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Michael S. Donchez, LVPC
EXECUTIVE SUMMARY

Put simply, the goal of this plan is to save lives! The plan serves as a foundation for safety improvement planning through the analysis of crash trends, the identification of high priority areas and recommended countermeasures.

In 2009, the Lehigh Valley Planning Commission (LVPC) and Lehigh Valley Transportation Study (LVTS) introduced the region’s first traffic safety plan analyzing the five-year period between 2002 and 2006. At that time, the Lehigh Valley saw 67 vehicle-related fatalities per year on average. This successor plan covers the five-year period between 2010 and 2014 and shows 56 fatalities per year on average. While incidents have declined considerably despite growth in population and registered vehicles, we must continue to strive toward a zero injury and death goal.

To achieve this ambitious goal, this plan builds upon the partnerships developed over time and utilizes a safe system approach to encourage ‘safe drivers, safe vehicles and safe roads’. Accordingly, this document includes an analysis of crash types and trends; reports on the current status of goals; identifies high crash study areas and locations in the Lehigh Valley; and evaluates next steps, priorities and recommendations.

This plan considers numerous types of crashes and contributing factors. The plan’s goal is to reduce the number of fatalities and major injuries by at least 50% over the next two decades. Accordingly, specific goals are as follows:

**Fatalities:**
- Reduce the 2006–2010 fatality rate of 60.8 per year to not more than 30.4 per year in the 2026–2030 period.
- The 2010–2014 fatality rate is 56.2 per year, which is slightly above the 55 per year average targeted for this period.

**Major Injuries:**
- Reduce the 2006–2010 major injury rate of 168.2 per year to not more than 84.1 per year in the 2026–2030 period.
- The 2010–2014 major injury rate is 151 per year, which exceeds the goal of 152 targeted for this period.

The preparation of this report has been financed in part through grant[s] from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

A summary of this report will be translated into Spanish. Readers may request a full translation into alternate languages by contacting Michael Donchez, Senior Transportation Planner, Lehigh Valley Planning Commission, 961 Marcon Boulevard, Suite 310, Allentown, Pennsylvania 18109-9397, (610) 264-4544, mdonchez@lvpc.org. Efforts will be made to provide translated documents in a reasonable timeframe.
This plan follows the direction set forth in the *Pennsylvania Strategic Highway Safety Plan* and adopts an approach to highway safety that focuses on areas called the “vital seven”. They are:

<table>
<thead>
<tr>
<th>Reducing Impaired Driving</th>
<th>Reducing Speeding &amp; Aggressive Driving</th>
<th>Reducing Distracted Driving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing Seat Belt Usage</td>
<td>Infrastructure Improvements</td>
<td>Mature Driver Safety</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motorcycle Safety</td>
</tr>
</tbody>
</table>

The crashes identified in this plan cover these seven areas. In addition, this plan seeks to identify fatal and major injury crash causal factors and then develops recommendations intended to mitigate these factors through education and training, communication, community initiatives, enforcement, research, legislation, new technologies, road engineering and infrastructure improvements.

Highway safety is a diverse and complex field. Motor vehicle crashes generally involve multiple contributing factors, which means the approach to reducing crashes must be multidisciplinary in nature. Implementing the 6E’s of Safety throughout our comprehensive Highway Safety Programs will have a high impact on reducing crashes. The 6E’s of Safety include:

**Education**: Driver training, citizen advocacy groups, educators and prevention specialists are particularly effective in age-related and behavioral crashes, such as young driver-related incidents, mature driver-related incidents, alcohol-related crashes and motorcycle-related crashes. Programs such as the Federal Highway Administration’s Safe Routes to School program are currently focusing on decreasing young driver-related crashes. For mature drivers, available resources include the American Association of Retired Persons, Inc., Older Driver programs and Pennsylvania Department of Aging programs. The Pennsylvania Driving Under the Influence Association program is a viable option towards education for alcohol-related crashes.

**Enforcement**: State and local law enforcement agencies along with appropriate legislative change are key to decreasing some driver-related crashes in the Lehigh Valley. Major factors include aggressive driving, unrestrained driving, distracted driving, running red lights, tailgating and alcohol-related incidents. Projects like the Pennsylvania Aggressive Driving Enforcement and Education project are designed to decrease aggressive driving. The zero tolerance law for younger drivers helps with young driver and alcohol-related crashes. Programs such as the Click-It-Or-Ticket campaigns are helpful to increase seat belt use.

**Engineering**: Physical infrastructure improvements, highway design, traffic management and maintenance, and operations planning also help to improve safety. Example mitigation strategies include:

- **Guide Rail**: used primarily to reduce roadway departure crashes like head-on, run-off-road and hit fixed object.
- **Cable Barrier**: used primarily to reduce head-on and opposite direction sideswipe crashes.
- **Advanced Warning Sign/Signal**: used ahead of intersections to warn oncoming traffic.
- **High Friction Road Surface**: used primarily for roadway departure crashes like run-off-road and hit fixed object.
• Centerline and Edge Line Rumble Strip: used primarily for roadway departure crashes like run-off-road and hit fixed object.

• Pedestrian Signal: used to reduce pedestrian-related crashes and for accessibility.

• Roundabout: used to reduce intersection and intersection-related crashes.

• Bridge Parapet: used to prevent roadway departure crashes off of bridges.

• Resurfacing: improves lifespan of roads and reduces roadway departure conditions due to poor pavement condition.

• Traffic Calming: used throughout traffic engineering and can be used to reduce speed-related crashes. Traffic calming can include a number of devices and techniques, including but not limited to diagonal parking, changing one-way streets to two-way, widening sidewalks/narrowing streets and traffic lanes, bulb out, diverters, chokers, neckdowns, chicanes, roundabouts, traffic circles, raised medians, tight corner curbs, road humps, speed tables, speed cushions, rumble strips and other surface treatments.

• Autonomy/Connectivity: connected vehicle technology has the potential to transform the way Americans travel through the creation of a safe, interoperable wireless communications network that includes cars, buses, trucks, trains, traffic signals, cell phones and other devices. Like the Internet, which provides information connectivity, connected vehicle technology provides a starting point for transportation connectivity that will potentially enable countless applications around crash prevention, mobility, congestion relief, environmental benefits and real-time connectivity to all system users.

