



# Lehigh Valley International Airport

Allentown, Pennsylvania

## Airport Master Plan Update Section 2 – Regional Context

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## Section 2 – Regional Context

### 2.1 Introduction

#### Airports in the Global Economy

Metropolitan regions are the basic economic units of the global economy, and airports are fundamental components of the transportation system that provide the quickest and most direct access to the national and global marketplace. For the regions they serve, the airport is the symbolic and functional gateway to the nation and the world. As a result, airports should be viewed as multidimensional facilities affecting the economy and quality of life of the metro region, and as integral components of the larger transportation and logistics network, and not as stand-alone facilities whose purpose is limited to air service. Even airports in smaller metropolitan areas provide access to the larger national and global marketplace through their connectivity to the economies and larger air hubs found in the larger metropolitan regions.

#### Airports and Economic Regions

The forces shaping the future of the Lehigh Valley and LVI) are not limited to those within the valley, but include those that are reshaping the world, the Northeast, and the New York and Philadelphia metro areas. As these changes take place, the market forces driving the future of the Airport will change with them, and need to be taken into consideration during the master planning process.

The complex set of forces driving the future of LVIA is the result of its intricate web of relationships within the Northeast and the New York and Philadelphia market areas. The Bureau of Economic Analysis explains that “the general concept of a metropolitan area is that of a core area containing a large population nucleus, together with adjacent communities having a high degree of economic and social integration with that core.”

The Lehigh Valley metropolitan area can be considered an adjacent community to both the New York and Philadelphia metro areas. The continuously urbanized Northeast region of the U.S. extends from Boston to Washington D.C., covering parts of states from Maine and New Hampshire on the northern end, to northern Virginia in the south. This area contains over thirty metropolitan areas and over 54 million people. Within this massive urban area, the Lehigh Valley has strong relationships to both the Philadelphia and New York areas. For example, the Allentown-Bethlehem-Easton metro area is located directly on the line separating the New York and Philadelphia trade areas<sup>1</sup>, yet for the purposes of real estate analysis, it is considered a submarket within the Philadelphia market area.<sup>2</sup>

As a result of these complex sets of relationships, understanding the forces shaping the Lehigh Valley requires an analysis of the changing demographic, transportation, economic patterns, and real estate market characteristics at the three scales of the Northeast, the New York and Philadelphia metro areas, and the Lehigh Valley. To achieve the greatest return on future investments at the Airport, its vision and goals should be shaped and aligned with the forces driving the future of the Lehigh Valley.

<sup>1</sup> Rand McNally, Commercial Atlas & Marketing Guide, 2010

<sup>2</sup> CBRE. *Marketview: Greater Philadelphia Industrial*, Q3 2016.



## Nonhub Commercial Airports in the Transportation Network

The FAA categorizes airports by type and level of activity. Publicly owned airports that have at least 2,500 passenger boardings (also known as enplanements) each year and receive scheduled passenger service are classified as commercial service airports. The commercial service classification is then broken down into categories based on what percentage of the total passenger boardings in the nation occur at each airport. These categories are Large Hub, Medium Hub, Small Hub, Nonhub Primary, and Nonhub Commercial Service.

The Airport is classified as a Nonhub Primary airport. Nonhub Primary airports often serve urban centers that could otherwise be isolated, requiring long automobile or transit commutes to reach large hub airports and the global marketplace. The main difference between nonhub primary airports and the hub airports lies in the number of passengers served as a percentage of the national total. To be classified as a small hub, an airport must enplane more than 0.05% of the total passenger boardings for the nation, while nonhub primary airports must have more than 10,000 passenger boardings, but less than 0.05% of the national total. As of 2015, the FAA reported 320,544 passenger boardings at LVIA, less than 80,000 boardings from the threshold of being classified as a small hub airport of just under 400,000 passengers.

## Context for LVIA

Since its opening in 1929, the Airport has gone through many stages of development, and the region has experienced significant changes in its economic and demographic patterns. Understanding the regional context and the current and projected trends will be important to developing a vision and set of goals for the Airport to better capture opportunities. Over the past two decades, the Lehigh Valley has made a significant transformation from a steel production center to a diversified manufacturing and logistics hub. At the same time, the institutional infrastructure provides the region with high-level research that is the basis for developing an innovative knowledge economy.

The relationship of airports to the social and economic future of their regions is changing dramatically as a result of global integration. Every mode of transportation other than air is limited to either land or water travel. As airports provide long-distance connections across both land and water, they are the only means of transportation that is not bound by surface conditions. The integration of the global economy has made it necessary for passengers and freight to reach destinations on every part of the globe, no longer limited to the geography of the 'free world' or 'communist world'. In this context, LVIA is a primary means of reaching the world economy. While it is a nonhub primary airport in the Northeast transportation network, located between the large hubs at New York and Philadelphia and the small hub at Harrisburg, it provides connections to the large hubs that reach worldwide destinations. The Lehigh Valley's increasing importance as a logistics center within the Northeast market, and close proximity to the massive New York and Philadelphia markets, positions LVIA to serve the passenger and freight demands of businesses and residents of the Valley and serve as an important component in the economic evolution of the Northeast. Recognizing and understanding the region's relationship to the rest of the Northeast, and especially the New York and Philadelphia markets will be important to developing an effective vision and long-term development strategy for LVIA.



## Context for Multidimensional Airport Planning

An understanding of the changing role and function of airports is leading to important changes in airport planning. Airport planning and development should be multidimensional and include not only consideration of the interactive effects with adjacent property at the smallest scale, but its linkage to the region's transportation network, its influence and role in the region's urban and economic future, and ultimately its role and function in the global network and marketplace. As a result, airport planning should not be limited to considerations and factors stopping at the edge of an airport boundary, since focusing on boundaries eliminates important opportunities to create new structural linkages to other transportation, institutional, and economic entities.

Airport planning and development can be positioned in three interconnected conceptual frameworks.

### 1. Airport as an island

Since airports are highly complex, multi-dimensional facilities with the greatest safety concerns of any transportation facility, traditional airport design was generally limited to planning for the functions performed within the Airport property, and the immediately adjacent property that is affected by noise or safety concerns. Airport planning is divided into a set of landside (parking, roadways, transit connections, support facilities, passenger terminal) and airside (runways, taxiways, navigational aids, and apron areas) issues, and the success of an airport depends on their effective interaction.

### 2. Airport as a component of the transportation/communications network

Airports must be connected to the metropolitan population and market they serve by the surface transportation system. The level of seamless connectivity is a key issue for access as it determines the level of reliability, cost and frustration a passenger or freight mover will experience in using the Airport. The basic purpose of an airport is the same as that for the other modes of transportation; to provide both access and mobility for the region's population and businesses. Therefore, an airport's ability to provide reliable service to its regional passenger and freight customers is related to the level of seamless connection it has to the interstate, transit, and other transportation systems. Small hub and non-hub airports greatly benefit in their competition with their larger air hubs found in the large nearby metros by ensuring easy, reliable, and low cost access through this surface system.

### 3. Airport as a key factor in the region's social and economic evolution

Airports throughout the US regularly complete economic impact studies to measure their effect on their region's economy. These impacts are created not only by the direct effects such as employment, but by the access to the national and global marketplaces that the Airport provides. As each metro area, large or small, is a place in the global network and economy, each airport provides services that supports and strengthens the economic role and function of the metro it is located within. Often, the impacts created by airports are estimated to reach up to several billion dollars. For example, JFK airport is estimated to contribute \$37.3 billion in economic activity to the New York metro area<sup>3</sup>, and Philadelphia International Airport is estimated

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<sup>3</sup> John F. Kennedy International Airport. Facts and Information. Accessed at <http://www.panynj.gov/airports/jfk-facts-info.html>.



to contribute \$13.9 billion.<sup>4</sup> Despite these facts, airport planning is rarely directly related to achieving its maximum economic impact on the region’s development. Considerations of the region’s social and economic future and the role of the Airport should be prime factors in airport planning.

## Timeframes and Scenarios in Airport Planning

Airport planning uses long-term projections for determining future airport functions and services in 5-, 10-, 20- and sometimes 25-year timeframes. For this master plan update, our timeframe is to 2040. These projections are used to plan for future development and expansions of the terminal, gates, runways, and other airport components. Unfortunately, across America airports now find that they are "locked" in non-expandable land envelopes, making capacity expansion difficult, if not impossible. Using a longer timeframe adds flexibility to the planning process to help ensure that the Airport does not end up "locked."

Within these longer-term planning horizons, a new wave of technology, affecting every aspect of transportation, economic activity, and urbanization will continue to change the forces and patterns shaping the Lehigh Valley and the Airport. As these are largely unpredictable, due to when they will emerge and their effect on current patterns and trends, it is important to consider scenario planning as a tool by which to evaluate different courses of long-term development. Each scenario can be based on projecting and analyzing different combinations of change within the economic, transportation, demographic, and urban patterns.

## 2.2 The Northeast Context

The Northeast region of the US is the largest urban, population and economic concentration in North America. It is an area that contains both very large and smaller metro areas connected by roads, transit, air and waterways. The Lehigh Valley is centrally located within this highly urbanized area. The central spine of this area is formed by I-95 linking five of the nation’s largest metro areas extending from Boston to Washington and includes New York, Philadelphia, and Baltimore, each originally founded as a seaport to serve its own area, into one continuous and interactive market, as shown in **Figure 2.2.1**.

Immediately west of this line of very large metros along I-95 is a set of smaller, satellite metros that are increasingly linked and interactive with the major metros extend from Harrisburg, PA through Allentown-Bethlehem, Scranton-Wilkes-Barre, to Albany and Hartford-Springfield. While the urban pattern may seem random, the network of roads rails, airports and seaports and the spatial location of their passenger and freight facilities has given to each metro a very specific role and function in serving this massive market area.

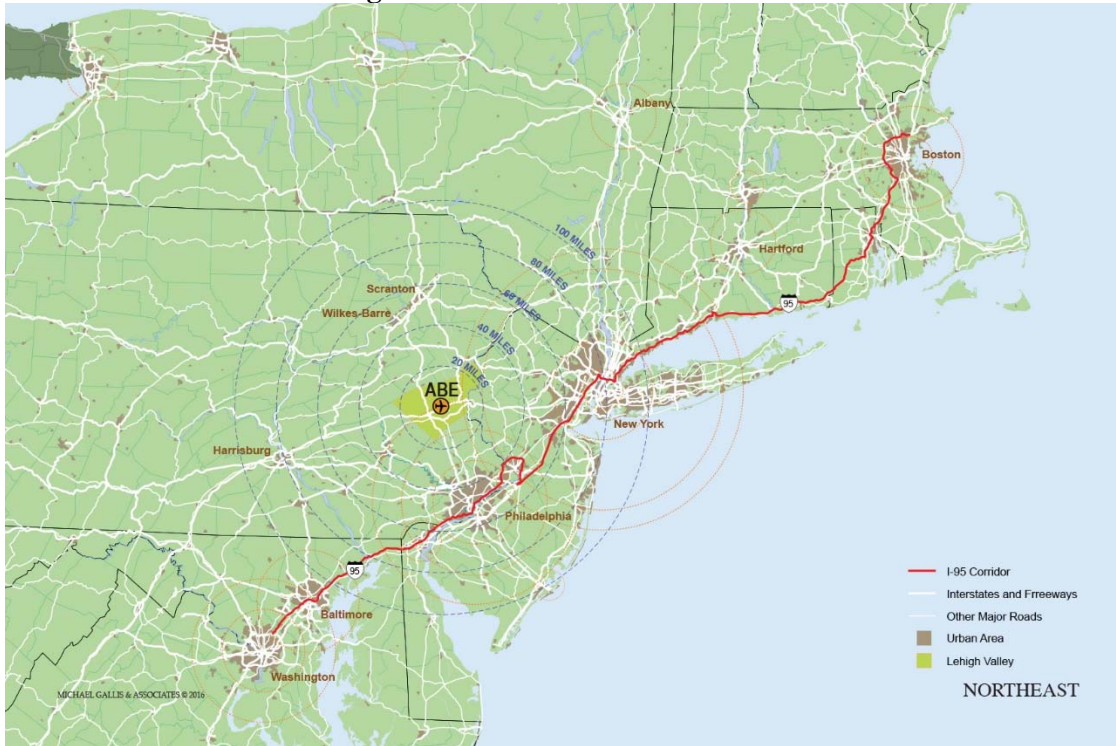
The market of each metro is a function of the size and characteristics of its population, and economy. A further definition is provided by the size and characteristics of its office and industrial real estate development markets and their trends.

