



Section 3 – Existing Conditions/Inventory

An early step in preparing an Airport Master Plan Update consists of gathering and organizing information about existing conditions at LVIA. 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.

3.1 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 3.1.1** 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 3.1.2** 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.”¹ Special restrictions are imposed upon development in this zone, including stringent height restrictions for obstructions located within Airport visual approach, instrument procedure approach, 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.²

North Catasauqua Borough

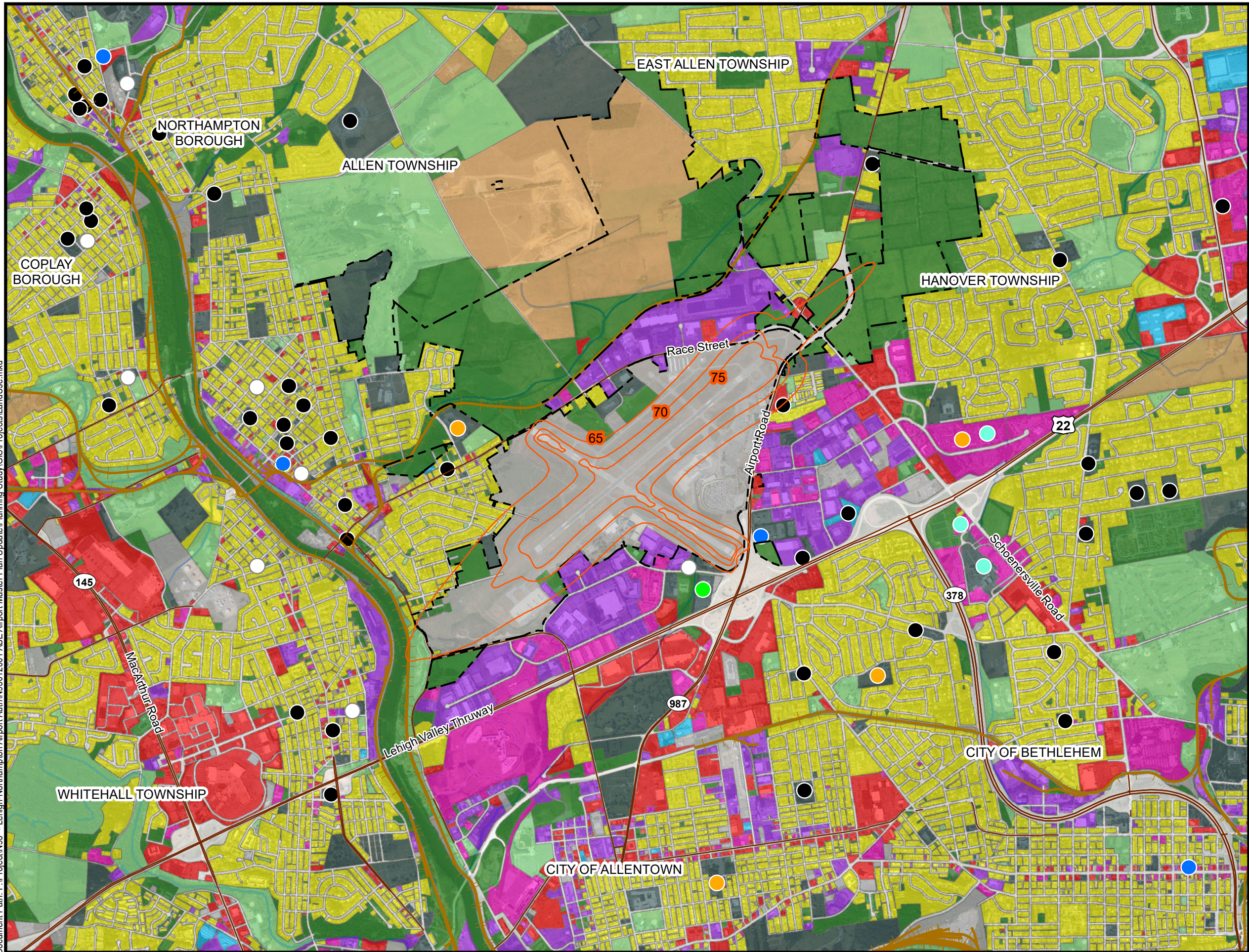
Currently, all Airport property located in North Catasauqua Borough is zoned as Urban Residential.

