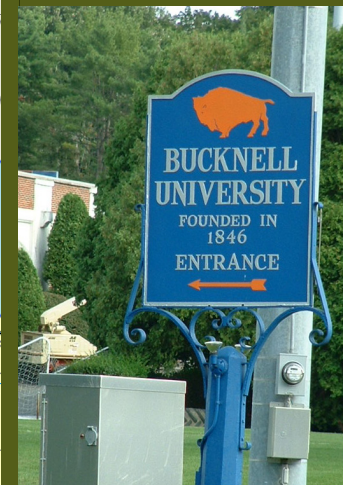
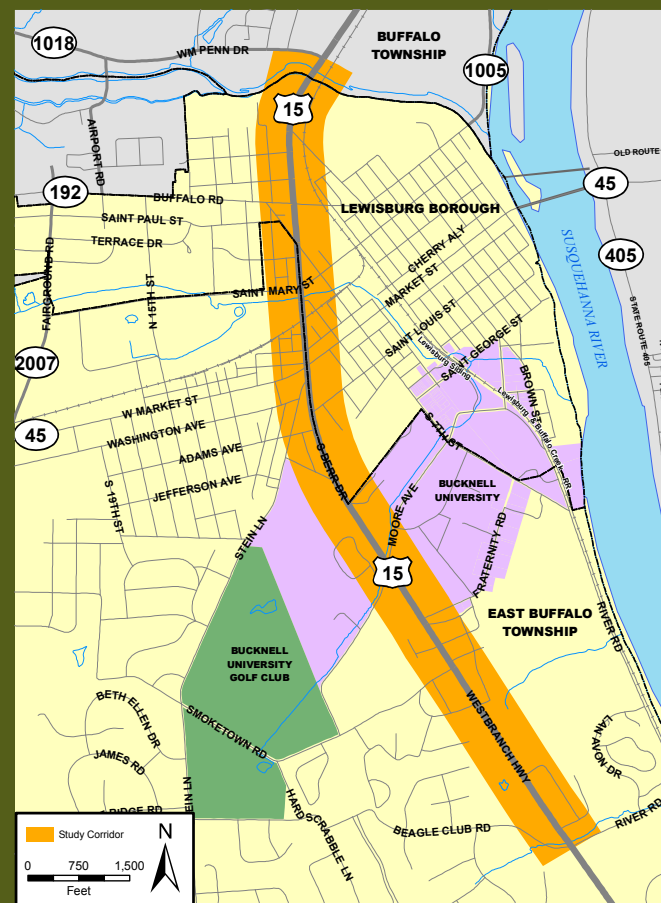


SUMMARY REPORT



MARCH 2012

PREPARED IN COOPERATION WITH:



PREPARED BY:



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CHAPTER 1

Introduction



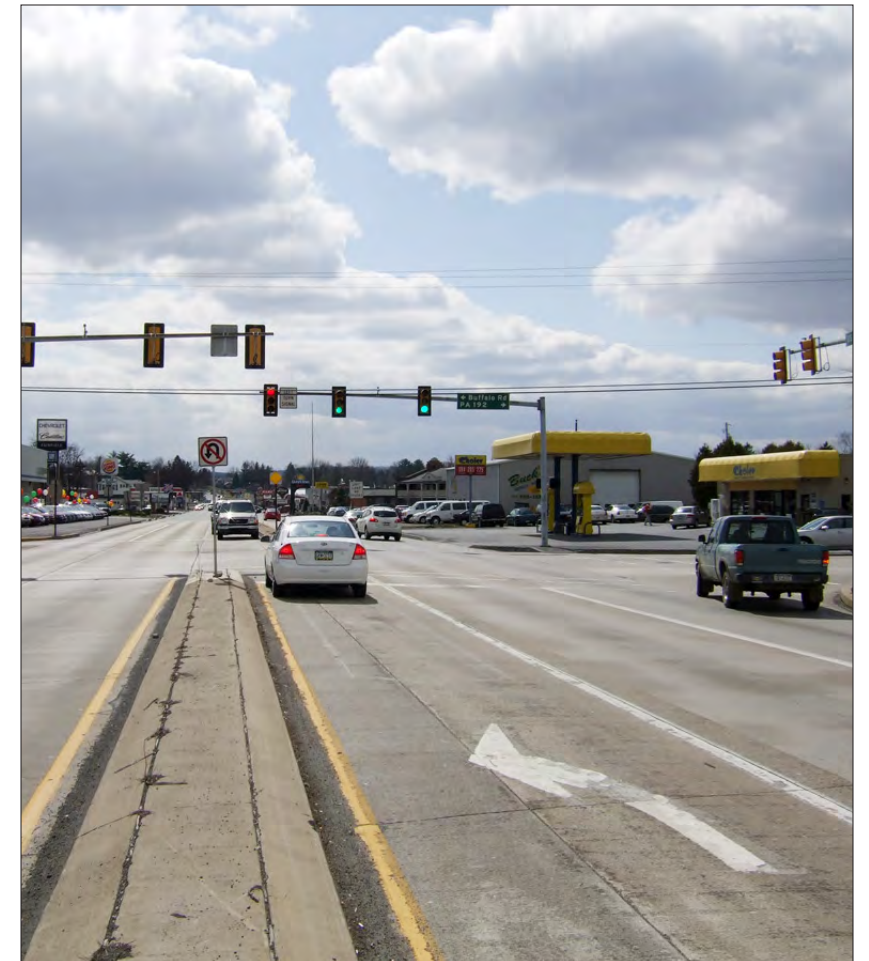
Purpose of the Plan

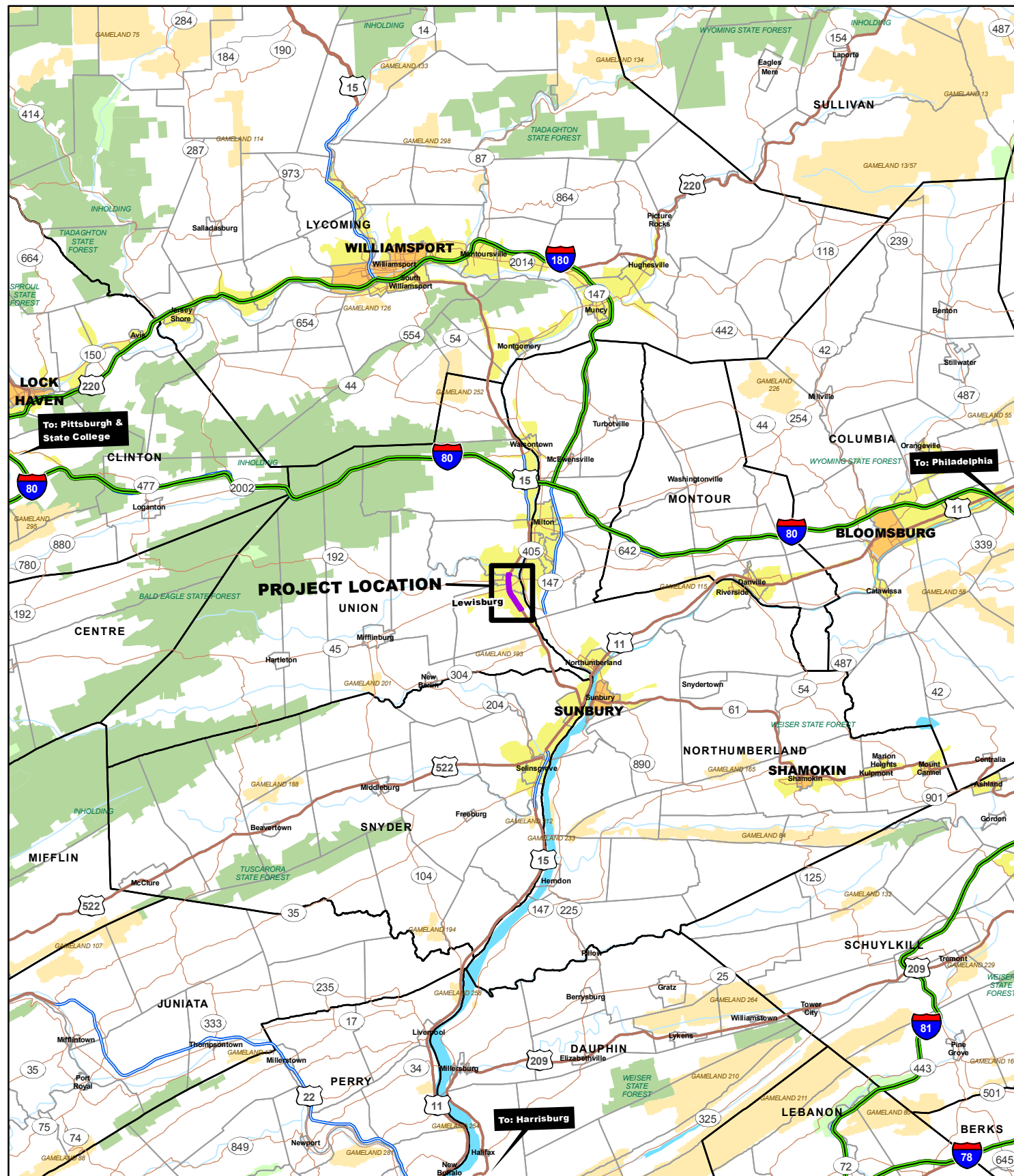
East Buffalo Township and Lewisburg Borough, together with their partners, Union County and PennDOT, initiated a 13-month-long study of the US 15 corridor. Called the *US 15 Smart Transportation Corridor Improvement Plan*, its purpose is to develop a comprehensive framework and vision that integrates the analysis of both land use and transportation issues along the 2.5-mile-long corridor. The Plan focuses on improving mobility, safety, circulation, and quality of life. It also makes recommendations that balance future traffic capacity demands within the context of existing and future land use conditions, community vision, and multi-modal travel options. The goal of the Plan is to develop efficient, functional concepts and designs for the corridor that are compatible with the community.