Evaluation: It is important to continually monitor safety improvement investments across the region. This can be accomplished in many ways, including the establishment of performance standards and after-action studies. The LVPC will continue to monitor the standards articulated in this plan, will implement improvements and will conduct after-action studies to assure the effectiveness of its decision-making process and the allocation of resources when implementing regional safety improvements.

Encouragement: Encouragement programs are important in promoting alternative safety considerations. Programs can include transportation demand management and workplace commuter options, using safe and efficient alternative modes of travel, technical assistance programs and generally working with safety organizations to develop new and innovative driver safety incentive programs.

Equity: In terms of transportation safety, equity refers to the distribution of benefits and whether that distribution is considered appropriate. Transportation equity can manifest itself in a variety of ways, from the installation of pedestrian improvements to mass transit availability and convenience. The ultimate goal is to ensure that communities across the full economic spectrum receive the benefits of safety improvements. Planners must devote particular attention on lower-income populations, whose transportation options are typically more limited and who often suffer higher rates of vehicular-related injuries and fatalities. According to an August 2016 Governing Magazine article titled ‘Pedestrians Dying at Disproportionate Rates in America’s Poorer Neighborhoods’, “many cities have made pedestrian safety a priority, but their efforts rarely focus on poorer areas, which have approximately double the fatality rates of wealthier communities”. In addition to normal public input channels, and as safety projects are implemented, care will be taken to assure that improved benefits are realized across socio-economic boundaries.
UNDERSTANDING THE PLAN

This plan, along with past plans, utilizes five-year averages to show gradual change through trend-based information by identifying numerous trends causing or contributing to fatalities and major injuries—‘General’, ‘Mode-Specific’, ‘Infrastructure’, ‘Behavioral’ and ‘Other’ Related Trends.

OVERVIEW

Between the Lehigh Valley’s two counties—Lehigh and Northampton—are a total of 62 municipalities that include cities, boroughs and townships. The Valley has more than 4,000 miles of roads and highways. Roadways maintained by the Pennsylvania Department of Transportation (PennDOT) make up only 25% of this network, with the balance owned and maintained by local governments or other entities.

The data found in this plan, including crash location, type and contributing factors, originate from PennDOT’s Crash Data Analysis Retrieval Tool (C-DART) and incorporate reportable crashes that resulted in a major injury or a fatality. This plan defines a fatality as any injury from a crash that causes death within 30 days from the incident, while a major injury requires immediate emergency transport to a hospital or clinic for medical treatment.

This plan tabulates crash characteristics and presents them as trends. Various publications served as tools to stratify the data and compare results to the Lehigh Valley region, including the 2012 Pennsylvania Strategic Highway Safety Plan, the 2014 Pennsylvania Crash Facts & Statistics report, the 2014 Pennsylvania Highway Statistics report and the 2015 Lehigh Valley Metropolitan Planning Organization (MPO) Highway Safety Guidance Report.
TRAVEL DEMAND FACTORS

Crashes can be affected by factors of travel demand. Changes in population, employment, passenger car registrations and vehicle miles traveled all have an impact on the total number of crashes. Let’s take a quick look at each:

Population

The 2010–2014 reporting period shows a regional population increase of 2.39%.
Employment

The 2010–2014 reporting period shows a regional employment increase of 3.21%.

![Graph showing employment increase from 2010 to 2014 with a 3.21% increase]
Passenger Car Registrations

The 2010–2014 reporting period shows car registrations are up 2.16%.

```
Year       Registrations
2006-2010  570,114
2007-2011  575,470
2008-2012  577,243
2009-2013  579,973
2010-2014  582,421
```

2.16% increase
Vehicle Miles Traveled

The 2010–2014 reporting period shows vehicle miles traveled is up 0.40%.

Growth rates have continued to climb through this reporting period, and one could argue that congestion levels are also climbing accordingly. While there is debate regarding whether crash frequency rises with increased congestion levels, it is generally understood that crash frequency, severity and type fluctuate dramatically based on observed flow condition, speed, driver behavior and road design.
HIGHWAY SAFETY PLANNING INTEGRATION

The Lehigh Valley Transportation Study (LVTS) utilizes this plan, along with other safety reports and studies, to inform other planning efforts, including:

- **MOVELV: Long Range Transportation Plan.** The Lehigh Valley Long Range Transportation Plan 2015–2040, adopted in October 2015, includes highway safety goals that support the “vital seven” focus areas.

- **MOVELV: Lehigh Valley Regional Freight Plan.** The Lehigh Valley Regional Freight Plan, adopted in October 2015, includes highway safety goals directed to at-grade rail crossings and commercial truck parking locations.

- **Transportation Improvement Program (TIP).** The Transportation Improvement Program 2017–2020, adopted on July 25, 2016, addresses safety projects. The TIP provides a regional list of projects in a four-year period.

- **Congestion Management Process (CMP).** The Congestion Management Process was updated in 2016 and derives its priorities from several criteria, including high frequency crash corridors, which serve as an input for the Long Range Plan.

- **Corridor Area Safety Reviews.** The LVPC conducted safety reviews on two high priority corridors in the fall of 2010—Route 222 in Upper Macungie Township, Lehigh County and Route 248 in Lehigh Township, Northampton County. The team then created reports for each corridor and included a crash analysis, existing roadway conditions, observations and short and long term recommendations for improvements.

FUNDING/GRANTS/LOANS

The LVTS utilizes various funding sources to support safety improvements, including:

- **Railroad Safety Infrastructure Improvement Grants.** These grants are available to projects that make safety improvements to railroad infrastructure. Eligible projects include the acquisition, improvement or rehabilitation of intermodal or rail equipment, such as rolling stock, locomotives and passenger cars; or rail facilities, including track, bridges, tunnels, yards, buildings, passenger stations, and maintenance and repair shops.

- **Railroad Safety Technology Grants for Positive Train Control (PTC).** This discretionary funding applies to eligible Railroad Safety Technology Grant projects. Available funding is limited to eligible projects that implement a positive train control system on railroads.