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<sup>4</sup> PA DOT, Bureau of Aviation. *The Economic Impact of Aviation in Pennsylvania*, 2011



Figure 2.2.1: Northeast Context Area



Source: Michael Gallis & Associates

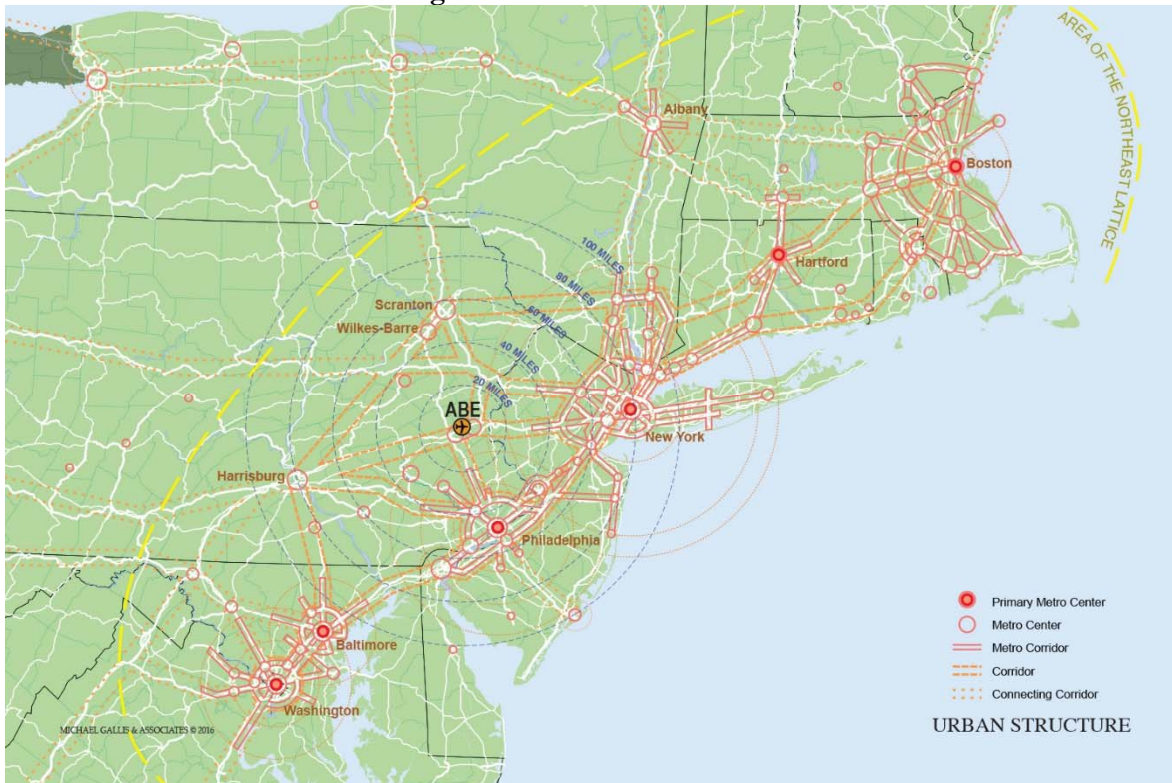
## Northeast Urban Structure

The fall of the Soviet Union in 1991 led to a vast reorganization of global trading patterns and integration of the world economy. Throughout the 1990's and the first decade of the 21<sup>st</sup> century, global redistribution of economic activity, combined with rapid advancements of technology affecting every aspect of economic activity and transportation redefined the global trade patterns. One of the most significant effects was the radical shift in the US trade patterns that led to industry consolidation and a new pattern of passenger and freight flows connecting the nation's larger and smaller hubs into a more strongly linked and integrated network.

In the Northeast, the breakup of Conrail and the absorption of the two components of that rail network into the CSX and Norfolk Southern systems led to further integration of the Eastern U.S. market. This contributed to a revival of the industrial centers like Harrisburg, Allentown-Bethlehem, and Scranton-Wilkes-Barre as they transformed into inland hub distribution centers serving the larger northeast market.

The Northeast today is a structure of corridors that connect the major and smaller metro areas into one interactive market area we refer to as the Northeast Lattice (shown below). Within this context, the Lehigh Valley is emerging as a freight hub serving the entire Northeast.

Figure 2.2.2: Northeast Lattice



Source: Michael Gallis & Associates

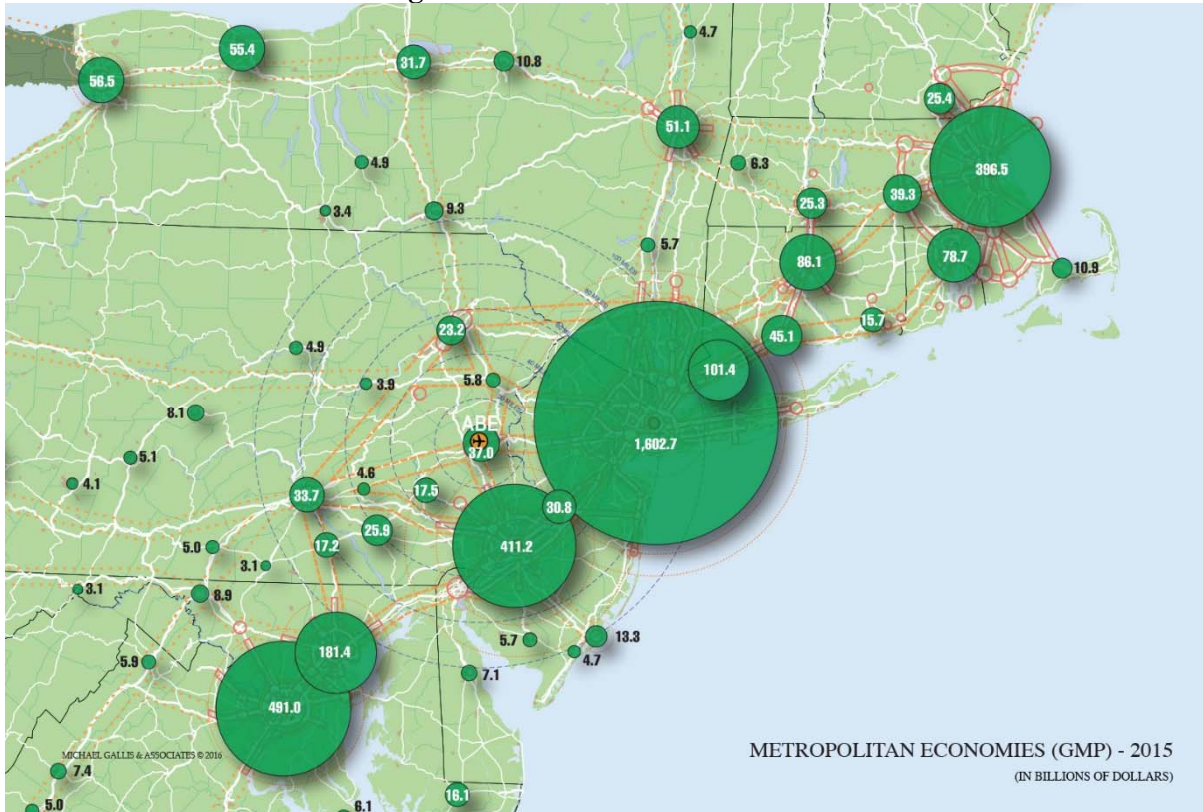
## Northeast Economies

The five largest metro economies of the Northeast, as measured by their Gross Metropolitan Product (GMP), are all located along the I-95 corridor. As seen in **Figure 2.2.3**, a group of smaller GMPs are located both along this corridor and in a group immediately to the west. One grouping is located between Boston and New York, while a second distinct group is located west of the area between New York and Washington. Allentown-Bethlehem-Easton occupies a central location within the entire Northeast market area, and provides it with excellent access to the large concentration of economic activity in the center of the lattice formed by New York, the largest, and Philadelphia, the third largest, metro economies in the Northeast.

Allentown-Bethlehem-Easton is the third largest economy in the state of Pennsylvania, and the 11<sup>th</sup> largest within the 23 metros of the Northeast Lattice (see **Table 2.2.1**). It has had a rate of growth similar to Pittsburgh and Philadelphia. On a national basis, its economy is similar in size to Charleston, SC and Tucson, AZ.



Figure 2.2.3: Northeast Economies



Source: Michael Gallis & Associates, US Bureau of Economic Analysis



**Table 2.2.1: Gross Domestic Product of Northeast Corridor Metros (in millions of current dollars)**

US Rank	Area	2005	2010	2015	Chg 10-15	Chg 05-15
1	New York-Newark-Jersey City, NY-NJ-PA	1,151,061	1,340,859	1,602,705	19.5%	39.2%
5	Washington-Arlington-Alexandria, DC-VA-MD-WV	356,837	432,364	491,042	13.6%	37.6%
8	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	301,415	348,749	411,161	17.9%	36.4%
9	Boston-Cambridge-Newton, MA-NH	280,460	330,024	396,549	20.2%	41.4%
19	Baltimore-Columbia-Towson, MD	129,363	152,820	181,419	18.7%	40.2%
38	Bridgeport-Stamford-Norwalk, CT	76,084	82,351	101,385	23.1%	33.3%
40	Hartford-West Hartford-East Hartford, CT	70,748	81,935	86,113	5.1%	21.7%
42	Providence-Warwick, RI-MA	61,598	67,754	78,694	16.1%	27.8%
62	New Haven-Milford, CT	37,968	41,021	45,091	9.9%	18.8%
67	Worcester, MA-CT	30,416	34,216	39,257	14.7%	29.1%
<b>73</b>	<b>Allentown-Bethlehem-Easton, PA-NJ</b>	<b>27,279</b>	<b>31,337</b>	<b>36,968</b>	<b>18.0%</b>	<b>35.5%</b>
79	Harrisburg-Carlisle, PA	25,850	29,162	33,730	15.7%	30.5%
82	Trenton, NJ	22,203	25,853	30,815	19.2%	38.8%
94	Lancaster, PA	18,385	20,835	25,917	24.4%	41.0%
95	Manchester-Nashua, NH	20,109	21,483	25,442	18.4%	26.5%
97	Springfield, MA	19,800	22,483	25,337	12.7%	28.0%
106	Scranton--Wilkes-Barre--Hazleton, PA	18,238	20,330	23,194	14.1%	27.2%
132	Reading, PA	13,403	15,119	17,503	15.8%	30.6%
135	York-Hanover, PA	13,917	16,164	17,150	6.1%	23.2%
147	Norwich-New London, CT	14,670	15,975	15,710	-1.7%	7.1%
188	Barnstable Town, MA	8,819	9,079	10,898	20.0%	23.6%
278	East Stroudsburg, PA	4,596	5,623	5,769	2.6%	25.5%
329	Lebanon, PA	3,309	4,142	4,609	11.3%	39.3%
	<b>Total Northeast Lattice</b>	<b>2,706,528</b>	<b>3,149,678</b>	<b>3,706,458</b>	<b>17.7%</b>	<b>36.9%</b>

Source: Gross Domestic Product (GDP) by metropolitan area, 2015. Bureau of Economic Analysis. Sept 20, 2016

The 23 metros that are directly connected as part of the Northeast Lattice have a combined economy of \$3.7 trillion dollars. They range in size from the largest, New York at \$1.6 trillion, down to Lebanon with an economy of \$4.6 billion. The average growth rate was 36.9% from 2005 to 2015, with Boston being the fastest growing at 41.4% and Norwich-New London being the slowest at 7.1%.

The Allentown-Bethlehem-Easton economy at \$37 billion is relatively small compared to the largest, but is in close proximity to the New York and Philadelphia economies, which total over \$2 trillion, or 54% of the total Northeast Lattice economy. This provides the Lehigh Valley with a competitive advantage to serve these two massive and growing economies.

