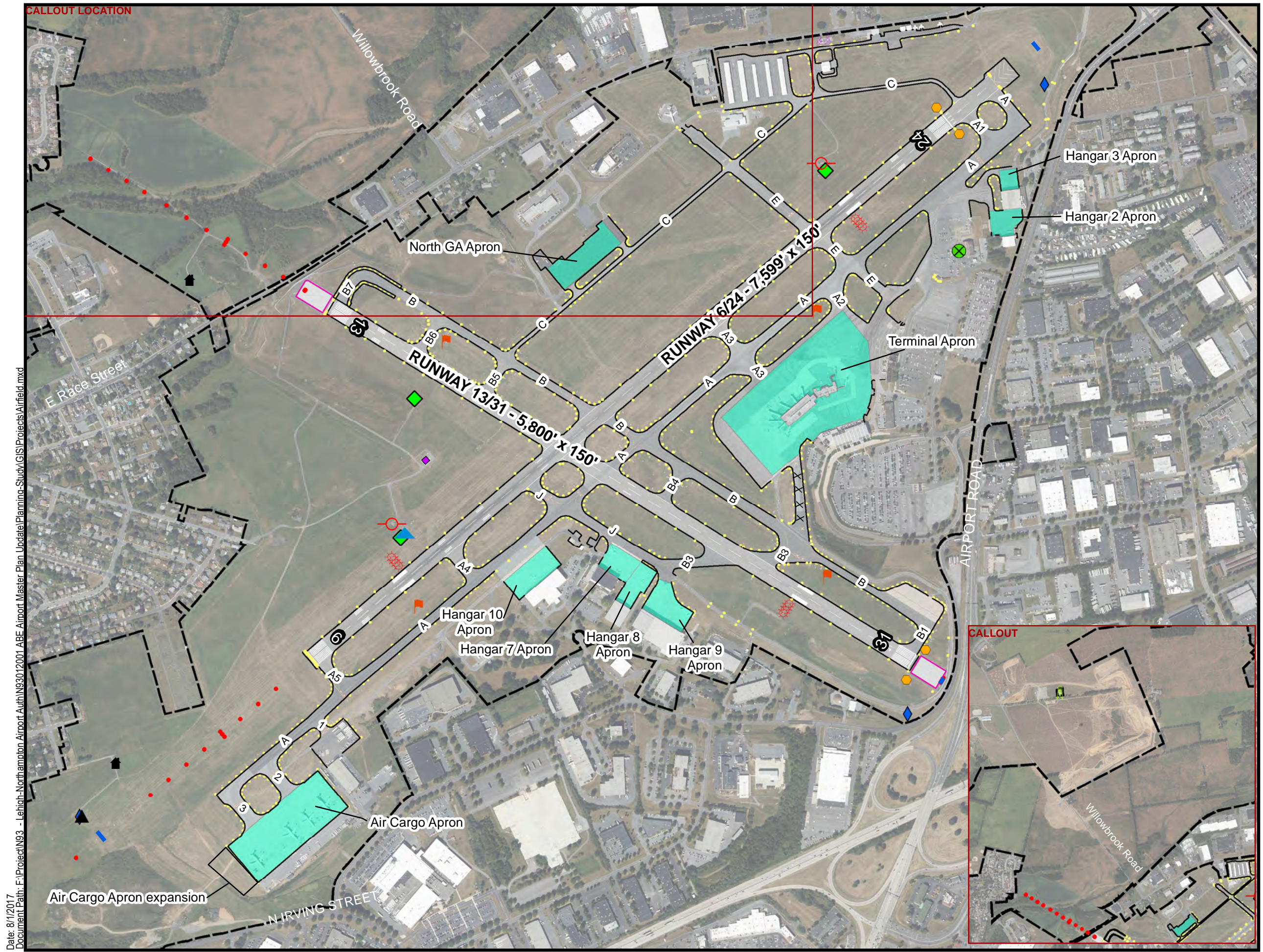
Source: C&S Engineers, Inc.; Northeast Regional Climate Center (NRCC); CLIMOD product: Hourly Observations; Start Date: January 1, 2014; End Date: December 31, 2015. Data report created by NRCC, Cornell University 09/02/2016 15:48 UTC; Data summarized by C&S Engineers, Inc. - September 8, 2016. Numbers may not add up as a result of rounding.

Note: Total hours available calculated by 365 days per year x 24 hours x 5 years = 43,800 hours

3.4 Airfield

Airfield facilities include those that directly support airport operations including runways, taxiways, navigational aids (NAVAIDs), and apron areas. The following section documents existing conditions for airfield facilities at LVIA. **Section 5 – Demand Capacity and Facility Requirements** will address existing airfield design conditions in regards to FAA design standards.

LVIA’s airfield is shown in **Figure 3.4.1**. **Table 3.4.1** provides a summary of the existing airside facilities which are described in the subsequent text.



Legend

- Airport Property Line
- Apron
- EMAS

Visual NAVAIDs

- 🚩 Windcone
- ☀️ PAPI
- 🟡 REIL
- Airfield Lights
- MALSR
- 🏠 MALSR Shelter
- ⊗ Rotating Beacon

Electronic NAVAIDs

- ◆ ILS-GS
- ILS-LOC
- ◆ ILS-LOC Shelter
- ▲ DME
- 📡 FAA Airport Surveillance Radar

NAVAID Support Equipment

- RVR
- ▲ ASOS
- 📡 FAA Radio Towers
- 🟪 Airfield Electrical Vault

* Note: Runways and Taxiways labeled by nomenclature

0 200 400 800 1,200 Feet
1 inch = 800 feet
When printed at 11" x 17"



Lehigh Valley International Airport
Master Plan Update

Airfield and NAVAIDs

Figure 3.4.1

Date: 8/1/2017
Document Path: F:\Project\N93 - Lehigh Valley International Airport Authority\N93012001 ABE Airport Master Plan Update\Planning-Study\GIS\Projects\Airfield.mxd

SOURCES: NAVAIDs from aerial imagery and 2004 ALP/2015 Updated ALP Base files from LNA; Taxiway labels from AirNav. Aprons digitized by C&S Engineers, Inc. Aerial Imagery from Quantum Spatial taken 09/12/16 CREATED BY: C&S Engineers, Inc.



Table 3.4.1: Runway System Characteristics

Characteristics	Runway 6-24	Runway 13-31
Use	Primary	Crosswind
Length (feet)	7,599	5,800
Displaced Threshold (feet)	0 / 510	0 / 0
Width (feet)	150	150
Condition	This information will be provided in Element 16: Pavement Management Plan	
Pavement Condition Index	This information will be provided in Element 16: Pavement Management Plan	
Pavement Condition Number	This information will be provided in Element 16: Pavement Management Plan	
Pavement Strength (pounds)		
Single Wheel	75,000	75,000
Dual Wheel	209,000	161,000
Tandem	370,000	290,000
Composition	Asphalt/grooved	Asphalt/grooved
Wind Coverage (AW)		
10.5 knots	93.50%	95.44%
13 knots	96.44%	97.88%
16 knots	99.04%	99.58%
Markings	Precision / Precision	Precision / Non-Precision
Edge Lighting	HIRL/HIRL	HIRL/HIRL
Approach Lighting	MALSR / 0	MALSR / 0

Source: FAA Airport Master Record Form 5010 (09/15/2016), AirNav (01/01/2016) and C&S Engineers, Inc.



Runways

Runway 6-24, the primary runway, is 7,599 feet long by 150 feet wide. There is a 510-foot displacement on the Runway 24 end. **Table 3.4.2** lists the declared distances (runway lengths available for takeoff and landing).

Table 3.4.2: Runway 6-24 Declared Distances (feet)

Runway End	Takeoff Run Available (TORA)	Takeoff Distance Available (TODA)	Accelerate Stop Distance Available (ASDA)	Landing Distance Available (LDA)
6	7,600	7,600	7,600	7,600
24	7,600	7,600	7,600	7,090

Source: FAA Airport Master Record Form 5010 (09/15/2016)

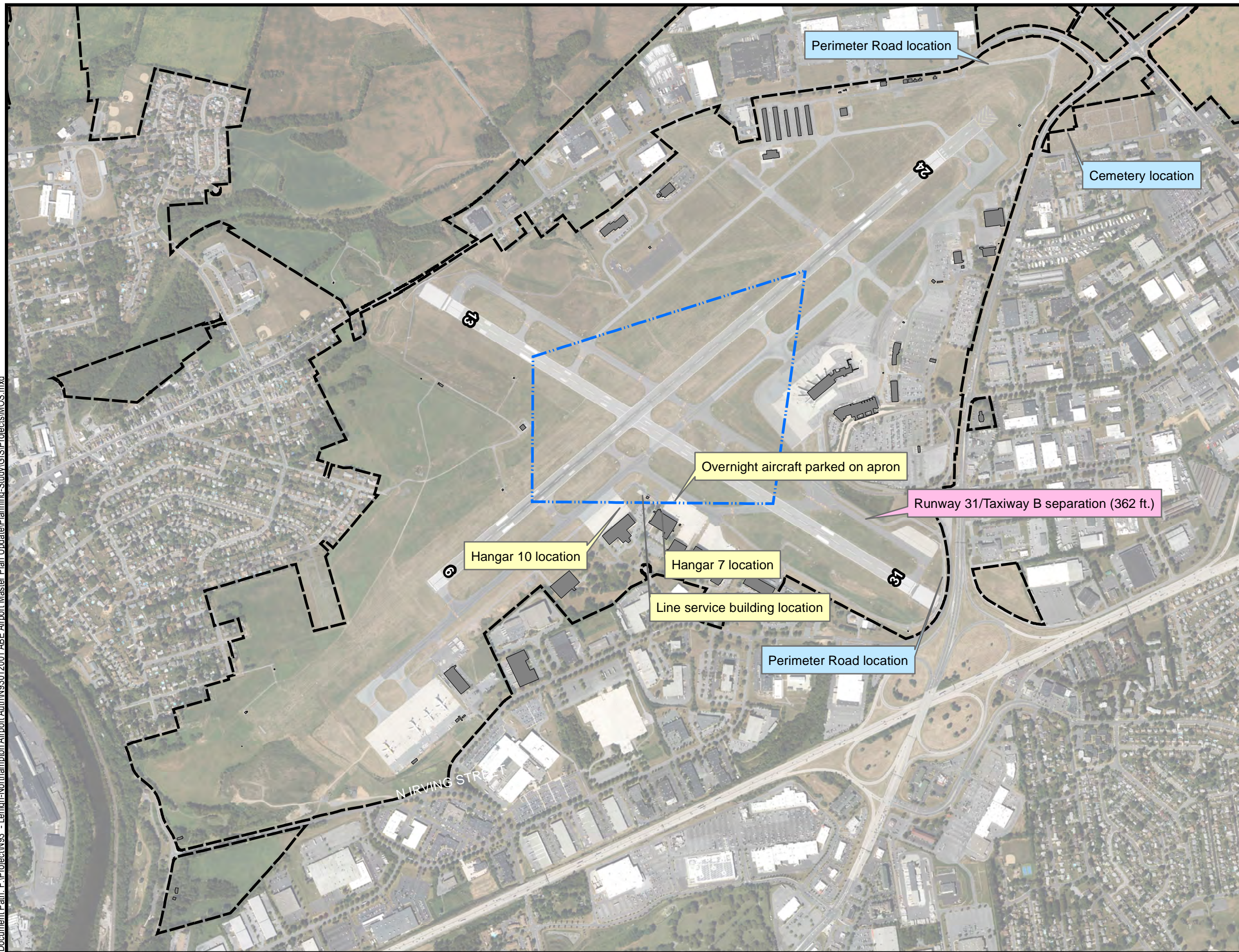
Runway 6-24 consists of grooved asphalt with precision instrument pavement markings. Runway 6-24 is equipped with high intensity runway edge lights (HIRLs) and centerline lights. Both runway ends have precision performance capability through an instrument landing system (ILS) and an Area Navigation (RNAV) global positioning system (GPS) localizer (LOC) performance with vertical guidance (LPV). Both runway ends have 4-light precision approach path indicators (PAPIs). Runway 24 has runway end identifier lights (REILs). Runway 6 has a medium intensity approach lighting system (MALSR) and Runway 24 is also served by distance measuring equipment (DME).

Runway 13-31 is 5,800 feet long by 150 feet wide. The grooved asphalt runway is equipped with HIRLs. Runway 13 has precision performance capability through an ILS and a RNAV GPS LPV. Runway 13 has precision instrument pavement markings and a MALSR. Runway 31 has a non-precision approach with visibility minimums greater than ¾ mile. Runway 31 has non-precision instrument pavement markings, REILs and 4-light PAPIs.

The runway visibility zone (RVZ) is defined as an area formed by imaginary lines connecting the two runways' line of sight points. Line of sight points are imaginary points located on the runway centerline at locations determined by runway geometric dimensions. In the RVZ, any point five feet above the runway centerline must be mutually visible with any other point five feet above the centerline of the crossing runway and inside the RVZ. As indicated in **Figure 3.4.2**, there are currently three FAA approved modifications to the RVZ design standard:

- Hangar 7/10 (approved 12/1993)
- Overnight aircraft parked on apron (approved 12/1993)
- Hangar 10 and line service building (approved 9/2002)

Date: 1/18/2018
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Legend

- Airport Property Line
- - - Runway Visibility Zone (RVZ)

Modification of Standards (MOS) to the:

- Runway Visibility Zone (RVZ)
- Runway/Taxiway Separation
- Runway Object Free Area (ROFA)

0 300 600 1,200 Feet
1 inch = 1,000 feet
When printed at 11" x 17"



Lehigh Valley International Airport
Master Plan Update
**Modification of Standards
(MOS) Locations**

Figure 3.4.2

SOURCES: Aerial Imagery from Quantum Spatial taken 09/12/16 CREATED BY: C&S Engineers, Inc.



Taxiways

Each runway is served by a full length parallel taxiway. The airfield is also developed with a network of connector and cross-field taxiways. The taxiways are equipped with medium intensity taxiway edge lights (MITL) and centerline/edge pavement markings. The required separation from the parallel taxiways' centerlines to their associated runways' centerlines is 400 feet. There is currently an FAA approved Modification of Standards (MOS) to the Runway/Taxiway Separation design standard for a section of Taxiway B (approaching Runway 31) that provides only 362 feet of separation from the runway centerline (approved 12/1993). The taxiway locations can be viewed in **Figure 3.4.1** and **Table 3.4.2** lists and summarizes the characteristics of each taxiway.

Table 3.4.2: Taxiways

Taxiway	Serves	Width (feet)
A	Parallel to RW 6-24; extends beyond RW 6 to cargo apron	75
A1	Access from TW A to RW 24	
A2	Access from TW A to terminal apron	
A3	Access from TW A to RW 6-24 and terminal apron	
A4	Access from TW A to RW 6-24	
A5	Access from TW A to RW 6	
B	Parallel to RW 13-31	75
B1	Access from TW B to RW 31	
B3	Access from TW B to RW 13-31 and Hangars 7-9	
B4	Access from TW B to RW 13-31	
B5	Access from TW B to RW 13-31	
B6	Access from TW B to RW 13-31	
B7	Access from TW B to RW 13	
C	Cross-field from RW 24 to TW B	35
E	Cross-field from terminal apron to ARFF facility	93
J	Connector from RW 6-24 to Hangars 7-9	60

Note: Pavement type and condition will be provided in Element 16: Pavement Management Plan

Safety Areas and Object Free Areas

Runways and taxiways are surrounded by rectangular areas known as “safety areas”. These areas have slopes ranging from 1% to 5% and should be graded and free of obstructions to enhance the safety of aircraft that undershoot, overrun, or veer off a runway or taxiway. The purpose of the safety areas is to minimize the probability of serious damage to aircraft accidentally entering the area, and to provide greater accessibility for firefighting and rescue equipment during such incidents.

Runway design standards applicable to each runway are specified by the Runway Design Code (RDC). The RDC consists of three components related to the operational demands of aircraft:

- Aircraft Approach Category (AAC) – approach speed
- Airplane Design Group (ADG) – wingspan and tail height
- Runway Visibility Range (RVR) - visibility minimums

The Airport Layout Plan (ALP), approved in December 2004, identified the existing RDC for Runway 6-24 as D-IV and the existing RDC for Runway 13-31 as C-III. Based on the RDC, the applicable Runway Safety Area (RSA) for both runways is 500 feet wide centered on the runway and extends for 600 feet prior to the



arrival threshold and 1,000 feet beyond the departure end. The RDC and these surfaces will be further evaluated in the facility requirements based on the forecasts of aviation demand.

An Engineered Materials Arresting System (EMAS) provides a level of safety that is equivalent to an RSA and is considered to be a “standard RSA.” An EMAS is designed to stop an overrunning aircraft by exerting predictable deceleration forces on its landing gear as the EMAS material deforms. An EMAS is installed on Runways 13 and 31.

Areas known as Object Free Areas (OFAs) also surround runways and taxiways. These areas require clearing of objects except for any object whose location is fixed by function. The purpose of the OFAs is to provide safe and efficient operations at the Airport. The applicable Runway Object Free Area (ROFA) for both runways is 800 feet wide and centered on the runway, and extends for 600 feet prior to the threshold and 1,000 feet beyond the departure end. There are currently two FAA approved modifications to the ROFA design standard:

- Perimeter road in ROFA of Runway 24 and Runway 31 (approved 10/1993)
- Corner of cemetery located 250 feet from extended Runway 6 centerline with 300-foot penetration (approved 12/1993)

The Taxiway Safety Area (TSA) is a defined surface alongside the taxiway that is suitable for reducing the risk of damage to an aircraft deviating from the taxiway. The applicable TSA for ADG III is 118 feet and for ADG IV is 171 feet. The Taxiway Object Free Area (TOFA) for ADG III is 186 feet and for ADG IV is 259 feet. The ADG and these surfaces will be further evaluated in the facility requirements based on the forecasts of aviation demand.

Runway Protection Zone

As defined by FAA AC 150/5300-13A, Airport Design, the function of the Runway Protection Zone (RPZ) is to enhance the protection of people and property on the ground. This is best achieved by Airport acquisition of property located within the RPZ and clearing it of incompatible land uses and obstructions. The RPZ is a trapezoidal shape centered on and extending out from the runway centerline, and contains a Central Portion and a Controlled Activity Area. The Central Portion of the RPZ is equal in width to the runway OFA. The Controlled Activity Area is the remaining area of the RPZ on either side of the Central Portion of the RPZ. The dimensions of an RPZ are determined by the type of aircraft that the facility serves as well as the approach visibility minimums for each runway end. RPZ dimensions for each runway end are outlined in **Table 3.4.3**.

Table 3.4.3: LVIA Approach Runway Protection Zones (RPZ)

RPZ	6	24	13	31
Length	2500 ft.	1700 ft.	2500 ft.	1700 ft.
Inner Width	1000 ft.	1000 ft.	1000 ft.	1000 ft.
Outer Width	1750 ft.	1510 ft.	1750 ft.	1510 ft.

Source: FAA AC 150/5300 13A



Lighting and Navigational Aids (NAVAIDs)

Lighting/Visual NAVAIDs

Visual aids to navigation are extremely important, especially for those under VFR. The visual aids at the Airport include:

- **Wind Sock** – a wind sock is a conical textile tube that provides a visual indication of wind direction and velocity. The Airport has five lighted wind cones:
 - south of RW 6, between TW A4 and A5
 - south of RW 24, between TW A3 and A2 (primary windcone)
 - south of RW 24, between TW A2 and A1
 - east of RW 13, between TW B6 and B5
 - east of RW 31, between TW B1 and B3
- **Airport Beacon** – A rotating beacon is installed at an airport to indicate its location to aircraft pilots at night. The beacon rotates at a constant speed, which produces the visual effect of flashes at regular intervals of two alternating colors (180°, Green & White). The airport beacon is located adjacent to the rental car quick turnaround area.

Airport Beacon



Source: C&S Engineers, Inc.

The Airport has several different lighting systems to facilitate operations during periods of low visibility or at night. A summary of lighting is summarized in **Table 3.4.4** and includes the following:

- **Runway Edge Lighting** – both runways have HIRLs
- **Runway Centerline Lighting (RCL)** – in pavement RCLs are installed on Runway 6-24.
- **Approach Lighting System (ALS)** – the MALSR is a configuration of lights positioned uniformly along the extended runway centerline for the purpose of visual guidance. The MALSR is provided to augment the ILS and provides a ground reference aid for the pilot when making an approach to the runway. MALSR are installed on Runways 6 and 13.
- **Runway End Identifier Lights (REILs)** – REILs are installed at an airfield to provide rapid and positive identification of the approach end of a particular runway. The system consists of a pair of synchronized flashing lights located laterally on each side of the runway threshold. REILs are installed on Runways 24 and 31.
- **Precision Approach Path Indicator (PAPI)** – provides visual approach slope guidance during aircraft landing operations. A PAPI system consists of two-four light units, located left of the runway edge and perpendicular to the runway centerline. PAPIs are installed on Runways 6, 24 and 31.
- **Taxiway Lighting** – all taxiways have MITL

Table 3.4.4: Runway Lighting

Lighting	6	24	13	31
HIRL	✓	✓	✓	✓
RCL	✓	✓		
MALSR	✓		✓	
REIL		✓		✓
PAPI	✓	✓		✓

Source: FAA Airport Master Record Form 5010 (09/15/2016), AirNav (01/01/2016) and C&S Engineers, Inc.



Electronic Aids to Navigation

Electronic NAVAIDS help pilots navigate to and land at the airport and are generally classified by the approach procedures they support. Electronic NAVAIDS and the approaches they support at the Airport include:

Precision Approach

- **ILS** – an electronic ground-based system that provides precision lateral and vertical guidance to an aircraft approaching and landing on a runway, using radio signals to enable a safe landing during periods of low ceilings or reduced visibility. The Glide Slope (GS), LOC, and DME are primary discrete radio antenna components of the ILS. There is an ILS approach to Runways 6, 24 and 13.

Runway 13 Glide Slope



Source: C&S Engineers, Inc.

Approaches with Positive Vertical Guidance

A Wide Area Augmentation System (WAAS) is an air navigation aid to augment the GPS by improving its accuracy. GPS uses a network of satellites to create reference points that allows users with GPS receivers to determine their latitude, longitude and altitude. RNAV describes an aircraft’s capability to navigate using performance standards and enables aircraft to navigate using a combination of GPS and ground based navigational aids as a network of navigation beacons. This provides the most efficient use of airspace because coverage is limited by the capabilities of the network rather than a single system.

- **Localizer Performance with Vertical Guidance (LPV)** – lateral and vertical guidance to provide approach capabilities similar to Category I ILS.
- **Lateral Navigation/Vertical Navigation (LNAV/VNAV)** – provide both horizontal and vertical approach guidance.

Non-Precision Approach

- **Lateral Navigation (LNAV)** – WAAS RNAV (GPS) non-precision approach that provides lateral guidance.
- **Very High Frequency Omnidirectional Range (VOR) Circling** – short-range radio navigation system enabling aircraft to determine their position and stay on course by receiving radio signals transmitted by a network of fixed ground radio beacons. There is a VOR-A circling approach.
- **Tactical Air Navigation System (TACAN)** – provides bearing and distance information.

Table 3.5.5 summarizes the electronic NAVAIDS and **Table 3.4.6** summarizes the published Instrument Approach Procedures (IAP) for LVIA. LVIA also has published takeoff minimums, departure procedures and IFR Alternate Airport Minimums.

Table 3.4.5: Electronic NAVAIDS

NAVAID	6	24	13	31
GS	✓	✓	✓	
LOC	✓	✓	✓	
DME		✓		

Note: GS, LOC, and DME are components of the ILS

Source: FAA Airport Master Record Form 5010 (09/15/2016), AirNav (01/01/2016) and C&S Engineers, Inc.



Support Equipment

The airport is also served by the following support equipment:

- **Automated Surface Observing System (ASOS)** – an automated sensor suite, which is designed to serve aviation and meteorological observing needs for safe and efficient aviation operations, weather forecasting and climatology. An ASOS is located northwest of the intersection of Runway 6-24 with Taxiway A4.
- **Runway Visual Range (RVR)** – a system that measures visibility, background luminance, and runway light intensity to determine the distance a pilot should be able to see down the runway. The RVR interfaces with the ASOS to support precision landing and takeoff operations. There are RVRs serving runways 6 and 24.

Runway 24 Glide Slope and RVR



Source: C&S Engineers, Inc.

Table 3.4.6: LVIA IAPs and Minimums
Aircraft Approach Category
Altitude/Visibility Minimums in 1,000's of Feet)

Procedure	Category	A	B	C	D
ILS or LOC RWY 6	S-ILS 6	594/24	594/24	594/24	594/24
	S-LOC 6	920/24	920/24	920/55	920/55
	Circling	920/1	920/1	920/1½	980/2
ILS or LOC/DME RWY 24	S-ILS 24	587/40	587/40	587/40	587/40
	S-LOC 24	800/55	800/55	800/60	800/60
	Circling	900-1	900-1	900/1½	980/2
ILS or LOC RWY 13	S-ILS 13	633/1	633/1	633/1	633/1
	S-LOC 13	1260/1	1260/1	1260/2½	1260/2¾
	Circling	900-1	900-1	900/1½	980/2
RNAV (GPS) RWY 6	LPV DA	594/24	594/24	594/24	594/24
	LNAV/VNAV DA	644/24	644/24	644/24	644/24
	LNAV MDA	840/24	840/24	840/45	840/45
	Circling	900-1	900-1	900/1½	980/2
RNAV (GPS) RWY 24	LPV DA	587/40	587/40	587/40	587/40
	LNAV/VNAV DA	783/1¼	783/1¼	783/1¼	783/1¼
	LNAV MDA	860/55	860/55	860/1 ³ / ₈	860/1 ³ / ₈
	Circling	900/1	900/1	900/1½	980/2
RNAV (GPS) RWY 13	LPV DA	636/½	636/½	636/½	636/½
	LNAV/VNAV DA	758/1¼	758/1¼	758/1¼	758/1¼
	LNAV MDA	940/1	940/1	940/1 ⁵ / ₈	940/1 ⁵ / ₈
	Circling	940/1	940/1	940/1 ⁵ / ₈	980/2
RNAV (GPS) RWY 31	LPV DA	633/¾	633/¾	633/¾	633/¾
	LNAV/VNAV DA	758/1¼	758/1¼	758/1¼	758/1¼
	LNAV MDA	940/1	940/1	940/1 ⁵ / ₈	940/1 ⁵ / ₈
	Circling	940/1	940/1	940/1 ⁵ / ₈	980/2
VOR-A	Circling	980/1	980/1	980/1½	980/2
TACAN-C	Circling	940/1	940/1	940/1½	980/2

Note: Approach plates are documented in the **Appendix**. Source: AirNav (01/01/2016) and C&S Engineers, Inc.



NAVAID and Support Equipment Condition

Table 3.4.7 indicates construction dates for the above NAVAIDs and support equipment.