- **Railroad Safety Grants for the Safe Transportation of Energy Products by Rail Program.** This discretionary funding is available to states for public and private railroad grade crossing enhancement and track improvement projects that improve safety on rail routes that transport flammable energy products.

- **Rail Line Relocation & Improvement Capital Grant Program (RLR).** This program provides financial assistance for local rail line relocation and improvement projects that involve a lateral or vertical line relocation and also mitigate the adverse effects of rail traffic on safety, motor vehicle traffic flow, community quality of life or economic development.

- **Railroad Safety Technology Grant Program.** This program provides financial assistance to passenger and freight rail carriers, railroad suppliers and state and local governments for the deployment of positive train control collision avoidance systems and complementary advanced technologies.
• **Operation Lifesaver, Inc. (OLI).** A national not-for-profit rail safety organization, OLIExternal Link receives funding to support its public education efforts to reduce collisions between trains and motor vehicles at highway-rail grade crossings and to discourage illegal trespassing along railroad rights-of-way.

• **Transportation Infrastructure Finance and Innovation Act (TIFIA).** This is a U.S. Department of Transportation program that makes three forms of credit assistance available—secured (direct) loans, loan guarantees and standby lines of credit—for surface transportation projects of national or regional significance.

• **Connected Vehicle Pilot Deployment Program.** This program supports the implementation of connected vehicle technologies through a comprehensive deployment plan that includes refinement of core operational concepts and a comprehensive system requirements analysis. This program is currently in pilot form and being tested in three states. It is anticipated that the program will evolve nationally to improve safe and efficient truck movement, improve vehicle flow and pedestrian safety in high-priority corridors, and deploy multiple safety and mobility applications.

• **Pennsylvania Multimodal Transportation Fund (MMTF).** This grant program provides for transportation alternative projects that enhance pedestrian and bicycle facilities, improve access to public transportation, create safe routes to school, preserve historic transportation structures, provide environmental mitigation, create trails that serve a transportation purpose, and promote safety and mobility.

• **Pennsylvania Infrastructure Bank (PIB).** This funding source is a PennDOT operated program that provides low-interest loans to help fund transportation projects. The goal of the PIB is to leverage state and federal funds, accelerate priority transportation projects, spur economic development and assist local governments with their transportation needs.

• **Pennsylvania Transportation Alternatives Program (TAP).** This is a competitive reimbursement program intended to fund activities that go beyond the normal or historic elements of a Long Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP). Twelve categories of projects are eligible for transportation alternatives funding.

• **Highway Safety Improvement Program (HSIP).** This program is the primary source of funding for safety improvements. HSIP is federal funding apportioned by formula to each state and then suballocated to each region. Funding includes surface transportation funds that are integrated into the Transportation Improvement Program (TIP) and the Long Range Transportation Plan (LRTP). The goal of the HSIP program is to achieve a significant reduction in traffic fatalities and major injuries on all public roads. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance.
The following graph compares the Lehigh Valley’s five-year trend fatalities and major injuries rate to Pennsylvania and then to the United States as a whole.

### TOTAL VEHICLE FATALITIES AND MAJOR INJURIES (ANNUALLY)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Majors (Unavailable)</td>
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<tr>
<td>Fatals US</td>
<td>34,283</td>
<td>32,526</td>
<td>31,241</td>
<td>30,418</td>
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<td>Majors PA</td>
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<td>3,693</td>
<td>3,556</td>
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<td>3,340</td>
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<td>Fatals PA</td>
<td>1,413</td>
<td>1,365</td>
<td>1,329</td>
<td>1,277</td>
<td>1,265</td>
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<tr>
<td>Majors LV</td>
<td>168</td>
<td>163</td>
<td>159</td>
<td>152</td>
<td>151</td>
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<tr>
<td>Fatals LV</td>
<td>61</td>
<td>57</td>
<td>58</td>
<td>55</td>
<td>56</td>
</tr>
</tbody>
</table>
Regional

The following graphs show the five-year trend for crashes, fatalities and major injuries.
Fatalities and Major Injuries by Day of the Week

2010–2014
- SUN: 162
- MON: 122
- TUE: 139
- WED: 155
- THU: 124
- FRI: 164
- SAT: 170
Total Fatalities and Major Injuries: 1,036

2008–2012
- SUN: 167
- MON: 125
- TUE: 142
- WED: 135
- THU: 133
- FRI: 173
- SAT: 205
Total Fatalities and Major Injuries: 1,080
Fatalities and Major Injuries by Time of Day

### 2008-2012

<table>
<thead>
<tr>
<th>AM</th>
<th>01:00</th>
<th>02:00</th>
<th>03:00</th>
<th>04:00</th>
<th>05:00</th>
<th>06:00</th>
<th>07:00</th>
<th>08:00</th>
<th>09:00</th>
<th>10:00</th>
<th>11:00</th>
<th>12:00</th>
</tr>
</thead>
</table>

### 2010-2014

<table>
<thead>
<tr>
<th>AM</th>
<th>01:00</th>
<th>02:00</th>
<th>03:00</th>
<th>04:00</th>
<th>05:00</th>
<th>06:00</th>
<th>07:00</th>
<th>08:00</th>
<th>09:00</th>
<th>10:00</th>
<th>11:00</th>
<th>12:00</th>
</tr>
</thead>
</table>

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Traffic Safety Plan
Fatalities Collision Types by Year

- Hit Pedestrian
- Hit Fixed Object
- Sideswipe (Opp. Direction)
- Sideswipe (Same Direction)
- Angle
- Head-On
- Rear End
- Non-Collision/Other

2010 2011 2012 2013 2014

281 Collisions Total
Major Injury Collision Types by Year

- Other/Unknown
- Hit Pedestrian
- Hit Fixed Object
- Sideswipe (Opp. Direction)
- Sideswipe (Same Direction)
- Angle
- Head-On
- Rear End
- Non-Collision