### Northeast Population Change

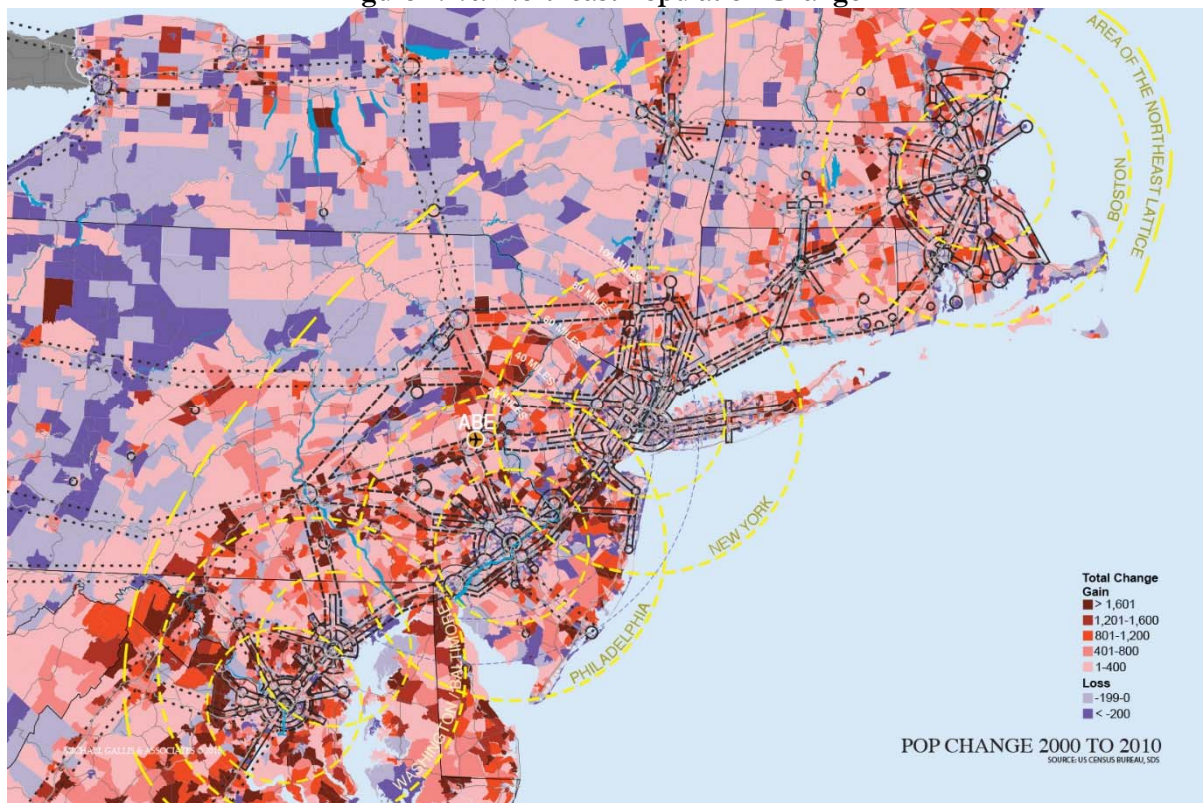
The total population of the Northeast urban lattice was 54.3 million in 2010. It grew at a rate of 5.7% between 2000 and 2010. As seen in **Figure 2.2.4**, this population growth has not been equally distributed across the

Northeast, but rather exhibits a high degree of variance. The major area of growth is found from New York south, with Boston primarily growing north into Maine and New Hampshire.

Urban growth is expanding in larger concentric patterns around the core area of each major metro center, with outer ring suburban growth continuing to dominate the urban growth pattern. While each metro area is experiencing a high level of reurbanization within the center city core area, the areas between the core and the ring of expanding outer suburban growth is largely static or declining in population.

The Lehigh Valley and the area north towards Scranton are high growth areas in proximity to both the New York and Philadelphia metros. The high rate of growth in the Lehigh Valley and north of it is expected to increase the population base within the area served by the Airport.

**Figure 2.2.4: Northeast Population Change**



Source: Michael Gallis & Associates, US Census

## Northeast Air Hubs

The airport pattern serving the Northeast is a highly bifurcated pattern divided between the large air hubs found in the major metros along I-95, and the smaller inland airports. The highly bifurcated pattern is exaggerated by the high degree of concentration of large hubs with the broad dispersal of the smaller hubs. Of the eight large hubs there are two clusters of three, one in the New York metro and one in the greater Washington metro area, with the two others found in the Boston and Philadelphia metros (see **Figure 2.2.5**). The one medium hub is located between Hartford and Springfield. The five small FAA designated air hubs

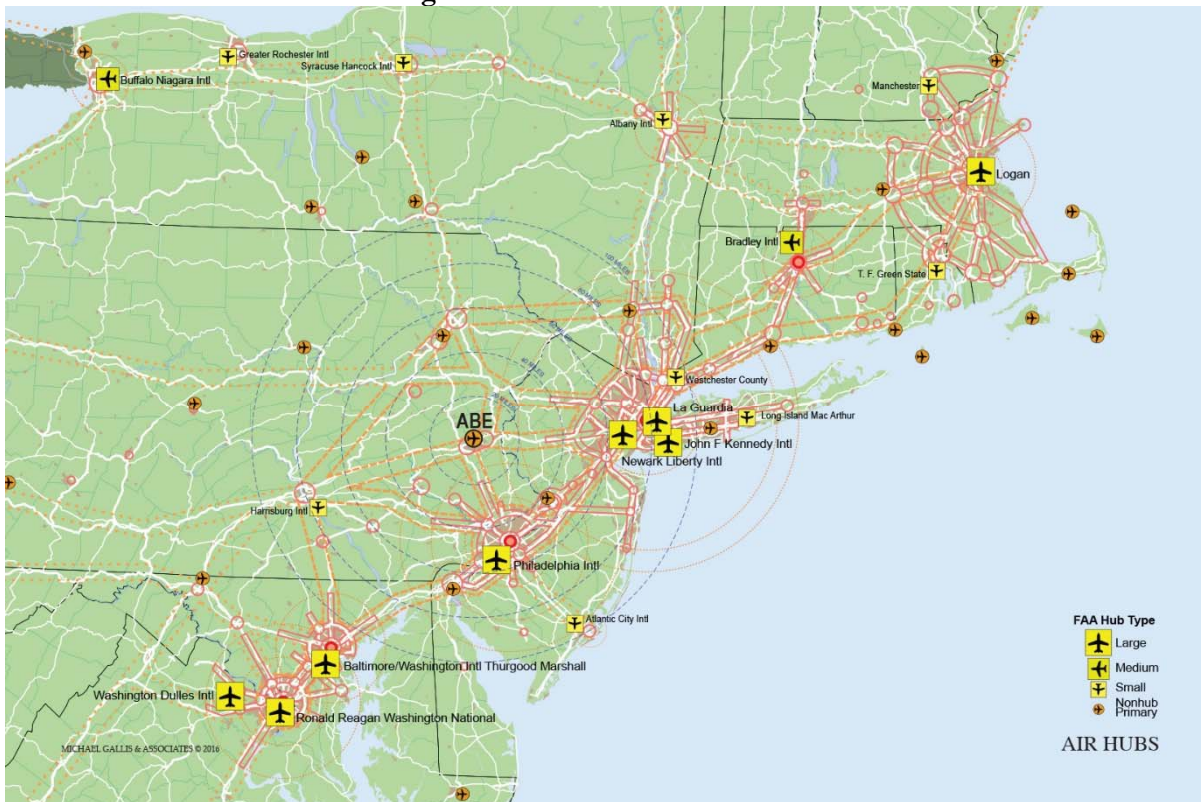


and ten nonhub primary airports are almost evenly spread across the remainder of the linked metros of the Northeast Lattice.

Of the three airports found in the metros west of the I-95 corridor, Harrisburg is a Small air hub, while LVIA and Scranton are Nonhub Primary airports.

Within the Northeast Lattice, LVIA currently has non-stop service to Philadelphia, and United serves connections in Newark via bus service.

Figure 2.2.5: Northeast Air Hubs



Source: Michael Gallis & Associates, FAA

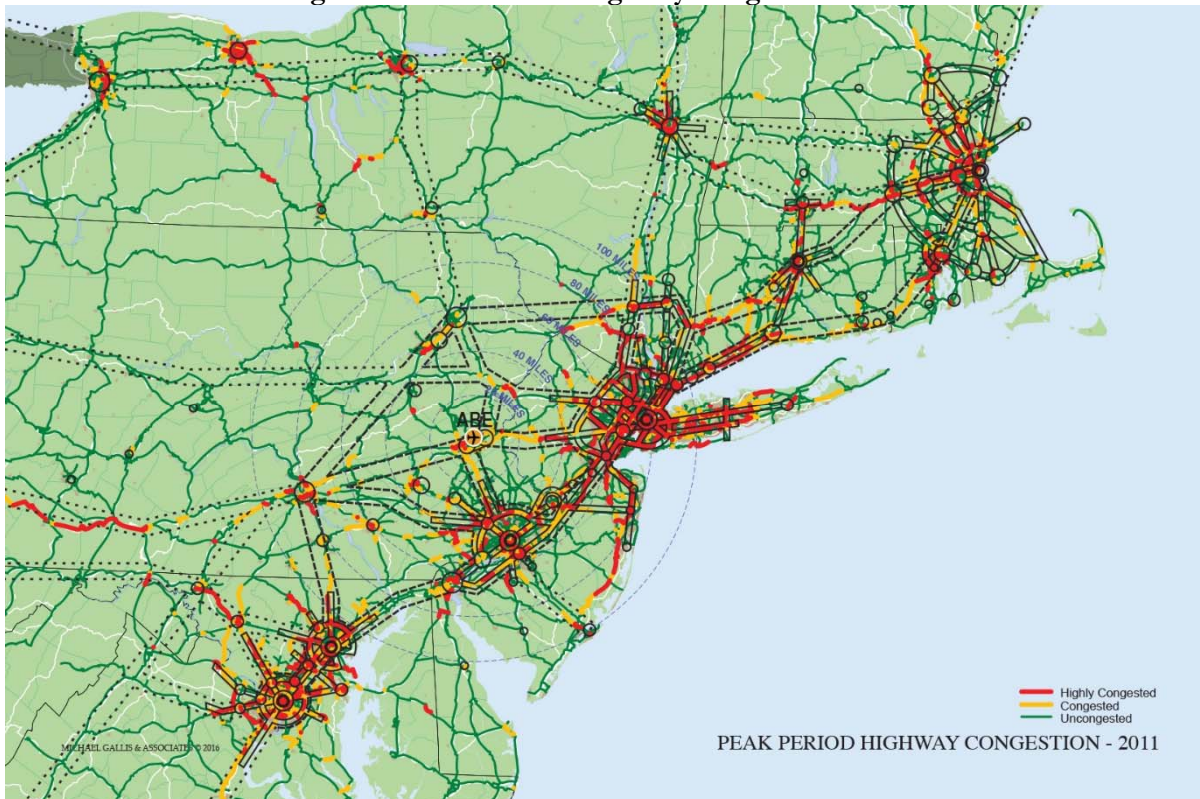
## Northeast Highway Congestion

### 2011 Highway Congestion

The highway network that provides access for passengers and freight to the dense core areas of each of the five major metros in the Northeast is highly congested. The air hubs serving these major metros are also located in these highly congested areas. The high level of congestion makes surface travel for passengers and freight equally unreliable. As passenger and freight volumes increase in the future around these large air hubs, highway congestion will grow and reliability will continue to decline, representing a barrier to their future growth.

The smaller urban areas also exhibit some areas of significant congestion, but the roads connecting the smaller, inland metros to the major metros are currently less congested (see **Figure 2.2.6**). This ease of access should provide LVIA with a competitive advantage to capture a larger share of the projected population growth in the area, which should drive increasing passenger activity at the Airport. This also provides a competitive advantage for the distribution and logistics functions in the smaller metros as freight originating in the smaller metros can more reliably reach the largest part of the market area surrounding the large metros, than if it originated from sources in the large metro core area.