Table 3.4.7: NAVAID and support equipment construction dates

Runway 6 Glide Slope	1954
Runway 6 Localizer	1954
Runway 6 MALSR	1978
Runway 24 Glideslope	2006
Runway 24 Localizer	2006
Runway 13 Glideslope	1976 (relocated in 2015)
Runway 13 Localizer	1976
Runway 13 MALSR	1977
ABE RTR	1955

Source: LNAA and C&S Engineers, Inc.

Airfield Electrical Vault

The Airfield Electrical Vault is located in the western area of the airfield, north of Runway 6 and west of Runway 13. The vault was built in 2003 and is accessible via the Airport’s perimeter road.

Aircraft Parking Aprons

The Airport has multiple aircraft parking aprons available for based and transient aircraft use. The North GA Apron is currently vacant and is being used for additional Ground Support Equipment (GSE) equipment storage. **Table 3.4.8** indicates details regarding all aircraft parking aprons.

Table 3.4.8: Aircraft Parking Aprons

Location	Based/Transient	Area (sq. yd.)	Physical Condition	Aircraft Spaces/Tie-downs
North GA Apron	Based	14,949		36
Terminal	Transient	96,500		14
Hangar 2	Based	6,015	This information will be provided in Element 16: Pavement Management Plan	Private
Hangar 3	Based	3,036		Private
Hangar 7	Transient & Based	7,129		8
Hangar 8	Based	7,056		18
Hangar 9	Based	10,970		
Hangar 10	Based	10,830		
Air Cargo Apron	Transient	45,016		5

Source: C&S Engineers, Inc. Apron dimensions measured using ArcGIS and are approximate values.

Signage and Markings

Airfield signage is used for navigational and safety purposes. Types of signage located on the airfield include informational and directional signage.

Airfield pavement markings provide information that is useful during aircraft takeoff, landing, or taxiing. Examples of airfield markings used at the Airport include the following:

- Holding Position Marking for the Runway/Approach Surface
- Holding Position Marking for the ILS/POFZ (Precision Obstacle Free Zone)
- Holding Position Marking for the Intermediate
- Enhanced taxiway centerline marking
- Taxiway edge marking (continuous and dashed)
- Non-movement area boundary marking
- Vehicle roadway markings
- Surface painted Holding Position Signs¹⁶

Airspace and Air Traffic Control

As indicated in **Figure 3.4.3**, LVIA operates under Class C airspace.

The criteria for a site receiving a Class C airspace is that it must have an operational ATCT, be serviced by a radar approach control, and have either at least 75,000 annual instrument operations at the primary airport, at least 100,000 annual instrument operations at the primary and secondary airports in the terminal area hub, or at least 250,000 enplaned passengers at the primary airport.

Although variations do exist, the general configuration of Class C airspace is laterally represented as two circles centered on the airport reference point. The inner circle has a 5 NM radius and the outer circle has a 10 NM radius. Typical vertical limits of the ceiling of the Class C airspace is 4,000 feet above the primary airport's field elevation, with the 5 NM circle extending down to the surface and the airspace between the 5 and 10 NM circles extending no lower than 1,200 feet Above Ground Level (AGL).¹⁷

Figure 3.4.3: Airspace Classification



Source: Types of Controlled Airspace, ALC Content, FAA. Accessible at:
https://www.faasafety.gov/gslac/ALC/course_content.aspx?cID=42&sID=505&preview=true

While operating in Class C airspace, pilots must establish and maintain two-way radio communications with the ATCT from the airport from which they are operating or from the ATCT of the facility having

¹⁶ “Airfield Signage and marking Plan – Exhibit 311 (1-3)” Lehigh Northampton Airport Authority

¹⁷ FAA, Order NO 7400.2H, Section 2, Class C Airspace Standards. Accessible at:
<http://tfllearning.fly.faa.gov/publications/atpubs/AIR/air1602.html>

jurisdiction over the airspace. All aircraft within the Class C airspace must be equipped with the appropriate transponder equipment as identified in 14 Code of Regulations (CFR) Part 91, section 91.215. Additionally, beginning January 1, 2020, all aircraft operating in the Class C airspace described in 14 CFR Part 91, section 91.225 must have ADS-B Out equipment installed.¹⁸

When operating in Class C Airspace it is required for ATC to separate aircraft operating under VFR rules from aircraft operating under IFR rules. VFR weather minimums in Class C Airspace require visibility of 3 statute miles and distances from clouds of 1,000 feet above, 500 feet below, and 2,000 feet horizontally.

3.5 Terminal Area

The passenger terminal complex at LVIA is located in the southeast quadrant of the Airport adjacent to the Runway 24 and Runway 31 endpoints and the Airport Access Road. The terminal complex is classified as a satellite configuration, which is one of four basic terminal concepts outlined in FAA AC 150/5360-13, *Airport Terminal Planning and Design*. Airside access from the runway system to the terminal complex is via parallel Taxiway A or Taxiway B. The main terminal is accessible from the landside via City Line Road. In front of the terminal complex is the public parking lot, and adjacent to the terminal complex to the east was a maintenance facility that was demolished in December 2016 to build a Multi-modal Transportation Center. **Figure 3.5.1** depicts a site plan of the existing terminal area.

Terminal Building



Source: LVIA, Accessed from:
<http://www.flylv.com/stay-connected/facts/>

At LVIA, the terminal complex consists of two main facilities: the terminal Main Terminal and the Satellite Concourse. The Main Terminal is three floors, and an approximate total floor area of 97,300 square-feet, excluding the Floor 3 office space. Floors 1 and 2 are the primary public areas that contain the major functional areas, and are accessed by a stacked roadway and curbside passenger pick-up and drop-off locations. Floor 3 is non-public area consisting of the Airport Authority offices. The Main Terminal is connected to the Satellite Concourse via an underground tunnel at the central building vertical circulation core.

The Satellite Concourse is a combination of two building, the Satellite Wiley Concourse and the old Satellite Concourse. The concourse is two floors, and an approximate total floor area of 68,305 square feet (77,088 square-feet including the tunnel). Floor 2 of the western part of the concourse is the primary public area that contains major functional areas including holdrooms, concessions, and restrooms. Floor 1 of the eastern part of the concourse contains the same elements, although is only utilized for overflow. Level 1 of the western part of the concourse is occupied by airline and airport offices, and concessions support space.

Terminal Apron Area

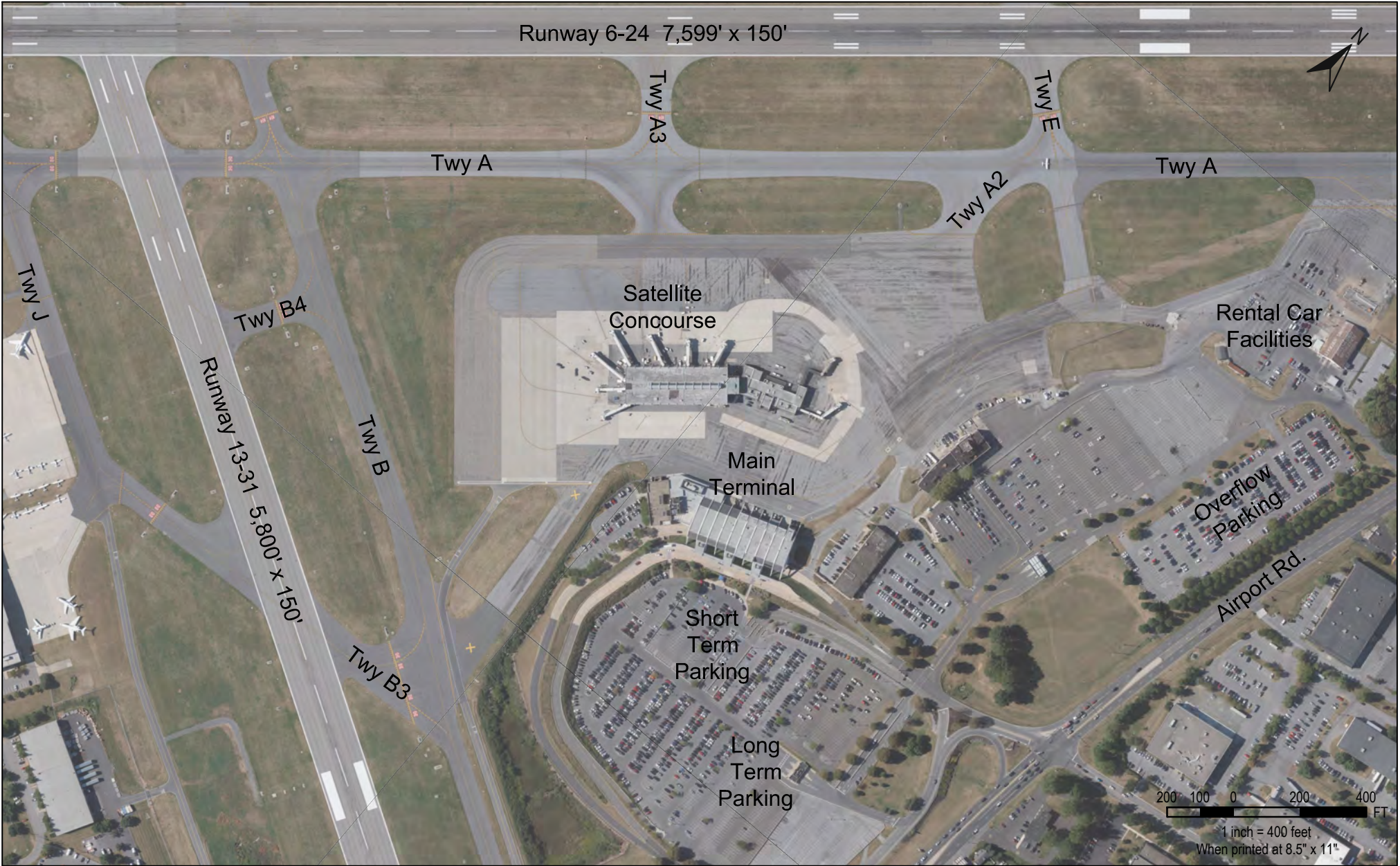
The Satellite Concourse is approximately 600 feet long with a total of 15 gates. The eastern part of the

¹⁸ *FAA Regulations and Policies, Handbook, Chapter 15 Airspace*, Accessed 2/14/17. Accessible at:
https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/17_phak_ch15.pdf



concourse has six gates, two of which are served by loading bridges. The western part of the concourse has nine gates, of which seven are served by loading bridges. The eastern concourse is only used as needed for overflow or chartered aircraft. The western part of the concourse is served by Allegiant, American, Delta, and United airlines. Gates 14 and 15 are typically utilized by American. **Table 3.5.1** depicts existing airline allocation, existing aircraft types, and largest aircraft types by gate.

The terminal apron is within a non-movement area whose limits are the apron area taxilane that wraps around the satellite concourse. There are two aircraft ingress/egress points to access aircraft parking gates; Taxiway A2 and A3. Taxiway A3 is the primary access point for most aircraft. There are no designated vehicle service roads (VSR) adjacent to the apron area, therefore GSE such as baggage tugs operate in a “see and avoid” environment throughout the apron area. Aircraft fueling is accomplished by truck, at each gate. **Figure 3.5.2** depicts the terminal apron area and aircraft parking gates.



Existing Terminal Area

Lehigh Valley International Airport
Master Plan Update

Figure 3.5.1

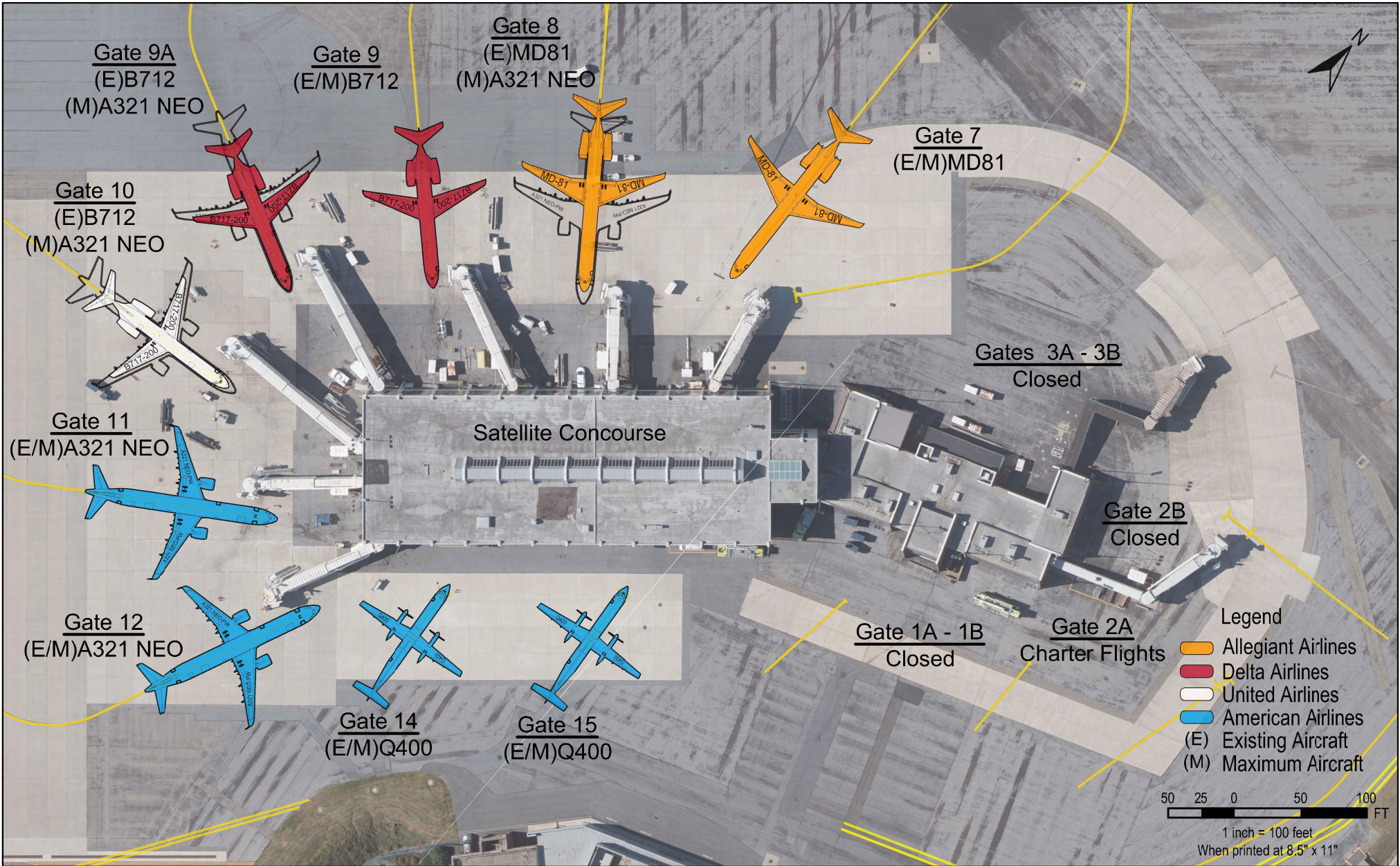




Table. 3.5.1: Existing Aircraft Parking Gates Data

Gate	Status	Current Airline	Current Aircraft	Maximum Aircraft
1A	Closed	n/a	n/a	n/a
1B	Closed	n/a	n/a	n/a
2A	Closed	Charter	n/a	n/a
2B	Closed	n/a	n/a	n/a
3A	Closed	n/a	n/a	n/a
3B	Closed	n/a	n/a	n/a
7	Active	Allegiant	MD80/A320	A320
8	Active	Allegiant	MD80	ADG-III
9	Active	Delta	B717	B717
9A	Active	Delta	B717	ADG-III
10	Active	United	B717	ADG-III
11	Active	American	ADG-III	ADG-III
12	Active	American	ADG-III	ADG-III
14	Active	American	Q400	Q400
15	Active	American	Q400	Q400

Source: LNAA Aircraft Parking Plan

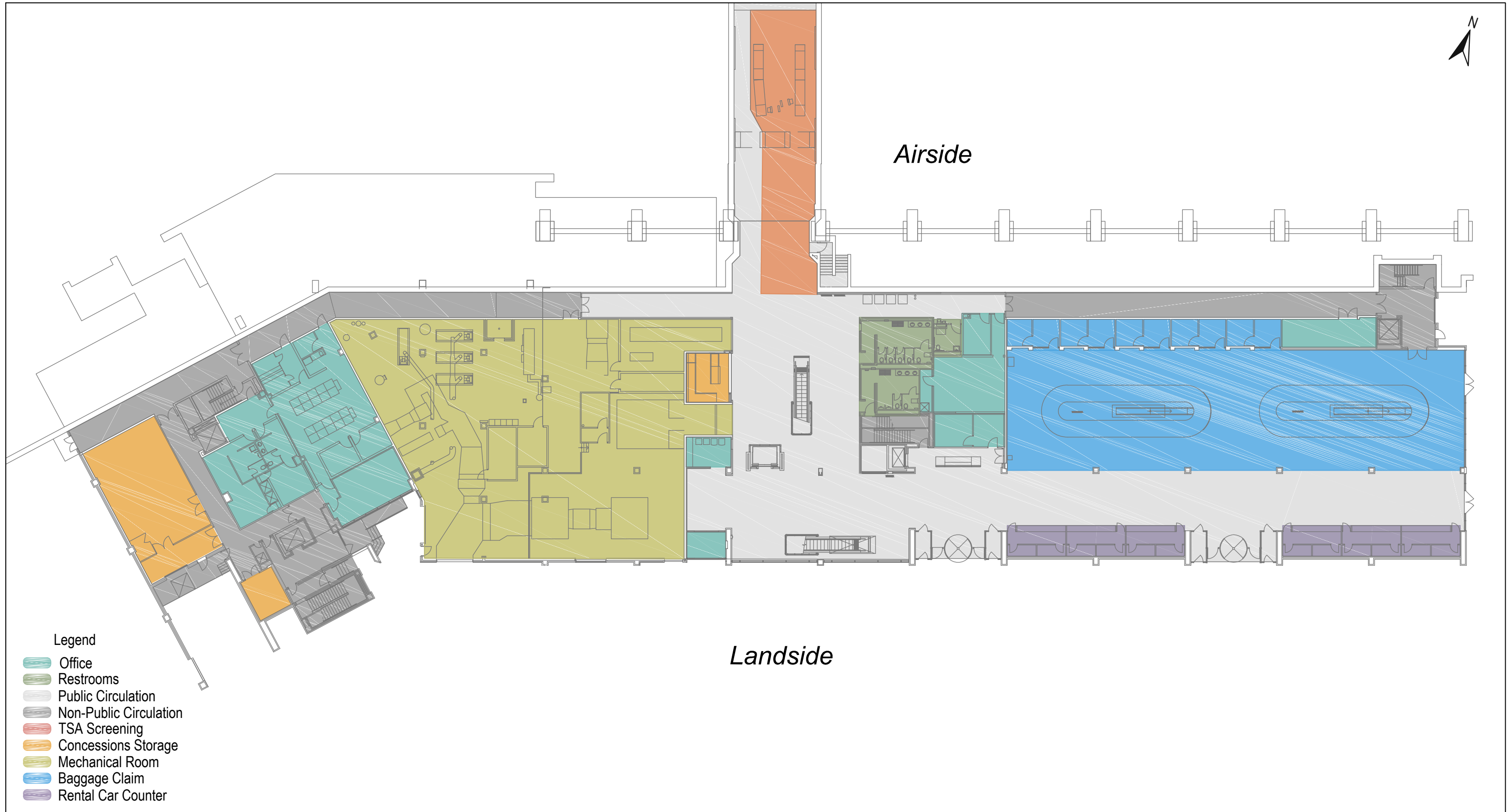
Terminal and Concourse Area

Main Terminal - First Floor

The functional areas provided in the passenger terminal are described below.

The Main Terminal consists of three levels; first floor, second floor, and third floor. The first floor is for passenger processing such as baggage claim. Respectively, the second level is the main level for passenger processing, often referred to as the enplaning level, as well as the apron and airline employee offices. The third level is mostly non-public area, and is often referred to as the mezzanine level. The physical areas provided at LVIA are described below in **Table 3.5.2**.

Figures 3.5.3 and **3.5.4** depict the Main Terminal and Satellite Concourse first floor





Satellite Wiley Concourse - 1st Floor





Table 3.5.2: First Floor Summary

Main Terminal Building	
Functional Element	Area (SF)
Baggage Claim	5,880
TSA Passenger Screening	1,750
Rental Car Counter	930
Public Circulation	13,400
Non-Public Circulation	9,610
Restrooms	830
Airport Office	3,950
Concessions (storage)	1,450
Tunnel	8,800
Airline Offices	775
Satellite Wiley Post and Old Departure Concourses	
Holdrooms	5,300
Airline Offices	6,270
Office	4,780
Public circulation	9,045
Non-public circulation	9,075
Restrooms	870
Mechanical Room	13,760

Source: LNAA Main Terminal Building and Satellite Concourse Deplaning Level Plans

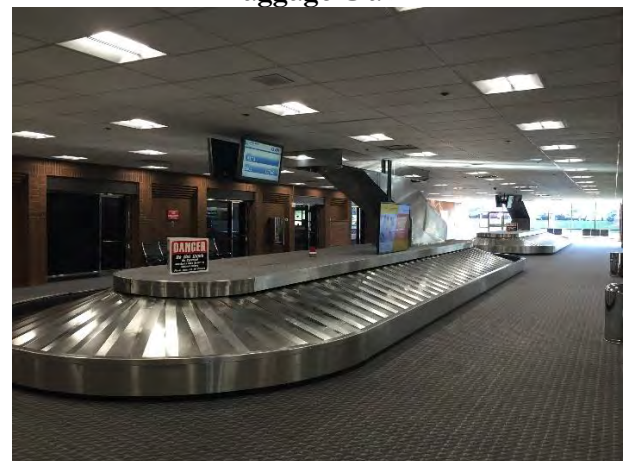
Baggage Claim

The baggage claim is located on the east half of the first floor. Arriving passengers access the baggage claim area via the central circulation core. There are two sloped-plate carousels for arriving passengers to retrieve their bags. There is circulation around the carousels and between the baggage claim area and the rental car counters. Once passengers claim their bags, they exit through three exit vestibules near to the rental car counters. Adjacent to the carousels are airline baggage service offices (BSO). Currently, most are occupied by airlines, but some are used for airport storage.

TSA Passenger Security Screening Checkpoint

The Transportation Security Administration (TSA) is responsible for ensuring the security of the nation’s transportation systems. TSA provides mandatory passenger and baggage screening services at airports.

Baggage Claim



Source: C&S Engineers, Inc. 11/6/16



The TSA passenger security screening checkpoint is located in the narrow tunnel connector between the Main Terminal and the Satellite Concourse. Departing passengers, after visiting the check-in area on the second floor, must proceed down the escalator or elevator to access the security checkpoint on the first floor from the main circulation core. Passengers who check-in prior to arriving at the Airport, and are parked in the long-term parking lot, access the security checkpoint through vestibules located in the baggage claim area. The security checkpoint has two screening lanes; including one TSA PreCheck lane, opened in December 2016. Arriving passengers circulate past the checkpoint in a narrow back-flow prevention corridor.

Public Circulation

Public circulation is located throughout the first floor, and is the main circulation aisle from the security checkpoint to the baggage claim area and to the exit. Elevators, stairs, and escalators provide vertical access to the second floor. At the first floor of the Satellite Wiley and Old Departure Concourse, public circulation areas connect the vertical circulation from the tunnel to gates, holdrooms, and vertical circulation to the two-level western part of the concourse.

Non-Public Circulation

Non-public circulation areas are only accessible by Airport, airline, or people under escort with security clearance. In the Main Terminal these areas are circulation corridors behind the baggage claim area and throughout the central receiving dock, Airport office, and mechanical rooms. In the satellite concourse, these areas include circulation corridors between Airport and airline offices, and mechanical rooms.

Holdrooms

Holdrooms are where departing passengers enplane and arriving passengers deplane. A seating area for waiting and a gate podium for airline assistance is included at each holdroom. Holdrooms are located on both the first and second floors of the Satellite Concourse. The eastern part of the concourse has holdrooms for Gates 1A-3C, but is not typically served by airlines unless required. There are no concessions and no passenger amenities such as charging stations in these holdrooms. The western part of the concourse has holdrooms for Gates 7-12 and 14-15, where all flights arrive and depart. The concourse is a common-use type, and thus airlines can utilize any available gate. Airlines are typically located at the same gates, however they can utilize other gates depending on availability or maintenance issues.

Restrooms

Restrooms are located in the main path of travel for maximum passenger convenience. In the Main Terminal, restrooms are located adjacent to the central circulation corridor and passenger security screening. In the Satellite Concourse, the restrooms are located in the middle of Satellite Wiley Concourse and adjacent to the vertical circulation core connecting the tunnel and the Old Departure Concourse.

Airport Offices

Much of the Airport's office space is located on the third floor. There is limited office area on the second level in the Main Terminal and Satellite Concourse. On the west end of the Main Terminal there is a conference room utilized by the Airport, and can be rented out to individuals or companies as needed. These areas are not in public areas and are used primarily for meeting rooms and storage.

Airline Offices

Airline offices are located on the first floor of the Satellite Wiley Concourse. These offices include airline operations space such as storage for aircraft parts, GSE, workshop areas, employee break areas, and flight crew weather briefing areas. These areas are leased by individual airlines due to the proprietary nature of their operation.



Rental Car Counters

Rental car counters are where arriving passengers are processed to receive their rental car keys once they've claimed their luggage. The counters are located adjacent to the baggage claim area. The area includes counters where the transactions take place, and a small back room used for storage, break room, etc.

Receiving docks

There is one dock located on each end of the Main Terminal. The central receiving dock for deliveries is located at the far west area of the Main Terminal. This is the area where all deliveries come in and waste goes out of the terminal complex. Adjacent to the receiving dock are multiple storage areas that contain deliveries that do not need to be immediately taken to a concessions location at the terminal building or concourse. Access from the concessions receiving dock to the Main Terminal is via a non-public corridor behind the Airport offices and mechanical rooms.

The receiving dock located on the east end of the Main Terminal is for Airport use. This dock is used primarily for maintenance, along with lost airline baggage loading and delivery.

Mechanical rooms

Substantial mechanical rooms are located in the Main Terminal and Satellite Concourse. They are located in a non-public area in both buildings. These areas provide power, data, and heating and cooling for the respective facility they are located in.

Second Floor

Located on the second floor of the Main Terminal are two check-in areas, airline ticket offices, TSA baggage screening, outbound and inbound baggage makeup, concessions, Airport office, restrooms, and public and non-public circulation. The second floor of the Satellite Wiley Concourse includes holdrooms, concessions, restrooms, and public circulation. **Figures 3.5.5** and **3.5.6** depict the second floor of the Main Terminal and Satellite Wiley Concourse. **Table 3.5.3** shows a summary of square footage by area.