With a new Comprehensive Plan in place, Union County successfully received funding for this Plan from PennDOT's competitive Pennsylvania Community Transportation Initiative (PCTI). This initiative focuses on "smart transportation", which develops plans for building great communities that link transportation investments with land use planning and decision-making. Recommendations that come from PennDOT's "smart transportation" initiative advance the livability and sustainability of Pennsylvania communities.

These top priorities, developed during Steering Committee meetings, are conveyed in the recommendations of the *US 15 Smart Transportation Corridor Improvement Plan*:

- Reduce traffic congestion, specifically along the central portion of the corridor
- Address safety at intersections
- Provide safe bicycle and pedestrian access across and along US 15
- Resolve the Buffalo Valley Rail-Trail crossing of US 15
- Recommend aesthetic improvements along the US 15 corridor
- Create a gateway on the US 15 corridor for the Lewisburg Downtown
- Recommend land use and zoning consistency between Lewisburg Borough and East Buffalo Township

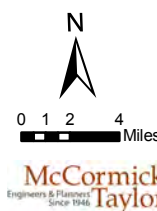




**US 15 Corridor Study
REGIONAL LOCATION**

Figure 1.1: Regional Location Map

Source: McCormick Taylor.

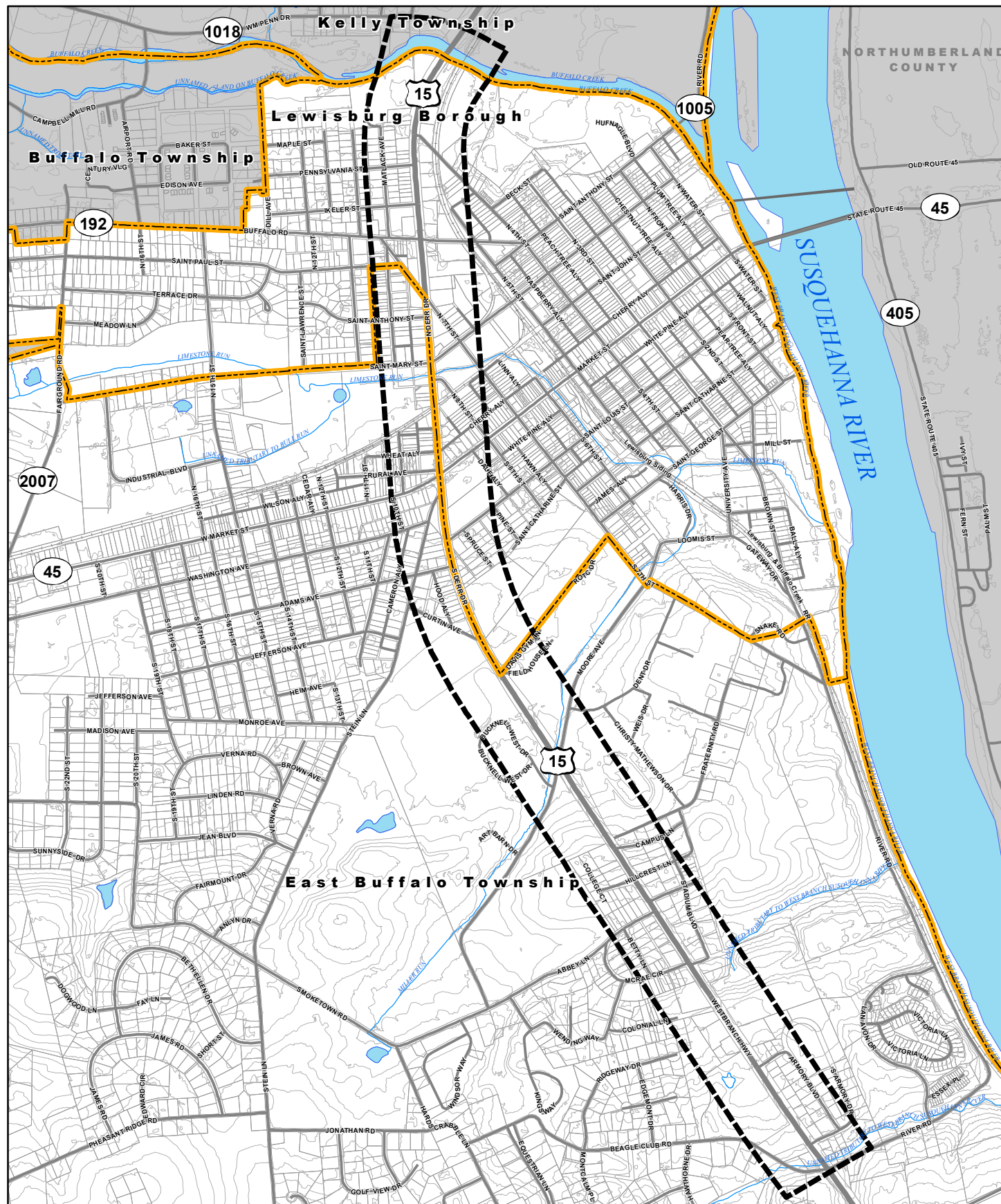


Setting

US 15 is a major north-south arterial through central Pennsylvania in Union County, just west of the Susquehanna River. It is a critical part of the region's transportation system, as it links the Lewisburg area with Harrisburg to the south and I-80 to the north (Figure 1.1 Regional Location Map).

The Plan's analysis of the 2.5-mile-long US 15 corridor is bounded by Beagle Club Road to the south and William Penn Drive to the north. The US 15 corridor is located in East Buffalo Township and Lewisburg Borough. In the approximate center of the study area, Bucknell University's campus spans both sides of US 15 (Figure 1.2 Corridor Area). The Township and Borough have a long history of working together as one community.

- **East Buffalo Township**, a second class township, has approximately 6,700 residents. US 15 is primarily located along the eastern portion of the township and acts as a boundary between East Buffalo Township and Lewisburg Borough.
- **Lewisburg Borough** is approximately 1.5 square miles with approximately 5,700 residents. As the county seat of Union County, Lewisburg is the primary commercial center of the area and has the greatest density of persons in all of Union County. The northern section of the study area is in Lewisburg Borough.
- **Bucknell University** is a private liberal arts university primarily located in East Buffalo Township. Its campus is 450 acres and 89% of its 3,500 undergraduate students live on campus.





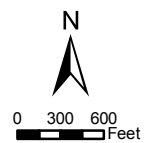
**US 15 Corridor Study
BASE MAP**

Figure 1.2: Corridor Area

Source: Union County, McCormick Taylor.

Legend

-  Study Corridor
-  Municipal Boundary



**McCormick
Taylor**
Engineers & Planners
Since 1946