**Figure 2.2.6: Northeast Highway Congestion - 2011**



Source: Michael Gallis & Associates, US DOT

### 2040 Highway Projections

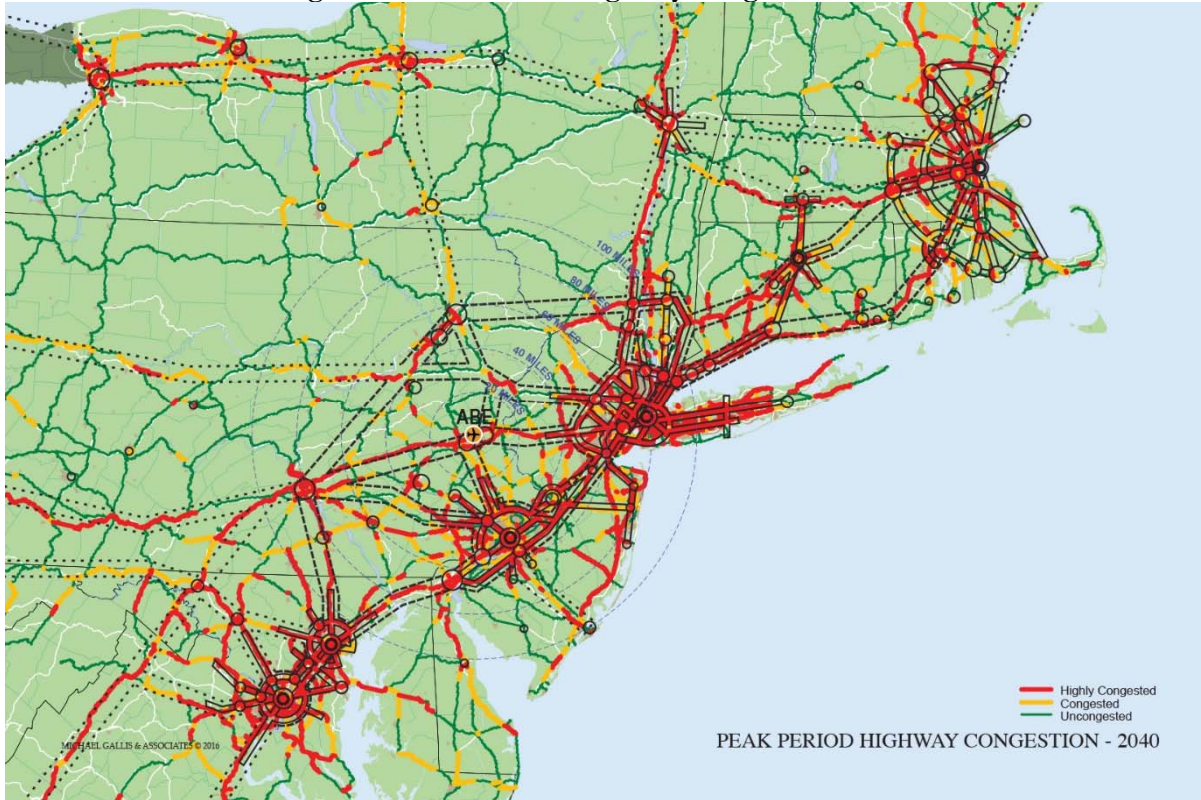
By 2040, highway congestion is projected to have spread throughout the entire metropolitan grid and along the major corridors connecting the five major metros and outward along the corridors that connect the smaller metros (see **Figure 2.2.7**). The existing relatively uncongested roads connecting the inland metros to the major metro areas will also reach ‘highly congested’ levels, making travel more difficult and less reliable. I-78 turns highly congested east and west of LVIA by 2040.

The large air hubs are all projected to continue to grow, but congested surface access will become more widespread and continuous, making travel more unreliable. It is expected this will result in the need for more air service in the more accessible smaller hubs. This will increase the importance of service from LVIA as an airport that can offer more reliability from the adjacent market areas.



The 2015 Lehigh Valley Freight Plan lists a total of 40.9 million tons of freight to and from the Lehigh Valley in 2011, with nearly 90% of it going by truck.<sup>5</sup> This freight traffic is expected to grow over 96% by 2040 to over 80 million tons. The projections are for 92% of this freight to be carried by truck.<sup>6</sup>

Figure 2.2.7: Northeast Highway Congestion - 2040



Source: Michael Gallis & Associates, US DOT

## 2.3 New York and Philadelphia Market Area Context

Allentown-Bethlehem-Easton’s central location within the Northeast urban lattice provides it with excellent access to the largest (New York), and third largest (Philadelphia) metro population concentrations, economies and market areas in the Northeast. Population increases and the rapid rate of economic growth over the past decade indicate that demand in these markets for goods and services will continue to expand. Difficulty of access to the dense core areas of these markets and the large air hubs will increase as urbanization pushes their suburban edges further out. Rising land costs will make warehouse, manufacturing and distribution facilities unaffordable close to the cores, giving more importance to the inland logistics hubs as locations to serve the much larger nearby markets.

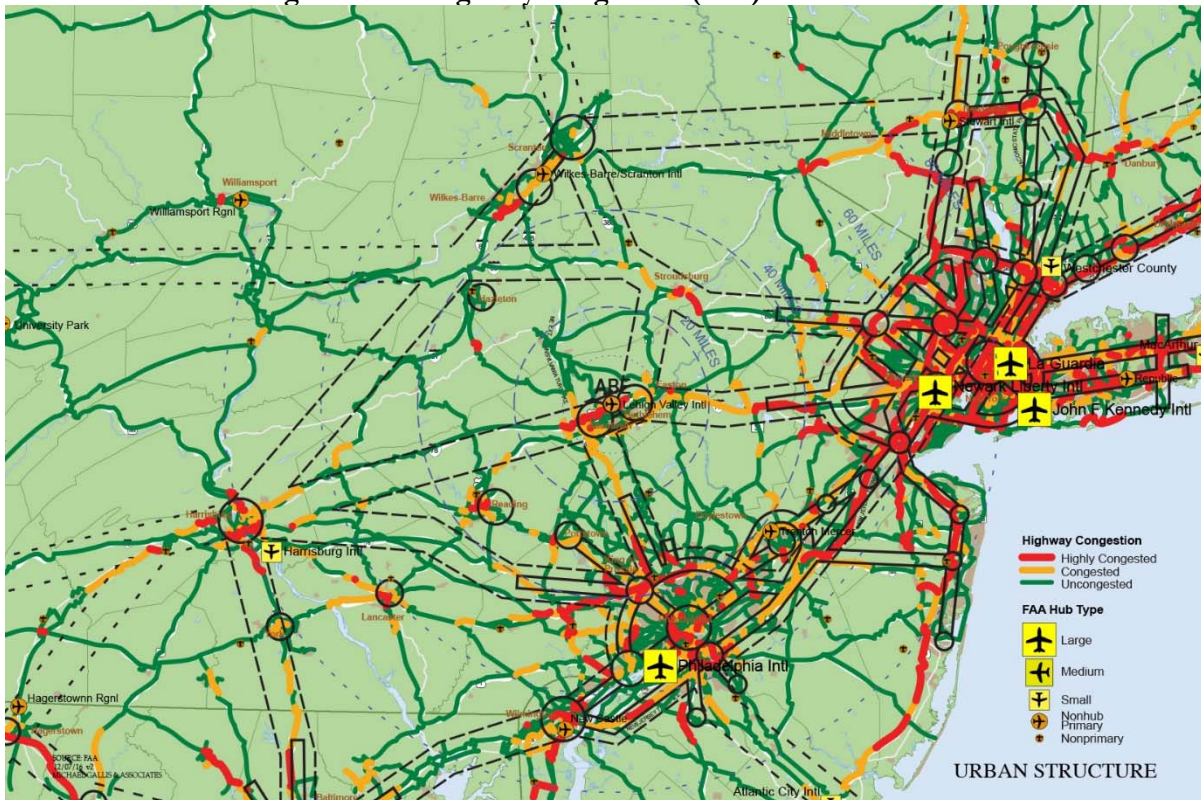
Despite the close proximity, surface access to these two major markets is problematic due to the high level

<sup>5</sup> Lehigh Valley Planning Commission. *MoveLV – Lehigh Valley Freight Plan*. October 13, 2015.

<sup>6</sup> *ibid.*

of congestion in the highway network (see **Figure 2.3.1**) and the lack of transit connections (see **Figure 2.3.6**). Surface congestion is a much larger barrier to the New York core region and airports than it is for access to the Philadelphia core area and airport. Air service to these markets will become increasingly important as surface congestion increases and becomes more of a barrier to reliable access. Currently, there is air service from LVIA to the Philadelphia market via American Airlines.

**Figure 2.3.1: Highway Congestion (2011) and Air Hubs**



Source: Michael Gallis & Associates, FAA, US DOT

## Regional Airports

### Passenger Service

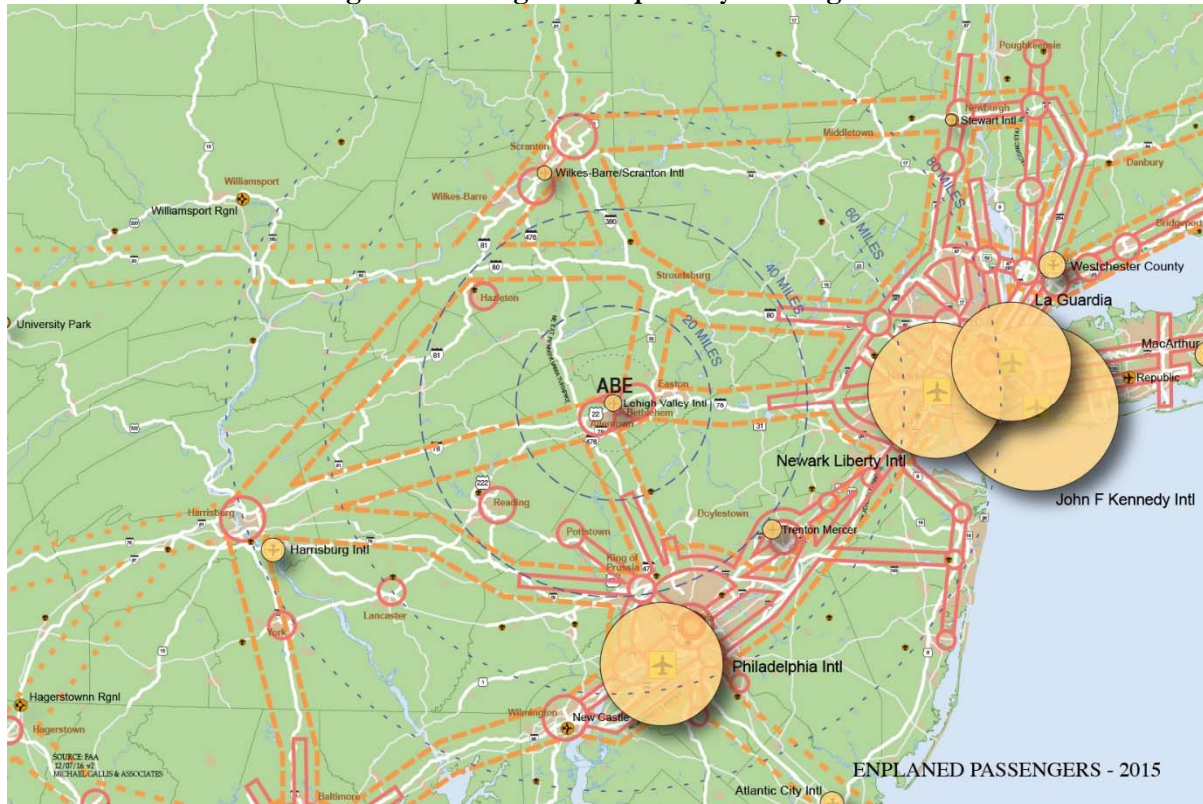
Air service, domestic and international, is concentrated in the three large air hubs in the New York metro and the large hub in the Philadelphia metro (see **Figure 2.3.2**). The competitive advantage of the large hubs is due to their extensive domestic and international destinations. As they continue to grow, these large hubs will continue to suffer greater problems with congested access and lack of reliability.

The smaller airports located in the inland metros despite their ease of access and convenience; provide limited non-stop service to specific airline hub cities in the Eastern half of the U.S. and year-round or seasonal service to major tourism destinations in Florida, Mexico, and the Caribbean. As service grows in the large hub airports, surface congestion, airfield and airspace capacity, and noise restrictions will become more formidable barriers, increasing the competitive advantage of the small airports.



The FAA lists LVIA as having 320,544 passenger enplanements in 2015, Harrisburg International at 587,049, Trenton Mercer at 389,598, and Wilkes-Barre/Scranton International at 219,796 enplanements.<sup>7</sup> For reference, LVIA had 1% of the passenger enplanements of JFK.