Airside

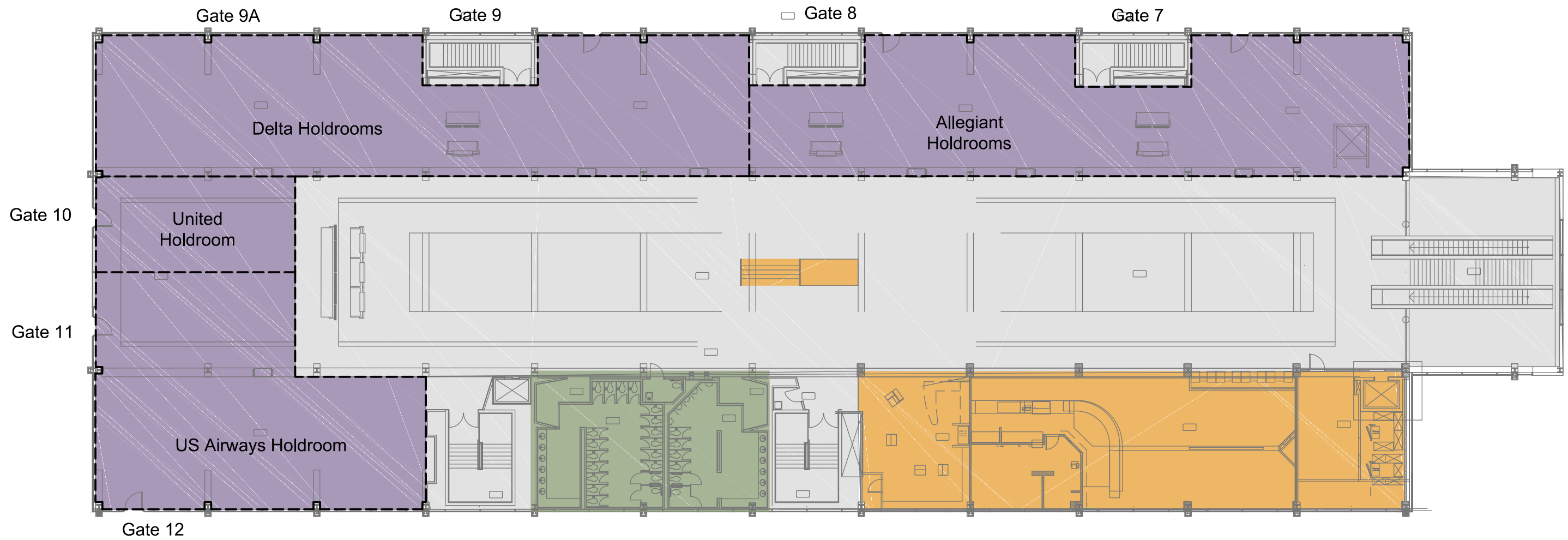
Landside



- Legend
- Office
 - Restrooms
 - Public Circulation
 - Non-Public Circulation
 - Ticketing Area
 - Concessions



Main Terminal
Second Floor



- Legend
- Restrooms
 - Public Circulation
 - Holdroom
 - Concessions



Satellite Wiley Concourse Second Floor



Table 3.5.3: Second Floor Summary

Main Terminal Building	
Functional Element	Area (SF)
Check-in	7,575
Airline Ticket Offices	3,895
TSA Baggage Screening	4,000
Outbound Baggage Makeup	10,039
Inbound Baggage Makeup	Included above
Concessions	2,210
Airport Office	4,230
Restrooms	1,820
Public Circulation	25,260
Non-Public Circulation	1,730
Mechanical Room	3,340
Conference Room	500
Satellite Wiley Post and Old Departure Concourses	
Holdrooms	13,210
Concessions	3,930
Restrooms	1,755
Public circulation	13,170
Mechanical Room	4,060

Source: LNAA Main Terminal Building and Satellite Concourse Enplaning Level Plans



East Check-in Ticket Counters



Source: C&S Engineers, Inc. 11/6/16

Check-in

Departing passengers who need to obtain a boarding pass or check their baggage enter one of two check-in areas. Check-in areas are located on either side of the central circulation core. The main check-in area is located to the east, adjacent to the enplaning curbside vestibules. The other is located to the west. The Airport has a common use platform that airlines use to process their passengers.

The check-in process has changed significantly in the last five years due to passenger processing technology innovation such as smart phone applications, permanent bag tags, etc. Also, airline baggage fees have reduced

the number of passengers who check bags. Both have reduced the passenger demand on the check-in area and number of required check-in positions, to be further evaluated in the facility requirements section.

Airline Ticket Offices

Airline Ticket Offices (ATO) traditionally include space to support day-to-day activities and transactions specific to airline operations. Many of the reasons for having these offices, such as a cash safe, are no longer relevant. Most of these areas are used today for storage or break areas for airline employees, with computers and workstations utilized by station managers. Currently, the ATOs are located immediately behind the check-in counters.

TSA Baggage Screening

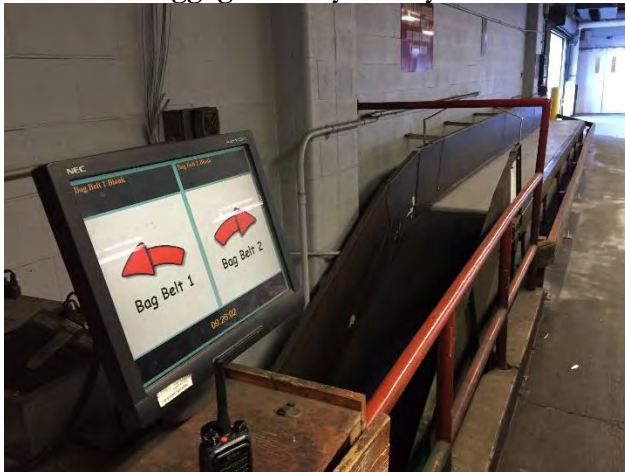
There are two TSA baggage screening areas, one serving each of the check-in areas. These systems are known as “mini inline” explosive detection systems (EDS). Bags from the check-in areas go behind the public wall to the screening area. Bags are screened and proceed to secondary screening or the outbound baggage makeup area. The system provides a good level of service for passengers and airlines by automating the screening process. These areas are secured by TSA, not accessible by the public, and require special access for airport or airline employees.

Outbound Baggage Makeup

Outbound baggage makeup area is where airline personnel organize, separate, and load passenger baggage onto carts for departing flights. Once a bag exits the TSA screening area it travels on a belt to the sortation area or baggage makeup. There are two baggage make up areas, one serving each of the check-in/TSA screening areas.



Baggage Conveyance System



Source: C&S Engineers, Inc. 11/6/16

Inbound Baggage Makeup

The inbound baggage system is used by airline personnel to transfer passenger baggage from arriving aircraft to individual sloped-plate baggage claim units. The baggage transfer occurs in the non-public area of the second floor. When the baggage is placed on the inbound baggage units it is transported via moving conveyance system to the public baggage claim area and picked up by waiting passengers. There is one inbound baggage makeup area located adjacent to the eastern outbound baggage makeup.

Holdrooms

As described previously, holdrooms are where departing passengers enplane and arriving passengers deplane. A seating area for waiting and a gate podium for airline assistance is included at each holdroom. Holdrooms are located on both the first and second levels of the satellite concourse. The eastern part of the concourse has holdrooms for Gates 1A-3C, but is not currently served by any airlines. The western part of the concourse has holdrooms for Gates 7-12 and 14-15, where all flights arrive and depart. Holdrooms are leased to individual airlines, but because of the compact nature of the concourse and close proximity to other gates, passengers often use holdrooms of adjacent airlines.

Concessions

Airport terminals typically have four to five basic concession offerings. These include food and beverage, retail, news/gifts, specialty, and duty-free. LVIA airport has four public concessions areas: a café adjacent to the central circulation core in the Main Terminal building; a restaurant, news/gifts shop, and a business center in the satellite concourse.

Public Circulation

Public circulation is located throughout the enplaning level and is the main circulation aisle from the entrance vestibules to central circulation core and north end of the building. Elevators, stairs, and escalators provide vertical access to the first floor. The concourse circulation is a wide aisle connection to the vertical circulation to the holdrooms, concessions, and restrooms. Egress vertical circulation cores are located at various holdrooms.

Non-Public Circulation

Non-public circulation areas are accessible only by Airport, airline, or other people under an escort with security clearance. In the main terminal building, these areas are behind the check-in areas and adjacent to the TSA screening and outbound baggage makeup areas. There are no non-public circulation areas in the concourse at this level.

Restrooms

Restrooms are located in the main path of travel for maximum passenger convenience and adjacent to offices areas for tenant and Airport personnel conveniences. In the Main Terminal building, restrooms are located adjacent to the central circulation corridor and adjacent to office spaces. In the Satellite Concourse, the



restrooms are located between holdrooms and concession areas.

Airport Offices

Much of the Airport’s office space is located on the third floor. There is some office area on the enplaning level in the Main Terminal. These areas are used primarily for meeting rooms and storage and also leased to TSA, airport police, etc. There is no office area in the concourse.

Third Floor

The mezzanine level is the primary location for the LNAA offices. Other support areas include public circulation, which is egress for the Authority’s office space, and restrooms to support the offices. There is also a waiting area and check-in window. A square footage area summary is in **Table 3.5.4**.

Table 3.5.4: Mezzanine Level Area Summary

Main Terminal Building	
Functional Element	Area (SF)
Airport Office ¹	8,000
Public Circulation ²	470
Non-Public Circulation ³	1,930
Restrooms	620
Conference Rooms	1,300

¹ Includes interior hallways

² Includes foyer and vertical transitions only

³ Includes outside hallway and stairway

Source: LNAA Main Terminal Mezzanine Level Plans

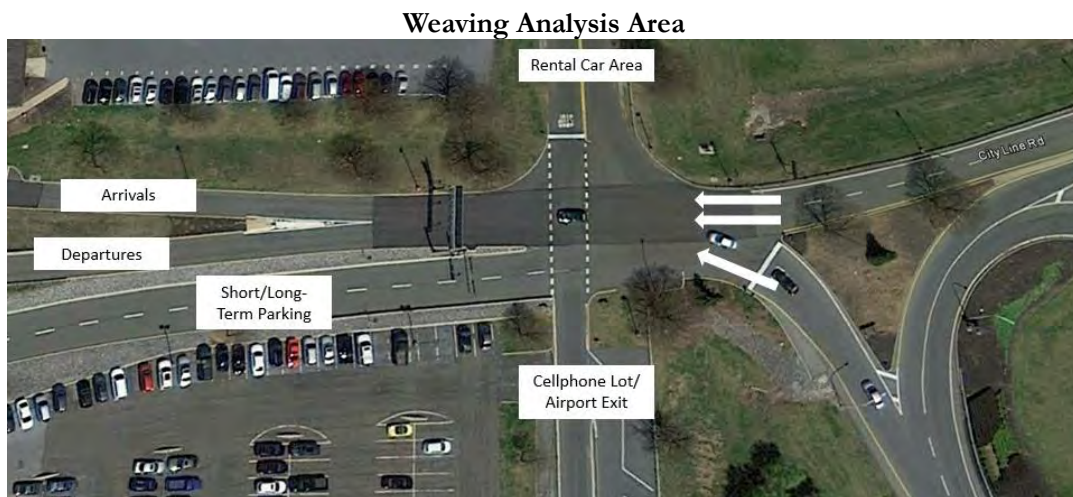
3.6 Access, Circulation, and Parking

This section summarizes the Airport’s access, circulation, and parking facilities, and the current levels of activity occurring at those facilities. **Figure 3.6.1** depicts key access and parking facilities referenced throughout.

Data Sources

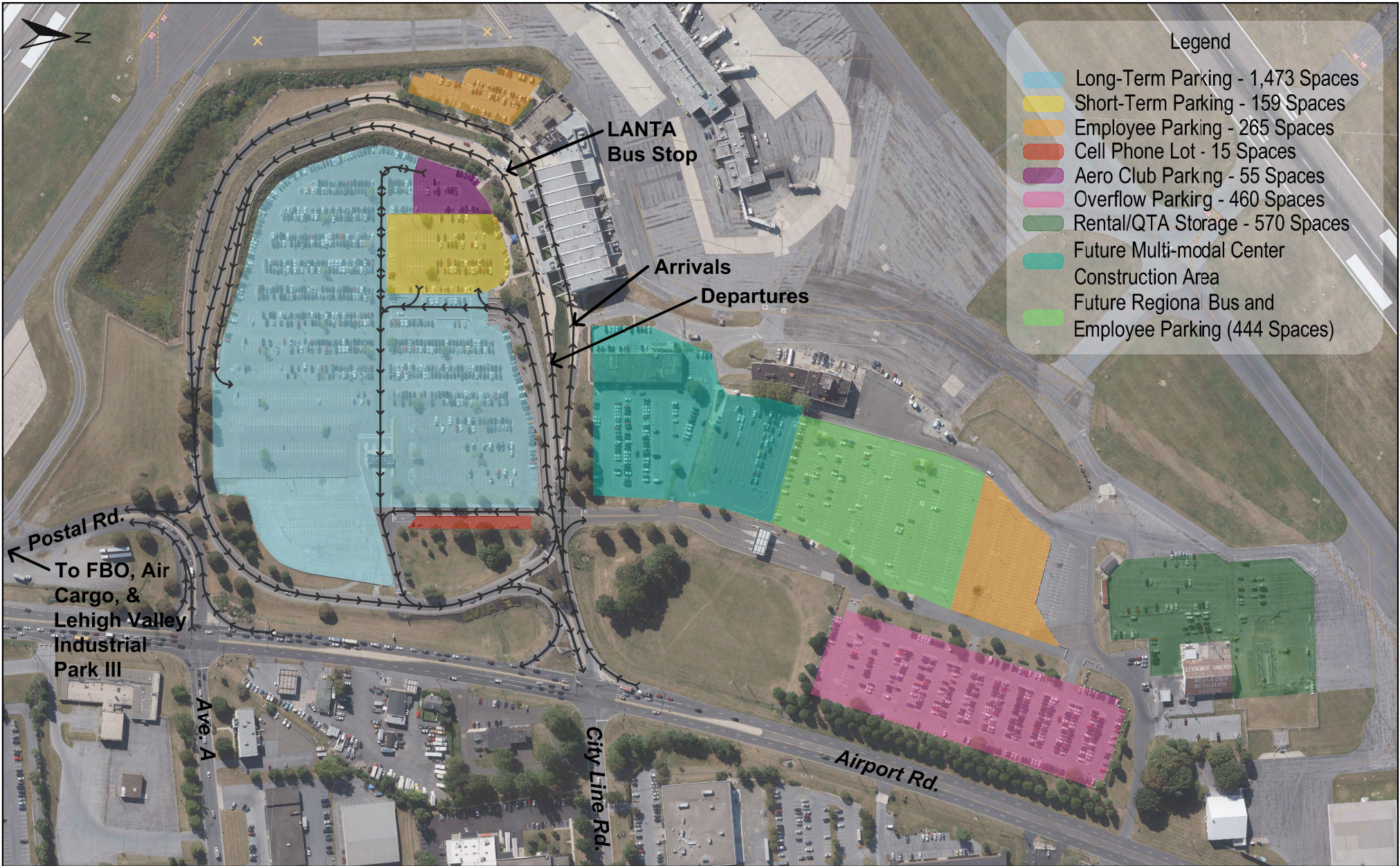
Previously prepared reports and available traffic data were reviewed, and surveys of Airport traffic were conducted to assess existing levels of activity on Airport roadways and within the Airport’s parking facilities. Surveys conducted as part of this master plan are listed below. Detailed data is provided in the **Appendix**.

- **Traffic Counts** – The specific traffic data collection locations and the type of data collected at each are shown in **Figure 3.6.2**. Automatic traffic recorders (ATR) were used to collect seven days of hourly counts along Airport Road (ATR 1) and the entrance to the Airport (ATR 16) in October 2016 in order to determine the peak day and hour for Airport activity and for Airport Road. The peak day of the week was determined to be Friday and the peak hour for both the Airport and Airport Road was found to be 4:00 – 5:00 PM. Data specific to the peak hour was collected at the 16 ATR locations and turning movement counts were collected at the intersections of Airport Road with City Line Road and Ave A/Postal Road as noted on **Figure 3.6.2** on Friday, December 2, 2016.
- **Curbside Data** – A vehicle dwell time survey was conducted on Friday, December 2, 2016 from 4:00 – 6:00 PM. This included the recording of all vehicles by type that stopped along the arrival or departure curbside and for how long. Pedestrians crossing each of the curbside roadway areas were also documented. Video of each curbside area was also recorded for all of December 2, 2016 in order to observe activity.
- **Weaving Analysis** – Video was collected on Friday, December 2, 2016 and used to document traffic patterns along the main entrance to the Airport. The main entrance road includes two travel lanes from Airport Road. Within a short distance, vehicles must choose between the rental car area, arrival curbside roadway, departure curbside roadway, short-term parking, long-term parking, the cell phone parking area, and exiting the Airport (see photo).



Source: Google and C&S Engineers, Inc.

- **Other Data** –
 - Traffic data for other major roadways in the vicinity of the Airport was obtained through the Pennsylvania Department of Transportation’s (PennDOT) website:
<http://www.penndot.gov/ProjectAndPrograms/Planning/Maps/Pages/Traffic-Volume.aspx>

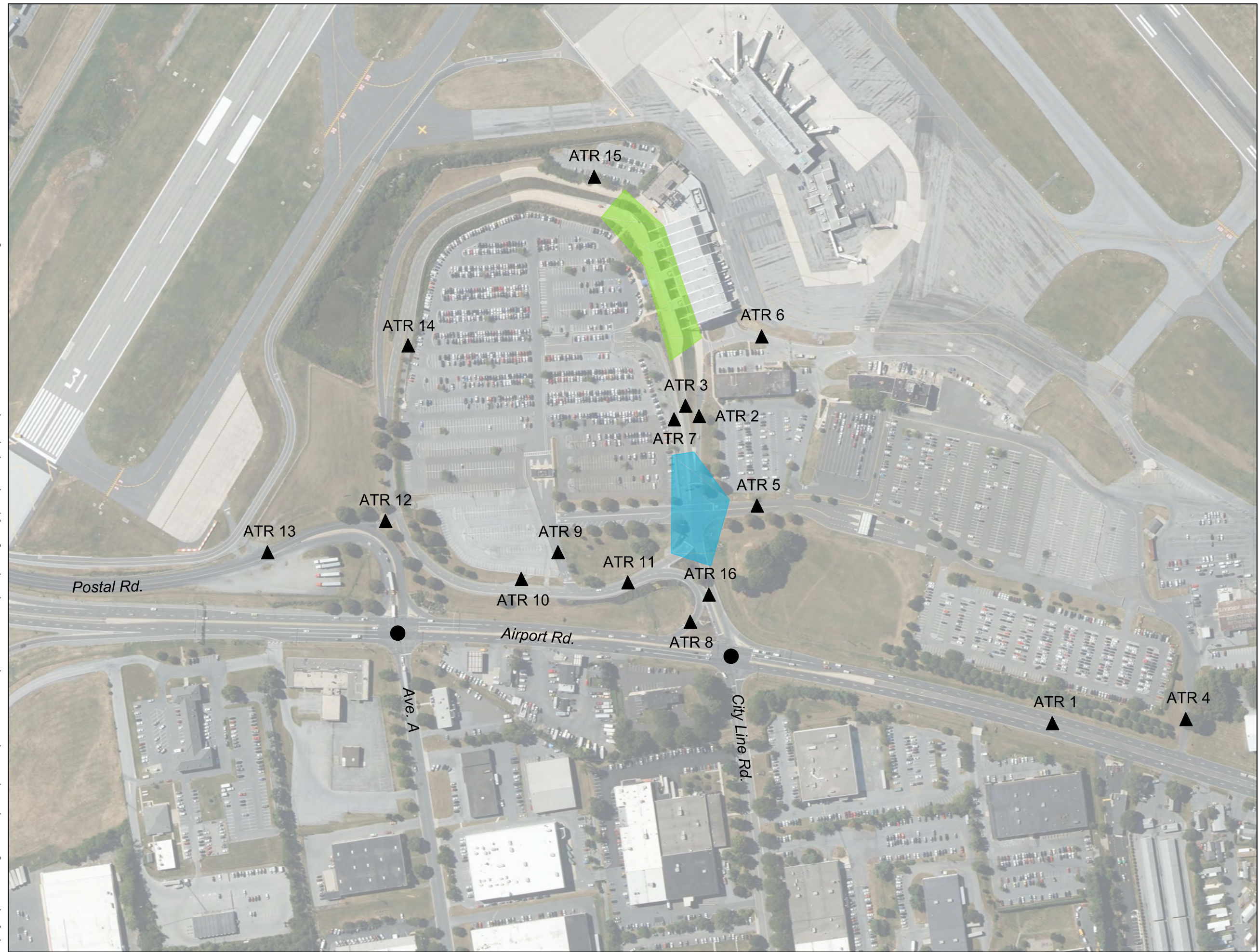


Access, Circulation, and Parking Facilities

Lehigh Valley International Airport
Master Plan Update

Figure 3.6.1

Jul 26, 2017 - 9:38am
F:\Project\N93 - Lehigh-Northampton Airport Auth\N93012001 ABE Airport Master Plan Update\Planning-Study\CADD\Exhibits\Chapter 3\3.7.2 - Traffic Data Collection Locations.dwg



Legend

- Curbside Activity Survey Area
- Weaving Analysis Survey Area
- Automatic Traffic Recorder (ATR) Counts (24 Hours)
- Turning Movement Counts (4-6 pm)

N
Not To Scale



Lehigh Valley International Airport
Master Plan Update
Traffic Data Collection
Locations
Figure 3.6.2



- Flight schedules, enplanement/deplanement data, and parking data was provided by the LNAAL for December 2, 2016
- Bus routing and schedules for the Lehigh and Northampton Transportation Authority (LANta) was obtained via <http://www.lantabus.com/>.

Assumptions and Planned Development

A number of development projects are currently under construction or are planned in the near term, which could affect airport access, circulation, or parking:

- In December 2016, the Airport began demolition of a maintenance facility building adjacent to the terminal to begin the construction of a new multi-modal center. Traffic data was collected before construction began and rental car traffic was diverted. This development is not part of the existing condition scenario but will be considered part of the existing Airport for future condition and alternatives analysis.
- Anticipated volumes and infrastructure improvements along Willowbrook and Airport Roads, including the development of a FedEx Ground Distribution Center on former airport property, will be considered for future condition and alternatives analysis. Data associated with this development and future improvement recommendations were obtained through the Environmental Assessment for Land Release dated June 2015.

Other Transportation Plans

The Lehigh Valley Transportation Study (LVTS), the Metropolitan Planning Organization (MPO) for the region, documented a number of goals for the region's airports in its latest long range transportation plan, MoveLV, which are derived from the Lehigh and Northampton Counties' Comprehensive Plan – The Lehigh Valley...2030. Some of these goals relevant to LVIA include:

1. To be a model aviation system, providing the highest levels of service to diverse customers while serving as a gateway to the community, region, and world.
2. To maximize the compatibility of LVIA operations and nearby land uses.
3. To optimize the operational efficiency, effectiveness, and safety of the facility.

While MoveLV does not specifically address airport needs or future projects, it does identify a number of infrastructure improvement projects surrounding the Airport such as the US Route 22 widening from Airport Road to Route 309 and Schoenersville Road Corridor improvements. MoveLV also documents goals for freight, transit, and bicycle/pedestrian modes that should be taken into consideration as the future of the Airport is developed and evaluated.

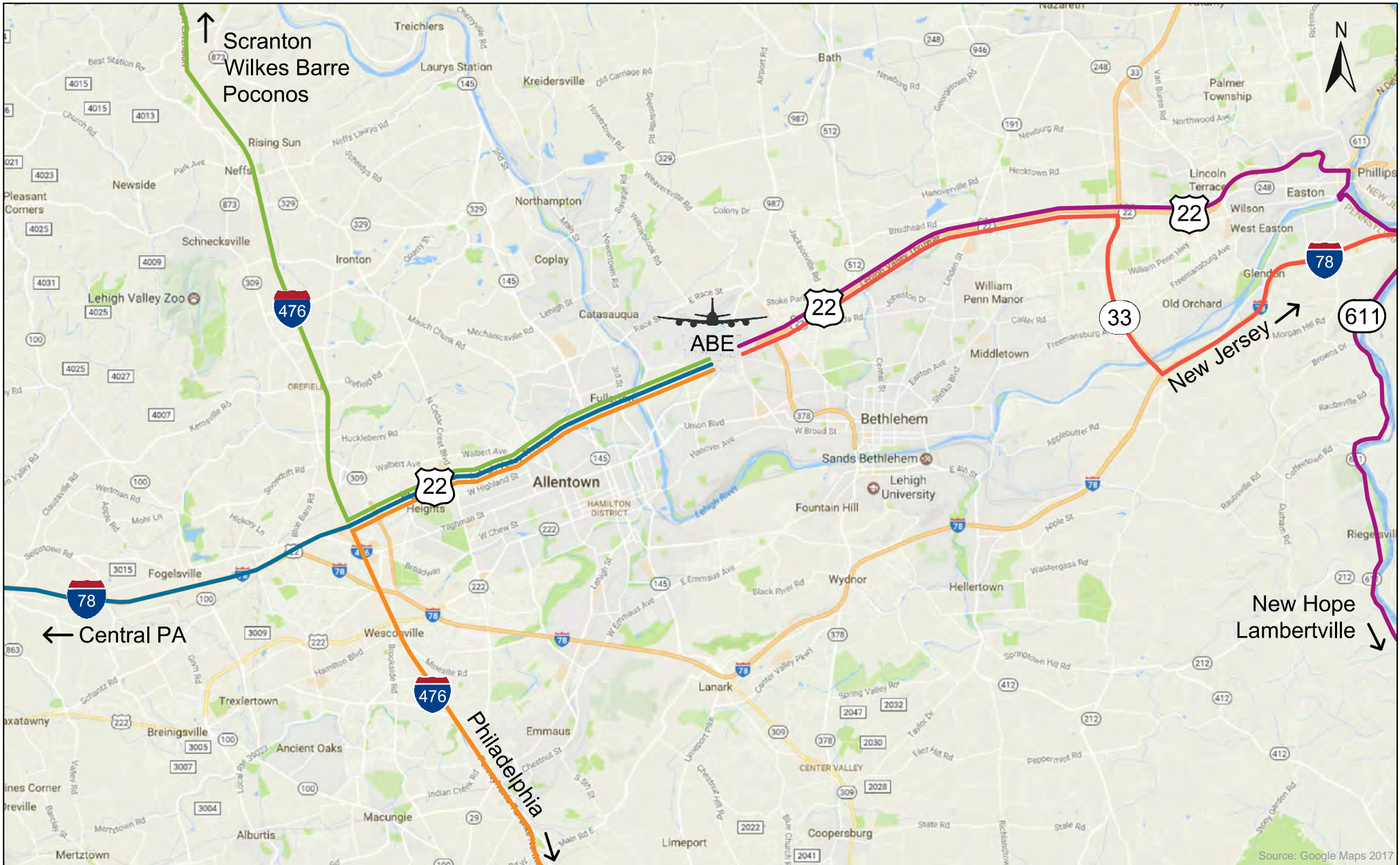
Access and Circulation

This section describes the access to the Airport and circulation throughout for all modes of travel. It describes the access to the Airport via the highway system and local roadway network, the internal roadway circulation, the curbside areas, and multi-modal accommodations.