US 15 is part of the US Highway system. Originally constructed between Harrisburg, PA and Rockingham, NC, US 15 was extended north to Lawrenceville, PA in 1936. US 15 is classified as a principal arterial by the Federal Highway Administration (FHWA), which is described as a road that carries most of the traffic entering and leaving an area. US 15 is generally two-lanes in each direction with a shared center left turn lane. While US 15 performs as a principal arterial, it has an equally important role to perform as part of the local transportation network that connects residents with local shopping and services tucked along the Susquehanna River.

There are many characteristics of the US 15 corridor. In the southern end, it cuts through a more rural environment with very little business frontage. Traveling further north in East Buffalo Township, many roads intersect US 15, and it gently transforms into a suburban corridor with commercial activity clustered at intersections or set back from US 15's right-of-way. As US 15 cuts through Bucknell University's campus and becomes the division between East Buffalo Township and Lewisburg Borough, the pattern of roads intersecting US 15 is much more dense, the frontage of buildings are at various setbacks, and there are more pedestrians and bicycles attempting to cross the street.

Planning Partnership

The study consisted of four major phases: Identifying Opportunities, Visioning, Draft Report, and Final Report. Within each phase, parallel investigations relevant to transportation and land use took place in the respective streams, at the same time emphasizing cross-referencing and interaction with the integrated stream. Through this process, tangible and synthesized products for the integration of transportation and land use in the US 15 corridor emerged.

Stakeholder Engagement

The *US 15 Smart Transportation Corridor Improvement Plan* provided a variety of methods to engage key stakeholders and residents in the planning process.

Steering Committee

The planning process was primarily guided by a Steering Committee (SC), consisting of representatives from the two municipalities (East Buffalo Township and Lewisburg Borough), Union County, SEDACOG Rural Planning Organization, Bucknell University, PennDOT District 3-0, Lewisburg School District, Lewisburg Area Recreation Authority, and local businesses. The SC provided valuable feedback and guidance to the Project Team, as they met regularly throughout the development of the Plan:

- **January 26, 2011:** SC members met the consultant team, learned about the purpose of the Plan and their role, reviewed the proposed work program, and discussed a series of base maps illustrating existing conditions of the corridor. SC members also participated in an activity to identify problems, concerns, or issues that the plan could address.
- **March 17, 2011:** SC members reviewed the focus group synthesis, existing traffic data, preliminary analysis maps, and identified goals and objectives of the plan.
- **May 19, 2011:** This meeting was held prior to Public Meeting #1, where SC members reviewed the public meeting presentation for final feedback.
- **June 16, 2011:** During this meeting, SC members discussed the feedback from Public Meeting #1, including the public meeting activity. SC members also reviewed the initial set

of four alternative themes and a matrix to compare features between the themes.