Figure 2.3.2: Regional Airports by Passengers



Source: Michael Gallis & Associates, FAA

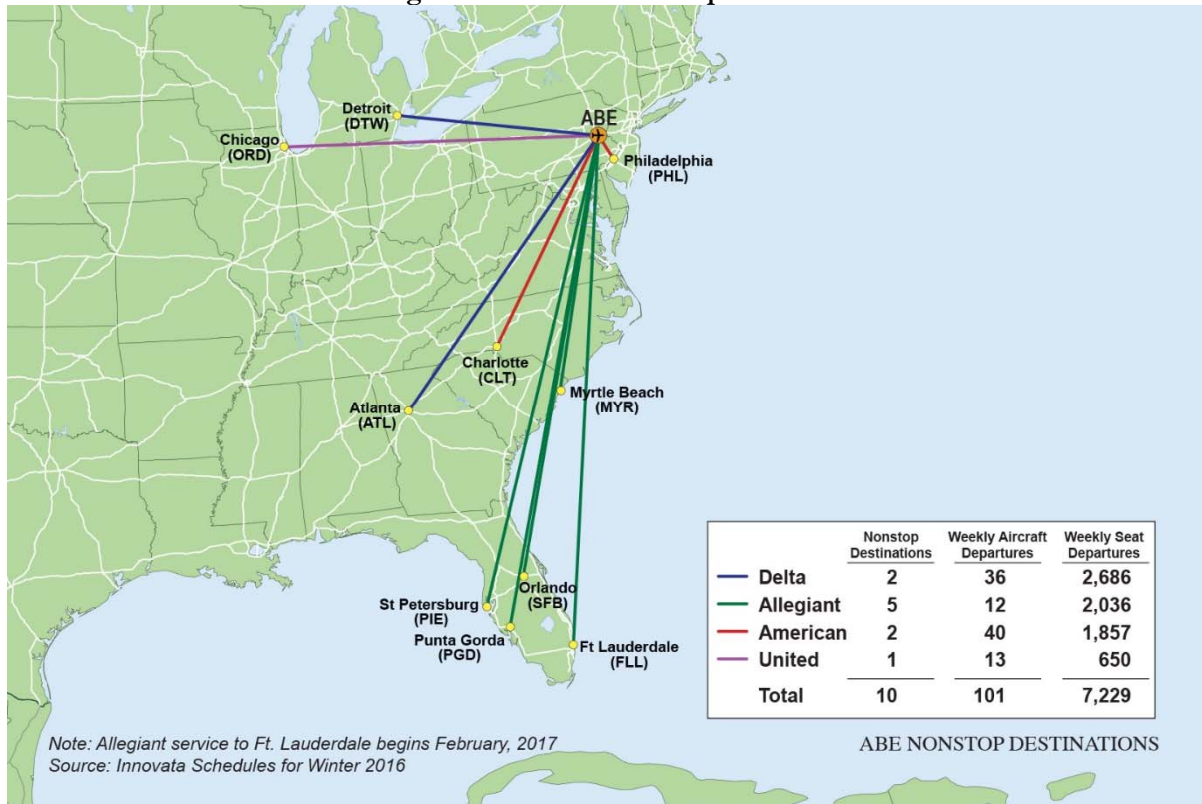
### Nonstop Service

One important measure of airport service is the number of nonstop destinations or city pairs that can be accessed from the Airport. Despite its close proximity to the Northeast metros, LVIA has limited access to the five major northeast metro markets. Currently, LVIA offers service to the large airline hubs operated by American in Philadelphia and Charlotte, Delta in Atlanta and Detroit, and United in Chicago and with bus access to Newark, through which travelers can access the full range of national and global destinations.

Allegiant provides low cost access to major tourism markets in the Southeast; Myrtle Beach in South Carolina, and Orlando, St Petersburg, Punta Gorda, and Ft Lauderdale in Florida (see **Figure 2.3.3**).

<sup>7</sup> Federal Aviation Administration. *Enplanements at All Commercial Service Airports (by Rank), CY2015*. October 31, 2016.

Figure 2.3.3: LVIA Nonstop Service



Source: Michael Gallis & Associates, Campbell Hill from Innovata Schedules for Winter 2016

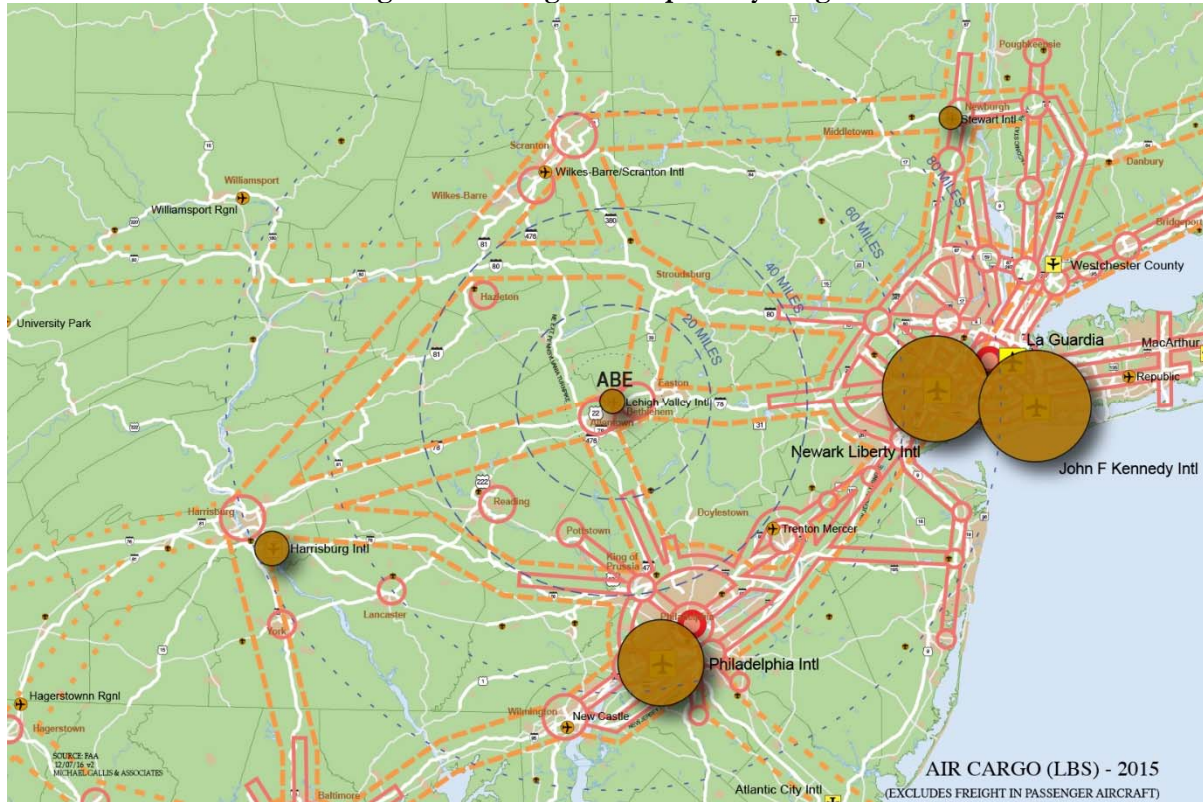
### Cargo

There is significant discussion regarding the trends that will determine the amount of air cargo that will be carried as belly freight in the new generation of wide-body aircraft or in dedicated freighters. As can be seen in **Figure 2.3.4**, air cargo via dedicated air freighters is largely concentrated in two of the major hubs of New York (JFK and Newark), and to a lesser extent, Philadelphia.

Only three of the smaller inland airports exhibit significant levels of airfreight, LVIA, Harrisburg, and Stewart. The FAA lists the amount of freight in dedicated freighter aircraft at LVIA in 2015 as nearly 166 million pounds, driven primarily by the increase in Amazon freight, making it the 96<sup>th</sup> largest in the U.S. for cargo in freight aircraft (this does not include freight shipped in the belly of passenger aircraft). Harrisburg International carried over 323 million pounds, and Stewart International carried over 145 million pounds.

The growing importance of the Lehigh Valley as a freight hub serving the entire Northeast region is due in part to the recent shift in domestic air cargo to truck. The increased importance of the Lehigh Valley as a logistics hub is resulting in growing freight volumes at LVIA. LVIA had 5% of the cargo in freighters of JFK, a significantly higher ratio than it had with passengers.

Figure 2.3.4: Regional Airports by Cargo



Source: Michael Gallis & Associates, FAA

## Distribution and Fulfillment Centers

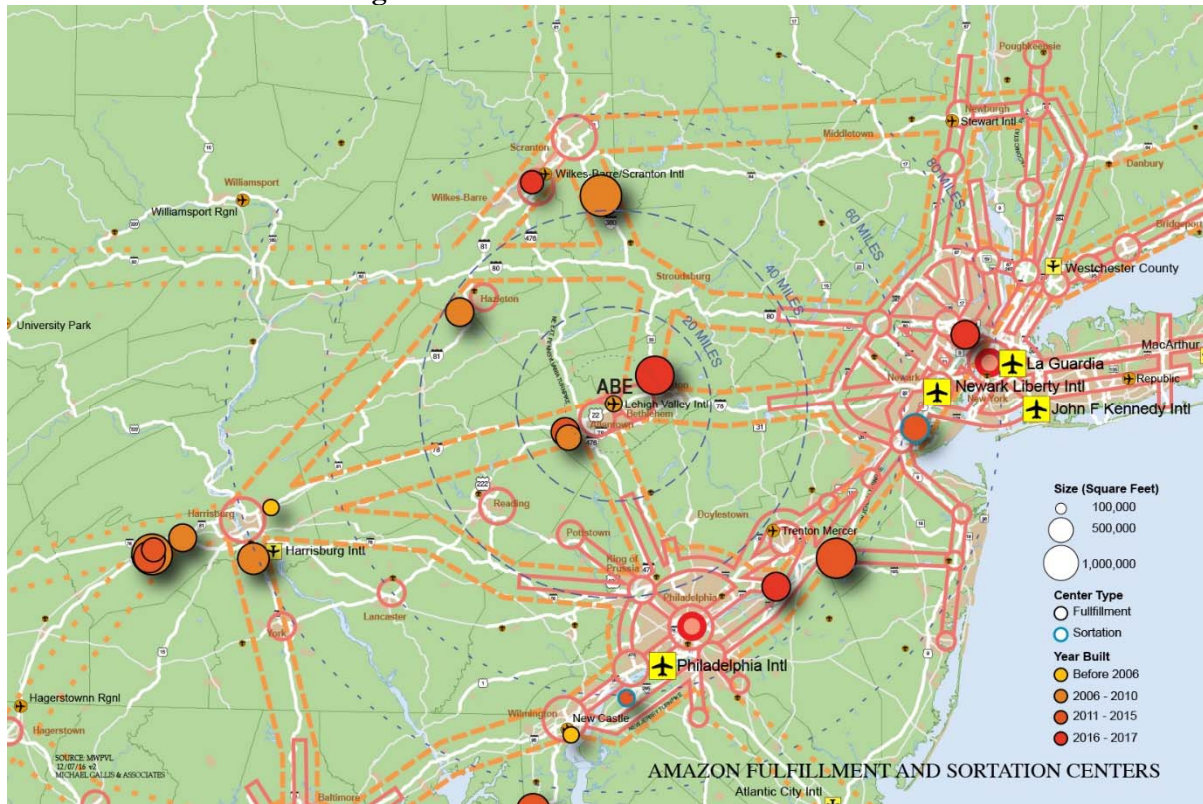
As an example of the emerging patterns of freight distribution across the Northeast responding to omni-channel e-commerce (“what you want, when you want it”) fulfillment centers, the logistics facility strategy of Amazon can be analyzed to determine the trends in location of these e-commerce driven fulfillment centers. The major concentration of consumers are located in the dense metropolitan core areas surrounded by rings of suburbs that lie along the dense I-95 corridor, yet only six of the Amazon facilities are found in that corridor. Twelve of the fulfillment centers are located in low-density areas and small metros. Nine are located in the I-78 corridor, concentrated around Harrisburg and the Lehigh Valley, and three around Scranton/Wilkes-Barre and Hazleton (see **Figure 2.3.5**). It would appear that this distribution of facilities is due to the ease of access from the smaller metros to suburban areas of the major metro markets. This is further evidenced by the recent announcement of the FedEx Ground facility adjacent to LVIA.

Amazon has begun flying its own Boeing 767 cargo jets to supply its network, and has five (5) cargo flights a day to LVIA. LVIA is currently one of 11 airports in the U.S. used by Amazon Prime Air, and serves the “75 million consumers in the area from Boston to Washington D.C.”<sup>8</sup>

<sup>8</sup> Assad, Matt. *Amazon has LVIA flying high*. The Morning Call, December 12, 2016.