Regional Access

The Airport's website, <http://www.flylv.com/contact/directions/>, provides directions to the Airport as noted below and shown on **Figure 3.6.3**:

- From the West/Central PA – take Route 78 to Route 22 East to Route 987 (Airport Road)
- From the East/New Jersey – take Route 78 West to Route 33 North to Route 22 West to Route 987 North (Airport Road)



Source: Google Maps 2017



Regional Access Routes

Lehigh Valley International Airport
Master Plan Update

Figure 3.6.3



- From Scranton, Wilkes-Barre, or Poconos – Take PA Turnpike South (Route 476) to Lehigh Valley Exit to Route 22 East to Route 987 North (Airport Road)
- From Philadelphia and Southern New Jersey – Take the Northeast Extension (Route 476) to the PA Turnpike North to Route 22 East to Route 987 North (Airport Road)
- From New Hope/Lambertville – Take Route 32 North to Route 611 North to Route 22 West to Route 987 North (Airport Road)

The Airport is generally bound by US Route 22 to the south, Airport Road (Route 987) to the east, East Race Street to the north, and Irving and Lehigh Streets to the west. US Route 22 is a 4-lane divided highway with a full interchange at Airport Road. The average annual daily traffic on the portion of US Route 22 just east of Airport Road was 82,000 and 90,000 just west in 2015. Airport Road is generally a 5-lane roadway with two lanes in each direction and a center left turn lane. The average annual daily traffic on Airport Road was noted as 23,000 in 2015 by PennDOT. Access to the Main Terminal and parking areas for the Airport are via the intersection at City Line Road and Airport Road. Access to the air cargo and GA facilities are via the intersection at Ave A/Postal Road and Airport Road. Airport Road is oriented north/south and is under the jurisdiction of PennDOT.

As stated previously, turning movement counts were collected on Friday, December 2, 2014 from 4:00 – 5:00 PM at the intersections of Airport Road with Ave A/Postal Road and City Line Road. **Table 3.6.1** shows the intersection turning movement counts at these two locations during the peak hour.



Table 3.6.1: Intersection Turning Movement Counts

		Direction of Movement	Peak Hour Volume (4-5 PM)
Airport Road & Ave A/Postal Road			
Airport Road	Northbound	Left	144
		Thru	1,259
		Right	147
	Southbound	Left	13
		Thru	1,119
		Right	78
Postal Rd	Eastbound	Left	188
		Thru	58
		Right	428
Ave A	Westbound	Left	317
		Thru	111
		Right	52
Airport Road & City Line Road			
Airport Road	Northbound	Left	143
		Thru	1,238
		Right	151
	Southbound	Left	36
		Thru	883
		Right	51
LVIA Driveway	Eastbound	Left	40
		Thru	25
		Right	120
City Line Road	Westbound	Left	257
		Thru	53
		Right	105

Source: C&S Engineers, Inc. December 2, 2016

The two intersections were analyzed using the computer model, SYNCHRO 9, which implements methods presented in the Highway Capacity Manual 2010. SYNCHRO determines the level of service (LOS), which is defined in terms of delay, as well as anticipated queue lengths.

The LOS for both signalized and unsignalized intersections are defined in terms of control delay. Control delay is a measure of the total travel time lost and includes slowing delay, stopped delay, queue move-up time, and start-up lost time. LOS thresholds are defined as average delay in seconds per vehicle over a fifteen-minute analysis period and range from LOS A to F for both signalized and unsignalized intersections. An overall intersection LOS D or better is generally considered acceptable at a signalized intersection. The following table provides a summary of the LOS thresholds as defined in the Highway Capacity Manual.



Table 3.6.2: Intersection Level of Service Criteria

Level of Service (LOS)	Signalized Intersections
	Delay (sec)
A	0-10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	over 80

Source: Highway Capacity Manual 2010

The analysis was performed for the two intersections using the PM peak hour traffic volumes with existing roadway and intersection geometry information, as well as field verified signal timing and phasing information. While volumes may be higher for some movements during an AM peak hour, the overall peak hour for the day was used for analysis purposes. **Table 3.6.3** shows the LOS, delay in seconds, v/c ratio, and 95th percentile queues for each lane group of each study intersection. The 95th percentile queue is defined as the queue length (in feet) that has only a 5-percent probability of being exceeded during the analysis time period and is often used to determine storage lengths for dedicated turn lanes. Movements with a LOS E or F are italicized.

While the intersection of Airport Road with City Line Road is operating at an acceptable LOS, the intersection with Ave A/Postal Road is currently operating at an average intersection LOS E with LOS F for the Ave A left-turn movement and Postal Road movements during the PM peak hour. The southbound shared through/right-turn movement is also a LOS F. Due to the high v/c ratios, queue length calculations may be inaccurate but field observations confirmed that queues on Postal Road reach up to 400 feet and the southbound approach of Airport Road at Ave A/Postal Road can reach the City Line Road intersection.

The existing condition output files from the Synchro models are included in the **Appendix**.



Table 3.6.3: Existing Condition Intersection Capacity Analysis – PM Peak Hour

			LOS	Delay (sec)	v/c Ratio	95th % Queue (ft)
Airport Road & Ave A/Postal Road						
Airport Road	Northbound	Left	C	21.6	0.46	109
		Thru	C	22.3	0.71	430
		Right	A	2.6	0.18	30
	Southbound	Left	D	39.9	0.13	m15
		<i>Thru/Right</i>	F	<i>119.4</i>	<i>1.17</i>	<i>#696</i>
Postal Road	Eastbound	<i>Left/Thru</i>	F	<i>151.3</i>	<i>1.17</i>	<i>#370</i>
		<i>Right</i>	F	<i>94.4</i>	<i>1.11</i>	<i>#360</i>
Ave A	Westbound	<i>Left</i>	F	<i>121</i>	<i>1.09</i>	<i>#461</i>
		Thru/Right	D	44.1	0.56	178
Average Intersection			E	78.2		
Airport Road & City Line Road						
Airport Road	Northbound	Left	B	11.2	0.44	m31
		Thru/Right	A	7.4	0.67	m133
		Left	C	29	0.32	54
	Southbound	Thru	C	23.4	0.59	354
		Right	A	0.2	0.07	0
LVIA Driveway	Eastbound	<i>Left/Thru</i>	E	<i>66.3</i>	<i>0.65</i>	<i>88</i>
		Right	B	12.2	0.51	22
City Line Road	Westbound	Left	D	53.2	0.84	239
		Thru/Right	C	22.3	0.37	111
Average Intersection			B	19.2		

- 95th % volume exceeds capacity, queue may be longer

m - volume for 95th % queue is metered by upstream signal Source: C&S Engineers, Inc.

Internal Airport Roadways and Intersections

The terminal and parking areas are served by a loop road with counter-clockwise traffic flow that can be accessed via Airport Road at its intersection with City Line Road as shown on **Figure 3.6.1**. From Airport Road, there are two lanes from which drivers can choose to go to the rental car area, arrival curbside roadway, departure curbside roadway, short-term parking, long-term parking, the cell phone parking area, or exit the Airport. After driving through the terminal curbside area, drivers could enter the long-term parking area, turn onto Postal Road, exit the Airport, or return to the terminal curbside area. **Figure 3.6.4** shows the PM peak hour volumes throughout the internal roadway system of the Airport along with the intersections of Airport Road at City Line Road and Ave A/Postal Road. Approximately 2,100 vehicles entered and 1,900 exited the Airport via City Line Road on December 2, 2016. A summary of hourly volume data is available at all locations shown in **Figure 3.6.2** in the **Appendix**.



Curbside Area

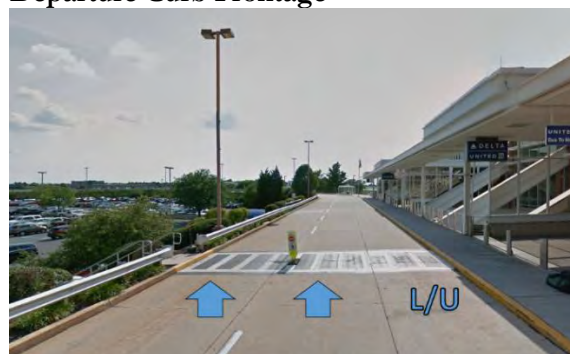
Figure 3.6.5 shows the curb frontage roadways for the terminal. The lower, northern roadway is dedicated for arrivals. There is approximately 300 feet of curb frontage (15 spaces) with a designated police parking space as you exit the terminal area. The arrival curb frontage is split by a crosswalk that guides pedestrians from the parking area to the terminal. There are two through lanes and one loading/unloading lane. There are also 5 marked and signed taxi parking spaces approaching the terminal.

The upper, southern roadway is dedicated for departures, a United bus to Newark, New Jersey, and a LANta bus stop and shelter. The departures curb frontage can accommodate approximately 19 parked vehicles, including the area dedicated to the LANta and United buses. There are three signed walkways, noted as you drive along the roadway: Delta/United, American, and Allegiant. There is a marked crosswalk at the walkway marked for Delta/United passengers and one at the LANta bus stop, as shown in **Figure 3.6.5**. Similar to the arrivals roadway, there are two through lanes and one loading/unloading lane.

Arrival Curb Frontage



Departure Curb Frontage



Source: C&S Engineers, Inc./Google Arrow: Thru lane L/U: Loading/unloading lane

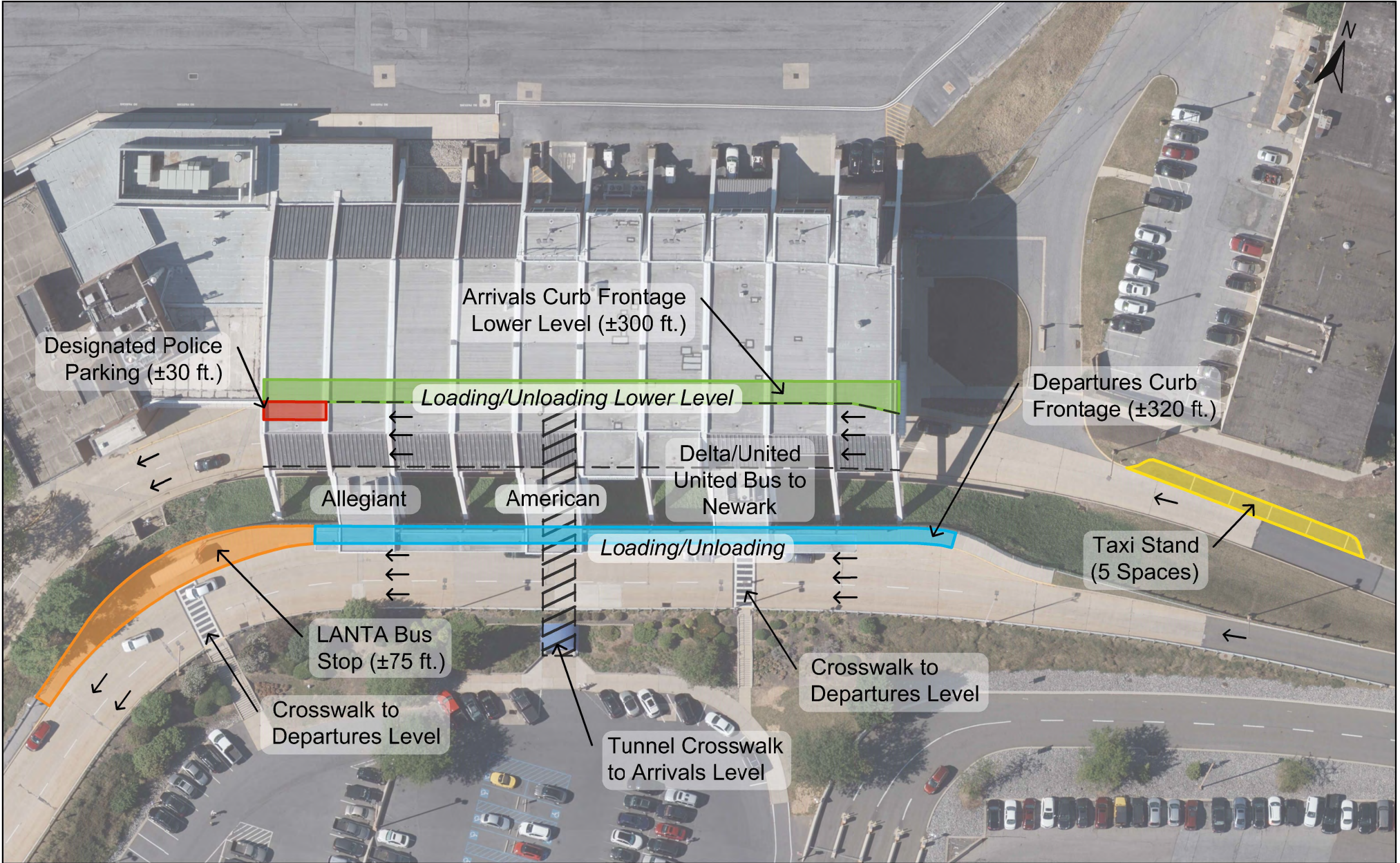
The Airport currently charges vehicles for hire/courtesy vehicles an annual fee per vehicle to operate curbside. The LNAA is currently under negotiations with transportation network companies (Uber/Lyft) to operate at the Airport. The Airport currently does not have the technology to collect per trip fees from any ride service providers.

Table 3.6.4 summarizes the vehicles counted along both curb frontage areas on Friday, December 2, 2016 from 4:00 – 5:00 PM. The average dwell time for all vehicles stopped along the arrivals curbside area was 6 minutes 40 seconds while the average dwell time along the departures curb was 4 minutes 24 seconds. Most of the vehicles stopped at either curbside area were passenger vehicles. There was one taxi that was noted to park at the arrivals curb, not in the designated taxi spaces, for over 25 minutes. The other taxi and bus activity at either curb was minimal.

Table 3.6.4: Curb Frontage Usage Data

	Arrivals		Departures	
	Vehicle Count	Average Dwell Time (min:sec)	Vehicle Count	Average Dwell Time (min:sec)
All vehicles	52	6:40	58	4:24
Passenger vehicles	50	6:25	54	4:22
Taxis	1	25:22	1	2:48
Buses	1	0:19	3	5:41

Source: C&S Engineers, Inc. Data collected 12/2/16 from 4-5 PM



Curb Frontage



Video was recorded along both curbside roadways for 24-hours on Friday, December 2, 2016. Activity along the departure curb was well distributed from 4:00 – 5:00 PM with no double parking observed. The arrival curbside was close to capacity with a few instances of double parking observed between 4:30 – 5:00 PM which aligns with the flight schedule that indicates four flights arrived at LVIA between 4:30 – 5:00 PM.

Based on the average dwell time for all vehicles and the number of available parking spaces along each curbside area, the arrivals curb could accommodate approximately 135 vehicles during the peak hour while the departure curb could accommodate up to 260 vehicles. With peak hour parked vehicles observed to be 52 for the arrivals curb and 58 for the departures curb, the curbside areas are operating at approximately 40% and 22% capacity, respectively.

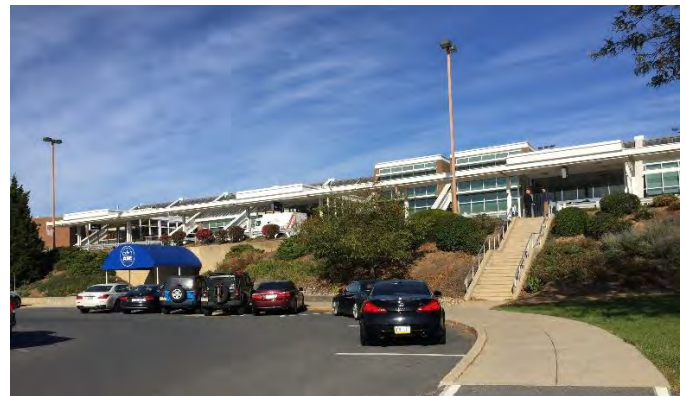
A microsimulation model has been created for the 4:00 – 5:00 PM hour that includes the Airport’s circulation and curb frontage roadways. The model simulates curbside activity, the weaving area as vehicles approach the terminal and parking areas from Airport Road, and the circulation roadways based on actual volume, vehicle classification, and dwell time data collected. As future scenarios are developed, this model will be revised and the changes in roadway density and vehicle delays will be documented to assist in the evaluation of alternatives.

Multi-modal Accommodations

There are no sidewalks or dedicated bicycle infrastructure along Airport Road or to the Airport terminal or parking areas. A few pedestrians at the intersections without sidewalks or crosswalks were observed during the peak hour turning movement counts at Airport Road with City Line Road and Ave A/Postal Road. No bicycles were observed.

Pedestrians are accommodated throughout the parking areas via striped, signed, or barricaded areas separated from vehicle driving lanes in some places. As noted in the curbside area discussion, there is a striped, signed, and lit crosswalk in the center of the arrival curb frontage area between the parking area and the terminal building. There are two crosswalks along the departure curb area at the Delta/United walkway and at the LANta bus stop that provide access to the parking areas via staircases. Based on observations between 4:00 – 5:00 PM at both curbside areas, 120 pedestrians were observed using the arrivals crosswalk while 17 pedestrians crossed the departures roadway (3 near the bus stop, 9 at Delta/United, and 5 at unmarked points).

Pedestrian Access to Terminal



Source: C&S Engineers, Inc.

The Airport is currently served by three LANta bus routes: 215 – South Bethlehem/LV Airport, 319- LV Mall – Bethlehem Square via LV Airport, and 324 – Allentown/LV Airport.

- Route 215 makes its first stop heading northbound at the Airport at 6:40 AM then at 10 minutes past the hour from 7:10 AM – 5:10 PM. The route travels between the Hellertown-Creekside shopping center and the Lehigh Valley Industrial Park III.
- Route 319 makes its first stop at the Airport at 6:36 AM and makes 18 stops throughout the day, ending at 5:55 PM.
- Route 324 makes 7 stops at the Airport between 6:46 AM and 5:46 PM. The route travels between the Airport and the Allentown Transportation Center.

Ridership information for these routes is not available at this time, however the schedule is subject to change based on the new Multimodal Transportation Center under construction at the Airport.

As stated previously and shown in **Figure 3.6.1**, the current rental car staging areas will be the home of a new multi-modal facility that will accommodate rental car functions as well as provide a base for transit activity. The center is expected to open in the summer of 2017. The center will double existing taxi stands and create seven bus slips and a loop for LANta and TransBridge, Inc. activity at the Airport. TransBridge currently operates from the Lehigh Valley Industrial Park, east of the Airport. Other improvements, as noted on <http://www.flylv.com/multi-modal-transportation-center-arrival-2017/>, include the following:

- Reduced walking distances to rental cars from the terminal
- Weather protected walkways
- Improved safety by eliminating passengers/vehicles conflict points
- Designated areas for bus services from LANta and TransBridge Lines, Inc.

Rental Car Facilities

There are currently a number of rental car companies operating at LVIA: Avis, Budget, Enterprise, National, Alamo, Hertz, Dollar, and Thrifty. While each company has their own signage and contact information on the LVIA website, the LNAA has contracts with these entities in groups: Enterprise Holdings (Alamo, Enterprise, and National), Avis Budget Group, and Hertz Global Holdings (Hertz, Dollar, and Thrifty). Prior to construction of the multi-modal center, the rental car ready lot was located east of the terminal, past Building 10 that was begin used for maintenance. The multi-modal center will allow for more direct access between the terminal and the rental ready lot. The rental car quick turnaround area is currently, and is expected to remain, north of the overflow parking areas.

Parking

Passenger Parking

On-airport passenger parking is available in a number of forms as shown in **Figure 3.6.1**: cell phone, short-term, long-term, and Aero Club dedicated spaces. The cell phone lot contains 15 spaces and is located along the one-way southbound roadway just east of the parking areas. These spaces are signed for 30-minute use. The short-term lot is accessed via the right lane of the parking entrance approaching the terminal area and is most closely adjacent to the pedestrian tunnel leading to the arrivals level of the main terminal. Two gates provide access to 159 short-term parking spaces that include 10 accessible spaces.

Parking Wayfinding Signage



Source: Google

Long-term parking includes 1,473 spaces (including 183 A-lot spaces and 13 accessible spaces) and has two access points: the left lane of the parking entrance approaching the terminal (adjacent to the short-term access) and along the departures roadway past the terminal area. The main access has two ticket gates and

the alternate access has one. As stated previously, the rental car operations are currently allocated 330 spaces in the long-term parking lot.

Aero Club Parking



Source: C&S Engineers, Inc.

The Airport offers a parking program for frequent customers which provide conveniently located parking on a first-come, first-served basis. Normal parking rates apply, but the 55 spaces allocated to the Aero Club are located next to the short-term parking area but charged long-term pricing. This program is available to individuals that have used the Airport a total of 15 times within the last 12-month period.

Exit for all paid parking is consolidated within the long-term parking area. There are four gates: two express exits (credit only) and two for other users. Users may pre-pay for parking using the terminal pay station located on the lower level of the main terminal or pay using a credit card or cash at the exit booth.

The current parking rates are shown in **Table 3.6.5**.

Table 3.6.5: Parking Rates

	Time	Rates
Short-Term Parking (159 spaces)	0-10 minutes	Free
	11-40 minutes	\$1.00
	41-60 minutes	\$2.00
	Per Hour	\$2.00
	Per Day	\$22.00
Long-Term/Aero Club Parking (1,528 spaces)	Per Day	\$14.00
	Per Week	\$79.00

Source: [Lehigh Valley International Airport, Parking Rates:](http://www.flylv.com/parking/parking-rates/)
Accessible at: <http://www.flylv.com/parking/parking-rates/>.
Accessed 12/29/16

Parking information associated with Friday, December 2, 2016 was available to provide a snapshot of activity in terms of the duration of stay for those that exited the parking facilities that day, the number of vehicles that entered/exited and a running total of parked vehicles, and transaction amounts. The day began with 418 vehicles parked in the short-term, long-term, and Aero Club spaces. For the purposes of these comparisons, it is assumed that the parking area is reduced by 330 spaces due to rental car functions for a total of 1,357 available spaces. The occupation of the lots peaked at 34 percent during most of the morning and experienced the lowest occupancy at 7:00 PM (16 percent), as shown in **Table 3.6.6**.



Table 3.6.6: Parking Entry/Exit Data

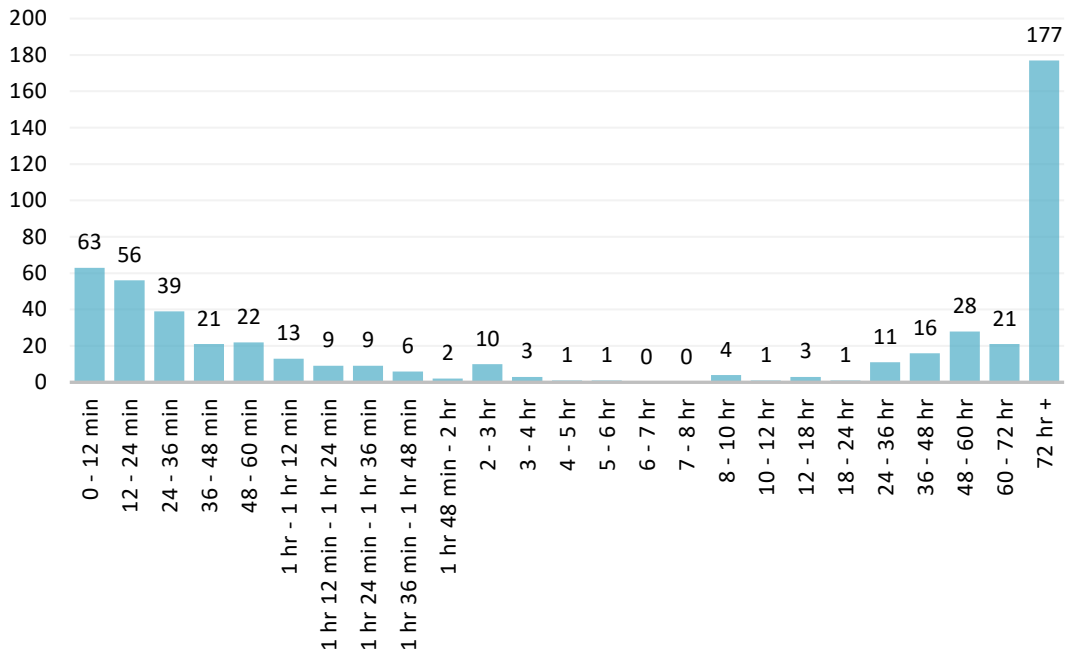
Hour	Entry	Exit	Occupied spaces	Percent Occupied ¹
12:00 AM	0	0	418	31%
1:00 AM	0	0	418	31%
2:00 AM	1	1	418	31%
3:00 AM	1	0	419	31%
4:00 AM	29	0	448	33%
5:00 AM	14	7	455	34%
6:00 AM	3	4	454	33%
7:00 AM	3	1	456	34%
8:00 AM	9	7	458	34%
9:00 AM	18	12	464	34%
10:00 AM	25	33	456	34%
11:00 AM	19	18	457	34%
12:00 PM	13	36	434	32%
1:00 PM	14	8	440	32%
2:00 PM	9	26	423	31%
3:00 PM	42	33	432	32%
4:00 PM	42	45	429	32%
5:00 PM	16	110	335	25%
6:00 PM	6	10	331	24%
7:00 PM	9	21	219	16%
8:00 PM	3	3	319	24%
9:00 PM	22	44	297	22%
10:00 PM	9	35	271	20%
11:00 PM	20	63	228	17%
Totals	327	517		

¹ Assumes there are a total of 1,357 available spaces
Source: LNAA – data collected 12/2/2016

The duration of stay for the 517 vehicles that exited the parking areas on Friday, December 2, 2016 is provided in **Figure 3.6.6** on the following page. Based on this information, 39 percent were parked for less than an hour, 51 percent were there less than 24 hours, and 34 percent were there more than three days. With 51 parking tickets validated worth a total of \$124, the Airport collected \$16,290 on the 466 paying vehicles that exited the parking facilities that day. For the 466 paid tickets, the average fee collected was approximately \$35. The distribution of ticket values is shown in **Figure 3.6.7** on the following page.