- **July 21, 2011:** SC members reviewed an updated set of alternative themes, including graphics to illustrate various median options and cross sections.
- **September 15, 2011:** This meeting was held prior to Public Meeting #2, where SC members reviewed the public meeting presentation for final feedback.
- **October 20, 2011:** SC members reviewed the latest Corridor Improvement Framework and five corridor system plans. They also provided the project team with feedback about the structure of the Final Report.
- **February 23, 2012:** SC members provided the project team with feedback to the draft of the Final Report.



Focus Groups & Interview Activities

Many SC members, as well as other residents and business operators along the corridor, took part in five focus group and interview activities on March 1, 2011 to inform land use and transportation components of the Plan.

- **Business and Frontage Property Group:** discussions centered on the physical condition of US 15 and how it is a negative impact to Lewisburg's historic business district and amenities. Inconsistent building frontages along US 15 are a result of different zoning regulations between Lewisburg Borough and East Buffalo Township, and because many properties were developed before either municipality had zoning regulations.
- **Transportation, Traffic, Bike and Pedestrian Groups:** discussions identified traffic speed and large amounts of traffic make pedestrian and bicycle crossing the corridor difficult, and US 15 was a barrier between communities. Recommendations for urban design interventions, such as landscaped medians and sidewalks, could provide order to the corridor.
- **Land Use, Zoning, and Community Character Group:** discussions centered around lack of connectivity between alternate travel routes for bicycle, pedestrians, and vehicles make circulation in the area very difficult and primarily auto-oriented.
- **Bucknell University Group:** discussions identified the University's priority to reconfigure the intersection of Moore Avenue and US 15 to include a more perpendicular geometry. Concerns about maintenance of landscaped medians were also voiced.
- **Municipal Officials Group:** discussions revolved around pending or proposed development ideas, including the former Pennsylvania House Furniture parcel, East Buffalo Township municipal complex, and a regional police structure.

Public Meetings

For the *US 15 Smart Transportation Corridor Improvement Plan*, two public meetings were held.

The first public meeting was held on May 19, 2011. Over 50 people attended the meeting representing a mix of residents from East Buffalo Township, Lewisburg Borough, SC members, local business owners, media representatives, and elected officials. The meeting started with a one-hour open house, followed by a half-hour presentation with a question and answer session, and concluded with another hour of the open house.

During the open house, over a dozen photo images, depicting various street scenes, building styles, pedestrian activity, varying lane widths, and parking accommodation were on display. Participants were encouraged to provide feedback about what they liked and disliked about each image.



The strongest themes that emerged from the Image Exercise included:

- The need for bicycle improvements and pedestrian improvements along US 15 and the connecting streets. The ability to cross US 15 while walking and biking is critical.
- A variety of materials and/or textures (for crosswalks, turning lanes, medians, and bike lanes) should be used to create clear visual cues that there are multiple modes of transportation along the corridor.
- Improvements need to trigger the driver that they are entering a community, and that US 15 is not just a throughway.

Written comments were also collected during the first public meeting. The majority of respondents at the event indicated that they live or operate a business immediately adjacent or near to US 15; and used the route, at a minimum, several times a week with the majority of respondents using the route several times a day. For the 'short or local' trips around the immediate US 15 route area, half the respondents indicated that they used an auto and half used a bicycle, walked, or jogged.

In expressing their concerns with the current conditions along US 15, the responses fell into the following six areas:

- High vehicular traffic volumes (including many heavy trucks) with frequent speeding, and the associated noise.
- A corridor of vehicular activity that is generally hostile to and less safe for pedestrians and bicyclists.
- Poor, if any, landscaping along the route.
- Too few vehicular and pedestrian crossings; and where they are allowed, they present issues of safety and convenience for pedestrians, cyclists, and joggers. These same locations

are for vehicular turning onto cross streets contributing to vehicular and non-vehicular conflicts.

- Poor appearance of the whole route that includes blighted properties, reflecting poor land use planning, and development standards.
- A general loss of the historic character of the community.



The second public meeting was held on September 15, 2011. The evening was divided into a half-hour presentation, where participants provided feedback to the Project Team and SC about the features included in the draft recommended concepts. During the open house, participants and Project Team members discussed concerns or support for specific features and traffic analysis, and were provided an opportunity to submit written comments related to the draft recommended concepts.

Written comments collected during the second public meeting centered around desired improvements to the corridor and general comments related to implementation:

- Pedestrian access and safety are the most important considerations.
- Bicycle access needed for safe travel to the shopping centers/around the area in general.
- Improved signage/need for signage to direct people to the Lewisburg/downtown/rail trail/area businesses.
- Crosswalks/signals improvement needed.
- Street sign ordinance/regulations needed.
- Green medians/buffer zones need to be easy/low maintenance.
- Lighting and Greening of the corridor is a great idea.
- Priority is to move the US 15 traffic and not create attractions that will cause congestion.
- Implementation time/costs was questioned for the concepts presented.
- Costs and funding to implement recommendations will be a major challenge, such as the traffic signal system.