755 Collisions Total
Collisions by Road Condition 2010–2014

- Dry: 856
- Wet: 145
- Snow-Covered: 10
- Ice Patches: 8
- Ice: 5
- Water Standing or Moving: 5
- Slush: 3
- Other: 3
- Sand/Mud/Dirt/Oil or Gravel: 1
Collisions by Weather Condition 2010–2014

- No Adverse Conditions: 910
- Rain: 94
- Snow: 16
- Other/Unknown: 5
- Fog: 5
- Rain and Fog: 4
- Sleet and Hail: 1
Collisions by Illumination Type 2010–2014

Daylight: 568
Dark - No Streetlights: 235
Dark - Streetlights: 203
Dawn: 15
Dusk: 10
Dark - Unknown Roadway Lighting: 3
Other: 2
High Crash Corridors

The corridor map primarily identifies the priority areas identified in past reports. Two of the corridors identified were the subject of detailed safety reports, including the State Route 248 Corridor Safety Report and the State Route 222 Corridor Safety Report. The recommended improvements from these reports have been adopted into the current Transportation Improvement Program. Additional improvements that are currently underway include safety improvements to State Route 22, State Route 145 bridge reconstruction to make way for Route 22 acceleration/deceleration lanes, and the 5th Street bridge replacement to serve Fullerton Avenue interchange improvements.

The South 4th Street-American Parkway corridor in Allentown was added to the High Crash corridors for this reporting period. This corridor was added due to a high occurrence of crashes along the corridor.

Corridors will remain listed until safety improvements are completed and enough time has passed to provide evidence of the effectiveness of the improvements.

<table>
<thead>
<tr>
<th>ID</th>
<th>ROAD NAME</th>
<th>FROM</th>
<th>TO</th>
<th>MUNICIPALITY</th>
<th>ON TIP</th>
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<tbody>
<tr>
<td>1</td>
<td>Schoenersville Rd.</td>
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<td>Hanover Ave.</td>
<td>Hanover (LC) and (NC)</td>
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<td>2</td>
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<td>W. Mountain View Dr.</td>
<td>Walnut Dr.</td>
<td>Lehigh</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Route 329</td>
<td>Mauch Chunk Rd.</td>
<td>Bellview Rd.</td>
<td>N. Whitehall</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Route 222</td>
<td>Dorney Park</td>
<td>Prior to Rt. 100 Interchange</td>
<td>S. Whitehall, Lower Macungie, Upper Macungie</td>
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</tr>
<tr>
<td>5</td>
<td>Route 29, Chestnut St.</td>
<td>PA Turnpike</td>
<td>Mill Rd.</td>
<td>Upper Milford</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>Kings Highway</td>
<td>Zionsville Rd.</td>
<td>Palm Rd.</td>
<td>Lower Milford</td>
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<tr>
<td>7</td>
<td>Tilghman St.</td>
<td>Poplar St.</td>
<td>Airport Rd.</td>
<td>Allentown</td>
<td>No</td>
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<tr>
<td>8</td>
<td>Route 22</td>
<td>MacArthur Rd.</td>
<td>Lehigh River Bridge</td>
<td>Whitehall, Hanover (LC)</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>William Penn Hwy</td>
<td>Stones Crossing Rd.</td>
<td>S. Greenwood Ave.</td>
<td>Palmer</td>
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<td>10</td>
<td>Rt 222 &amp; Schantz Rd.</td>
<td>Schantz Rd.</td>
<td>Independent Rd.</td>
<td>Upper Macungie</td>
<td>Yes</td>
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<tr>
<td>11</td>
<td>Route 145</td>
<td>Riverview Dr.</td>
<td>Main St.</td>
<td>Lehigh, Walnutport</td>
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<tr>
<td>12</td>
<td>Cedar Crest Blvd.</td>
<td>Albright Ave.</td>
<td>Tilghman St.</td>
<td>S. Whitehall, Allentown</td>
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<tr>
<td>13</td>
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<td>Tilghman St.</td>
<td>Hamilton Blvd.</td>
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<td>Lehigh St.</td>
<td>Jefferson St.</td>
<td>Oxford Dr.</td>
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<td>15</td>
<td>Center St.</td>
<td>W. Broad St.</td>
<td>Church St.</td>
<td>Bethlehem (NC)</td>
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<td>16</td>
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<td>Seidersville Rd.</td>
<td>Fretz Ave.</td>
<td>Salisbury</td>
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<td>17</td>
<td>4th Street Corridor</td>
<td>Normandy St.</td>
<td>Gordon St.</td>
<td>Allentown</td>
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</tr>
</tbody>
</table>

Note: TIP - Transportation Improvement Program
High Crash Corridors
High Crash Intersections

Intersection crashes were evaluated to determine priority areas for intersection improvements. A map of intersection crashes was further evaluated for prioritization. Areas with more than four intersection crashes within 150 feet of an intersection were selected. These areas were then prioritized based on average severity of all crashes within the designated area.

<table>
<thead>
<tr>
<th>ID</th>
<th>LOCATION</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Freemansburg Ave. - Coolidge St. - Willow Park Rd.</td>
<td>Bethlehem (Twp.)</td>
</tr>
<tr>
<td>2</td>
<td>I-78 at Morgan Hill Road Interchange</td>
<td>Williams</td>
</tr>
<tr>
<td>3</td>
<td>Main Street and W. Union Blvd.</td>
<td>Bethlehem (LC) and (NC)</td>
</tr>
<tr>
<td>4</td>
<td>Nazareth Park - Hanoverville Rd. - Hecktown Rd. - Schlegel Ave.</td>
<td>Lower Nazareth</td>
</tr>
<tr>
<td>5</td>
<td>Park Ave. and Oakwood Lane</td>
<td>Washington (LC), North Whitehall</td>
</tr>
<tr>
<td>6</td>
<td>Riverview Drive and Birch Road</td>
<td>Lehigh, North Whitehall</td>
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<td>7</td>
<td>Rose Inn Ave. and Robin Drive</td>
<td>Bushkill</td>
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<tr>
<td>8</td>
<td>Route 22 at Nazareth Pike Interchange</td>
<td>Bethlehem (Twp.)</td>
</tr>
<tr>
<td>9</td>
<td>Route 873 - Mountain Road</td>
<td>Lehigh</td>
</tr>
<tr>
<td>10</td>
<td>South 4th St. and West Federal St.</td>
<td>Allentown</td>
</tr>
</tbody>
</table>
Focus Areas

This plan summarizes the current status of significant crashes in the Lehigh Valley against goals established for the 2010–2014 reporting period. The ultimate goal is to halve the five-year averages of fatalities and major injuries by 2030.