East Allen Township

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

¹ 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>

² The Borough of Catasauqua, Lehigh County, PA, Chapter 280: Zoning, Article IX: Airport Hazards. Accessed 1/17/17. Accessible at: <http://ecode360.com/10692541>



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"



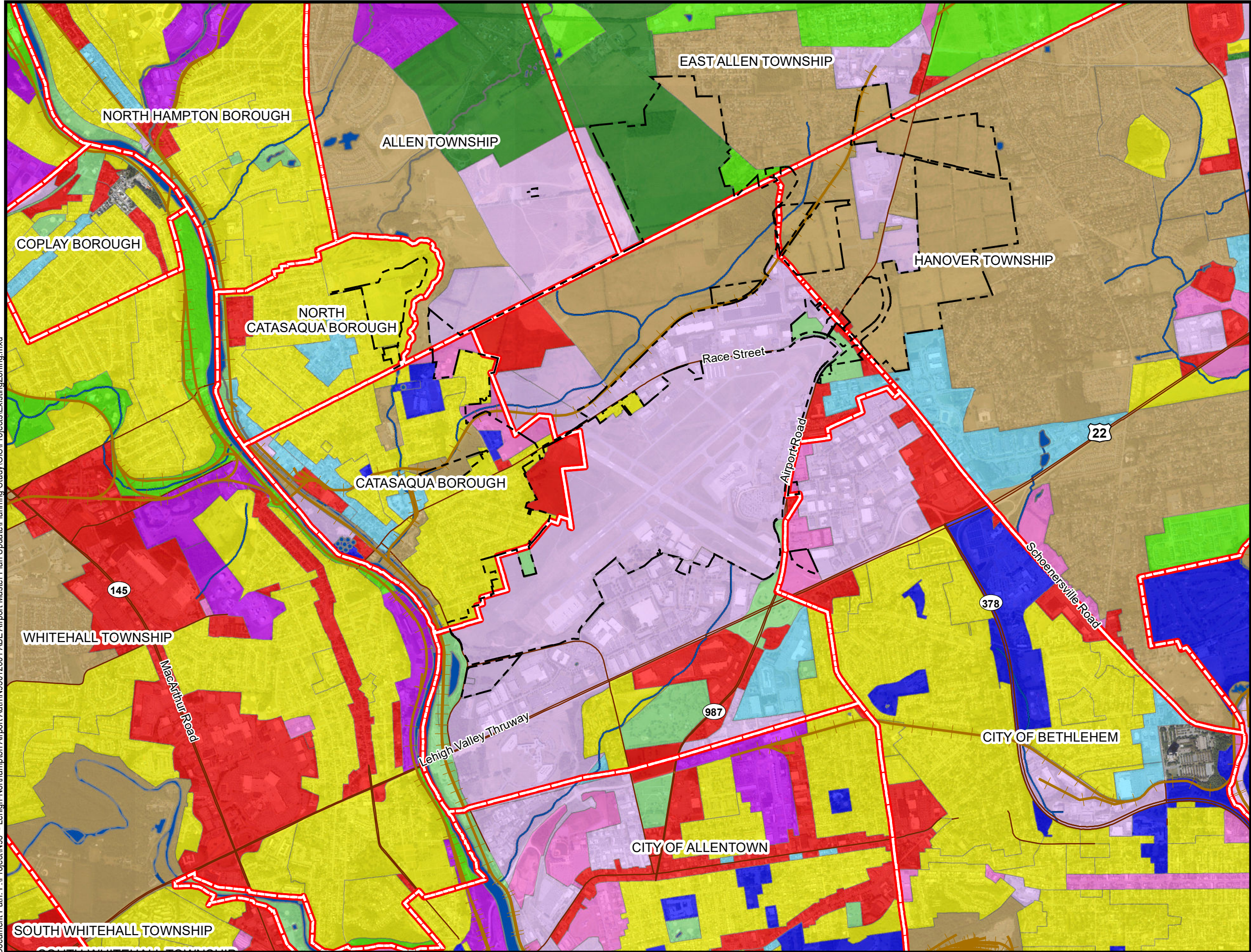
Lehigh Valley International Airport
Master Plan Update

Land Use

Figure 3.1.1

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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.
CREATED: November 2016 by C&S Engineers



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 3.1.2

Date: 6/27/2019
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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



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.³

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.⁴

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/boardinghouses. 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.⁵

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 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,

³ 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>

⁴ 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>

⁵ 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>



architecture, or engineering, business offices, real estate offices, printing and publishing plants, and light assembly.⁶

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.⁷

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.⁸

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 1.0 inches of precipitation.⁹

⁶ 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>

⁷ 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

⁸ 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

⁹ 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



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.