The third and final public meeting was held on March 22, 2012, after the release of the draft plan report.

Project Website

For the duration of the project, Union County maintained a project website, http://www.unioncountypa.org/residents/government/county/route15_corridor/. Meeting summaries and announcements were posted regularly on the website, and it was a great resource for spreading the word about the project.



Goals of the Plan

Feedback gathered during the first few SC meetings and Focus Groups was synthesized into 8 Goals of the *US 15 Smart Transportation Corridor Improvement Plan*:

1. Enhance visual quality of corridor

- Homogenize zoning
- Gateway
- Design guidelines – Boulevard design
- Control access (PA 192-North)
- Greening the corridor
- Complete Bucknell Gateway project
- Add greenery to the corridor
- Ensure the south end emerges as an attractive portion

2. Facilitate safe pedestrian crossing of US 15 corridor/ Improve pedestrian access through the community network

- Complete rail-trail crossing of US 15
- Improve pedestrian accommodation at existing signals
- Implement/infill sidewalks on US 15
- Provide sidewalks, crosswalks & refuges
- Reduce conflicts with turning traffic
- Provide contextual clues to motorists

3. Opportunities for development and redevelopment

- Identify strategic parcels along corridor
- Establish Redevelopment Authority to assist with small parcels
- Consider form-based code

4. Enhance community identity

- Improve wayfinding – signage (local & regional)
- Cohesive design standard/character
- Network/community connections

5. Manage vehicular traffic congestion/ accommodate all modes in corridor

- Access management
- Network expansions/connections
- Traffic calming
- Multi-modal opportunities
- Provide opportunities for pedestrians and cyclists to move along both sides of the corridor

6. Map implementation

- Phased plan
- Key Stakeholders/implementers
- Opportunities for pilot/demo projects

7. Improve operating efficiency of corridor

- Coordinate traffic signals
- Enact access management regulations

8. Enhance the mixed-use character of the corridor

- Provide for additional commercial development and add residential, office and community functions
- Encourage mixed-use on major/large parcels

Pennsylvania's Smart Transportation Policies

In setting out a unified framework and vision for future transportation and land use, the *US 15 Smart Transportation Corridor Improvement Plan* was developed based on a smart future for the corridor, one in which there is a good balance among mobility, safety, economic viability, and quality of life. A successful corridor results when planning, design, and development solutions integrate transportation, visual quality, community livability, and economic factors so that the results work in a synergistic way. A corridor that is well balanced will offer good mobility and access but, above all, it will be sustainable over the long term.

Some of the smart transportation principles that are germane to the *US 15 Smart Transportation Corridor Improvement Plan* are described below.

- **Leverage and preserve existing investments** – This plan considered ways to maximize the utility of existing roadway investments and expand transportation alternatives in the corridor so that these investments continue to serve in an efficient manner. The plan also considered reinvesting in already-developed areas. The viability of existing communities depends on their ability to remain competitive in a changing economy. At the same time, redevelopment, infill development, and development that is mixed can increase trip generation in the pedestrian and bicycle modes, potentially reducing traffic congestion and offering a lifestyle that is healthy and efficient in an era of high energy costs.

- **Accommodate all modes of travel** – The area includes state highways, local road networks, and the Buffalo Valley Rail Trail. The plan integrates land use and transportation and examines balanced alternatives that improve the safety, access, travel time, and quality-of-experience of each of these modes of travel. Providing modal choice for residents is a hallmark of the plan.
- **Plan and design within the context** – A future vision for the corridor must be responsive to the corridor's unique attributes and character. The potential transportation and land use strategies for the US 15 corridor were developed with this context in mind.
- **Look beyond level-of-service** – Before commitments are made for significant capacity investments, implications of both land use and transportation changes to the area need to be examined. Ultimately, the construction of the Central Susquehanna Valley Throughway (CSVT) could bring regional expressway network improvements, offering significant benefits for the US 15 corridor and adjacent communities. The *US 15 Smart Transportation Corridor Improvement Plan* looked well beyond a capacity-based performance measure and included an integration of land use and multi-modal transportation opportunities.
- **Enhance local network** – Improved cross streets and parallel roads will help local residents reach local destinations, including schools, shopping, recreation, and jobs more easily in the future. Recognizing the high cost of new roads and new capacity, the plan considered ways to enhance the local street network in a cost-effective way.
- **High value/price ratio** – The US 15 corridor includes connections to important tourist, cultural, educational, and recreational destinations in East Buffalo Township and Lewisburg Borough. By planning for sustainable transportation investments in the area, we leverage these investments and improve the value of all community assets.

CHAPTER 2

Corridor Context



During Phase A, Identifying Opportunities, of the *US 15 Smart Transportation Corridor Improvement Plan*, existing functional and physical conditions in the corridor were examined. Previous planning studies were reviewed, data was compiled from various sources, and field investigations conducted in order to document the conditions of the corridor. These conditions are documented in the form of maps, photos, and written descriptions on the following pages.