Out of the 17 significant crash types noted in this plan, 12 met their goal for reduction in fatalities, and 13 met their goal for reduction in major injuries. Only two categories failed to meet their goals for reducing both fatalities and major injuries, including the pedestrian and head-on crash categories. This is particularly alarming as rates in both categories have trended upward through several five-year reporting periods. Accordingly, these two trends were focused upon during the development of Lehigh Valley high crash corridors and intersections.

An analysis similar to the one performed for intersection crashes was utilized to prioritize locations of focus area crashes. The only difference between the intersection analysis and the focus area analysis is that areas with two or more crashes within 250 feet were used for the prioritization.
Head-On and Pedestrian Crash Safety Focus Areas
MITIGATION STRATEGIES
A. Roadway Signage

- **Additional Signs**: Multiple signs in a single location intended to emphasize a safety hazard.
- **Advanced Warning Signs**: Signs indicating a hazard ahead on the road that may not be readily apparent to a driver.
- **Advisory and Warning Signs**: Signs that warn of a possible danger such as bumps, bicycles, low flying aircraft or emergency vehicles.
- **All-way Stop Signs**: Signs erected on all intersecting roads, typically resulting in three and four-way stops.

- **Dynamic Warning Signs**: Electronic traffic signs, often used on roadways to give travelers information about special events, traffic congestion, accidents, incidents, roadwork zones or speed limits on a specific highway segment.
- **Intersection Advisory Signs**: Signs that warn motorists of intersection hazards.
- **Obstruction Signs**: Larger signs intended to promote motorist attention to a potential hazard.
B. Off-Road Improvements

- **Curve Crash Mitigation Strategies**: Strategies, typically used in combination, designed to minimize or prevent road departures along the curved portions of roadways.
- **Drainage Improvements**: Manmade or natural improvement strategies designed to improve drainage caused by roadway surfaces.
- **Object Removal or Relocation**: The removal or relocation of a roadside hazard that is large enough to create damage or injury if struck.
- **Parking Restrictions**: The use of parking restrictions that provide for increased traffic flow.
- **Roadside Clear Zone Establishment**: Creation of a roadside border area, starting at the edge of the travel way, available for safe use by errant vehicles.
- **Sight Distance Improvements**: The removal of obstructions that assure greater visibility to a motor vehicle driver.
- **Truck Maintenance/Inspection**: A safe area along the roadway that allows room for truck enforcement officers to perform safety inspections.
- **Truck Parking/Rest Areas**: A public facility, located next to a large thoroughfare such as a highway, expressway or freeway at which drivers and passengers can rest, eat or refuel without exiting onto secondary roads.
C. Bicycle and Pedestrian

- **Alternative Transportation**: An alternative method or means of travel other than the private motor vehicle, including walking, cycling, carpooling or mass transit.
- **Bicycle Accommodations**: Any series of bicycle amenities, including but not limited to paved shoulders, bike lanes, shared use paths, bike boxes, signage, bicycle racks and lockers, lighting and bicycle friendly drainage grates.
- **Bicycle-Tolerable Edge Line Rumble Strips**: Road safety improvements that alert motorists by vibration but that are also designed in such a way as to accommodate bicycles.
- **Bike Lane Installation**: Construction and/or designation of a lane, route, way or path, which in some manner is specifically designed and/or designated for bicycle travel.
- **Complete Streets**: A transportation policy and design approach that requires streets to be planned, designed, operated and maintained to enable safe, convenient and comfortable travel and access for users of all ages and abilities regardless of their mode of transportation.
- **Crossing Safety**: Techniques designed to assure pedestrians can safely cross a roadway, including pedestrian refuges, flashing beacons and other similar amenities.
- **Crosswalk Striping and Illumination**: The act of providing a highly visible place readily seen by motorists and designated for pedestrians to cross a road.
- **Pavement Line Striping**: A roadway surface marking typically along the edge of the roadway used to direct bicycle movement and behavior.
- **Pedestrian Accommodations**: Any series of pedestrian amenities, including but not limited to push buttons, crosswalks, ramps, sidewalks, etc.
- **Pedestrian Channel Devices**: Devices used to guide pedestrians along a roadway or sidewalk and most typically used around construction areas to assure uninterrupted and safe pedestrian flow.
- **Pedestrian Signal Adjustments**: Traffic signal indication adjustments to pedestrian traffic control devices where engineering analysis shows that the vehicular signals cannot adequately accommodate the pedestrians using the intersection.
- **Road Diets**: A technique in transportation planning whereby the number of travel lanes and/or effective width of the road is reduced in order to achieve systemic improvements, sometimes referred to as a lane narrowing, lane reduction or road rechannelization.
• **Safe Routes to School**: Programs sustained by parents, schools, community leaders and local, state and federal governments to improve the health and well-being of children by enabling and encouraging them to walk and bicycle to school.

• **Shared Lane Markings**: A roadway surface marking placed in the travel lane to alert motorists and indicate where people should preferably cycle.

• **Sidewalk Installation**: The installation of sidewalks and/or shared use paths intended to promote walkability and connectivity.

• **Traffic Islands**: A solid or painted object in a road that channels traffic, reduces traffic speed and/or provides for pedestrian refuge.

• **Walkable Neighborhoods**: Implementation of techniques designed to improve pedestrian movements, including well-designed streets and sidewalks, places to walk to, interesting buildings, people, comfort, accessibility, green networks and beauty.
D. Technology

- **Autonomy/Connectivity**: Technology designed to enable a vehicle to sense its environment and navigate with little or no human input.

- **Intelligent Transportation Systems**: Advanced applications that provide innovative services related to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated and ‘smarter’ use of transport networks.

- **Light-Emitting Diode (LED) Lenses**: Traffic signal lighting system that provides for energy savings, reduced congestion and improved visibility.