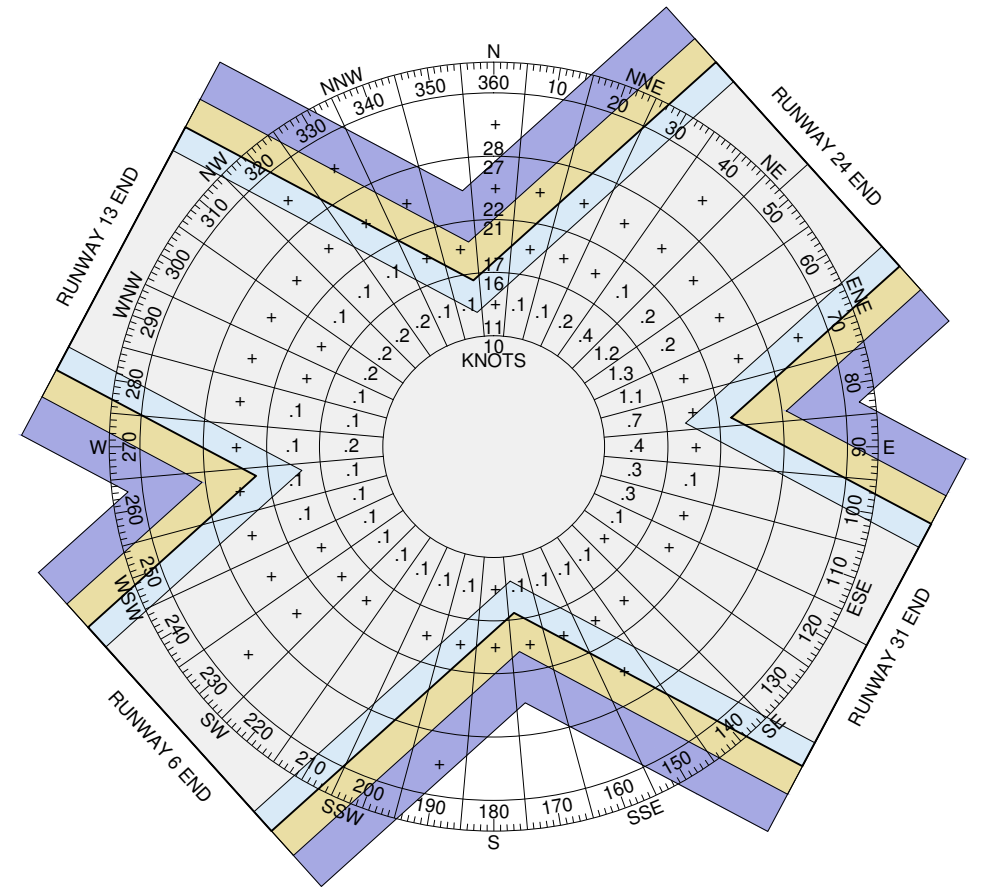
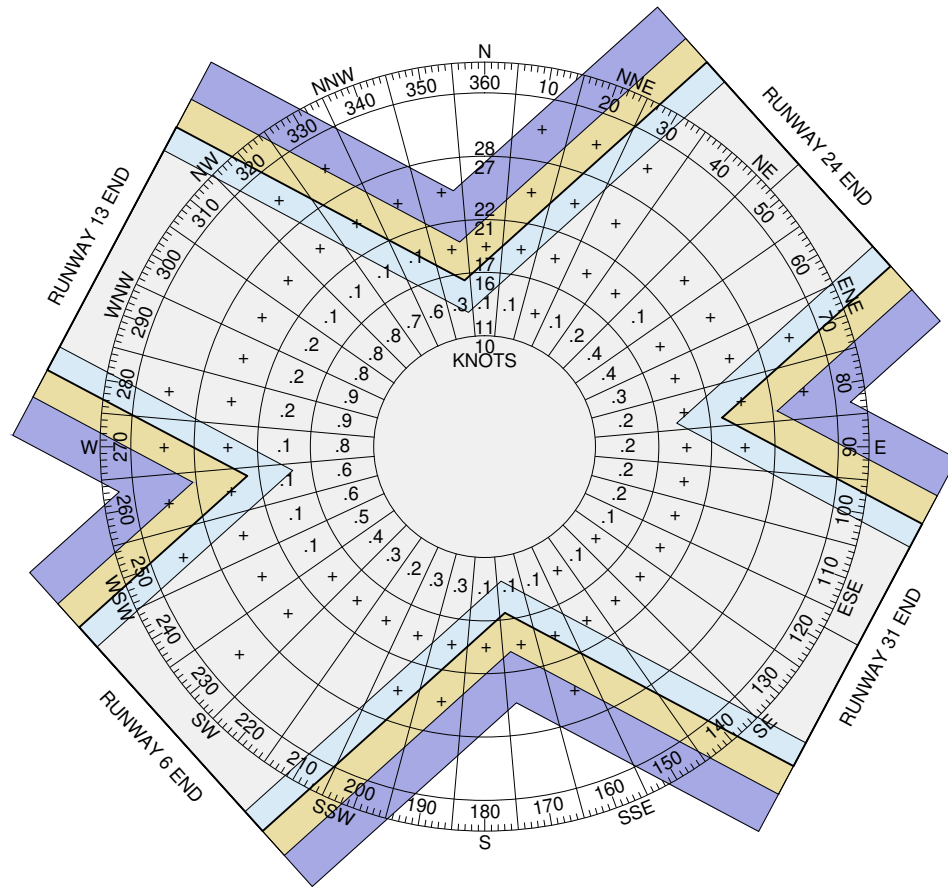
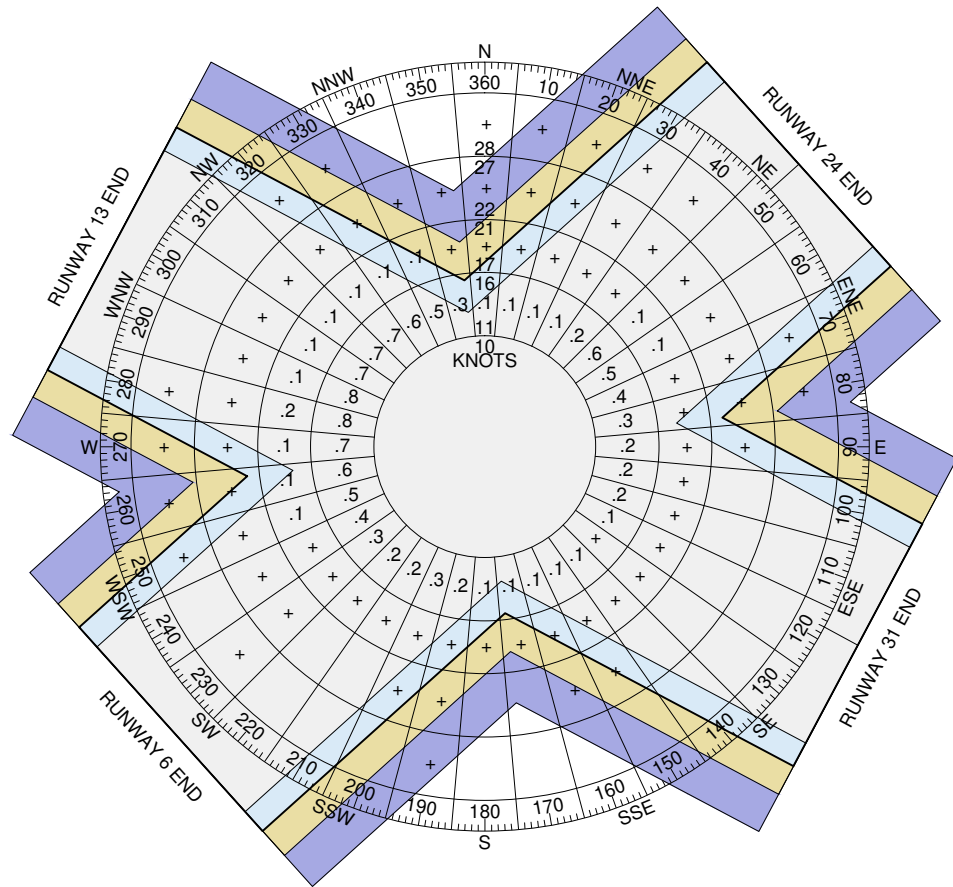
An existing wind analysis was undertaken using historical wind data obtained from the NOAA NCDC. Observations for this data were taken at the Airport for the period between January 1, 2006 and December 31, 2015. Percent wind coverage results are summarized in the following table for “AW” (All-Weather), “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 3.1.1**. The RDC, analogous to the Airport Reference Code (ARC), signifies the design standards to which a runway is built.

Table 3.1.1: 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 3.1.3** and percent wind coverages are outlined in **Table 3.1.2**.



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. 3.1.2: 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 secondary 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 3.1.3** 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 is consistent with VFR ceiling and visibility indexes.



Table 3.1.3: 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

3.2 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** addresses existing airfield design conditions in regards to FAA design standards.

LVIA’s airfield is shown in **Figure 3.2.1**. **Table 3.2.1** provides a summary of the existing airside facilities that are described in the subsequent text.