Existing Land Use

The Existing Land Use map (Figure 2.1) illustrates how land is currently used in the study area. The predominant land uses along US 15 are residential, commercial, and public. Open space / recreation and agricultural uses occur intermittently. The highest amount of commercial use is primarily in Lewisburg Borough; however, there are scattered commercial parcels at the southern tip of the study area.

The types of commercial businesses that line US 15 include auto repair shops, auto dealers, motels, and fast food restaurants, all of which are very auto-oriented. This is different from the types of commercial businesses that make up the Central Business District of

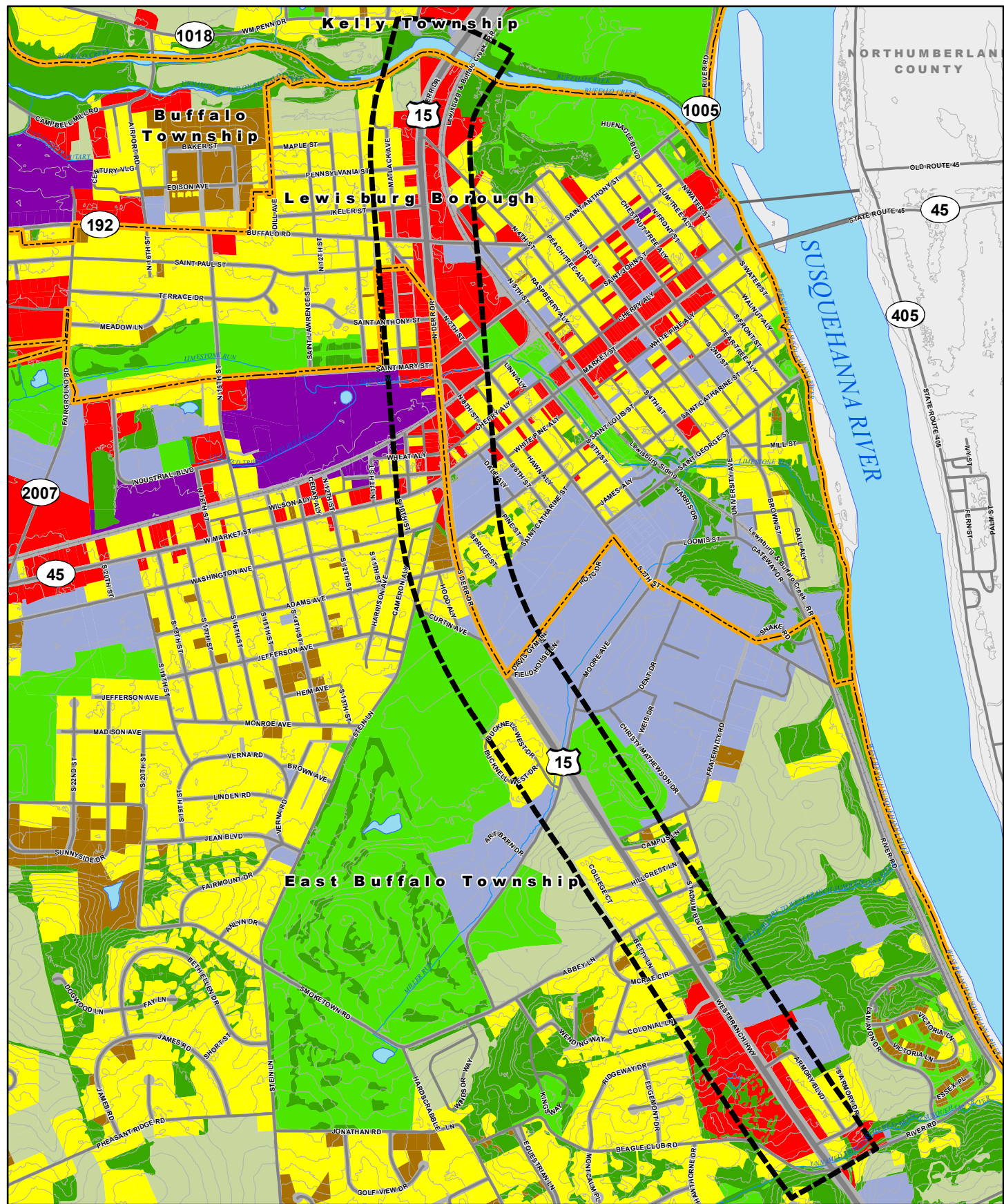
Lewisburg, a quarter of a mile from US 15. In downtown Lewisburg, the commercial corridor is made up of independent local retailers and service providers.

A cluster of industrial/manufacturing parcels is located on the west side of US 15, between Market Street and Saint Mary Street. This is the location of the former Pennsylvania House Furniture parcel, which was closed in 2004 and demolished in 2009.