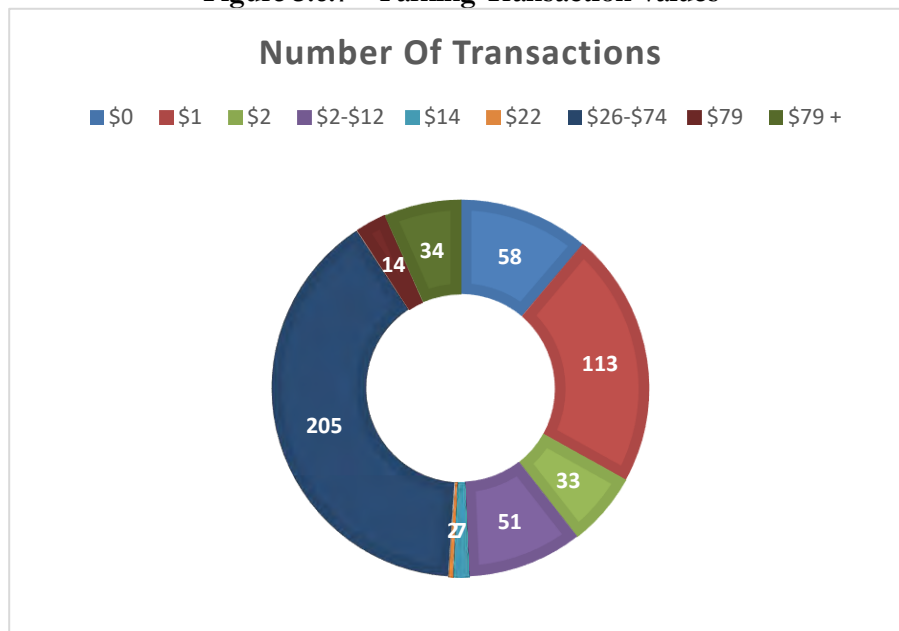


Figure 3.6.6: Parking Duration of Stay



Data as noted for December 2, 2016 Source: LNAA, C&S Engineers, Inc.

Figure 3.6.7 – Parking Transaction Values



Source: LNAA, C&S Engineers, Inc.



Employee Parking

Airport employees park in E-Lot, just west of the terminal, as shown in **Figure 3.6.1**. The lot includes 76 spaces and is accessed through a controlled gate. Prior to the multimodal center construction, there was a staff parking lot just east of the terminal with 24 spaces with additional overflow employee parking areas north of the rental car areas (440 spaces). The employee overflow parking area is expected to remain in that area after construction.

3.7 General Aviation Facilities

General Aviation (GA) refers to all civil aviation operations at an airport other than scheduled commercial air transportation (including cargo). **Figure 3.7.1** illustrates all GA facilities located at the Airport.

Table 3.7.1 indicates aircraft operations by type in 2015. In 2015, 82% of the Airport’s 88,084 aircraft operations were GA operations. Of the GA operations, 63% were local and 37% were itinerant.

Table 3.7.1: Aircraft Operations (2015)

Type of Operations	Operations	% of Total
Air Carrier	4,431	5.03%
Air Taxi	11,356	12.89%
GA Local	44,930	51.01%
GA Itinerant	26,926	30.57%
Military	441	0.50%
Total Operations.	88,084	100.00%

Note: Operations for 12 Months ending on 12/31/2015

Source: C&S Engineers, Inc.; Airport IQ 5010. Accessed 2/8/17. Accessible at:
<http://www.gcr1.com/5010Web/airport.cfm?Site=ABE&AptSecNum=2>

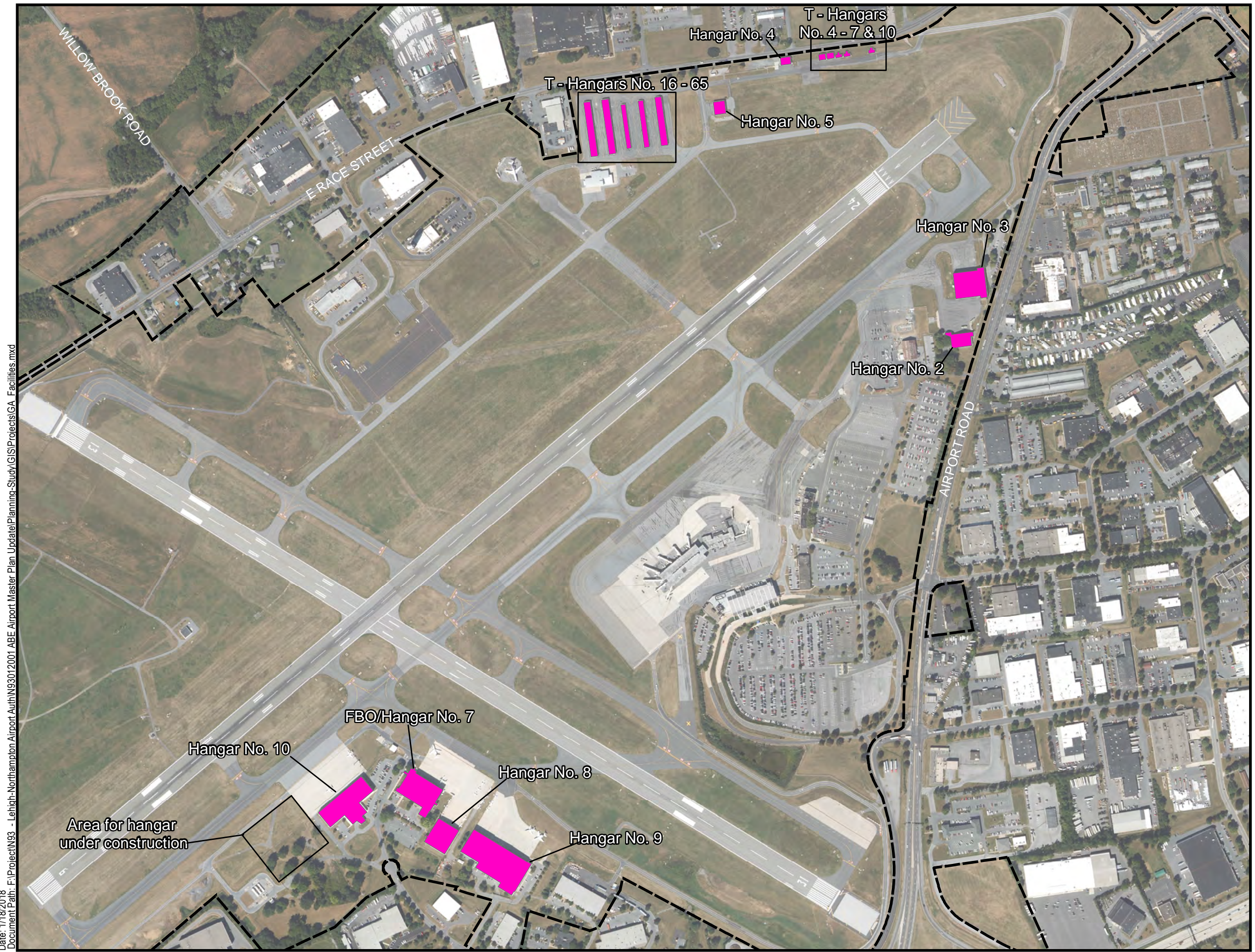
In 2015, the Airport had a based fleet of 107 aircraft. Based aircraft at LVIA are categorized in **Table 3.7.2**.

Table 3.7.2: Based Aircraft (2015)

Aircraft Type	Number Based
Single Engine	60
Multi Engine	7
Jet	37
Helicopter	3

Note: There are no gliders, military, or ultra-light based aircraft at the Airport

Source: C&S Engineers, Inc.; Airport IQ 5010. Accessed 2/8/17. Accessible at:
<http://www.gcr1.com/5010Web/airport.cfm?Site=ABE&AptSecNum=2>



Legend

- Airport Property Line
- General Aviation Facility

N

300 150 0 300 600 Feet

1 inch = 600 feet

When printed at 11" x 17"



Lehigh Valley International Airport
Master Plan Update

General Aviation & Fixed-Base Operator Locations

Figure 3.7.1

Date: 1/18/2018
Document Path: F:\Project\N93 - Lehigh-Northampton Airport Auth\N93\12001 - ABE Airport Master Plan Update\Planning-Study\GIS\Projects\GA Facilities.mxd

SOURCES: Building Polygons from LVIA ALP Base 2015 Update CAD files from LNAA; Aerial Imagery from Quantum Spatial taken 09/12/16 CREATED BY: C&S Engineers, Inc.



Fixed Base Operators

The Airport's FBO, Lehigh Valley Aviation Services, is located in Hangar 7, adjacent to Taxiway J. Currently the FBO is comprised of an approximate 23,550 square-foot hangar that houses single-engine aircraft, multi-engine aircraft, corporate jets, and helicopters, in addition to 25,770 square-feet of office space.¹⁹

Amenities provided by the FBO include: conference room space, concierge services for catering, car and hotel reservations, courtesy transportation, crew cars, a flight planning center, U.S. Customs, and a pilot lounge. Aircraft services include: de-icing (Type I and IV), full service fueling of Jet A and Avgas, ground handling, quick-turn services, on-site maintenance, potable water service, and a reservation center. This facility also houses the Ace Pilot Training Inc. flight school and the LCCC Aviation flight school.²⁰ On-site maintenance operations at this hangar include Scott Richards Aviation Maintenance and LV Avionics in conjunction with New World Aviation, operating out of Hangar 9 and adjacent to the FBO.²¹

Prior to its use as an FBO, this facility was owned and operated by Bethlehem Steel. Many amenities of the facility remain from its original construction. Recent improvements to the facility include an updated air conditioning system and lobby area. Interviews with the FBO have identified tenant improvement requests including: a new central heating/cooling system, restroom rehabilitations, the installation of an outside canopy, and potable water improvements.

Hangars

The Airport provides multiple conventional and T-hangars to house corporate and GA tenants.

Conventional / Bulk Hangars





Conventional/Bulk hangars, along with accessibility, tenants, and hangar/office capacities are outlined in **Table 3.7.3**. A total of 197,172 square-feet of hangar and 42,292 square-feet of office space are provided by these facilities. In addition, a 57,000 square-foot GA hangar facility is under construction adjacent to the LNAA Fuel Farm.

¹⁹ *Lehigh Valley International Airport Master Plan Update*, 2004, LNAA, DMJM Aviation, AECOM, GRA, Inc., DMJM Harris, McTish Kunkel & Associates




²⁰ "Amenities," Lehigh Valley Aviation Website. Accessed 11/14/16. Accessible at: <http://www.flylv.com/stay-connected/general-aviation-lnaa/lehigh-valley-aviation-services/amenities/>

²¹ "Services," Lehigh Valley Aviation Website. Accessed 11/14/16. Accessible at: <http://www.flylv.com/stay-connected/general-aviation-lnaa/lehigh-valley-aviation-services/services/>

Table 3.7.3: Conventional/Bulk Hangars

Hangar	Total Hangar Area/Office Area (SF)	Airside/Gate Access	Tenants
<p>Hangar 2</p> 	8,000/2,034	Taxiway A/Gate 11	<ul style="list-style-type: none"> ▪ DonJon
<p>Hangar 3</p> 	25,428/15,314	Taxiway A/Gate 14	<ul style="list-style-type: none"> ▪ Air Products ▪ DB Integrations ▪ Inflight Training Solutions, Inc.
<p>Hangar 4</p> 	3,100/N.A.	Taxiway C/Gate 16	<ul style="list-style-type: none"> ▪ Vacant (houses some GSE equipment)
<p>Hangar 5</p> 	5,760/1,500	Taxiway C/Gate 16	<ul style="list-style-type: none"> ▪ Lehigh Valley Flying Club



Hangar	Total Hangar Area/Office Area (SF)	Airside/Gate Access	Tenants
<p>Hangar 8</p> 	26,250/N.A.	Taxiway J/Gate 43A	<ul style="list-style-type: none"> ▪ GA Tenants
<p>Hangar 9</p> 	71,938/16,880	Taxiway J/Gate 44B	<ul style="list-style-type: none"> ▪ New World Aviation Inc. ▪ Also used to house LNAA equipment storage
<p>Hangar 10</p> 	40,654/6,564 (Does not include maintenance closet or fire protection system square footage)	Taxiway A/Gate 42B	<ul style="list-style-type: none"> ▪ Dumont Aircraft Charter ▪ East Coast Jets ▪ JET-A ▪ LR Services ▪ Flight Management Services LLC

Note: Hangar 1 is now the Rental Car QTA and is therefore not included as a hangar

Source: Hangar/Office square-footages from LNAA in Lehigh Valley International Airport T-Hangar/Bulk Hangar Rentable Space document; All photos from C&S Engineers, Inc. taken on 12/13/16



T-Hangars No. 1-10

T-Hangars No. 1-7 and 10 are located adjacent to Hangar 4 and are accessible airside from Taxiway C and landside via Gate 16. T-hangars 8 and 9 have been removed. **Table 3.7.4** illustrates that there is a total of 9,678 square-feet of capacity for these facilities. It should also be noted that T-Hangars 4-7 & 10, along with Hangar 4 are slated to be demolished in the summer of 2017 to accommodate the roadway improvements for the FedEx Ground facility.

T-Hangars No. 1-10



Source: C&S Engineers, Inc. 12/13/16.

Table 3.7.4: T-Hangars 1-10 Capacity

T-Hangars	Unit Area (SF)	Number of Units	Total Area (SF)
1, 2 & 3	1,326	3	3,978
4 & 5	1,440	2	2,880
6, 7 & 10	940	3	2,820
Total	N.A.	8	9,678

Source: C&S Engineers, Inc.; Hangar/Office square-footages from LNAA, “Lehigh Valley International Airport T-Hangar/Bulk Hangar Rentable Space”

T-Hangars No. 16-65

This T-hangar complex is located adjacent to the ARFF facility in the northern area of the airfield. This complex contains five facilities totaling 50 T-hangar units leased by the LNAA. These facilities can be accessed by tenants via Gate 16 off of Race Street. **Table 3.7.5** illustrates the total capacity of these facilities.

Table 3.7.5: T-Hangars 16-65 Capacity

T-Hangars	Unit Area (SF)	Number of Units	Total Area (SF)
16-19	928	4	3,712
20 & 21	1,067	2	2,134
22-25	928	4	3,712
26-35	830	10	8,300
36-45	650	10	6,500
46-65	1,420	20	28,400
Total	N.A.	50	52,758

Source: C&S Engineers, Inc.; Hangar/Office square-footages from LNAA, “Lehigh Valley International Airport T-Hangar/Bulk Hangar Rentable Space”



Flight Schools

Ace Pilot Training Inc.

Ace Pilot Training Inc. occupies approximately 800 square-feet of space in Hangar 7. They offer fixed-wing and helicopter instruction and placement services, aerial photography, financing, student housing services, FAA/FCC testing, and the M1 Foreign Student VISA program. Their fleet includes:

- Cessna 152 (7)
- Piper Cherokee (4)
- Diamond, Diamond Star (1)
- Cessna 172P (1)
- Beechcraft Dutchess 76 (1)
- Piper Seneca (1)
- Mooney – M20C (1)
- Schweizer (1)²²

Lehigh Carbon Community College (LCCC) Flight School

The LCCC Flight School occupies approximately 1,640 square-feet of space on the second floor of Hangar 7. Their facilities include two classrooms, two offices, and one flight simulator room. The school is approved to offer FAR Part 141 Flight School training.

Maintenance Services

Hangar 7

LV Avionics has approximately 651 square-feet of space designated in Hangar 7 for its sole use. LV Avionics provides services such as: avionics installations; iPad installations; equipment bench-testing, diagnostics, and repair; autopilot installation and diagnostics; 24 month IFR certifications and Reduced Vertical Separation Minimum (RVSM) checks; navigation calibrations; 406 Emergency Locator Transmitter (ELT) installations; aircraft weighing and balancing; custom instrument panels; silk screening (panel labelling); and sells new and used equipment.²³

Scott Richards Aircraft Maintenance, LLC provides services such as: piston and turbine repairs; annual inspections; 100 hour inspections; phase inspections; MSG document inspections; minor and major repairs; borescope inspections; aircraft recovery; and aircraft purchase consultation.²⁴ Scott Richards Aviation Maintenance occupies over approximately 2,000 square-feet of Hangar 7.

Hangar 7 Maintenance



Source: C&S Engineers, Inc. 12/13/16.

²² Ace Pilot Training, accessible at: <http://www.acepilot.com/>. Accessed 12/29/2016

²³ LV Avionics, accessible at: <http://www.lvavionics.com/>. Accessed 12/29/16

²⁴ Scott Richard Aircraft Maintenance LLC, Welcome page. Accessible at: <http://scottrichardmx.com/index.html>. Accessed 12/29/16



Hangar 9

New World Aviation provides inspections and repair services to Gulfstream, Challenger, Falcon, Hawker, and Learjet aircraft out of Hangar 9. They perform scheduled and non-scheduled maintenance services, comprehensive airframe services and inspection, engine repairs, and FAA Part 135 conformity inspections. They also install a full range of Flight Management Systems, basic instruments, and entertainment equipment.²⁵

Deicing Facilities

As of December 2016, current records indicate that approximately 30,000 gallons of propylene glycol is used each year for aircraft deicing.²⁶ Due to the low quantities of deicing fluid used at the Airport, no dedicated deicing facility exists or is currently planned. All deicing activity occurs on the ramp apron.

Both Type I and Type IV glycol are applied at the Airport. Type I glycol has a low viscosity and provides short term protection after application while Type IV glycol provides a longer holdover time after application. The following table, **Table 3.7.4**, indicates glycol deicing tank capacities at the Airport:

Table 3.7.4: Glycol Deicing Tank Capacities

Name/Location	Substance	Tanks	Tank Capacity	Total Capacity
LVAS Deicing Air Carrier Apron	Type I Glycol	2	6,000 gal.	12,000 gal.
US Airways Deicing Tank Air Carrier Apron	Type I Glycol	1	6,000 gal.	6,000 gal.
US Airways Deicing Tank Air Carrier Apron	Type IV Glycol	1	1,000 gal.	1,000 gal.
Delta Deicing Tanks Air Carrier Apron	Type I Glycol	1	6,000 gal.	6,000 gal.
Delta Deicing Tanks Air Carrier Apron	Type IV Glycol	1	1,000 gal.	1,000 gal.
FedEx Deicing Tanks (Mobile) Cargo Apron	Type I Glycol	1	5,000 gal.	5,000 gal.
FedEx Deicing Tanks (Mobile) Cargo Apron	Type IV Glycol	1	5,000 gal.	5,000 gal.

Source: C&S Engineers, Inc.; *Appendix II- Airport Emergency Plan, Lehigh Valley International Airport (ABE)*, Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016

3.8 Cargo

Air Cargo Data

In 2015, a Regional Freight Plan was developed by the Lehigh Valley MPO in cooperation with PennDOT and in conjunction with *Pennsylvania's Comprehensive Freight Management Plan (CFMP)* to identify trends, needs, and issues in freight transportation for the Lehigh Valley throughout the year 2040.

²⁵ New World Aviation, Maintenance. Accessible at: <http://www.newworldaviation.com/maintenance/>. Accessed 12/29/16

²⁶ *Preparedness, Prevention, and Contingency (PPC) & Spill Prevention Response (SPR) Plan*, Rettew Associates, Inc., February 2017.



According to this study, and as identified in **Table 3.8.1**, aviation is the third largest mode of transportation for cargo in the Lehigh Valley behind rail and truck, and is anticipated to increase from 10 thousand tons of annual cargo, as reported in the year 2011, to 20 thousand tons of annual cargo by the year 2040. This is a total cargo value for air freight growth from \$1,668 million in 2011 to an anticipated \$3,845 million by 2040. However, despite this increase in tonnage, the percent tonnage share of air cargo to total cargo for all modes is expected to decrease to less than 1 percent throughout the planning period while the total air cargo freight value percent share is expected to remain at a constant 3 percent. This means that although air cargo freight value is expected to remain constant, other modes of cargo transport, specifically trucking, are expected to grow at a faster rate. Factors contributing to this increase in trucking for cargo transport include the integration of Intelligent Transportation Systems (ITS), the need to streamline supply chain efficiency, and the current trend of existing railroad abandonment in the Lehigh Valley region.

Table 3.8.1: Total Freight Tonnage

Mode	2011 Total Tonnage (thousands)	2011 Tonnage % Share	2040 Total Tonnage (thousands)	2040 Tonnage % Share
Truck	36,649.55	90%	73,891.28	92%
Rail	4,208.38	10%	6,281.53	8%
Air	10.18	<1%	20.17	0%
Other	0.09	<1%	0.31	0%

Source: C&S Engineers, Inc.; “*Move Lehigh Valley, Lehigh Valley Regional Freight Plan*,” published by the LCTS and LVPC October 13, 2015

The LVIA is the only airport within the Lehigh Valley to offer commercial aviation service, having the ability to provide nonstop service to locations over 1,500 miles away. The Airport’s port of entry serves approximately 4,000 businesses per year, including major freight cargo operators such as FedEx, ATI, ABX, and Atlas Air which all have scheduled service at the Airport. Despite the potential for market expansion and the availability of capacity and uncongested airspace, LVIA’s cargo activity has decreased by 30% between 2004 and 2013.²⁷ More recent trends however, specifically from 2015 to 2016, show that cargo totals at the Airport have increased by 133%.²⁸

It should be noted that cargo and freight are evaluated in the Regional Context chapter, and forecasted in the Aviation Demand Forecasts chapter of this Master Plan.

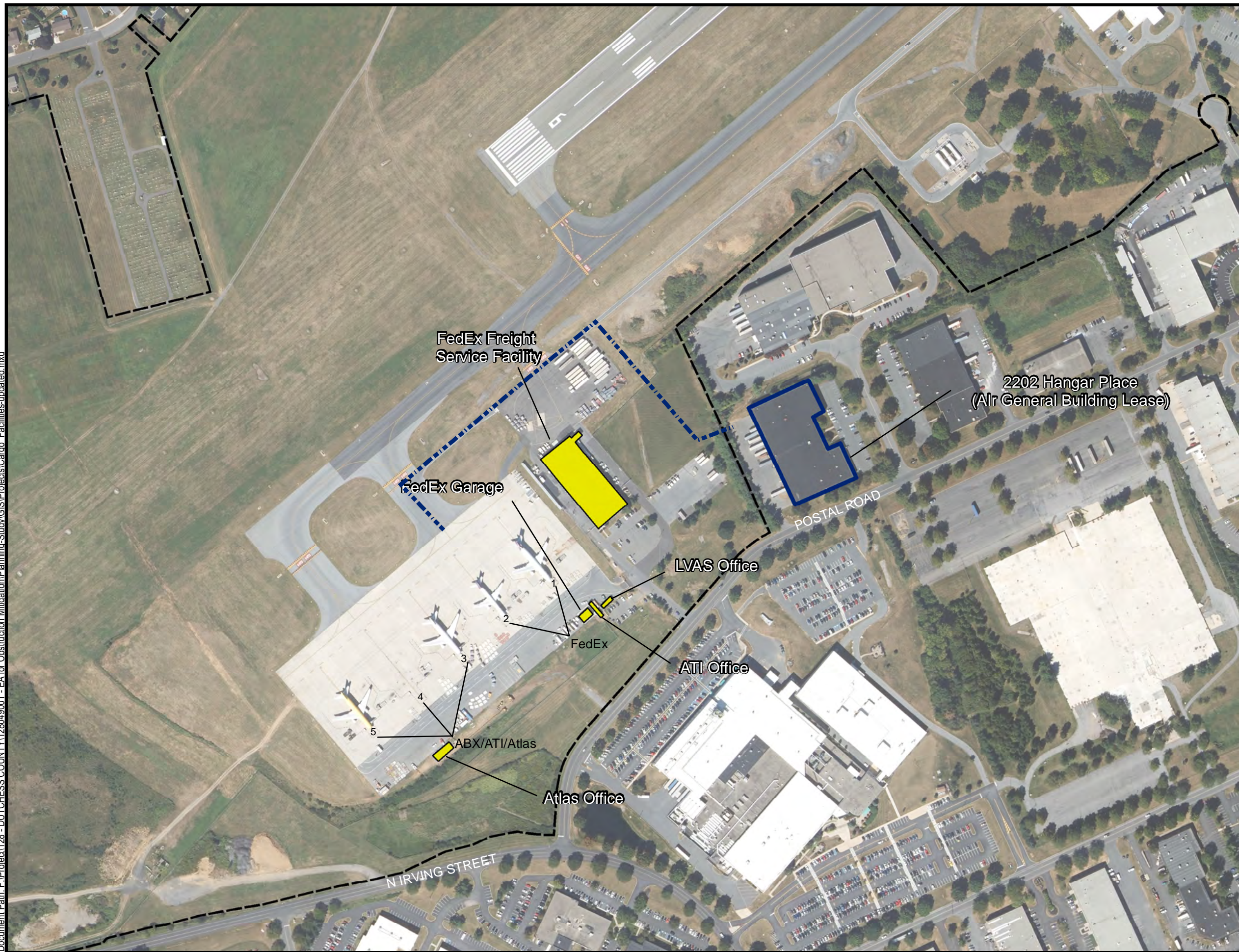
Cargo Facilities

FedEx, ABX Air, ATI, and Atlas Air are the four main air cargo carriers at the Airport. These air cargo carriers serve the ground cargo carriers of FedEx and Air General. Existing air and ground cargo facilities are highlighted in **Figure 3.8.1** and cargo operations are outlined in the sections below.

²⁷ Lehigh Valley Planning Commission, CDM Smith, and PennDOT. *Move Lehigh Valley, Lehigh Valley Regional Freight Plan*. Rep. LVPC, Oct. 2015. Web. <<http://www.lvpc.org/freightlv.html>>.

²⁸ FAA Form 5100-108.

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Legend

- Airport Property Line
- On-Airport Cargo Facilities
- Cargo Facility leased from PennCAP
- Route from Air Cargo Ramp to 997 Postal Rd.

0 100 200 400 600 Feet
1 inch = 300 feet
When printed at 11" x 17"

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Lehigh Valley International Airport
Master Plan Update

Existing Cargo Facilities

Figure 3.8.1

SOURCES: Building Polygons from LVIA ALP Base 2015 Update CAD files from LNAA; Cargo apron parking position allocations from LNAA; Aerial Imagery from Quantum Spatial taken 09/12/16 CREATED BY: C&S Engineers, Inc.



Air Cargo Apron

The air cargo apron is approximately 400,000 square-feet and is located south of the Runway 6 end. The apron is accessible via Taxiway C3 and C2 and contains five ADG D-IV aircraft parking positions, two of which are utilized for FedEx, with the other three utilized by ABX Air, ATI, and Atlas Air. The apron is also used for air cargo equipment staging.

Air General

Air General is a ground cargo service provider operating at the Airport, providing services for ABX Air, ATI, and Atlas Air. This facility is located at 997 Postal Road, and shares a facility with US Customs and Border Protection, along with the tenant Ilkem Marble and Granite. Air cargo is loaded and tugged to this facility by Lehigh Valley Aviation Services, via the airfield perimeter road and access/egress through Gate 45. Once at this facility, Air General loads this cargo onto their trucks as ground cargo.

FedEx Express

The existing FedEx Express freight service facility is located at 951 Postal Road, adjacent to the air cargo apron and south of the Runway 6 end. This facility is approximately 3,700 square-feet and houses only FedEx operations. FedEx operates two flights a day with B757 aircraft.

LVIA Air Cargo Apron



Source: C&S Engineers, 12/13/16

3.9 Support Facilities and Equipment

Locations of support facilities and equipment storage locations are documented in **Figure 3.9.1**.