- **Signal Head Additions and/or Improvements**: Adding to or improving existing traffic signal devices to assure traffic and pedestrian control and safety.

- **Signal Retiming**: Congestion and travel delay relief process that optimizes the operation of signalized intersections through a variety of low cost improvements, including the development and implementation of new signal timing parameters, phasing sequences, improved control strategies and, occasionally, minor roadway improvements.

- **Signal Conversion**: PennDOT program that provides assistance to municipalities to encourage traffic signal conversions from incandescent light bulbs to light-emitting diodes (LED) for the purpose of energy savings and reduced congestion.
E. Education and Enforcement

- **Access Management**: A set of techniques that State and local governments can use to control access to highways, major arterials and other roadways to improve traffic movement, reduce crashes and create fewer vehicle conflicts.
- **Driver Testing**: Procedure designed to test a person’s ability to drive a motor vehicle required to obtain a driver’s license.
- **Graduated Driver Licensing**: Programs designed to provide new drivers of motor vehicles with driving experience and skills gradually over time in low-risk environments.
- **Speed Limit Adjustments**: The raising or lowering of roadway speed limits.
- **Tickets/Fines**: Penalties imposed for violating traffic laws.
F. In-Road Improvements

- **Bridge Parapet**: A barrier along the edge of a bridge structure.
- **Centerline Striping**: A surface marking along the middle of the roadway used to direct vehicle behavior.
- **Climbing Lanes**: Roadway lanes that allow slower travel for large vehicles, such as large trucks or semi-trailer trucks, ascending a steep grade.
- **Designated Truck Routes**: An identified network or set of roads that commercial vehicles are required to utilize for the movement of goods and typically comprised of distinct classes of roadways, local truck routes and through truck routes.
- **Edge Line Striping**: A surface marking along the edge(s) of the roadway used to direct vehicle behavior.
- **Guide Rail Protection**: A system designed to keep people or vehicles from running off the road in higher risk driving areas, sometimes referred to as guardrail or railing.
- **High Friction Pavement**: A road surface treatment, typically installed along curves, that includes antiskid materials to lessen the chance of a road departure.
- **Lane Narrowing**: A technique in transportation planning whereby the number of travel lanes and/or effective width of the road is reduced in order to achieve systemic improvements, sometimes referred to as a road diet, lane reduction or road rechannelization.
- **Line Striping**: A surface marking typically along the edge of the roadway used to direct vehicle behavior.
- **Low Cost Safety Improvements (LCSI)**: Interim measures to capital construction at high crash locations.
- **Median Treatments (cable guide rail and concrete barriers)**: Barriers that physically separate opposing traffic streams and prevent crossover incidents or prevent pedestrians from crossing the road at unsafe places.
- **Pavement Legends**: A surface stencil or marking intended to keep flowing traffic informed particularly near school zones.
- **Raised Pavement Markers**: A safety device used on roads that is typically elevated from the roadbed and is reflective.
- **Reflective Sheeting**: A material typically applied to road signage that enhances visibility, particularly in low visibility situations.
- **Resurfacing**: A construction process that applies a new coating on or reforms an existing roadway.
- **Roadway Maintenance**: Periodic roadway inspections and treatments necessary to preserve the road in its originally constructed condition, protect adjacent resources and user safety, and provide efficient, convenient travel along the route.
- **Roundabouts**: A type of circular intersection or junction in which road traffic flows move continuously in one direction around a central island. “Modern” roundabouts require entering traffic to give way to traffic already in the circle and optimally observe various design rules to increase safety.
- **Rumble Strips (Centerline, Edge Line, Motorcycle Friendly, Shoulder)**: Also known as sleeper lines, rumple strips, alert strips, audible lines, “the corduroy”, growlers, “drift lines,” and “woo woo” boards, are a road safety feature to alert inattentive drivers of potential danger by causing a tactile vibration.
and audible rumbling transmitted through the wheels into the vehicle interior.

- **Shoulder Drop-Off Mitigation**: Strategies designed to minimize impacts created by a pavement edge drop-off where there is a difference in elevation between two surfaces of the roadway.
- **Shoulder Widening**: Strategies used to increase the width of a roadway shoulder area.
- **Stop Bar Striping**: A roadway surface marking typically installed prior to intersections that directs vehicle stop behavior.
- **Traffic Calming**: Traffic calming consists of physical design and other measures, including narrowed roads and speed humps, put in place on roads for the intention of slowing down or reducing motor vehicle traffic, as well as to improve safety for pedestrians and cyclists.
- **Turn Lane Installation**: Involves the construction of a dedicated roadway lane that is designated for use by a single line of vehicles for turning movements in an effort to reduce traffic conflicts.
- **Widening**: The enlargement of an existing roadway.
A. Pedestrian

This trend refers to any person involved in the crash who was a pedestrian. Unfortunately, this category is trending up, indicating that additional attention and resources are necessary.

Potential mitigation options in this category include:

According to WalkScore.com, “Walkability offers surprising benefits to our health, the environment, our finances, and our communities. The average resident of a walkable neighborhood weighs 6–10 pounds less than someone who lives in a sprawling neighborhood, cities with good public transit and access to amenities promote happiness, 82% of CO2 emissions are from burning fossil fuels and feet are zero-pollution transportation machines, cars are the second largest household expense in the U.S., and studies show that for every 10 minutes a person spends in a daily car commute, time spent in community activities falls by 10%.”

Walkable Neighborhoods

Well-designed streets and sidewalks, places to walk to, interesting buildings, people, comfort, accessibility, green networks and beauty make a neighborhood walkable.
B. Bicycle

This trend refers to any vehicle involved in a crash with a bicycle. This trend is positively meeting and exceeding targeted goals. However, additional planning efforts and attention will be directed toward achieving a zero-incident goal as the regional bicycle culture continues to evolve consistent with multimodal policy and programs.

Potential mitigation options in this category include:

Access Management

Access management generally refers to the regulation of interchanges, intersections, driveways and median openings to a roadway. The objective of such strategies is to enable access to land uses while maintaining roadway safety and mobility through controlling access location, design, spacing and operation. This is particularly important for major roadways intended to provide efficient service to through-traffic movements.