Figure 2.3.5: Amazon Fulfillment Centers



Source: Michael Gallis & Associates, MWPVL

## Real Estate Submarkets

### Office

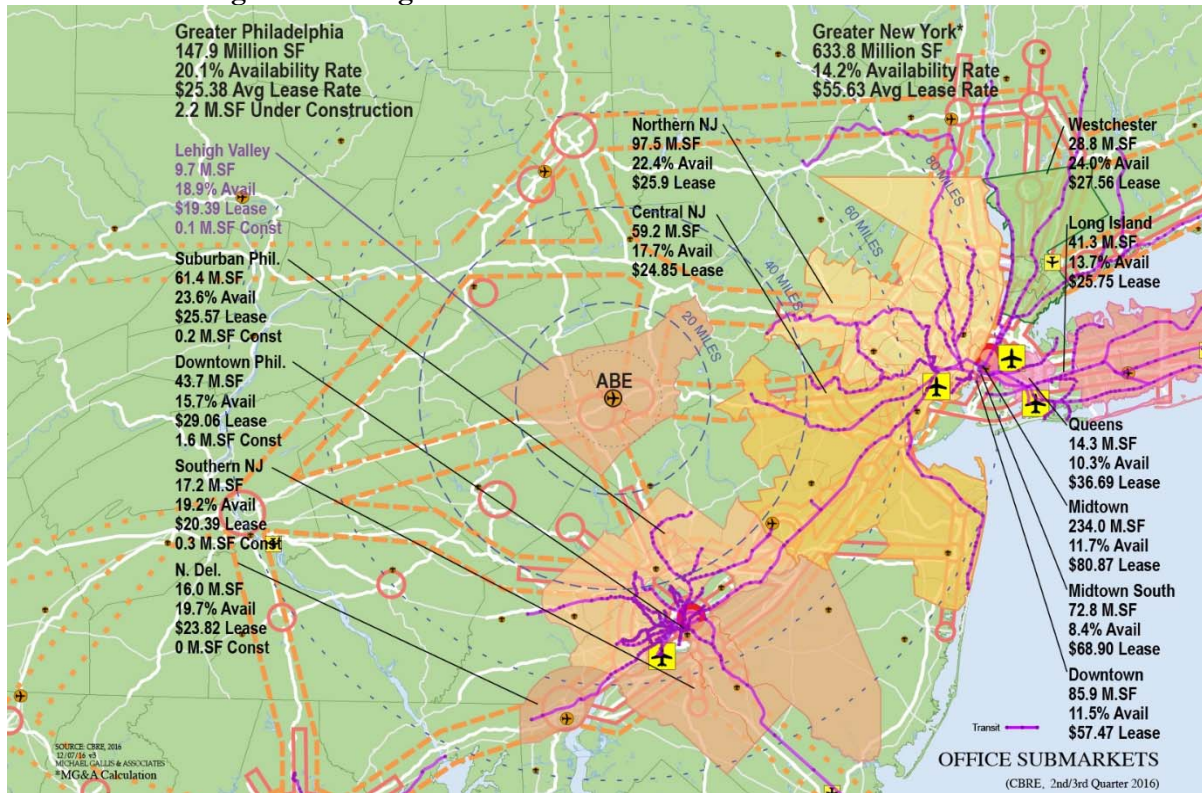
The size and growth rate of the office markets can be used as a factor in projecting demand for passenger service, as the rate of office growth reflects the rate of business and employment growth, and therefore, business travel demand. While the Lehigh Valley is considered a submarket of the Philadelphia market, it is also closely linked to the much larger New York office markets. It is the only stand-alone submarket (Figure 2.3.6) as each of the other submarkets of Philadelphia and New York are contiguous with the others and can be accessed by rail transit that facilitates interactions between the submarkets and the metro core market.

The Leigh Valley is supported by the quality of the institutional infrastructure within the Lehigh Valley. Anchored by Lehigh University, the region is developing as an innovation economy. CBRE (national real estate services company) shows this submarket as the smallest of the Philadelphia submarkets, with the lowest lease rate, the fourth lowest inventory under construction, but the second lowest vacancy rate<sup>9</sup>. Despite its cost advantage and close proximity to the Philadelphia and New York core area office markets, congested and unreliable road access, limited air service within the Northeast from LVIA (flight only to Philadelphia and bus to Newark), and lack of rail transit connections to New York and Philadelphia, are limiting office

<sup>9</sup> CBRE. *Marketview: Greater Philadelphia Office*, Q3 2016.

growth. Improved transit and air connections are important to growing this market.

**Figure 2.3.6: Regional Office Submarkets and Rail Transit Lines**



Source: Michael Gallis & Associates, CBRE 2016

## Industrial

The size and growth rate of the industrial markets can be used as a factor in projecting demand for air cargo service as it reflects the rate of total freight service demand in the Lehigh Valley.

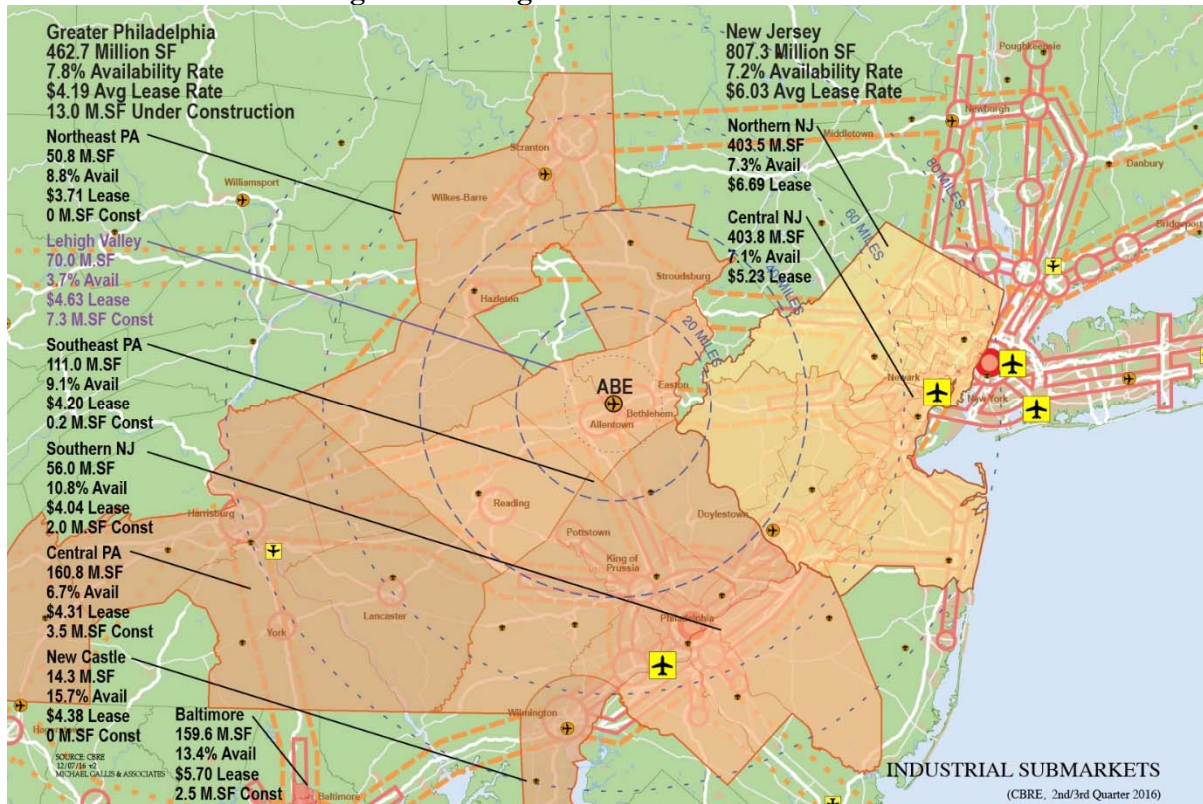
For the purpose of commercial real estate analysis, Allentown-Bethlehem-Easton is considered one of the six submarkets within the Philadelphia industrial market. It is the third largest, fastest growing, and has the highest lease rate, and lowest vacancy rate among the Philadelphia submarkets. According to CBRE, the Lehigh Valley submarket had over 7 million square feet of industrial space under construction as of the 3<sup>rd</sup> quarter of 2016.<sup>10</sup> Its central position and low cost advantage in the Northeast provides it with excellent opportunity to serve the entire Northeast market area (see **Figure 2.3.7**).

Several key factors are driving this market, including the growth of e-commerce fulfillment centers, the shift of domestic airfreight to trucking, and the highway and rail connectivity to ports and markets, all of which combine to provide the Lehigh Valley with a set of drivers that will continue to grow the market.

<sup>10</sup> CBRE. *Marketview: Greater Philadelphia Industrial*, Q3 2016.



Figure 2.3.7: Regional Industrial Submarkets



Source: Michael Gallis & Associates, CBRE 2016

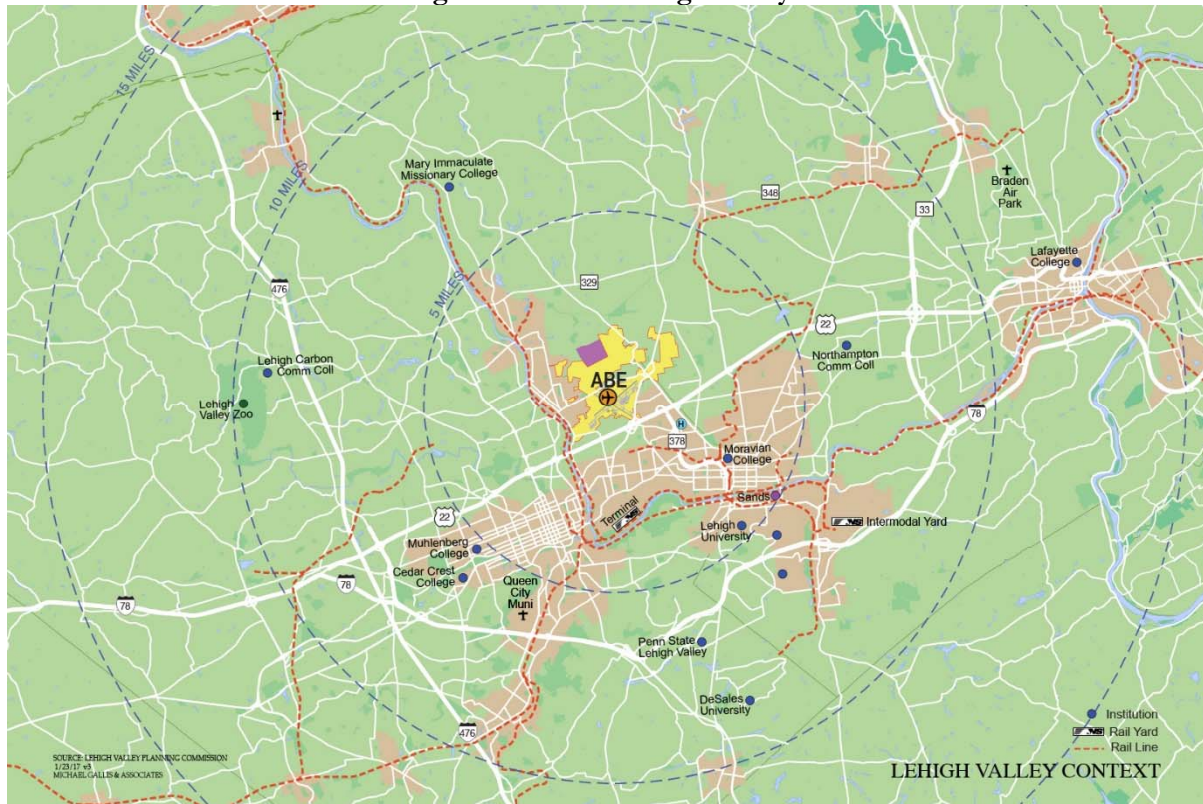
## 2.4 Lehigh Valley Context

The Lehigh Valley is defined by its environmental setting, a combination of its varied topography and location along the Lehigh and Delaware rivers. The urbanized area has become a continuous pattern extending from Easton through Bethlehem to Allentown, merging multiple cities, boroughs, and townships into one continuous metropolitan area (see **Figure 2.4.1**).

Its transportation network, formed by the turnpikes, interstates and freeways, the location of the Airport, and the freight rail lines, creates the framework for Lehigh Valley’s pattern of urbanization. The metro area has three interstates (I-78 and the PA Turnpike NE Extension (I-476) with access to I-80 and I-276), and is served by two (Norfolk Southern and Canadian Pacific) of the seven major railroads in North America. It has a rail/truck intermodal terminal capable of handling 120,000 lifts annually.<sup>11</sup> This concentration and intersection of interstates, combined with the railroads, creates the foundation for the region to continue its growth as a logistics hub within the Northeast. This concentration of freight flows using all transportation modes in close proximity creates the foundation for the possible development of an inland port.

<sup>11</sup> Lehigh Valley Economic Development. About the Lehigh Valley: Infrastructure. Accessed at <http://www.lehighvalley.org/about-lehigh-valley/infrastructure/>

Figure 2.4.1: The Lehigh Valley



Source: Michael Gallis & Associates, Lehigh Valley Planning Commission

The universities and colleges in the Lehigh Valley are an important competitive asset for the region. Lehigh University, ranked 44<sup>th</sup> in National Universities by US News and World Report<sup>12</sup>, is in relatively close proximity to the Airport. Other colleges in the region include Lafayette College (ranked #36 in Liberal Arts Colleges)<sup>13</sup>, Cedar Crest College, Muhlenberg College, Moravian College, the Penn State Lehigh Valley campus, and several other colleges and community colleges that complete the institutional framework and are important to the knowledge economy and regional workforce training. This concentration of academic institutions is an important foundation for the growth of the office market as research, academic staff, and graduates are all attractors of businesses and R&D facilities.

For over a century, the region was headquarters to the largest steel company in America, Bethlehem Steel, and a major steel-producing center. Today, the access provided by the transportation infrastructure and the concentration of logistics facilities has provided the foundation that supports and attracts more diverse manufacturing to the region. Manufacturing is again the largest sector of the Lehigh Valley economy, contributing \$5.56 billion, or 15% of GDP. This sector includes such manufacturing as trucks, medical devices, food and beverages, pipes, and crayons. Transportation and Warehousing is the 6<sup>th</sup> largest segment

<sup>12</sup> U.S. News & World Report. *Best Colleges 2017: National Universities Rankings*. September, 2016.