Airfield Maintenance

The Airport’s main maintenance facility is located in the Northeast Area of the Airport. As indicated by the Airport Certification Manual (ACM) for LVIA that was revised in March 2016, a large quantity of the Airport’s airfield maintenance equipment is past its expected useful life. A complete inventory of airfield maintenance equipment, their condition, storage location, and projected replacement year is indicated in **Table 3.9.1**.

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Legend

- Airport Property Line
- Support Facilities
- Support Facilities Equipment Storage

0 125 250 500 750 Feet
1 inch = 500 feet
When printed at 11" x 17"



Lehigh Valley International Airport
Master Plan Update
**Support Facilities &
Equipment Storage**

Figure 3.10.1

SOURCES: Building Polygons from LVIA ALP Base 2015 Update CAD files from LNAA; Aerial Imagery from Quantum Spatial taken 09/12/16 CREATED BY: C&S Engineers, Inc.



Table 3.9.1: Airfield Maintenance Equipment Inventory

Type	Year	Make	Model	Condition	Airfield Maintenance Department	Projected Replacement Year
Tractors	1971	Ford	5000	Poor	Braden	1991
	2011	John Deere #30	6330 with 24' three gang flail mowers	Good	Airfield	2031
	1973	Ford	4500 25' Boom Mower	Good	Airfield	1993
	1997	John Deere	3102J	Fair	Airfield	2017
	2005	New Holland	21' Three Gang Fail Mower	Good	Queen City	2025
	2017	John Deere #39	6120M w/CX20 mowing Deck	Good	Airfield	2037
	2017	Kubota	N/A	Good	Airfield	2027
Riding Mowers	2005	Toro	Outfront 72" Rotary Mower	Fair	Terminal	2015
	2006	Toro #37	4100D Outfront Rotary Mower- 10'6" cut	Fair	Airfield	2021
	2009	Toro	4100D Outfront Rotary Motor- 10'6" cut	Poor	Terminal	2019
	1995	John Deere	1145 Front Deck	Fair	Terminal	2005
	1992	Kubota #76	Tractor drag behind 6' mower w/ bucket	Fair	Terminal	2022
	2017	Toro 5000	Turf 60" EZ Vac Blower	Good	Terminal	2027
Misc. Equipment	1973	Engersoll Rand	Tow behind air compressor	Poor	Airfield	2018
	1994	Leroy	Q185DJE tow behind air compressor	Good	Airfield	2025
	1992	Craftco	EZ200D Tar Kettle crack filler	Poor	Airfield	2012
	2014	Graco	Line Lazer Paint Machine	Good	Airfield	2027
	2014	Ventrac	Mower-summer Broom-winter	Good	Airfield/Terminal	2030
	2008	John Deere #32	Model 310SJ Backhoe/Loader	Good	Airfield	2030
	1970	Mack	Flatbed Truck	Fair	Airfield	2020
	201	GMC	Flatbed Truck	Good	Airfield-Painter	2030

Airport Master Plan Update—Existing Conditions/Inventory
Lehigh Valley International Airport



Type	Year	Make	Model	Condition	Airfield Maintenance Department	Projected Replacement Year
Lighted X's	1997	Batts	Titan, Diesel, Generator capacity 5,000 watts	Fair	Queen City	2019
	1997	Batts	Titan, Diesel, Generator capacity 5,000 watts	Fair	Queen City	2019
	2013	Sherwin	Model S1701W Yanmar Diesel Generator	Good	Airfield	2033
	2013	Sherwin	Model S1701W Yanmar Diesel Generator	Good	Airfield	2033
	2010	Sherwin	Kipor Diesel Generator	Fair	Airfield	2025
	2010	Sherwin	Kipor Diesel Generator	Fair	Airfield	2025
Aerial Equipment	1999	JLG	600S 62' High Rock	Good	Terminal	2019
	2008	JLG	2630 26' Platform Lift	Good	Terminal	2028
Fork Lifts	1990	Caterpillar	Model 60 GC-30 5,000lbs.	Fair	Airfield	2025
	1955	Clark	6,000 lb.	Poor	Terminal	2018
	2017	Toyota	N/A	Good	FBO	2027
Bus	1996	International	78 passenger	Fair	Aviation Services	2025
Light Carts	2013	Allmand	Night-Lite Pro II 50/60 HZ generator	Good	Airfield	2033
	2013	Allmand	Night-Lite Pro II 50/60 HZ Generator	Good	Airfield	2033
Portable Generators	N/A	Honda	2,500 watt	N/A	ARFF	N/A
	N/A	Dayton	5,000 watt	N/A	ARFF	N/A
	N/A	Honda	2,200 watt	N/A	Terminal	N/A
	N/A	Honda	3,500 watt	N/A	Terminal	N/A
	N/A	Honda Kipor	5,000 watt	N/A	Airfield	N/A
	N/A	Endress	5,000 watt	N/A	Airfield	N/A
Trucks	2015	Ford #44	F-250 4door	Good	Airfield –Lawn crew	2027
	2011	Ford #42	F-250	Good	Airfield	2027
	2015	Ford #16	S-DTY F-550-Dejana Uplift Yellow Paint	Good	Airfield	2027
	2015	Ford #22	F-250 w/ plow	Good	Terminal	2027
	2015	Ford #23	F-250 w/ plow	Good	Terminal- Plumber	2027
	2015	Ford #25	F-250 w/ lift gate	Good	Terminal	2027
	2015	Ford	F-250 Truck	Good	Queen City	2027
	2016	Ford	Ford F250 4 door	Good	Cargo	2027

Airport Master Plan Update—Existing Conditions/Inventory
Lehigh Valley International Airport



Type	Year	Make	Model	Condition	Airfield Maintenance Department	Projected Replacement Year
	2014	Ford	Transit	Good	IT	2027
	2015	Ford #10	F150	Good	Airfield	2025
	2017	Ford #60	Transit Van 250	Good	Terminal- Electrical	2030
	2008	Ford #41	Van	Good	Terminal- Electrical	2028
	2008	Ford #46	Utility truck w/ plow	Good	Airfield – Electrical	2028
	1996	Ford #28	Van	Fair	Terminal-HVAC	2018
	2008	Ford #59	Utility truck w/plow	Good	Airfield	2028
	2000	Ford #61	Van	Fair	Terminal-Carpenter	2020
	2017	Ford	F750 w/spreader and 12ft plow	Good	Queen City	2040

Source: C&S Engineers, Inc.; ACM, *Appendix II- Airport Emergency Plan, Lehigh Valley International Airport (ABE)*, Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016. Equipment list updated July 2017.



Snow Removal Procedures and Inventory

Weather forecasting is monitored on a daily basis at the Airport using a variety of web-based sources as well as runway pavement sensors located on Runway 6/24 and 24-hour monitored closed circuit television cameras observing the airfield. An accumulation of one quarter of an inch of weather contaminants on an appreciable portion of the airfield pavement is an immediate trigger to begin snow removal operations. Whiteout conditions in which snow removal operations are deemed unsafe results in an immediate closure of aircraft operations. Runways which exceed the total allowable accumulation of winter contaminants as indicated in **Table 3.9.2**, will be closed.

Table 3.9.2: Runway Closures due to Accumulation

Contaminant	Contaminant Description	Depth
Wet Snow	Snow that has grains coated with liquid water, which bonds their mass together. A well compacted snowball can be made, but water will not squeeze out.	> ½ inch
Slush	Snow that has water content exceeding its freely drained condition. Water will drain when a handful is picked up.	> ½ inch
Standing Water	Freely flowing water/	> ½ inch
Dry Snow	Snow that has insufficient free water to cause cohesion between particles. Cannot be made into a snow ball.	> 2 inches

Source: C&S Engineers, Inc.; Appendix VI- Snow and Ice Control Plan, Lehigh Valley International Airport (ABE), Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016.

Three departments at the Airport have responsibilities during snow and ice removal. The Airport is physically inspected twice daily by the Airport Operations and Safety Department, which is also responsible for performing field condition assessments, field friction testing, filing Runway Condition Readings (RCR), closing airfield pavements, issuing Notices to Airmen (NOTAMS), and designating emergency access routes. The Operations Center is responsible for notifying personnel on the Snow Callout list and for relaying weather observation and tenant requests for information to management. The Airport’s Maintenance Department is tasked with the operation of snow removal equipment (SRE) to remove winter contaminants, perform de-icing, anti-icing, or sanding of airfield pavements. Maintenance Department staffing levels are adjusted based on the storm intensity and duration, with up to sixteen total pieces of SRE able to operate on the airfield simultaneously.²⁹

SRE equipment is maintained and stored at the Maintenance Department Garage. The majority of equipment is housed at this location, with additional equipment that cannot be accommodated stored at two remote sites. **Table 3.9.3** provides a list of SRE and their storage location. As seen with the ground maintenance equipment, a significant quantity of the Airport’s SRE is still being maintained long past its projected replacement year.

As the primary source of field condition reporting, the Operations Field Condition Assessment Vehicle is used to inform the ATCT, air carriers, air taxis, and other parties of runway closures and opening and to forward tenant requests for snow removal. The Command Vehicle is used to manage snow and ice clearing personnel and equipment operations. Together these two vehicles make up the Airport’s Snow Control Center (SCC).

²⁹ Appendix VI- Snow and Ice Control Plan, Lehigh Valley International Airport (ABE), Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016



Table 3.9.3: Snow Removal Equipment (SRE) Inventory

Year	Make & Model	Equipment Type	Projected Replacement Year	Condition	Quantity	Storage Location
1979	R-3000 Snow Blast #53	Snowplow mounted with 3,000 ton/hr. snow blower	1999	Fair	1	Inside GSE Garage
1979	Walters SnoDozer #52	Snowdozer with 28' snow plow and 12 cu. yd. sander	1999	Fair	1	Inside GSE Garage
2017	Case 921G #57	Front-end loader with a 4.75 cu yd bucket, 72" forks & 24' Blade	2042	Good	1	Inside GSE Garage
1990	Oshkosh P-series #s 64 & 65	8 cu. yd. Dump truck with 22' reversible snow plow and 8 cu. yd. sand spreader	2010	Fair	2	Inside GSE Garage
1992	Volvo Model 170 #75	4 cu. yd. Rubber Tire loader with 20' Ramp Blade	2006	Fair	1	Inside GSE Garage
1995	Caterpillar 966 #70	5 cu. yd. Rubber Tire loader with 30' Ramp Blade	2015	Good	1	Inside GSE Garage
1995	Oshkosh H-series #71	Multi-purpose SRE with front mounted Sweepster 18' snow sweeper or 3,000 ton/hr. snow blower	2015	Good	1	Inside GSE Garage
2001	Oshkosh P2530 #14	6 cu. yd. dump truck with 5 cu. yd. spreader and 14' high speed wing plow rollover	2021	Good	1	Inside GSE Garage
2004	Oshkosh H-series #35	Front mounted 5,000 ton/hr. snow blower	2024	Good	1	Inside GSE Garage
2010	Wausau-Everest SnoDozer #33	Snow dozer with front mounted 5,000 ton/hr. snow blower	2030	Good	1	Inside GSE Garage
1990	Oshkosh #s 66& 67	Sweepster with front mounted high speed 24' snow sweeper	2010	Poor	2	Outside GSE Garage



Year	Make & Model	Equipment Type	Projected Replacement Year	Condition	Quantity	Storage Location
2003	Oshkosh H-series #74	Multipurpose snow removal with 20' sweeper broom and two side wing snow- plower 45'	2024	Good	1	Outside GSE Garage
2011	Mack Granite #11	3,500 Gallon Deicer Tanker with 75' Spray Boom and 22' snowplow	2031	Good	1	Outside GSE Garage
1999	Batts	1,100 Gallon Deicer Trailer Back-up	2009	Fair	1	Outside GRE Garage
2015	Avalanche LDAT 400-30	30' ramp plow (blade is mounted on a 5 cu. yd. front end loader which is rented for the season)	2035	Good	1	Outside GSE Garage
2016	Avalanche LDAT 400-12	Snow Pusher	2035	Good	1	Maintenance
2015	Avalanche LDAT 400-22	Snow Pusher	2035	Good	1	Cargo

Sources: C&S Engineers, Inc.; *Appendix II- Airport Emergency Plan, Lehigh Valley International Airport (ABE)*, Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016 and *Appendix VI- Snow and Ice Control Plan, Lehigh Valley International Airport (ABE)*, Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016. Equipment list revised by LNAA July 2017

Airfield clearing priorities are adjusted based on precipitation type and intensity and air traffic limitations. However, priorities are given in the following order for clearing:

- Priority 1: The active runway, associated parallel taxiway, selected taxiway turnoffs, selected taxiways connecting the active runway to the terminal and cargo apron, NAVAID critical areas for the active runway, selected mutual aid access points, and designated emergency routes.
- Priority 2: The cross wind runway, its associated parallel taxiway, selected taxiway turnoffs, and the air carrier aircraft parking apron.
- Priority 3: The cargo apron and GA/FBO aprons.

According to the snow clearance plan, the approximate 2,478,800 square-feet making up the Priority 1 snow clearing area should have a clearance time of approximately 30 minutes.³⁰

General snow clearing principles at the Airport strive to maintain the best possible surface conditions for terminal aprons and GA taxiways. Runways are cleared to a minimum 100 feet width from runway centerlines and taxiways are cleared at a 40 feet width from their centerlines. Snow bank height profiles are maintained to stringent limits. Currently there is no snow fencing or trenching in use at the Airport. Designated snow stockpile areas are illustrated in **Figure 3.9.2**.

In the event that ice has bonded to pavements, the Airport Authority uses both a mechanical and chemical method of ice removal. Chemical methods include the application of potassium acetate and sodium formate according to the manufacturer’s suggested application rates. Sand is also used to provide traction and anti-skid control measures. Sand is applied according to FAA minimum for Expanded Sand Gradation Standards.

Ground Service Equipment (GSE) Facilities

The LVIA Maintenance Department houses, maintains, and operates the ground service equipment (GSE) required for the infrastructure and land owned by the Airport Authority. The Airport’s main maintenance facilities are located in the northeast area of the Airport, west of the FAA Air Traffic Control Tower, and can be accessed via Fashion Drive South, off of Race Street. This gated facility is approximately 23,400 square-feet.³¹ The Maintenance Building has two ground vehicle fuel tanks, one 10,000 gallon unleaded fuel tank and one 20,000 gallon diesel fuel tank. The building also houses 17,650 gallons of potassium acetate, which is used for pavement deicing, in two 1,550 gallon, one 2,600 gallon, and 12,000 gallon tanks.³²

Ground service maintenance equipment is housed within the Airport’s main maintenance facility, the GSE ramp, FBO Hangar 7, and Hangar 9. A complete GSE inventory, with equipment condition, housing location, and projected replacement year, is indicated in **Table 3.9.4**.

LNAA Maintenance Building



Source: C&S Engineers, Inc.

³⁰ Appendix VI- Snow and Ice Control Plan, Lehigh Valley International Airport (ABE), Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016

³¹ Lehigh Valley International Airport Master Plan Update, 2004, LNAA, DMJM Aviation, AECOM, GRA, Inc., DMJM Harris, McTish Kunkel & Associates

³² Source: Appendix II- Airport Emergency Plan, Lehigh Valley International Airport (ABE), Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016

Date: 2/9/2017
Document Path: F:\Project\N93 - Lehigh-Northampton Airport Auth\N93012001 ABE Airport Master Plan Update\Planning-Study\GIS\Projects\Snow Disposal Areas.mxd



SOURCES: Snow Disposal Areas digitized from ACM Appendix VI - Snow and Ice Control Plan, March 2016 revised version; Aerial Imagery from Quantum Spatial taken 09/12/16.
CREATED BY: C&S Engineers, Inc.



Snow Disposal Areas

Lehigh Valley International Airport
Master Plan Update
Figure 3.9.2

Table 3.9.4: Ground Service Maintenance Equipment Inventory

Year	Make	Model	Equipment	Condition	GSE Maintenance Department	Projected Replacement Year
1987	Ford	F-800	Deicer	Fair	GSE	2007
1988	Ford	F-800	Deicer	Fair	GSE	2008
1986	Ford	F-600	Deicer	Fair	GSE	2005
1985	Horbart FCz	800	GPU	Fair	GSE	2005
1985	Horbart Jet Ex	40	GPU	Fair	GSE	2005
1985	Horbart Jet Ex	40	GPU	Fair	GSE	2005
1988	Isuzu	160	Lavatory Truck	Fair	GSE	2008
1992	Hobart	160	Lavatory Truck	Fair	GSE	2012
1985	Stinar	2500	Air Stairs	Fair	GSE	2005
1990	Trilectron	PSC	Air Stairs	Fair	GSE	2010
1996	Tug	660	Belt	Fair	GSE	2016
1980	Cochran	660	Belt	Fair	GSE	2000
1978	Cochran	660	Belt	Fair	GSE	1998
1994	Tug	660	Belt	Fair	GSE	2014
1980	Cochran	660	Belt	Fair	GSE	2000
1985	Harlan	40	Tug	Fair	GSE-QC	2005
1975	Clark	50	Tug	Fair	GSE-QC	1995
1970	Hough	225	Tug	Fair	GSE Ramp	1990
1999	Tiger	50	Tug	Fair	GSE Ramp	2010
1975	Clark	50	Tug	Fair	GSE Ramp	1995
1975	Clark	50	Tug	Fair	GSE Ramp	1995
1999	Tiger	50	Tug	Fair	GSE Ramp	2019
1992	United Tractor	160	Tug	Fair	GSE Ramp	2012
1985	Harlan	160	Tug	Fair	GSE Ramp	2005
1975	Clark	50	Tug	Fair	FBO Hangar 7	1995
1970	Hough	180	Tug	Fair	FBO Hangar 7	1990
1975	Tug	160	Tug	Fair	FBO Hangar 7	1995
1970	Clark	2500	Tug	Fair	FBO Hangar 7	1990
1992	United Tractor	160	Tug	Fair	FBO Hangar 7	2012

Airport Master Plan Update—Existing Conditions/Inventory
 Lehigh Valley International Airport

Year	Make	Model	Equipment	Condition	GSE Maintenance Department	Projected Replacement Year
1986	United Tractor	160	Tug	Fair	FBO Hangar 9	2008
2016	Tronair	Electric	Tug	Good	FBO	2026
2016	Tronair	Electric	Tug	Good	FBO	2026
2014	Jeep	Cherokee	Jeep	Good	FBO	2024

Source: C&S Engineers, Inc.; *Appendix II- Airport Emergency Plan, Lehigh Valley International Airport (ABE)*, Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016. Updated by LNAA July 2017.

Fueling Facilities and Operations

The LNAA Fuel Farm at the Airport is accessible landside from Hayden Circle and airside from the Taxiway “A” Safety Area. Sufficient land area adjacent to the existing facility towards Postal Road has been reserved for expansion should there be a need for future capacity.

Currently, the Airport’s FBO provides full service fueling of 100LL Avgas and Jet A fuel. Full service fueling ensures that pilots in need of fuel will generally not have to reposition their aircrafts for fueling as fuel trucks driven by FBO employees will drive fuel to the aircraft, dispense fuel from the fuel truck, and then collect payment from the pilot. World Fuel Services is the current fuel supplier for the Airport, with fueling hours from Sunday to Saturday from 4am to 10pm.³³

In 2016, 684,210 gallons of fuel were sold for GA activities at the Airport, generating \$1,415,554 in gross fuel sales. This is a decrease from the \$1,832,379 generated from gross fuel sales from the sale of 836,007 gallons in 2015.³⁴

The fuel farm is sufficiently fenced and posted with “Flammable” and “No-Smoking” signs and equipped with boldly marked emergency cutoff valves located outside the areas of probable spill and near the routes that would be used to escape a fuel spill. The fuel farm contains three 50,000 gallon Jet A fuel tanks and one 12,000 gallon 100LL fuel tank.³⁵ All fuel tanks contain a non-splashing bottom inlet and are equipped with rain-proof and bug-proof vents at least twelve feet above grade. All piping is clearly identified by fuel type and grade by color and marking codes are sufficiently protected from damage by surface vehicles. Loading docks at the fuel farm are color coded and marked in accordance to fuel type and equipped with one accessible fire extinguisher, a non-bypassable, automatic fuel flow cutoff feature, and bond wire and appropriate conductor clamps for bonding tankers to the fueling system.³⁶

LNAA Fuel Farm



Lehigh Valley Aviation Services Fueling Vehicle



Source: C&S Engineers, Inc. 12/13/16

³³ “Lehigh Valley Aviation Services,” Airnav. Accessed on 11/11/2016 at <https://www.airnav.com/airport/KABE/LNAA>

³⁴ “Agenda, Financial Statements, Traffic Reports & Minutes for the Board of Governors Meeting on January 31, 2017,” Lehigh Northampton Airport Authority

³⁵ *Appendix II- Airport Emergency Plan, Lehigh Valley International Airport (ABE)*, Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016

³⁶ “Appendix I- Standards for Fuel Storage, Handling, and Dispensing”, *Airport Certification Manual for Lehigh Valley Airport Authority*, Lehigh-Northampton Airport Authority, March 2016 update



Mobile fuel trucks are used to transport fuel from the fuel farm to aircraft. An inventory of FBO mobile fuel trucks and their condition is located in **Table 3.9.5**. All mobile fuelers are equipped with emergency fuel cutoffs and fire extinguishers located on each side of the fueler, in addition to a brake interlock system that prevents the fuelers from being moved during fuel delivery. All mobile fuel tanks are equipped with closed and gasketed dome covers to prevent fuel spillage during vehicle movement and the influx of water, a sump drain to capture overflow, a tank bottom outflow cutoff valve to block fuel spillage in the event of a valve failure or rupture, and sufficiently marked hoses, nozzles, and connectors.³⁷

Table 3.9.5: FBO Fuel Truck Inventory

Year	Make	Model	Condition	Projected Replacement Year
1994	Ford	5,000 gallon Jet A Refueler	Fair	2014
1994	Ford	3,000 gallon Jet A Refueler	Fair	2014
2000	Int'l IHC 4900	5,000 gallon Jet A Refueler	Fair	2020
2004	Int'l IHC	5,000 gallon Jet A Refueler	Good	2024
2004	Ford	F-350 750 gallon Avgas Refueler	Good	2019

Source: C&S Engineers, Inc.; *Appendix II- Airport Emergency Plan, Lehigh Valley International Airport (ABE)*, Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016

All fueling agents are in compliance with the standards and procedures for fuel storage, handling and dispensing contained in the most recent edition of the National Fire Protection Association, *Standard for Aircraft Fuel Servicing*, in addition to the procedures for refueling and quality control contained in the most recent version of the National Air Transportation Association publication, *Refueling and Quality Control Procedures for Airport Service and Support Operations*. In addition, all fueling agents who fuel aircraft, accept fuel shipments, or otherwise handle fuel receive annual on-the-job safety training and report to at least one fueling supervisor with annual FAA approved fire safety training.³⁸

Aircraft Rescue and Firefighting (ARFF)

The LVIA ARFF Department provides fire and rescue services for aircraft and structures, serves as first responders for medical and hazmat emergencies, and conducts/oversees aviation related fire suppression and rescue operations at the Airport. As an ARFF Index C Airport, the Airport must have a minimum of two firefighters on duty at all times, which includes at least one ARFF Lieutenant or acting Lieutenant, and all ARFF personnel must comply with 14 CFR Part 139.315-319 guidelines. Currently, the Fire Department is directed by the Director of Operations and Safety. Staffing includes one ARFF Chief, three ARFF Lieutenants, three ARFF full-time members, and three ARFF part-time members. Scheduling is divided into three platoons that operate on a schedule of 24 hours on duty and 48 hours off duty, with typically one ARFF Lieutenant or acting Lieutenant and one firefighter working each shift.³⁹

³⁷ “Appendix I- Standards for Fuel Storage, Handling, and Dispensing”, *Airport Certification Manual for Lehigh Valley Airport Authority*, Lehigh-Northampton Airport Authority, March 2016 update

³⁸ “Appendix I- Standards for Fuel Storage, Handling, and Dispensing”, *Airport Certification Manual for Lehigh Valley Airport Authority*, Lehigh-Northampton Airport Authority, March 2016 update

³⁹ *Appendix II- Airport Emergency Plan, Lehigh Valley International Airport (ABE)*, Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016



The Airport currently has one 13,000 square-foot ARFF facility which was commissioned in October 2003 to house ARFF personnel, vehicles, and support equipment. The facility is located on the north-side of the Airport, northeast of the intersection of Taxiway C and Taxiway E. This location was chosen to yield the quickest response time to each runway end (less than five minutes to anywhere within the Airport security fence) in addition to strategically supporting the construction of a future parallel Runway 6/24. This two story facility is complete with a second story Watch Mezzanine, four vehicle bays, four dormitories, two offices, a power generator, emergency lighting, men’s and women’s locker rooms, a foam room with storage tank, and an exterior standpipe pump system for refilling tanks with foam.⁴⁰ An inventory of vehicles and equipment housed at this location is available in **Table 3.9.6**.

Table 3.9.6: ARFF Vehicle and Equipment Inventory

Number	Year	Make	Model	Condition	Projected Replacement Year*
1	2017	Oshkosh	Striker 3000 gallon water 420 gallon foam 50' Boom (HRET) High Reach Extendable Turret	Good	2027
2	2000	E-One	3,000 gallon water 450 gallon foam	Fair	2020
3	1997	Oshkosh	3,000 gallon water 450 gallon foam 52' sozzel boom	Fair	2013
4	2011	KME on Int'l Chassis	Rapid Response 500 gallon water 60 gallon foam	Good	2022
5	1994	Ford	F350 4x4 Utility Truck	Fair	2001
7	1993	Int'l	Support Vehicle Air Bags- jacks-blocking	Fair	2013
8	2017	Ford	F350 Utility Truck	Good	2027

Source: C&S Engineers, Inc.; *Appendix II- Airport Emergency Plan, Lehigh Valley International Airport (ABE)*, Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016. Updated by LNAA July 2017.

During an emergency dispatch, Taxiway E north of Runway 6/24 is used as the emergency access route for ARFF vehicles to access the airfield. Three first run vehicles are typically deployed during an emergency, Fire Rescue Trucks 2, 3, and 4, supplying a total of 6,500 gallons of water, 880 gallons of Aqueous Film Forming Foam (AFFF), and 950 gallons of dry chemical. Support and standby vehicles during an emergency dispatch includes Fire Rescue Trucks 1 and 5, carrying a total of 1,500 gallons of water, 200 gallons of AFFF, airbags, cribbing back boards, fans, and extra supplies. All internal operations, road, and pump tests are performed on a weekly basis to ensure efficiency.

⁴⁰ "Fire Department," *Stay Connected*, ABE website. Accessed 11/14/16. Accessible at <http://www.flylv.com/stay-connected/fire-department/>



ARFF Facility



Source: C&S Engineers, Inc. 12/13/16

Additional responding agencies may be called in during an emergency. Secondary responding agencies include: the Allentown Fire Department (Station 13), the Allen Township Fire Company (Station 45), the Bethlehem Fire Department (Engine 9), the Catasauqua Fire Rescue (Station 2), the East Allen Township Fire Company (Station 46), the Han-Le-Co Fire Company (Station 33), the Lehigh Township Fire Company (Station 47), the Northampton Township Fire Company (Station 42), the North Catasauqua Fire Department (Station 18), and the Whitehall Fire

Department (Station 35). Tabletop training exercises are conducted yearly with these additional rescue and firefighting agencies and full scale exercises are conducted at least every 36 months.