According to the Federal Highway Administration, access management can include the following:

- Access Spacing: Increasing the distance between traffic signals improves the flow of traffic on major arterials, reduces congestion and improves air quality for heavily traveled corridors.
- Driveway Spacing: Fewer driveways spaced further apart allows for more orderly merging of traffic and presents fewer challenges to drivers.
- Safe Turning Lanes: Dedicated left- and right-turn, indirect left-turns and U-turns, and roundabouts keep through-traffic flowing. Roundabouts represent an opportunity to reduce an intersection with many conflict points or a severe crash history (T-bone crashes) to one that operates with fewer conflict points and less severe crashes (sideswipes) if they occur.
- Median Treatments: Two-way left-turn lanes (TWLTL) and non-traversable, raised medians are examples of some of the most effective means to regulate access and reduce crashes.
- Right-of-Way (ROW) Management: As it pertains to ROW reservation for future widenings, good sight distance, access location and other access-related issues.
C. Motorcycle

This trend refers to any vehicle involved in a crash with a motorcycle. Fatalities and major injuries have steadily declined in this category.

Potential mitigation options in this category include:

- Roadway Signage
- In-Road Improvements
- Education/Enforcement

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**Motorcycle Major Injury**

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**Motorcycle Fatality**

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D. Heavy Truck

This trend refers to any vehicle involved in a crash with a heavy truck, including tractor trailers. Fatalities have trended up and remain above the target for the 2010–2014 period. Major injuries are trending down, falling to levels that are better than targeted goals.

Potential mitigation options in this category include:

- Roadway Signage
- In-Road Improvements
- Education/Enforcement
- Off-Road Improvements

![Graph showing data ranges for Heavy Truck Major Injury and Fatality from 2008-12 to 2010-14, with actual average, projected target limit, and target exceeded indicators.](image-url)
INFRASTRUCTURE TRENDS
A. Hit Fixed Object

This trend refers to a crash with a fixed object, such as an embankment, utility pole, tree or guide rail. Fatalities and major injuries have steadily declined in this category as indicated by the graph.

Potential mitigation options in this category include:

![Infrastructural Trends](image)

- Roadway Signage
- In-Road Improvements
- Education/Enforcement
- Off-Road Improvements

### Data Range

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</table>

5-Year Range Actual Average | 5-Year Range Projected Target Limit | Target Exceeded
B. Run-Off-Road

This trend refers to a crash that occurred on the shoulder, in the median, on the roadside or outside of the traffic way. Fatalities and major injuries have steadily declined in this category as indicated by the graph.

Potential mitigation options in this category include:

Low Cost Safety Improvements

Low Cost Safety Improvements (LCSI) are typically interim measures to capital construction at high crash locations. Recent highway safety research has identified a multitude of "low cost" common traffic control devices practices, which can reduce the incidence of crashes. Research has also quantified the safety benefit of "low cost" best practices of enhanced application of traffic control devices. While there are many strategies, common improvements include object removal such as large rocks and trees, utility pole relocation, breakaway poles, rumble strips, illumination, sight distance improvements and the flattening of side slopes.
C. Signalized Intersection

This trend refers to a crash that occurs at a signalized intersection, including highway ramps and rail crossings. This trend is exceeding targeted goals for fatalities but failing to meet goals for major injuries.

Potential mitigation options in this category include:

![Diagram showing data range for signalized intersections with categories for major injury and fatality from 2008-12 to 2010-14. The graph compares actual average with projected target limits, and highlights when the target is exceeded.]

Legend:
- 5-Year Range Actual Average
- 5-Year Range Projected Target Limit
- Target Exceeded
D. Stop Controlled Intersection

This trend refers to a crash that occurs at an intersection controlled by stop signs. Fatalities have trended up, while major injuries are trending down in line with the target for the 2010–2014 period.

Potential mitigation options in this category include:

- Roadway Signage
- In-Road Improvements
- Technology
- Education/Enforcement
- Bicycle and Pedestrian

<table>
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<td>5-Year Range Actual Average</td>
<td>5-Year Range Actual Average</td>
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0 10 20 30 (people)
This trend refers to a crash that occurs head-on, including an opposite direction sideswipe. Both fatalities and major injuries are trending up in this category and are not meeting targeted goals for reduction of total incidents.

Potential mitigation options in this category include:
F. Local Road

This trend refers to a crash that occurs on a municipal roadway. This trend is positively meeting and exceeding targeted goals for both fatalities and major injuries.

Potential mitigation options in this category include:

- Roadway Signage
- In-Road Improvements
- Technology
- Education/Enforcement

![Bar chart for Local Road Major Injury 2008-12, 2009-13, 2010-14 data range]

![Bar chart for Local Road Fatality 2008-12, 2009-13, 2010-14]

Legend:
- 5-Year Range Actual Average
- 5-Year Range Projected Target Limit
- Target Exceeded
G. Train/Vehicle

This trend refers to a crash that occurs with a train or trolley. There were no train/vehicle fatalities or major injuries over several five-year reporting periods, and the goal is to remain at zero. Past and continuing investment in key at-grade rail crossings has improved safety, while accommodating growth in rail freight.

Potential mitigation options in this category include:

- Education/Enforcement
- Off-road Improvements
- Bicycle and Pedestrian

Data Range

- 2008-2012
- 2009-2013
- 2010-2014

ZERODEATHS
BEHAVIORAL TRENDS
A. Aggressive Driving

This trend refers to driver aggression, including careless lane changes, speeding, running a red light and tailgating. This category is trending down. There will be a continued focus to assist in the deterrence of aggressive driving.

Potential mitigation options in this category include:

ROADWAY SIGNAGE    IN-ROAD IMPROVEMENTS    TECHNOLOGY    EDUCATION/ENFORCEMENT
B. Alcohol-Related

This trend refers to any individual (driver, pedestrian or bicyclist) suspected of drinking by police or with a measurable blood alcohol content (BAC). While this category is trending down, the overall numbers of major injuries and fatalities remain high. There will be a continued focus to assist in the deterrence of alcohol-related incidents.