<sup>13</sup> *ibid*.



of the regional economy, contributing \$1.69 billion in 2015.<sup>14</sup>

Lehigh Valley International Airport occupies a central location within the urban area, providing easy access from across the region for passenger and freight services that support the regional economy. The economic impact of the Lehigh Valley International Airport has been estimated at over \$500 million<sup>15</sup> by the Pennsylvania DOT in 2011.

## Distribution and Fulfillment Centers

Large-scale distribution centers, which are greater than one million square feet, are growing rapidly throughout the region. This should result in an increasing demand for logistics services and airfreight. The Lehigh Valley Planning Commission (LVPC) projected airfreight tonnage to double between 2011 and 2040<sup>16</sup>. The addition of multiple fulfillment centers since 2011, should further increase airfreight demand. Walmart and Amazon each occupy 2.2 million square feet of facilities in the Lehigh Valley. Uline (packing and shipping materials) and NFI industries (logistics and supply chain management) each occupy nearly 1.7 million, and Home Depot has 1.3 million. The new FedEx Ground facility north of the Airport will total nearly 1 million square feet for FedEx.<sup>17</sup> (see locations in **Figure 2.4.2**)

The LVPC has projected that overall employment in the Lehigh Valley to increase by 26% between 2015 and 2040, and employment in transportation and warehousing by 34%.<sup>18</sup>

The growth of distribution and fulfillment centers in the region is expected to result in the growth of truck traffic that will compete with passenger traffic for road space, leading to greater congestion throughout the metro and connecting roads to other metros. CBRE has also noted that tightening development regulations in Lehigh and Northampton Counties appear to be encouraging developers to look further west along I-78.<sup>19</sup>

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<sup>14</sup> Harris, Jon. *Boosted by Manufacturing, Lehigh Valley's economic output hits record \$37 billion.* The Morning Call, September 20, 2016.

<sup>15</sup> PA DOT, Bureau of Aviation. *The Economic Impact of Aviation in Pennsylvania*, 2011

<sup>16</sup> Lehigh Valley Planning Commission. *MoveLV – Lehigh Valley Freight Plan*. October 13, 2015.

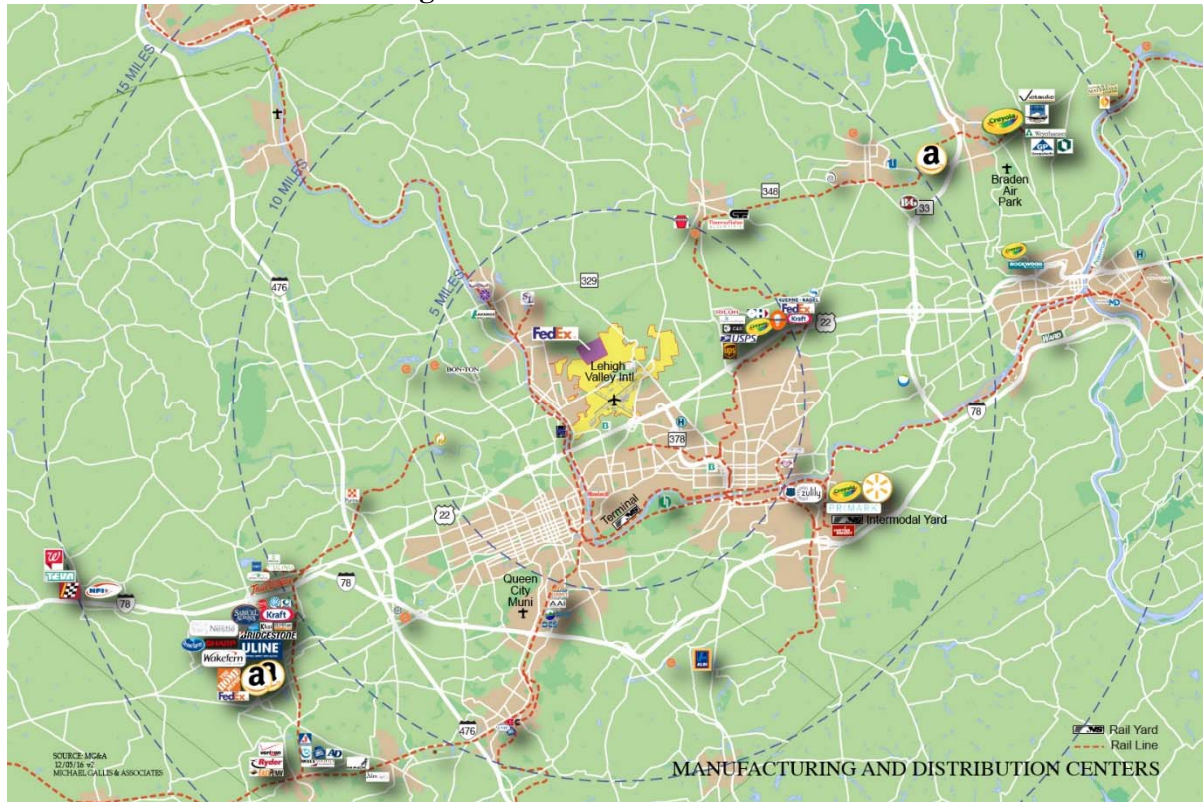
<sup>17</sup> Parmley, Suzette. *Why the Lehigh Valley is full of fulfillment centers.* Philly.com, October 30, 2016.

<sup>18</sup> LVPC. *History and Forecast of Employment, Lehigh Valley 2001-2040*. June 2012.

<sup>19</sup> CBRE. *Marketview: Greater Philadelphia Industrial*, Q3 2016.



Figure 2.4.2: Distribution Centers



Source: Michael Gallis & Associates, MG&A

## Lehigh Valley Truck Traffic

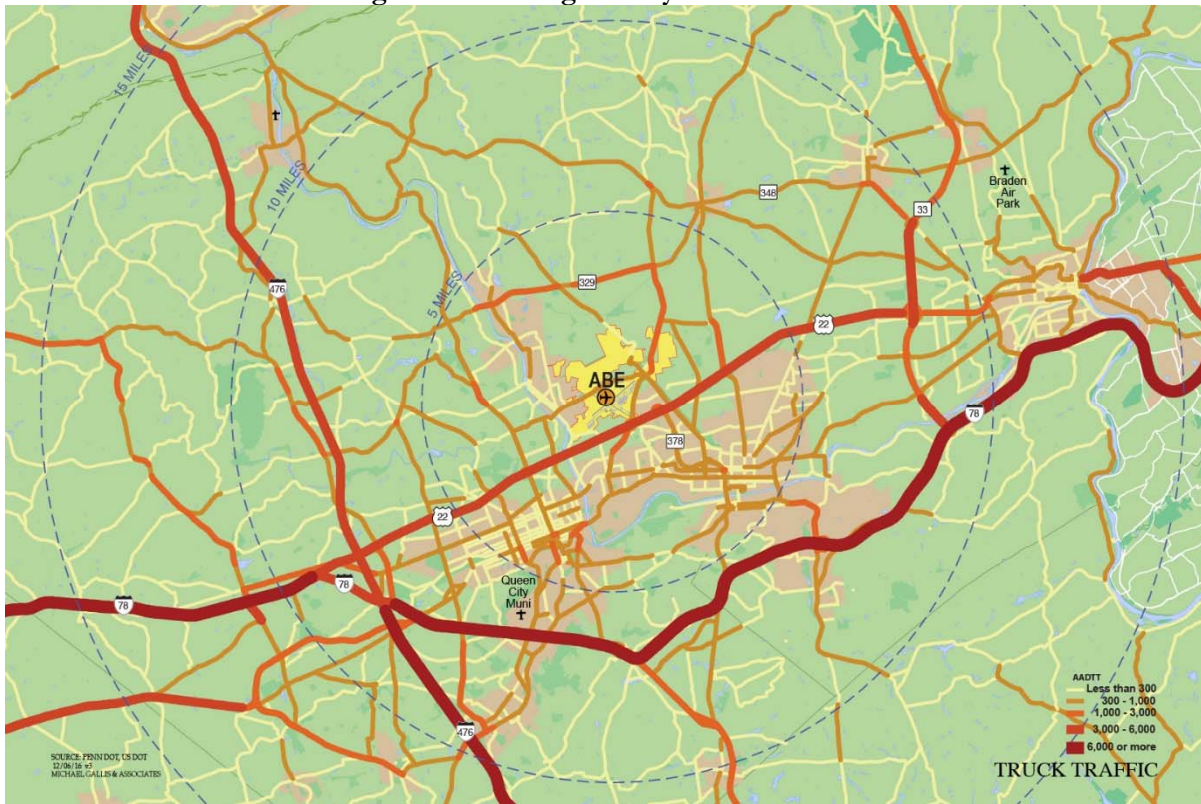
As can be seen in **Figure 2.4.3**, truck traffic is primarily concentrated on Interstate 78 both east and west, and I-476 south towards Philadelphia, although significant flows are found on all the major arterials in the Valley. US-22 is a significant truck corridor that provides access to the Airport. It plays a secondary role to I-78 as it does not provide the same level of continuous flow, speed, or through connections as I-78.

Preserving automobile and passenger access to the Airport will be an important consideration as truck traffic grows in the area. The Airport is currently constructing a multi-modal ground transportation center to improve accessibility of the Airport to travelers from outside of the region by both car and bus.

There have been discussions of creating an inland port connected to the Port of New York and New Jersey by Norfolk Southern and located at the existing Lehigh Valley Rail Management intermodal rail yard near I-78 in Bethlehem. Moving waterborne freight from the ports to the Lehigh Valley by rail, and increasing the ability to export by rail, could take some of the truck traffic off of the roads.<sup>20</sup> Charlotte Douglas international airport has built a rail intermodal yard, and Rickenbacker International an inland port and associated logistics infrastructure at the Airport. Similar possibilities could be investigated at LVIA.

<sup>20</sup> Dupin, Chris. *O' little port of Bethlehem*, American Shipper, December 23 2015.

Figure 2.4.3: Lehigh Valley Truck Traffic



Source: Michael Gallis & Associates, PennDOT

## Population Change

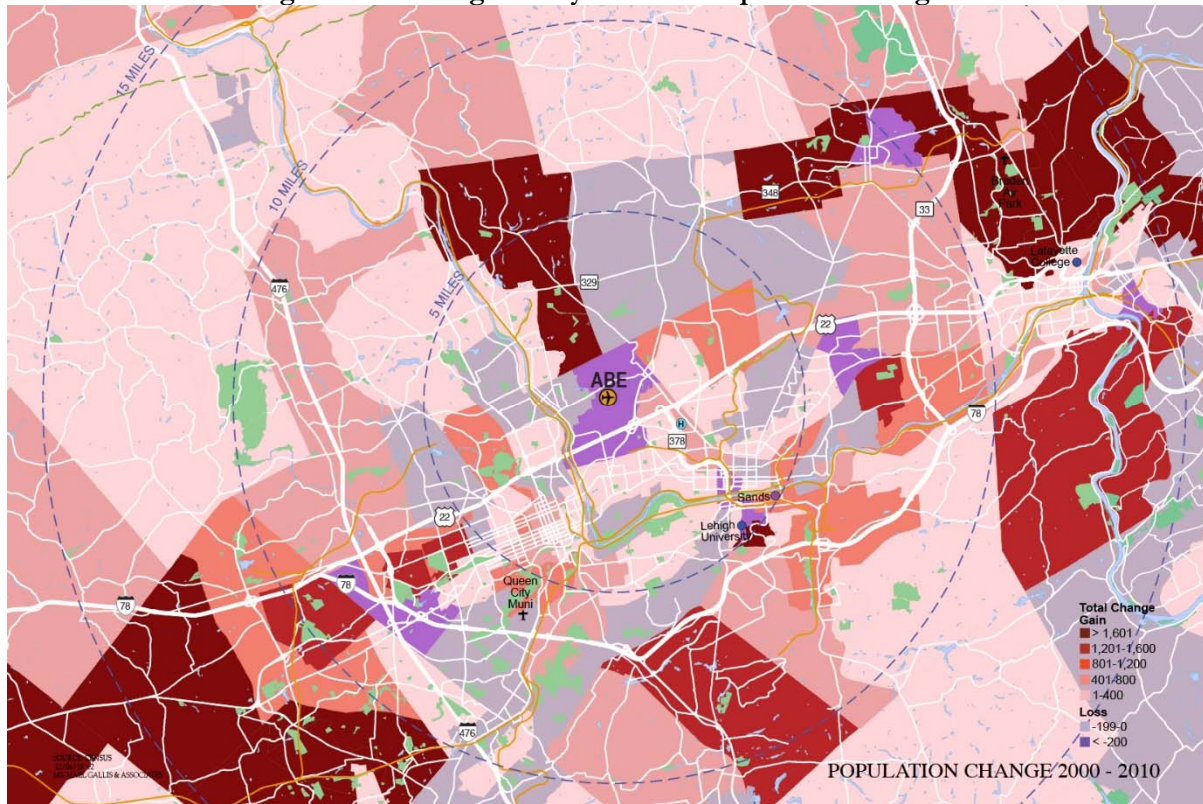
The Allentown-Bethlehem-Easton metro exhibits many of the same population trends as other larger metro areas. There are indications of new growth in the traditional core, surrounded by areas of static or slightly declining populations, with an encircling ring of higher rates of growth areas at the suburban periphery. Other than the high growth area immediately north of LVIA, the highest growth areas are at the east and west ends of the Lehigh Valley (see **Figure 2.4.4**).