In addition to ARFF facilities, there are 53 fire hydrants located on or adjacent to airport property that can be used to supply water, all with flowage rates between 1,280 to 1,405 gallons per minutes in the event of an emergency. In addition, all airport facilities are equipped with water sprinkler systems. Additional foam fire suppression systems are installed in Hangar 9, Hangar 10, and the LNAA Fuel Farm.⁴¹

Airport Police Department

The LNAA Police Department provides federally mandated Airport security and law enforcement services and provides direct communication with ICO and other key LNAA management personnel. Specific roles of the LNAA Police Department include managing law enforcement operations, such as traffic control, evacuation assistance (providing instruction for and controlling access to evacuated or sheltered areas), scene assess control, crowd control, and scene security. The Airport Police Department also provides perimeter security of the Aircraft Operations Area (AOA) fence line, Security Identification Display Area (SIDA), and AOA, as required by the FAA and TSA.

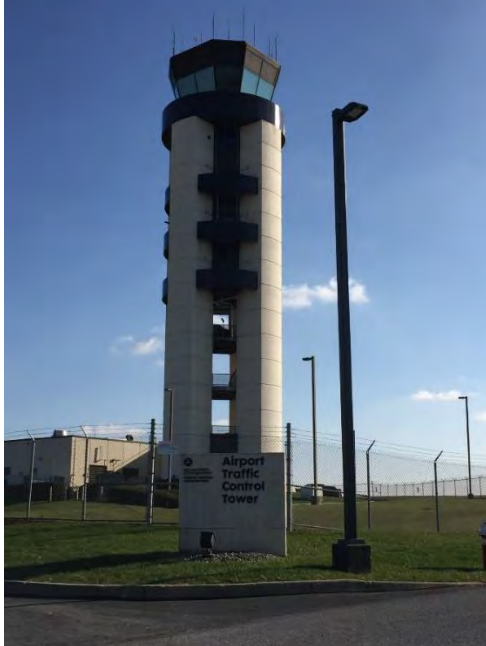
As an Authority, the LNAA Police Department is a police force separate from other local agencies. Currently the Airport has six full-time and nine part-time police officers, including the Chief of Police. All Airport Police Officers are trained and certified in the Commonwealth of Pennsylvania under Act 120 and under 14 CFR Part 139 & 49 CFR Part 1542 policies. In addition, all officers must complete annual recurrent Airfield Drivers' Training, S.I.D.A. Training, Wildlife Hazard Management Training, and Law Enforcement Training. The Airport Police Department is located on the first floor of the Main Terminal Building.⁴² Recent additions to Police Department equipment includes one Ford Interceptor and one Holland police vehicle.

⁴¹ Appendix II- Airport Emergency Plan, Lehigh Valley International Airport (ABE), Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016

⁴² Appendix II- Airport Emergency Plan, Lehigh Valley International Airport (ABE), Lehigh-Northampton Airport Authority, submitted February 2013 and revised March 2016

FAA Air Traffic Control Tower (ATCT) and facilities

FAA ATCT



Source: C&S Engineers, Inc. 12/13/16

The Airport's Federal Aviation Administration (FAA) ATCT is located in the northern area of the Airport. It is accessible landside from Fashion Drive South off of East Race Street and airside via Taxiway C. The ATCT is responsible for controlling all aircraft operations and ground vehicles operating with the Airport's active movement area and local airspace. The ATCT is FAA owned and was commissioned on December 10, 1995, before being dedicated on May 13, 1996. The facility is 155 feet tall overall, with a 525 square-foot cab, and a 12,000 square foot base. The ATCT operates 24 hours a day, seven days a week.

There are seven control tower operator positions for local and ground control in the tower and twelve operator positions in the Terminal Radar Approach Control (TRACON) in the building base. In addition to the TRACON, the base building also contains office space for the Air Traffic administrative workforce and Airway Facilities maintenance workforce. The ATCT is

staffed by thirty Air Traffic Control Specialists, four Operational Supervisors, four Administrative Staff Officers, one Contract Training Specialist, and ten Airway Facilities Specialists.⁴³

⁴³ "Facility Orientation Guide," Allentown Tower, published by the FAA. Accessible at: <http://www.air-traffic-control.org/pdf-files/allentown.pdf>



3.10 Building Assessments

The intent of this building evaluation report is to review the existing buildings, observe existing conditions, report the evaluations, and offer recommendations to correct noted issues and Code deficiencies. It should be noted that no hazardous material testing investigations or remediation measures were included. However, exposed assumed hazardous materials and known contaminants based on the installation have been noted accordingly.

The following buildings were visually inspected on November 17, 2016:

- Former Government Building
- Hangar 1 – Rental Car Quick Turn Around (QTA)
- Hangar 2
- Hangar 3
- Hangar 7
- First Floor of Wiley Terminal

These buildings are depicted in **Figure 3.10.1** and summarized in **Table 3.10.1**. Costs indicated in this table are preliminary estimates only and will be reexamined during the development of the capital improvements program. The full building inventory assessment report is available in the **Appendix**.



Legend

- Airport Property Line
- Assessed Buildings

0 100 200 400 600 Feet
1 inch = 400 feet
When printed at 11" x 17"





Lehigh Valley International Airport
Master Plan Update


Building Assessments


Figure 3.10.1


SOURCES: Building Polygons from LVIA ALP Base 2015 Update CAD files from LNAA; Aerial Imagery from Quantum Spatial taken 09/12/16 CREATED BY: C&S Engineers, Inc.

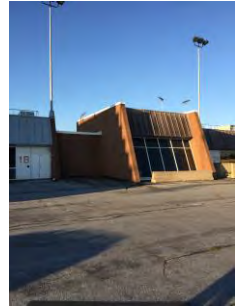
Table 3.10.1: Building Assessment Existing Conditions and Recommendations

	Structural	Architectural	Plumbing	Fire Sprinkler & Fire Alarm System	HVAC	Electric Service	Security & Communications/IT
Former Government Building							
Existing Conditions 	<ul style="list-style-type: none"> • Foundation in good condition • First Floor in satisfactory condition • Second & Third Floor in very poor condition 	<ul style="list-style-type: none"> • Exterior walls, exterior doors, exterior windows, roof, interior finishes, floor coverings, ceiling, interior doors in poor condition • Basement in good condition 	<ul style="list-style-type: none"> • Poor condition (have been decommissioned) 	<ul style="list-style-type: none"> • Equipped, but in poor condition • Fire alarm notification system does not exist 	<ul style="list-style-type: none"> • In poor condition and not salvageable 	<ul style="list-style-type: none"> • In poor condition 	<ul style="list-style-type: none"> • Access control or video surveillance systems do not exist • Telephone service is in poor condition and has been abandoned
Recommendation(s)	<ul style="list-style-type: none"> • Demolition of facility 						
Hangar 1 – Rental Car Quick Turn Around (QTA)							
Existing Conditions 	<ul style="list-style-type: none"> • Satisfactory condition 	<ul style="list-style-type: none"> • Siding and interior finishes in fair condition • Exterior doors and windows in poor condition • Roof condition could not be verified • Functionally meets current needs 	<ul style="list-style-type: none"> • Water service is in poor condition/state of disrepair • Car wash section in good condition 	<ul style="list-style-type: none"> • Fire suppression system does not exist • Fire alarm notification system does not exist 	<ul style="list-style-type: none"> • De-icing side in poor condition • Hertz Rental Car Wash side in good condition 	<ul style="list-style-type: none"> • In good condition and meets current facility needs 	<ul style="list-style-type: none"> • Access control or video surveillance systems do not exist • Telephone service is in adequate condition
Recommendation(s)	<ul style="list-style-type: none"> • Keep stockpile as far as possible from CMU wall 	<ul style="list-style-type: none"> • Remove existing metal wall panels, reinstall, and reinsulate the wall cavity during replacement • Replace existing metal roof panels and exterior doors 	<ul style="list-style-type: none"> • Re-assemble domestic water service (\$10,000) 	<ul style="list-style-type: none"> • Install fire sprinkler and fire alarm notification systems (\$90,000) 	<ul style="list-style-type: none"> • Remove and install new electric infrared heaters in De-icing storage area (\$1,200 per heater) • Install new fan coil unit with electric/gas heat to supply the necessary outdoor air required per PA State Mechanical Code in QTA Servicing Area (\$2.500) 	<ul style="list-style-type: none"> • Upgrade lighting to high-efficiency LED fixtures • Re-support conduit and cables 	<ul style="list-style-type: none"> • Install access control or video surveillance system

	Structural	Architectural	Plumbing	Fire Sprinkler & Fire Alarm System	HVAC	Electric Service	Security & Communications/IT
Hangar 2							
Existing Conditions 	<ul style="list-style-type: none"> Satisfactory condition 	<ul style="list-style-type: none"> Exterior walls, doors, roof, and roof gutter system in good condition Interior wall, ceiling, and floor finishes in fair condition Animal roosting in ceiling Facility and toilet rooms inaccessible 	<ul style="list-style-type: none"> Plumbing system functional and in fair condition Plumbing fixtures lack code required vacuum breakers 	<ul style="list-style-type: none"> Consists of a combined domestic/fire service that is in fair condition Does not have foam fire suppression system Fire alarm system in good condition 	<ul style="list-style-type: none"> Boiler, bath exhaust, and SAYNO heat pump system, in working condition but have exceeded useful life Water unit heaters in operational condition No make-up air system present First Co. hot water furnace and DX cooling coil cabinet in good condition 	<ul style="list-style-type: none"> Adequate overhead utility service Electrical panels in basement beyond useful life 129/340 volt panel with a wild leg on Phase B Danger concern regarding existing 5kW Onan generator appears undersized for emergency loads 	<ul style="list-style-type: none"> Access control or video surveillance systems do not exist Telephone service is in working condition
Recommendation(s)	<ul style="list-style-type: none"> Fill cracks in slab on grade 	<ul style="list-style-type: none"> Routine roof maintenance Provide office aesthetics upgrade if desired 	<ul style="list-style-type: none"> Provide modernized ADA compliant toilet room arrangement (\$70,000) 	<ul style="list-style-type: none"> Required installation of foam fire suppression system (\$500,000) 	<ul style="list-style-type: none"> Install make-up air unit with interlocked exhaust fans as required per Pennsylvania State Mechanical Code (\$25,000) Install new hot water unit heaters (\$850 per hot water heater) Remove and install new ductless split system in adjacent office to hangar (\$3,100) 	<ul style="list-style-type: none"> Upgrade basement panels and generator. Remove wild leg panel and provide dedicated feeds/transformers for 120/240 volt loads Upgrade to LED style fixtures 	<ul style="list-style-type: none"> Install access control or video surveillance system

	Structural	Architectural	Plumbing	Fire Sprinkler & Fire Alarm System	HVAC	Electric Service	Security & Communications/IT
Hangar 3							
Existing Conditions 	<ul style="list-style-type: none"> • Excellent Condition 	<ul style="list-style-type: none"> • Exterior walls in good condition with small areas of damaged insulation • Doors, exterior windows, roof gutter system, in good condition • Roof and interior wall in fair condition • Facility and toilet rooms inaccessible • Functionally meets the needs of an FBO of this size/type 	<ul style="list-style-type: none"> • Plumbing in functional and good condition • Heating system in good condition • Air dryer not functioning • Toilet facilities in hangar and office areas in good condition • Fueling system in good condition 	<ul style="list-style-type: none"> • Does not have automatic foam fire suppression system • Fire alarm system in good condition 	<ul style="list-style-type: none"> • Heating and make-up air system, water heaters, exhaust fan, and RTU in good condition • Diffusers in ACT ceiling in fair condition 	<ul style="list-style-type: none"> • Service is adequate for facility • Electric panels, wiring, and lighting in good condition 	<ul style="list-style-type: none"> • Local access control and video surveillance system in place • Telephone service is in working condition
Recommendation(s)	<ul style="list-style-type: none"> • Fill cracks in slab on grade 	<ul style="list-style-type: none"> • Patch damaged insulation • If desired for aesthetics upgrade office throughout • Inspect and re-caulk roof eave and wall joint • Repair epoxy floor around trench drain • install weather-stripping on door 	<ul style="list-style-type: none"> • Provide modernized ADA compliant toilet room (\$10,000) 	<ul style="list-style-type: none"> • Required installation of automatic foam fire suppression system (\$500,000) 	<ul style="list-style-type: none"> • Replace hot water unit heaters that are no longer performing efficiently (\$850 per unit heater) • Remove and replace damaged diffuser/grilles with new (\$75 each) • Acquire more detailed inspection of all major equipment 	<ul style="list-style-type: none"> • Replace interior and exterior apron lights with LED fixtures 	

	Structural	Architectural	Plumbing	Fire Sprinkler & Fire Alarm System	HVAC	Electric Service	Security & Communications/IT
Hangar 7							
Existing Conditions 	<ul style="list-style-type: none"> • Good condition 	<ul style="list-style-type: none"> • Exterior walls, hangar doors, in fair condition • Office doors, roof in good condition • Toilet rooms inaccessible 	<ul style="list-style-type: none"> • Plumbing systems in good condition • Hangar toilet facilities not operational • Office toilet facilities in good condition • Eye wash stations and service sinks/hose bibs in fair condition 	<ul style="list-style-type: none"> • Equipped with sprinkler and standpipe system in poor, abandoned condition • Requires installation of automatic foam fire suppression system • Has high level detection in hangar bay area 	<ul style="list-style-type: none"> • Unclear whether supply discharge diffuser is operational • Infrared heating system in good condition • Gas-fired unit heaters not operational • Radiation heaters have exceeded useful life • Boilers, piping, pumps, valves, controls, and insulation in good condition 	<ul style="list-style-type: none"> • Needs replacement for primary switch and transformers • Wiring in fair condition 	<ul style="list-style-type: none"> • Operated access control or video surveillance system not in place • Telephone service is in working condition
Recommendation(s)	<ul style="list-style-type: none"> • Repair cracks in CMU wall 	<ul style="list-style-type: none"> • Replace hangar sliding doors • Repaint exterior metal siding • Upgrade furnished office to modernize • Replace aluminum windows • Paint interior hangar walls to brighten space • Acquire detailed inspection of roof top unit dedicated for office spaces and training rooms 	<ul style="list-style-type: none"> • Upgrade/modernize toilets to ADA accessibility (\$250,000) 	<ul style="list-style-type: none"> • Install automatic foam fire suppression system (\$500,000) 	<ul style="list-style-type: none"> • Remove and install new make-up air unit to meet Pennsylvania State Mechanical Code (\$75,000) • Install new hot-water convectors in office/training rooms where necessary (\$450 per convector) 	<ul style="list-style-type: none"> • Upgrade building lighting to LED • Upgrade electrical devices 	<ul style="list-style-type: none"> • Remove abandoned phone systems

	Structural	Architectural	Plumbing	Fire Sprinkler & Fire Alarm System	HVAC	Electric Service	Security & Communications/IT
First Floor of Wiley Terminal							
Existing Condition 	<ul style="list-style-type: none"> • Good condition 	<ul style="list-style-type: none"> • Exterior walls and interior doors in good condition • Exterior windows in fair condition • Roof is in poor condition • Functionally space is not well utilized 	<ul style="list-style-type: none"> • Plumbing, electric water heaters, and sump pump in mechanical room in good condition • Natural gas supplies in good condition • Toilet facilities in good condition 	<ul style="list-style-type: none"> • Equipped with automatic sprinkler system in good condition • Equipped with building alarm fire notification system in good condition 	<ul style="list-style-type: none"> • RTUs may be causing water damage to gypsum ceiling system • Water-to-water heat exchanger may be “old” 	<ul style="list-style-type: none"> • Gear, electric panels, wiring, and lighting in good condition 	<ul style="list-style-type: none"> • Building access control and video surveillance systems in good condition • Telephone service is in working condition
Recommendation(s)		<ul style="list-style-type: none"> • Replace roof of main building area and damaged ceiling tiles • Remove trailer addition • Reconfigure or repurposes space for efficient use 	<ul style="list-style-type: none"> • Provide FRP panel surround at janitor’s sink 		<ul style="list-style-type: none"> • Acquire detailed inspection of RTUs and fan coil units located above the ACT ceiling • Acquire detailed inspection of the water-to-water heat exchanger located in the mechanical room adjacent to elevator shaft 	<ul style="list-style-type: none"> • Perform scheduled maintenance on lower level transformer and switches • Change out lighting to LED fixtures 	

Source: LNAA, Lehigh Valley International Airport Building Conditions Report from 11/17/16 visual inspection by AIA and C&S Engineers, Inc.



3.11 Utilities

Arora Engineers has performed an initial review of legacy utility data and documentation provided by LNAA. The goal of the utility inventory is to support an airport campus-wide assessment of utility needs, which is an important component of the airport master planning processes. **Figure 3.11.1** depicts the initial Utility data inventory. Overall the information received can be categorized as follows:

- Utility drawings as part of the original post-World War II airport construction plans, such as Electric Distribution and Field Lighting plans from 1948. While these are a valuable reference in terms of historical information, they are not in a digital geospatial format, and will be of limited value in terms of developing an authoritative utility inventory map.
- More recent project-specific drawings, computer-aided design (CAD) files, and data, particularly from airside construction projects over the past several years. This includes, for example:
 - Runway centerline lighting plans as part of the Runway 06-24 rehabilitation.
 - FAA Airports Geographic Information System (AGIS) data collection as part of the Runway 13-31 Safety Area project
 - Economy Parking Lot as-builts

Project-specific data sets may be useful for specific areas and are more likely to be timely, or at least authoritatively dated. However, some data may only be design or construction drawing-related data, and as-builts may or may not have been actual field-collected data.

- Campus-wide utility data. While this type of data is the most useful for facility planning across the airport, it is also often the rarest. LNAA does have a single electrical utility CAD file covering the airport, largely in and around the airfield.

As part of this Master Plan, standard AGIS mapping of utility features is included. However, due to the subsurface nature of utilities, the standard AGIS data, by itself, cannot provide a comprehensive view. The LNAA is currently cataloguing all hardcopy flat-files at the Airport to create an inventory list of drawings, with the goal of depicting as much utility information electronically that can be imposed into AutoCAD where recent electronic files are not available.

The next steps in investigating the Airport's utilities will be to prioritize data sets for quality and breadth, and investigate capacities where available. These will be eventually mapped into a Utility Plan. Data will need to be structured and standardized to the extent practical, along with categorization and annotation. The data sources noted above have various data structures and level of detail, not necessarily consistent across the airport.



Legend

- Master Plan AGIS Airfield Light Features
- Master Plan AGIS Utility Point Features
- LVIA Electrical Master CAD Lines
- Economy Parking Lot As-Built CAD Lines

Runway 13-31 RSA AGIS Point Data

- Airfield Light
- Utility Point

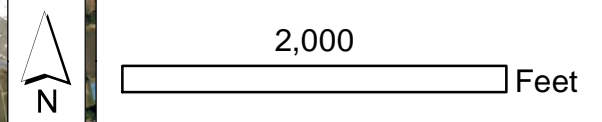
Runway 13-31 RSA AGIS Utility Line Data

- Utility Line; Utility Polygon



Lehigh Valley International Airport
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Utility Geospatial Data Initial Inventory



Sources: Lehigh-Northampton Airport Authority, Quantum Spatial, Inc.

Figure 3.11.1



3.12 Environmental

Background

The objective of conducting an environmental overview as part of the master planning process is two-fold: a. to describe the existing environmental conditions at the Airport and surrounding areas, and b.. to identify potential environmental issues, avoidance and/or mitigation options during the planning, design and construction of proposed airport development projects.

The environmental overview has been prepared in reference to the National Environmental Policy Act of 1969 (NEPA), as amended; and relevant Commonwealth of Pennsylvania regulations and procedures. Guidance provided in the FAA's Order 5050.4B, Environmental Handbook, and FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, and the FAA's 1050.1F Desk Reference were used to prepare the environmental overview.

This environmental overview does not replace environmental documents such as an Environmental Assessment (EA) or Environmental Impact Statement (EIS) that may be required for proposed actions resulting from the Airport Master Plan. To obtain federal environmental clearance for any proposed projects at the Airport, a full environmental evaluation document prepared in accordance with the U.S. DOT policy, FAA Order 5050.4B, FAA Order 1050.1F, and Council on Environmental Quality (CEQ) Regulations will be required.

The environmental discussion that follows focuses on describing the current environmental conditions within the Airport and its environs, as well as a preliminary discussion of potential environmental impacts that may be associated with proposed development included in the Airport Master Plan Update. Additional information will be provided during the development and evaluation of alternatives; however, detailed impacts and mitigation as they relate to specific development projects will be addressed during the preparation of the appropriate NEPA documents when proposed projects are ready for environmental review.

Environmental Overview

The Environmental Overview Map, shown on **Figure 3.12.1**, depicts various aspects of the Airport property and its vicinity including environmental features discussed in the following sections. All correspondence for environmental consultation and reference of publicly accessible databases conducted during this analysis are documented in the **Appendix**.

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Legend

- Airport Property Line
- Streets
- Railroads
- DCNR Rail Trails
- Streams & Rivers
- Impaired Streams & Rivers
- Municipal Boundaries
- Environmental Justice Areas
- Agricultural Security Areas
- Agricultural Protection Zone
- Conservancy District
- Conservation Zone
- Flood Hazard Protection Zone
- Limited Use Zone
- River Conservation Zone
- Park
- FWS Wetlands
- Ponds & Lakes
- FEMA 100-Year Flood Zone A
- FEMA 100-Year Flood Zone AE
- EPA Brownfield Sites
- National Park Service National Historic Landmarks
- Eligible District/Property
- Listed District/Property
- Eligible Landmark/Structure
- Listed Landmark/Structure

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1 inch = 2,000 feet
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Lehigh Valley International Airport
 Master Plan Update

Environmental Overview

Sources: SOURCES: Airport Property Line from Lehigh Northampton Airport Authority, County Subdivisions & Water Features from Census Bureau 2016 TIGER files. National Historic Places digitized from CRGIS by C&S Engineers, Inc. and are not an accurate representation for precise location; Flood Layer from FEMA NFHL; Wetlands from FWS National Wetlands Mapper; Rail Trails and DCNR Parks from PASDA Geospatial Data Clearing House; EPA Sites from EPA EnviroFacts Data Downloads CSV Data; River Conservation Zones, Parks, Limited Use Zones, Flood Hazard Protection Zones, Conservation Zones, Conservancy Districts, and Agricultural Protection Zones from parcel data obtained through Lehigh and Northampton County; Source Layer: Aerial Imagery from Quantum Spatial CREATED: November 2016 by C&S Engineers

Figure 3.12.1



The following elements normally identified within an EA and described in the FAA 1050.1F Desk Reference will be considered in the environmental review.

1. Air Quality
2. Biological Resources
3. Climate
4. Coastal Resources
5. Department of Transportation Act, Section 4(f)
6. Farmlands
7. Hazardous Materials, Solid Waste, and Pollution Prevention
8. Historical, Architectural, Archeological, and Cultural Resources
9. Land Use
10. Natural Resources and Energy Supply
11. Noise and Noise-Compatible Land Use
12. Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks
13. Visual Effects
14. Water Resources

At this stage of the Airport Master Plan Update, it is considered premature to include Cumulative Impacts and Irreversible and Irrecoverable Commitment of Resources.

This effort is primarily based on existing information including the data and analysis in the Environmental Assessment for the FedEx Land Release regarding the property released to RDG along Willowbrook Road. No wetland mapping or detailed field investigation is included in this task.

Air Quality

With regard to airport development, impacts to air quality are commonly associated with an increase or change in aircraft operations as a result of an action undertaken or a short-term increase in fuel consumption by both off-road and on-road vehicles required for construction. To determine potential impacts as they relate to NEPA and the federal Clean Air Act (CAA) the FAA published the Aviation Emissions and Air Quality Handbook. The handbook provides airport sponsors and NEPA practitioners a step-by-step process in which to evaluate if a proposed action warrants an air quality analysis and to formulate an approach to preparing it, if necessary.

As discussed in Chapter 1 of the FAA Environmental Desk Reference for Airport Actions (Desk Reference, October 2007), the United States Environmental Protection Agency (EPA), through the CAA, has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), particulate matter (PM₁₀ and PM_{2.5}), ozone, and lead. Unlike the other criteria pollutants, ozone (O₃) is not specifically emitted from a source, but rather generated through the photochemical reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOCs). An area that violates a national primary or secondary NAAQS for one or more of the USEPA designated criteria pollutants is referred to as non-attainment. A maintenance area is one that has previously been in violation of the NAAQS but has since implemented an avoidance plan and has had no additional violations over an extended period of time.

Conformity

Under Section 176(c)(1) (conformity regulations) of CAA, an action subject to federal funding or approval must conform to the goals set forth in the State Implementation Plan (SIP) for nonattainment and maintenance areas in the state in which the action is to take place. In addition, NEPA requires that an



assessment be conducted to determine if an action will generate emissions that exceed the NAAQS. However, if an action is unlikely to result in NAAQS violations, such an assessment is not required.

The EPA promulgated the initial conformity regulations in 1993 to assist federal agencies in complying with the SIP by specifying rules for two categories of federal actions: transportation actions and general actions. The two rules have separate and distinct applicability and evaluation requirements. Transportation conformity applies to highway and transit actions, and general conformity regulations apply to all other federal actions that are not transportation actions, such as airport improvement actions. The General Conformity Rule, published under 40 CFR Part 93, applies only to an action that is federally funded or federally approved, which will be the case for any of the projects depicted on the Airport Layout Plan developed through this planning process.

The General Conformity Rule applies to a federal action that is located in an area designated nonattainment or maintenance by the EPA. Only pollutants causing the area to be designated as nonattainment or maintenance are relevant and evaluated under the Rule. The net increase in emissions of the pollutants are compared against the threshold levels established in the Rule, known as the de minimis thresholds, published at 40 CFR 93.153(b)(1)-(b), Applicability Analysis. Under the General Conformity Rule, if the net increase in emissions due to a federal action equals or exceeds EPA established de minimis thresholds, a General Conformity Determination would be required.

NEPA

NEPA requires an analysis to assess an action's potential to exceed any NAAQS. However, where an action is unlikely to result in NAAQS violations, such an assessment is not required. PennDOT provides guidelines for evaluating carbon monoxide (CO) in PennDOT Publication 321: PennDOT Project-Level Air Quality Handbook, updated October, 2013. According to PennDOT Publication 321, NEPA project air quality analyses have typically focused on CO as the primary indicator for vehicular induced pollution. Over the last decade, the CO levels throughout Pennsylvania have dramatically improved, as demonstrated by the attainment status for CO throughout the state. While an evaluation of CO levels associated with transportation improvement projects will still be necessary, PennDOT and FHWA have developed several thresholds that are used to limit the number of projects requiring a detailed CO quantitative air quality analysis in order to streamline the NEPA process. Projects are compared against the thresholds based on their type, configuration, projected traffic volume, congestion, and location in order to determine if a quantitative analysis is required. These thresholds include an opening/design year annual average daily traffic (AADT) of less than 125,000 for mainline traffic in the project vicinity or an opening/design year overall LOS at intersection of A, B, or C within the project vicinity.