Potential mitigation options in this category include:

- Sobriety checkpoints allow police to briefly stop vehicles at specific, highly visible locations to see if the driver is impaired. Police may stop all or a certain portion of drivers. Breath tests may be given if police have a reason to suspect the driver is intoxicated.

- Ignition interlocks installed in cars measure alcohol on the driver’s breath. Interlocks keep the car from starting if the driver has a BAC above a certain level, usually 0.02%. They are used for people convicted of drunk driving and are highly effective at preventing repeat offenses while installed. Mandating interlocks for all offenders, including first-time offenders, will have the greatest impact.

- Multi-component interventions combine several programs or policies to prevent drunk driving. The key to these comprehensive efforts is community mobilization by involving coalitions or task forces in design and implementation.

- Mass media campaigns spread messages about the physical dangers and legal consequences of drunk driving. They persuade people not to drink and drive and encourage them to keep other drivers from doing so. Campaigns are most effective when supporting other impaired driving prevention strategies.

**Education, Enforcement, Signage**

- Sobriety checkpoints allow police to briefly stop vehicles at specific, highly visible locations to see if the driver is impaired.
• Administrative license revocation or suspension laws allow police to take away the license of a driver who tests at or above the legal BAC limit or who refuses testing.

• Alcohol screening and brief interventions take advantage of “teachable moments” to identify people at risk for alcohol problems and get them treatment as needed. This combined strategy, which can be delivered in health care, university and other settings, helps change behavior and reduces alcohol-impaired crashes and injuries.

• School-based instructional programs are effective at teaching teens not to ride with drunk drivers. More evidence is needed to see if these programs can also reduce drunk driving and related crashes.

Drunk driving laws make it illegal nationwide to drive with a BAC at or above 0.08%. For people under 21, “zero-tolerance” laws make it illegal to drive with any measurable amount of alcohol in their system. These laws, along with laws that maintain the minimum legal drinking age at 21, are in place in all 50 states and the District of Columbia and have had a clear effect on highway safety, saving tens of thousands of lives since their implementation.
C. Unrestrained

This trend refers to any person not wearing a seatbelt. Like the alcohol behavior trend, this category is also trending down, but the overall numbers of major injuries and fatalities remain high.

Potential mitigation options in this category include:

- Implement strategies for increasing seatbelt use and reducing child motor vehicle injuries and deaths.
- High visibility and aggressive enforcement of seatbelt laws.
- Require seatbelt laws that apply to everyone in the car, not just those in the front seat.
- Amend fine structure for not wearing a seatbelt so that the fine is high enough to be effective.
- Public awareness campaigns that educate and promote use as a social norm.
- Enlist health care industry to remind patients about the importance of seatbelt use.
- Encourage parents to use a seatbelt on every trip, no matter how short.
- Make sure children are properly buckled up in a car seat, booster seat or seatbelt, whichever is appropriate for their age, height and weight (child occupant protection programs).

Note: Seatbelt use nationally is 88.5%, while seatbelt use in Pennsylvania is at 85.2%.
D. Distracted/Drowsy Driver

This trend refers to any driver that was using a handheld mobile device or was fatigued to the point of sleep. This category is trending down. There will be a continued focus to assist in the deterrence of distracted and drowsy driver-related incidents.

Potential mitigation options in this category include:
E. Young Driver

This trend refers to any driver that was 16 or 17 years of age and involved in a crash. This category is trending down. Potential mitigation options in this category include:

![Diagram showing data range for Young Driver Major Injury and Fatality from 2008-12 to 2010-14.](chart.png)
F. Mature Driver

This trend refers to any driver that was 65 years of age and over and involved in a crash. This category is trending up.

Potential mitigation options in this category include:
NEXT STEPS
The Lehigh Valley Transportation Study will use the findings from this plan to inform future work and funding strategies. Some next steps include:

**Priority Area Safety Improvements:** The Lehigh Valley Transportation Study, PennDOT and other safety officials will conduct an analysis of study areas, prioritizing those corridors and intersections that contain a higher number of pedestrian and head-on incidents. Safety reviews will be conducted by the Lehigh Valley Transportation Study as appropriate, and improvements and funding sources will be identified.

**Systematic Improvements:** The Lehigh Valley Transportation Study and PennDOT will identify low cost safety countermeasures for deployment throughout the region. This process adds onto the traditional focus of areas with high crashes and considers low cost improvements that can be used at additional areas with similar roadway characteristics.

**Citizen Traffic Advisory Committees (CTAC):** The Lehigh Valley Transportation Study will continue to participate in CTAC and share expertise with respect to traffic safety.

**Spotlight Projects:** The Lehigh Valley Transportation Study will recommend two spotlight safety projects for the highest priority pedestrian crash and head-on crash categories. Each project will identify the location and include mitigation strategies and estimated resources/funding.

**Technical Assistance Programs:** PennDOT offers a number of technical assistance programs designed to assist local communities in identifying and mitigating local road safety issues. Many of these programs offer a process to identify and recommend low cost mitigation solutions in high safety risk areas. These programs are offered to municipal leaders at no cost, and funding for recommended improvements can come from municipal budgets, grants or other sources.
APPENDICES
<table>
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<tr>
<th>Municipality</th>
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Data Sources and Links

http://www.lvpc.org/long-range-plan.html

**MOVELV: Lehigh Valley Regional Freight Plan, adopted 2015**
http://www.lvpc.org/movelvfreight.html

**Transportation Improvement Program, 2017–2020, adopted 2016**
http://www.lvpc.org/tip.html

**Congestion Management Process, adopted 2016**

**Pennsylvania Strategic Highway Safety Plan, 2012**
http://www.penndot.gov/TravelInPA/Documents/2012%20PA%20SHSP.pdf

**Pennsylvania Crash and Statistics Report, 2014**

**Lehigh Valley Metropolitan Planning Organization (MPO) Highway Safety Guidance Report, 2015**

Referenced Programs and Links

**Pennsylvania Aggressive Driving Enforcement and Education Project**
http://www.patrafficsafety.org/pa-aggressive-driving

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