It is expected that the growth of residential areas in the townships will continue, as detailed in the *Build LV; Lehigh Valley Annual Development Report* by the Lehigh Valley Planning Commission. As growth moves further out in to the suburban areas, it will increase the driving distances for local air passengers trying to access the Airport. This will increase the importance of road access along US-22 and the arterial and interstate grid that feeds US-22.

While population growth is an important factor in projecting future demand, the spatial distribution of growth should also be incorporated and considered in planning for the future access to the Airport.



Figure 2.4.4: Lehigh Valley Absolute Population Change



Source: Michael Gallis & Associates, US Census

## Land Use

The LVIA occupies a central position within the Allentown-Bethlehem-Easton urban area, and will be an increasingly important growth anchor for the region. Residential growth is resulting from employment growth in the region due to the growth of jobs in its manufacturing and logistics functions, and workers in Philadelphia and New York living in the Lehigh Valley due to its quality of life and lower cost of living, despite the long commute. Residential, while primarily concentrated along the central corridor from Allentown to Easton, is also increasingly dispersed throughout the valley.

New industrial development is occurring through both greenfield and brownfield reuse of disused industrial areas, and accounted for over 60% of the new non-residential floor area approved in 2015.<sup>21</sup> As can be seen in **Figure 2.4.5**, the Manufacturing/Industrial and Warehousing/Distribution uses are primarily concentrated along three approximately parallel, east-west primary industrial corridors:

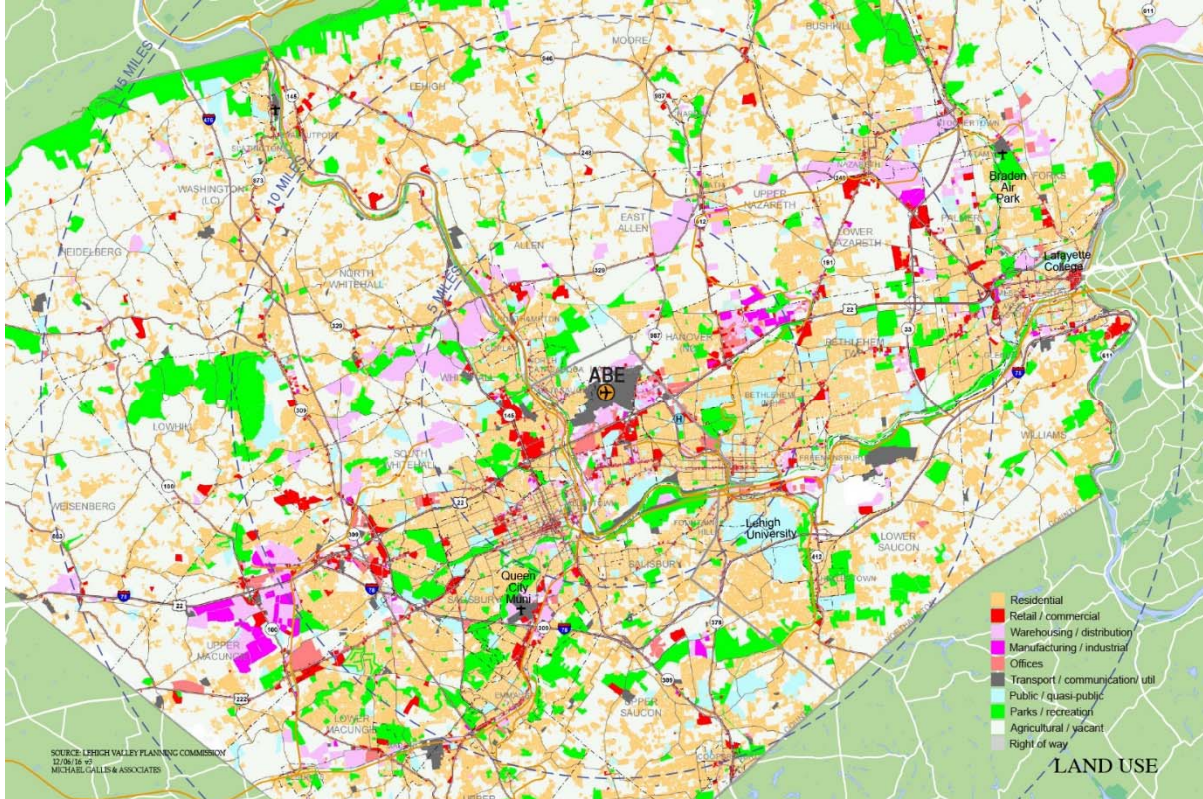
1. US-22 is a central industrial and commercial corridor through the region.
2. I-78 has a growing concentration of primarily industrial activity.
3. PA-329/248 is a parallel resource extraction and industrial corridor.

<sup>21</sup> LVPC. Build LV: Lehigh Valley Annual Development Report. September 2016.



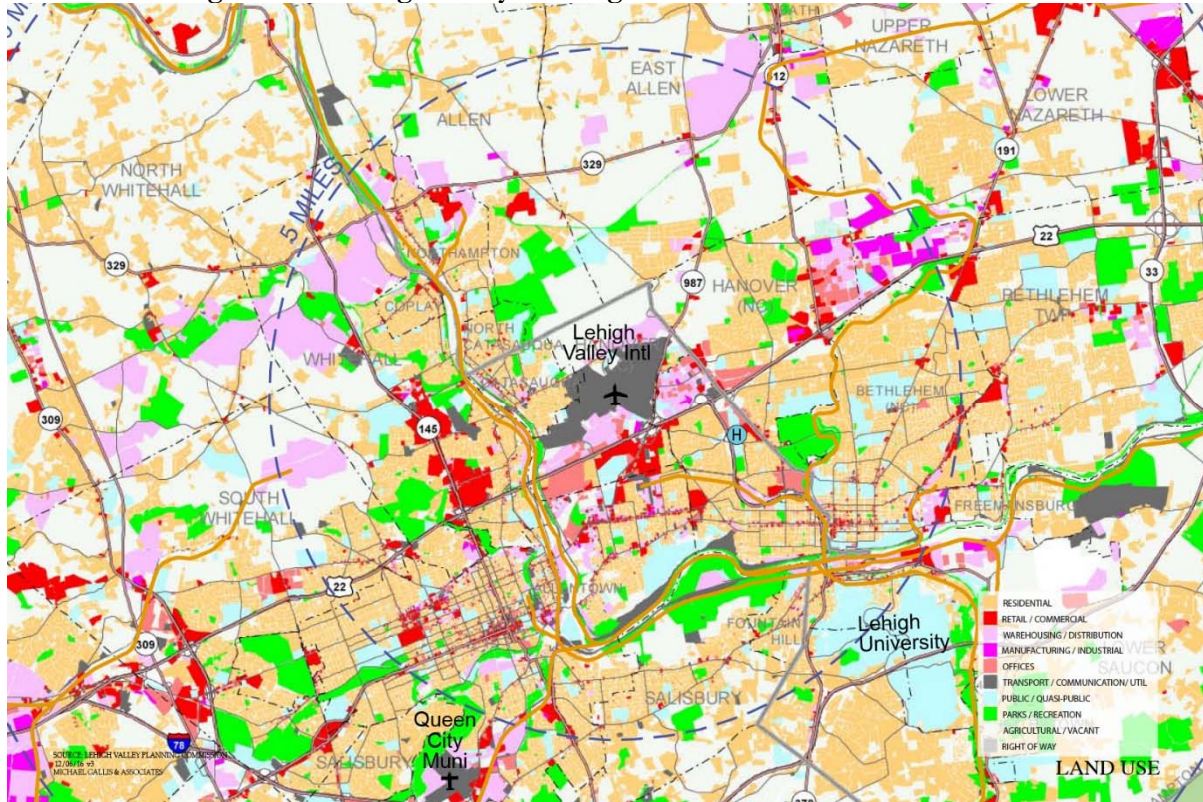
The Airport retains a significant amount of land that is centrally located within the Lehigh Valley that can be used to support airport activities and economic growth in the valley.

Figure 2.4.5: Lehigh Valley Existing Land Use Pattern



Source: Michael Gallis & Associates, Lehigh Valley Planning Commission

Figure 2.4.6: Lehigh Valley Existing Land Use Pattern – 5 Mile Area



Source: Michael Gallis & Associates, Lehigh Valley Planning Commission

## 2.5 Conclusions

Allentown-Bethlehem-Easton’s central position within the Northeast and the massive concentration of economic activity found in the nearby Philadelphia and New York markets provides it with the foundation for a growing and dynamic economy. Strengthening connections to these markets by all modes, especially air will become increasingly important as population, urbanization, and economic activity continues to grow.

The Lehigh Valley economy is being driven by multiple forces and challenges:

- The dominant driver of current economic activity is its growing role as a logistics hub serving an estimated 54 million across the Northeast Lattice, an even broader market space for Amazon reported at 75 million, and its close proximity to the New York and Philadelphia areas.
- A second driver is the quality and strength of the institutional assets anchored by Lehigh University that is growing the innovation and knowledge economy components. The strength of the Lehigh Valley office submarket is evidenced by it being the only non-contiguous submarket in either the New York or Philadelphia office markets. This market is supported by the institutional assets and would be further strengthened by increased surface and air connections to the New York and Philadelphia core areas.
- A third driver is population growth in what has been termed “the wealth belt”, the ring of outer suburban growth around the New York and Philadelphia metro areas. While the logistics hub will lead to demands





for greater freight movements, the innovation economy and population growth will lead to greater demand for passenger travel and air service. Increasing air service to the New York and Philadelphia markets will be an important factor in the economic growth of the region.

- The Airport is already mentioned and acknowledged as a key component in attracting business to the area. The region continues to strengthen its role and function as a logistics hub serving the Northeast. As a logistics hub, it will become more attractive to manufacturers, wholesalers, warehousing, and other freight related functions that will benefit from having direct and immediate access to multiple modes of movement. This will lead to increasing demand for truck, rail, and ancillary airfreight services. Increased truck traffic will lead to increasing highway congestion and significantly increase the need for alternative modes to provide access, including enhanced rail service, and ancillary airfreight service.
- The national shift from domestic airfreight to trucking is increasing road congestion resulting in decreasing domestic airfreight, yet in the Lehigh Valley, both trucking and airfreight are increasing together due to its strategic location.
- Developing a multi-modal strategy to achieve higher levels of system integration resulting in more seamless transfers of passengers and freight will be important to maintaining reliability, cost effectiveness, and safety as the region continues to grow.
- Increasing non-industrial economic activity, including the office market, will be one of the important drivers of air passenger demand. Strengthening air and transit connections will be key to creating the infrastructure necessary to support and grow the office market. Air service has been cited as an important consideration to foreign direct investment in the Lehigh Valley, as it represents the primary connection to the world marketplace.
- Despite its many advantages, barriers to the region’s growth include growing congestion throughout the Northeast that will make reliable and cost effective access to the major markets more difficult, the region’s lack of commuter rail transit that can offer scheduled and reliable service to New York and Philadelphia, and its lack of air service to the New York market and more frequent service to the Philadelphia market.
- Another possible limitation will be the tightening land market and need to preserve the lifestyle that makes the region an attractive alternative location to the more densely populated centers. The Airport has engaged with the surface transportation agencies to ensure that ease of access is maintained and strengthened.
- With its central position, the Airport’s land envelope is an important asset in the development of air service and attracting economic activity to the Lehigh Valley. The need to optimize the use and value of this land in relationship to the Airport and regional development goals will increase as the Lehigh Valley continues to grow.
- The Airport will have to respond to increasing demands for freight and passenger service. While the dominant trend is in the rapid growth of the region’s logistics function, the trends in the innovation economy and population indicate that the demand for future passenger services will continue to increase.