Conclusion

Potentially significant air quality impacts associated with an FAA action would be demonstrated by the action exceeding one or more of the NAAQS for any of the time periods analyzed. According to the USEPA Green Book, Lehigh and Northampton Counties are classified as marginal non-attainment for ozone and non-attainment for PM_{2.5}. In addition, Pennsylvania is part of the ozone transport region.

Emissions resulting from the selected projects will need to be compared to the Clean Air Act De Minimis Thresholds, which provides the applicable thresholds for pollutants based on their non-attainment status. If the increase in emissions from the project does not equal or exceed these thresholds, the action is assumed to comply with the Rule and no further analysis is required under CAA Section 176(c)(1). If the threshold levels are exceeded, a General Conformity Determination would be required.



According to the USEPA Green Book,⁴⁴ Lehigh and Northampton Counties are classified as marginal non-attainment for the ozone (O₃) standards and were recently reclassified to maintenance for particulate matter under 2.5 microns (PM_{2.5}) standards. Ozone is not directly emitted from a source but is formed through the reaction of oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight. Emissions of ozone are evaluated based on emissions of the ozone precursor pollutants, NO_x and VOCs. Therefore, the applicability analysis for General Conformity only applies to PM_{2.5}, NO_x and VOCs.

Biological Resources

The Endangered Species Act (ESA) of 1973 provides federal protection for species that are facing potential extinction due to the loss of habitat. Consideration of biotic communities and endangered and threatened species is required for all proposals under the ESA. If an agency determines that an action “may affect” a federally protected species, then Section 7(a) (2) of the ESA requires the agency to consult with the US Fish and Wildlife Service (USFWS) to ensure that the action the authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of the federally listed endangered or threatened species, or result in the destruction or adverse modification of critical habitat. If a species has been listed as a candidate species, Section 7(a) (4) states that each agency must confer with the USFWS.

According to the USFWS list of Federal Endangered and Threatened Species, there are four federally listed species with potential to occur on or adjacent to the airport property:

Table 3.12.1: Federally Listed Species

Species	Status
Flowering Plants	
Northeastern Bulrush	Endangered
Mammals	
Indiana Bat	Endangered
Northern Long-eared Bat	Threatened
Reptiles	
Bob Turtle	Threatened

Source: USFWS, Pennsylvania Ecological Services Field Office, Official Species List, November 16, 2016

Projects involving a federal agency or federal funding are required to consult with the USFWS to ensure that project actions will not destroy or adversely modify critical habitat. According to the USFWS, there are no critical habitats or National Wildlife Refuges within the immediate vicinity of the Airport.

Because there is potential for federally listed species to occur on or near the Airport, a proposed action could potentially have adverse impacts in which further analysis is required. Dependent upon the level of analysis required and the agency providing funding for the proposed action, coordination should be completed with federal, state and local regulatory agencies to determine if the action would likely jeopardize a species’ continued existence.

⁴⁴ U.S. Environmental Protection Agency Green Book, September 22, 2016.
https://www3.epa.gov/airquality/greenbook/anayo_pa.html



Climate

Greenhouse gases (GHG) are those that trap heat in the earth's atmosphere. Greenhouse gases such as water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and ozone (O₃) are both naturally occurring and anthropogenic (man-made). There is presently a broad scientific consensus that human activities that produce GHGs are contributing to changes in the earth's atmosphere. These GHGs, brought about principally by the combustion of fossil fuels, decomposition of waste materials and release of refrigerants, cause an increase in the earth's average temperature – a phenomenon that is referred to as the “greenhouse effect.”

Historically, GHG emissions had not been regulated under the CAA as air pollutants. However, after the United States Supreme Court in 2007 clarified that carbon dioxide is an "air pollutant" subject to regulation under the CAA, the EPA embarked on developing requirements and standards for GHG emissions from mobile and stationary sources under the CAA.

There are no federal standards for aviation-related GHG emissions. However, the CEQ has indicated that climate should be considered in NEPA analyses. The CEQ recently issued final guidance for addressing climate change suggesting that agencies consider “(1) The potential effects of a proposed action on climate change as indicated by assessing GHG emissions (e.g., to include, where applicable, carbon sequestration); and, (2) The effects of climate change on a proposed action and its environmental impacts” (CEQ, August 1, 2016). The guidance does not establish a significant impact threshold for GHGs, stating that “In light of the global scope of the impacts of GHG emissions, and the incremental contribution of each single action to global concentrations, CEQ recommends agencies use the projected GHG emissions associated with proposed actions as a proxy for assessing proposed actions’ potential effects on climate change in NEPA analysis” (CEQ, August 1, 2016).⁴⁵

As required by the Pennsylvania Climate Change Act of 2008, the Pennsylvania Department of Environmental Protection (DEP) and the Climate Change Advisory Committee prepared a Climate Change Action Plan and in 2009 that:

- “Identifies GHG emission and sequestration trends and baselines in the Commonwealth;
- “Evaluates cost-effective strategies for reducing or offsetting GHG emissions;
- “Identifies costs, benefits and co-benefits of reduction strategies recommended;
- “Identifies areas of agreement and disagreement among committee members; and
- “Recommends to the General Assembly legislative changes necessary to implement the Action Plan.”⁴⁶

The Plan is updated every three years with the most recent version published in 2015. The Plan includes identification of climate change impacts by sector, quantification of GHG emissions, and strategies/initiatives to minimize and address climate change.

Based on federal guidance and the state's efforts, the identification and mitigation of potential impacts associated with the proposed actions should consider GHG emissions as well as the effects of climate change and its environmental impacts.

Coastal Resources

There are no coastal barriers or coastal zones in the project study area. The project site is located approximately 75 miles from the coast; the proposed actions would therefore not have any impacts on coastal resources or coastal barriers.

⁴⁵ https://www.whitehouse.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf

⁴⁶ <http://www.dep.pa.gov/Business/Air/BAQ/ClimateChange/Pages/default.aspx>



Department of Transportation Act: Sec. 4(f)

In order to preserve the natural beauty of certain areas and/or types of land, Section 4(f) of the DOT Act places restrictions on the use of any significant publicly owned recreational land, public park, recreation area, wildlife and waterfowl refuge or historic site of national, state, or local significance. Proposed actions must be reviewed to determine if they will have a physical or constructive impact to a Section 4(f) property.

A final piece of legislation that may affect Section 4(f) resources is Section 6(f) of the Land and Water Conservation Fund Act (L&WCFA), 16 US, and Section 4601; 36 CFR 59. Section 6(f) provides funds for buying or developing public use recreational lands through grants to local and state governments. Section 6(f) prevents conversion of lands purchased or developed with L&WCFA funds to non-recreation uses, unless the secretary of the Department of the Interior (DOI), through the National Park Service (NPS), approves the conversion. The conversion may only be approved via the following conditions: the conversion is consistent with the latest comprehensive statewide outdoor recreation plan when the approval occurs, and the converted property is replaced with other recreational use property, or reasonably equivalent usefulness and location for fair market value.

The Pennsylvania Department of Conservation and Natural Resources (DCNR) list of state parks was reviewed to determine if any state parks, recreation areas or refuges are located in the study area. The Department of Interior's National Park Service and USFWS list of federal resources were also reviewed to determine if any federal parks, conservation areas or wildlife refuges are located within one mile of Airport property. No federal or state 4(f) resources are located in the study area.

The DCNR also served as a resource for identifying local parks. As shown on **Figure 3.12.1**, there are several parks adjacent to the airport property but none within the study area. In developing alternatives, consideration should be made to avoid or minimize potential impacts related to constructive uses. Although a constructive use does not physically occupy or require purchase of a Section 4(f) resource, this use occurs when an action would substantially impair that resource. Substantial impairment occurs only when the activities, features, or attributes of the resource that contribute to the resource's significance or enjoyment are substantially diminished. Potential causes of constructive use include shifts in user population because of direct use of bordering properties, and/or non-physical intrusions such as noise, air pollution, or other effects that would substantially impair the resource's use.

During the Section 106 process for the release of airport property used for the development of the FedEx Ground distribution facility, one historic property that qualifies as a Section 4(f) resource was identified within the project area, the Miller Farm (Bureau for Historic Preservation [BHP] Key Number 156212). The Miller Farm has been found eligible for listing in the National Register of Historic Places (NRHP). The section on Historic and Archeological Resources provides more information on the Miller Farm and Miller Farm Archeological Site.

Farmlands

Figure 3.12.2 presents the different soil types and farmland classifications present within the airport property. As shown, the airfield and terminal areas of the Airport are primarily designated as Urban land-Udorthents, limestone complex; Urban land – Duffield complex; and Urban land. According to the United States Department of Agriculture, National Resources Conservation Service (NRCS), these soils are not classified as prime farmland or farmland of statewide importance. However, the remainder of the airport property is classified as prime farmland or farmland of statewide importance and several areas are currently used for agricultural purposes. Proposed development within the areas may require additional coordination with the local NRCS field office. In addition, there are Agricultural Security Areas and Agricultural Protection Zones north of the airport boundary (see Figure 3.12.1).

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Legend

- Airport Property Boundary
- USGS Soil Boundaries
- On-Airport Soils**
- Prime Farmland
- Farmland of Statewide Importance
- Washington silt loam**
- 0-3% slopes (Northampton)
- 3-8% slopes (Northampton)
- 8-15% slopes (Northampton)
- 15-25% slopes (Northampton)
- Urban land-Udorthents, limestone complex**
- 0-8% slopes (Northampton)
- Urban land-Duffield complex**
- 0-8% slopes (Lehigh)
- 0-8% slopes (Northampton)
- 8-25% slopes (Lehigh)
- 9-25% slopes (Northampton)
- Urban land**
- 0-8% slopes (Lehigh)
- Udorthents**
- Lehigh
- Middlebury silt loam**
- Lehigh
- Northampton
- Duffield silt loam**
- 3-8% slopes (Lehigh)
- Clarksburg silt loam**
- 0-3% slopes (Northampton)
- 0-3% slopes (Lehigh)
- 3-8% slopes (Northampton)

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1 inch = 2,000 feet
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Lehigh Valley International Airport
Master Plan Update

Soils and Farmland

Figure 3.12.2

Sources: Airport Property Line from Lehigh Northampton Airport Authority, Soil boundaries from USGS Soils Mapper/USDA/NRCS, data collected for Lehigh County and Northampton County. Aerial Imagery from Quantum Spatial. CREATED: November 2016 by C&S Engineers



The Bureau of Farmland Preservation administers the Agricultural Security Area (ASA) program at the state level. ASAs are a tool for strengthening and protecting quality farmland from the urbanization of rural areas. The ASA program is voluntary for farmers/landowners. Petitions are submitted to township supervisors. As shown in **Figure 3.12.1** (presented previously), ASAs are located north and of the study area. There are no ASAs located within the study area.

Hazardous Materials, Solid Waste, and Pollution Prevention

The development of the Airport Master Plan Update will consider if alternatives may increase the quantity of solid waste generated by the Airport or affect the manner in which the Airport's solid waste is collected or disposed. Future airport development is not anticipated to significantly impact solid waste services and any permitting should be limited to temporary construction impacts. A Solid Waste Management and Recycling Plan is included in this Airport Master Plan Update, which will help the Airport increase diversion rates and minimize waste.

The Comprehensive Environmental Response, Compensation, and Liability Act of 1981 (CERCLA) and the Resource Conservation and Recovery Act of 1976 (RCRA) are two important statutes that govern actions to construct and operate facilities. CERCLA provides for cleanup of any release of a hazardous substance (excluding petroleum) into the environment. RCRA governs the generation, treatment, storage, and disposal of hazardous wastes.

In order to determine the potential for the proposed actions to impact hazardous materials, the EPA NEPAAssist mapping tool was used. There are a number of RCRA sites on and surrounding the airport property including those owned by tenants and the Airport Authority itself, whose site is qualified as a small-quantity generator. This is typical of many airports that handle and dispense aircraft fuels and include other aeronautical activities such as maintenance. Procedures are in place at LVIA through the most recent 2017 update of their "Preparedness, Prevention, and Contingency (PPC) & Spill Prevention Response (SPR) Plan" to prevent spills. LVIA's PPC and SPR Plans are in compliance with state and federal National Pollutant Discharge Elimination System (NPDES) permitting programs and sufficiently outline spill and leak prevention and response measures, countermeasures, LVIA's emergency spill control network, and stormwater management best practices for quantity/quality control. However, it is not anticipated that any proposed improvements would increase the potential for exposure of hazardous materials.

In addition to the RCRA sites, there is an EPA Brownfield site located west of the Airport but off airport property. It is unlikely that any proposed actions would have any impact on this site (i.e., no acquisition is anticipated at that location).

Historic, Architectural, Archeological, and Cultural Resources

The National Historic Preservation Act of 1966 (NHPA) requires an initial review of a proposed action's potential environmental impact area to determine if it includes any properties that are listed in, or eligible for inclusion in, the National Register of Historic Places (NRHP). The Archeological and Historic Preservation Act of 1974 provides for the survey, recovery, and preservation of significant scientific, prehistoric, historical, archeological, or paleontological data when such data may be destroyed or irreparably lost due to a federal, federally licensed, or federally funded project.

As shown on **Figure 3.12.1**, there are several eligible and listed landmarks as well as districts surrounding the Airport. In addition, there is an eligible district/property within the airport boundary on the north side of the property. Numerous cultural resources reports were prepared during the EA for the release of airport property used for the development of the FedEx Ground distribution facility and found that many of the previously identified sites or districts had lost integrity and were no longer eligible for listing on the NRHP. The district shown on **Figure 3.12.1**, however, was deemed potentially eligible. The delineated site represents



the Miller Farmstead, which was determined eligible for listing in the NRHP, significant under Criterion A for agriculture, from ca. 1850-1940. The Miller Farm is located at 149 Willowbrook Road, East Allen Township, Northampton County, Pennsylvania, and is owned by the Airport Authority.

It is comprised of approximately 106 acres, which include one abandoned dwelling, a potential summer kitchen, a barn, a machine shed/corn crib, a machine shed/combination structure, a tenant house, a shed, and agricultural fields. Although in poor condition and largely abandoned, the Miller Farm does retain integrity of location, design, setting, materials, workmanship, feeling, and association. The extant buildings communicate the agricultural history of the property.

Although the site has not yet been listed on the NRHP, should improvements or demolition be proposed, further cultural analysis would be required as part of the project-specific environmental compliance. As of present, the farmstead is expected to remain untouched during construction of the FedEx facility and there are no anticipated efforts to restore the property due to its structural instability.

Land-Use

The most recent version of FAA Order 1050.1F separates land use compatibility related to noise from other potential land use impacts. Although there is not currently a threshold established for determining impacts, additional considerations will be incorporated into the development and selection of alternatives to minimize effects on the surrounding land uses.

Natural Resources and Energy Supply

Development projects may have the potential to change or increase energy requirements or use of consumable natural resources. Once specific projects or overall plans are finalized, the Airport Authority should evaluate any potential impacts to natural resources and energy supply. In addition, the Airport Authority should consider strategies to minimize resource consumption as much as possible.

Noise and Compatible Land Use

An update to the Airport's Part 150 Study Noise Exposure Maps (NEMs)⁴⁷ was recently completed and provided information for this overview. As documented in this study, the Airport has implemented a number of recommended noise abatement procedures that aim to limit noise associated with aircraft operations. These noise abatement procedures address both aircraft and helicopter operations to and from various runways and include the following:

- For departing aircraft, the traffic pattern altitude, or the altitude that aircraft fly for touch-and-go operations in a fixed pattern around the Airport, is 1,400 feet MSL or approximately 1,000 feet AGL for piston propeller aircraft and 2,000 feet MSL (approximately 1,600 feet AGL) for turbine-powered aircraft.
- When departing Runways 06/24, aircraft should fly the heading of the runway until 2,000 feet MSL.
- Turbojet aircraft departing Runway 31 should turn right heading 360 degrees until 2,000 feet MSL.
- Turbojet aircraft departing Runways 06, 13 and 24 are advised that they will be flying over noise sensitive areas.
- Runways 06/24 are named as “preferential” meaning the ATCT and the pilot should give preference to using these runways, wind and weather permitting.

While the above procedures are intended to reduce noise impacts on surrounding property, directions from

⁴⁷ Wyle Laboratories, Inc., and Lehigh-Northampton Airport Authority. *Lehigh Valley International Airport Part 150 Update-2015/2020 Noise Exposure Maps*. Rep. no. A40065. N.p.: n.p., 2016. Print Accessible at: <http://www.flylv.com/public-info/special-projects/noise-compatibility-study-part-150-update/public-outreach/>



ATCT, or the safety of the aircraft as judged by the pilot, can often dictate variations from these patterns.

The updated NEM Study included an analysis of baseline and future noise exposure associated with airport activity. Information used to determine present and future noise exposure include aircraft fleet mix, number of operations by time of day, current and predicted flight tracks, and percent distribution of runway use. The noise level descriptor used in the analysis is the Day-Night Average Noise Level (DNL), which is a composite noise metric accounting for the sound energy of all noise events in a 24-hour period. In order to account for increased human sensitivity to noise at night, a 10 decibel (dB) penalty is applied to operations occurring during nighttime hours, between 10:00 p.m. and 7:00 a.m. Within DNL, individual flight and run-up event noise exposures are estimated in terms of Sound Exposure Level (SEL) and Lmax, respectively. SEL is an integrated metric normalizing the acoustic energy of a single flyover event to one second. SEL and Lmax are expressed in A-weighted decibels (dB or dBA).

The noise analysis was completed using the FAA-approved Integrated Noise Model (INM version 7.0D). (The study was initiated prior to the release of the FAA's new Aviation Environmental Design Tool [AEDT]). The resultant 65 dB, 70 dB and 75 dB DNL contours from the model can be seen in **Figure 3.3.1**. Under existing conditions, the 65 dB DNL contour extends off-airport by approximately 700 feet near the end of Runway 24 and along the heading of Runway 06/24 to the northeast. To the southwest, the 65 dB DNL contour extends off-airport to the Lehigh River. The 70 dB DNL contour extends off-airport by only 250 feet near the end of Runway 24. The 75 dB DNL contour is fully contained within the airport boundary.⁴⁸ The noise contours shown in **Figure 3.3.1**, also depict noise-sensitive public buildings, such as schools, hospitals, and health care facilities. No noise-sensitive public buildings are affected by 65 dB DNL or greater.

Using the federally accepted land use compatibility matrix, the noise analysis shows that a total of 146 people are estimated to be exposed to 65 dB DNL or greater under existing conditions. Sixteen of the 765 acres exposed to DNL greater than or equal to 65 dB are residential in their use. It is important to note, however, that seven of these 16 acres of residential land use are located within the airport property boundary. The on-airport residential land use parcels are prior residential areas that have since been purchased by the airport. As a result, only nine acres of the residential land are considered incompatible. There are 61 residential properties exposed to DNL between 65 dB and 70 dB, 57 of which have already been sound insulated. Four of the 61 opted out of sound insulation treatment.

The 65 dB, 70 dB and 75 dB DNL contours for 2020 annual average daily aircraft operations represent the forecast NEM. Under these conditions, the 65 dB DNL contour would extend off-airport by up to 700 feet near Runway 24 and along the heading of Runway 06/24 to the northeast. To the southwest, the 65 dB DNL contour would extend off-airport to the Lehigh River. The 70 dB DNL contour would extend off-airport by only 250 feet near Runway 24. The 75 dB DNL contour would be fully contained within the airport boundary. No noise-sensitive public buildings would be affected by 65 dB DNL or greater. A total of 133 people are estimated to be exposed to 65 dB DNL or greater in 2020. Relative to 2015, there would be 13 less people in this bracket in 2020. Sixteen of the 752 acres exposed to DNL greater than or equal to 65 dB are residential in their use. It is important to note that seven of these 16 acres of residential land use are located within the airport property boundary. The on-airport residential land use parcels are prior residential areas that have since been purchased by the airport. As a result, only nine acres of the residential land are considered incompatible. There would be 57 residential properties exposed to DNL between 65 dB and 70 dB, 53 of which have already been sound insulated. Four of the 57 opted out of sound insulation treatment.⁴⁹

⁴⁸ Wyle Laboratories, Inc., and Lehigh-Northampton Airport Authority. *Lehigh Valley International Airport Part 150 Update-2015/2020 Noise Exposure Maps*. Rep. no. A40065. N.p.: n.p., 2016. Print.

⁴⁹ Wyle Laboratories, Inc., and Lehigh-Norhtampton Airport Authority. *Lehigh Valley International Airport Part 150 Update-*



Socioeconomic, Environmental Justice, and Children’s Environmental Health and Safety Risks

Socioeconomic Impacts

Socioeconomic impacts result from an action causing extensive relocation of residents without sufficient replacement housing unavailable; extensive relocation of community businesses that would cause severe economic hardship for affected communities; disruption of local traffic patterns that substantially reduce the Levels of Service (LOS) of roads serving the Airport and its surrounding communities; or a substantial loss in community tax base. Once the facility requirements are identified, the potential for impacts should be considered in the development and evaluation of alternatives.

Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, (February 11, 1994) was issued to ensure that each federal agency conduct its programs, policies, and activities that substantially affect human health or the environment in a manner that does not exclude persons or populations from participation, does not deny benefits, and does not subject to discrimination because of race, color, or national origin. When an action would cause disproportionately high and adverse human health or environmental effects on minority and low-income populations, a significant impact may occur.

Any future potential development of the Airport is not anticipated to have a negative impact on minority or low-income populations.

Children’s Environmental Health and Safety Risks

Executive Order 13045 (April 21, 1997) requires federal agencies to ensure that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks and safety risks. Federal agencies must identify and assess potential environmental health risks to children. Potential environmental health risks are defined as risks to health that are attributable to products or substances that the child is likely to come in contact with or ingest, such as air, food, water, soil, and products.

Proposed actions will be considered to determine and minimize any potential environmental health risks to children in the area of the Airport.

Visual Effects

In order to assess the potential light emissions impacts, proposed airport lighting will be evaluated to determine if it will create an annoyance or interference to the surrounding community. A visual impact occurs when consultation with federal, state, or local agencies, tribes, or the public shows that these effects contrast with existing environments and is considered objectionable. Existing lighting consists of airfield, building, and obstruction lighting.

Lighting is not anticipated to differ drastically from existing installations. Coordination with local residents and owners of light sensitive sights would occur only if significant upgrades were proposed. Lighting improvements are typically eligible for categorically exclusion under NEPA.

Water Resources

Under FAA Order 1050.1F, Water Resources now encompasses Wetlands, Floodplains, Surface Waters,

2015/2020 Noise Exposure Maps. Rep. no. A40065. N.p.: n.p., 2016. Print.



Groundwater, and Wild and Scenic Rivers.

Wetlands

Wetlands are defined in Executive Order 11990, Protection of Wetlands, as "those areas that are inundated by surface or ground water with a frequency sufficient to support...a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas..."

As shown on **Figure 3.12.1**, there is one wetland located on airport property, north of the Runway 13 end. According to the USFWS National Wetlands Inventory, this is a 6.11-acre freshwater forested/shrub wetland. A formal wetland delineation may need to be conducted for any proposed action located on or in close proximity to the wetland identified.

Floodplains

Floodplains (or flood zones) are defined as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year."

The Threshold of Significance (TOS) is exceeded when there is an encroachment on a base floodplain (100-year flood). An encroachment involves:

- A considerable probability of loss of life;
- Likely future damage associated with encroachment that could be substantial in cost or extent, including interruption of service or loss of vital transportation facilities; or
- A notable adverse impact on natural and beneficial flood plain values.

The Federal Emergency Management Agency (FEMA) is responsible for mapping known floodplains and publishing these maps as Flood Insurance Rate Maps (FIRMs). Map areas within the 100-year floodplain have an annual probability of flooding of 1 percent or greater. In Zone A, detailed analyses have not been performed; therefore, not depths or base flood elevations are shown within those zones. In Zone AE, base flood elevations are provided. Areas between the 100-year and 500-year floodplains have an annual probability of flooding of between 0.2 and 1 percent, and areas outside of the 500-year floodplain have an annual probability of flooding of less than 0.2 percent.

As shown in **Figure 3.12.1**, there are two small areas of airport property that fall within the FEMA 100-year Flood Zones A and AE. Both areas are north of the airfield on parcels that are noncontiguous to the main airport property. Therefore, it is unlikely that aeronautical development would have an impact on this flood zone.

Surface and Ground Water

Federal agencies are required to comply with the Clean Water Act (CWA) for any action that may affect water quality, including the control of any discharge into surface or ground water and the prevention or minimization of loss of wetlands. Agencies must also comply with the Fish and Wildlife Coordination Act if the proposed action impounds, diverts, drains, controls, or otherwise modifies the waters of any stream or other water body. Section 1424(e) of the Safe Drinking Water Act requires consultation with the EPA if a proposed action has the potential to contaminate an aquifer designated by the EPA as a sole or principal source of drinking water for the area.

According to the NEPAassist tool maintained by the EPA, the airport property spans three watersheds including the Catasauqua Creek Watershed to the north, the Lehigh River-Delaware River Watershed over



which the airfield falls, and the Monocacy Creek Watershed to the east. There are two primary surface water features on the airport property - the Catasauqua Creek and an unnamed tributary shown on **Figure 3.12.1**. These waters are contaminated with pollutants contained in typical urban runoff including oil and grease, surfactant, heavy metals, solvents, pesticides, nutrients, and fecal coliform bacteria from livestock and pets. Both water bodies are classified as cold water fishes (CWF) and migratory fishes (MF) by Title 25, Chapter 93 of the Pennsylvania Code. In addition, the Lehigh River runs west of the Airport. Any impacts to these water bodies either directly or via runoff should be considered in the evaluation of proposed development. However, impacts will be mitigated due to implementation of Best Management Practices (BMPs) in compliance with applicable permits such as the National Pollutant Discharge Elimination System (NPDES) General Industrial Permit, which requires development of a Stormwater Pollution Prevention Plan (SWPPP).

Impacts to groundwater should also be considered, though during geotechnical investigations on the adjacent FedEx site, groundwater was only encountered in one test boring at a depth of approximately 32 feet below existing site grades.

Wild and Scenic Rivers

The Federal Wild and Scenic Rivers Act describes those river areas that are eligible for protection under the Act as free-flowing and possessing "...outstanding, remarkable, scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values." The Act restricts development within 1,000 feet of rivers identified as "wild and scenic."

The Nationwide Rivers Inventory (NRI) is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance. Under a 1979 Presidential Directive, and related Council on Environmental Quality procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect one or more NRI segments.

In reviewing the NRI for Pennsylvania, there are 409.3 miles designated as wild and scenic; however, none of these segments are located within the vicinity of the Airport.