Bucknell University's campus straddles US 15, and is primarily institutional and open space land use.

There are three primary clusters of residential land use. Two are located in East Buffalo Township, one south of Bucknell University, and the other southwest of the intersection of Market Street and US 15. The other cluster of residential land use is in Lewisburg Borough, on both sides of US 15. The residential areas are primarily single family dwellings in a suburban style urban design pattern.





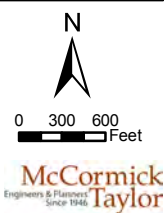
US 15 Corridor Study
EXISTING LAND USE 2010

Figure 2.1: Existing Land Use 2010

Source: Union County, McCormick Taylor.

Legend

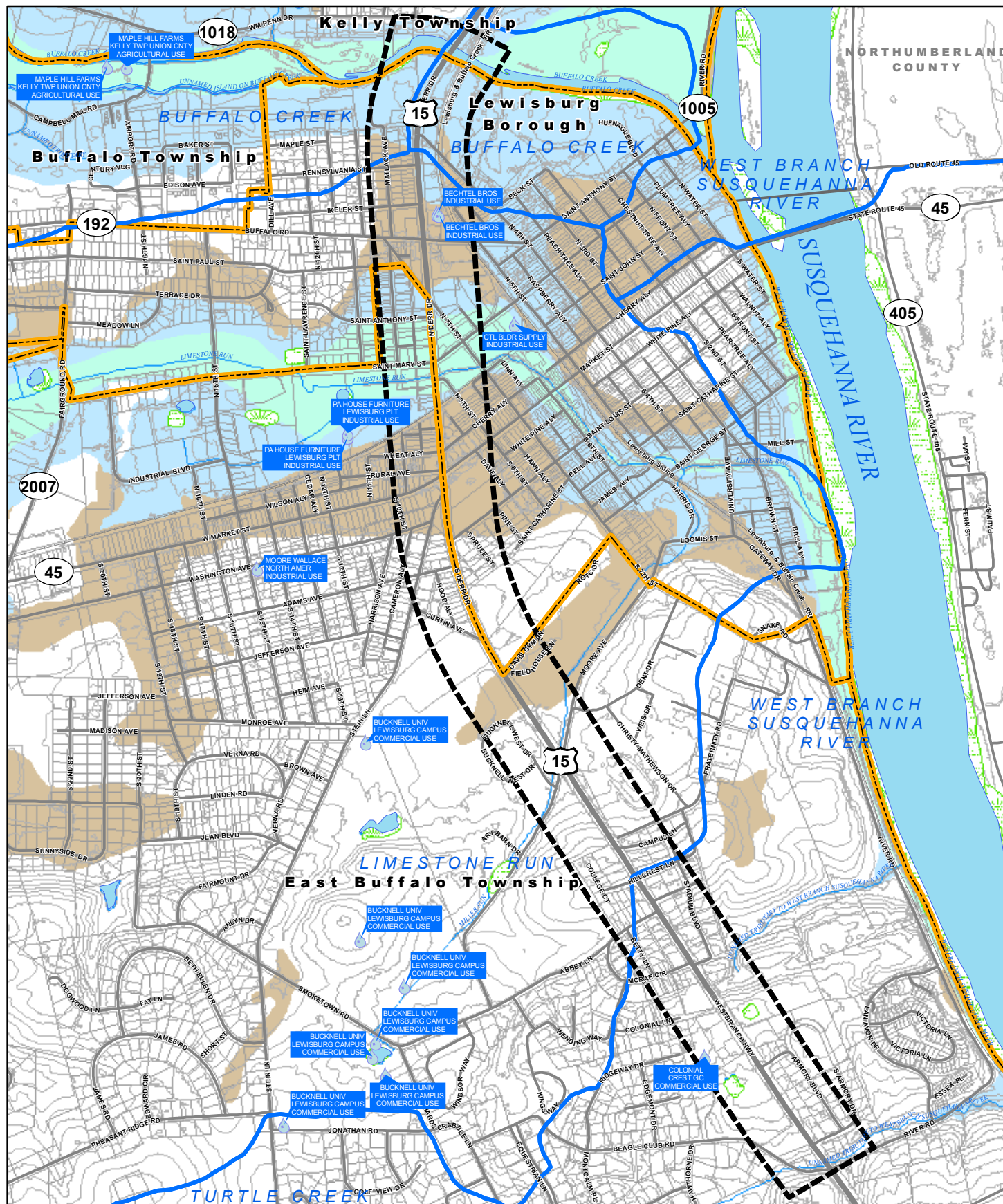
- | | | |
|----------------|--------------------------|----------------|
| Study Corridor | Wooded | Public/Exempt |
| Agricultural | Industrial/Manufacturing | Residential |
| Building Lot | Miscellaneous/Vacant | Transportation |
| Commercial | Open Space/Recreation | Water |



The following land use categories have been used to map the use of parcels within the corridor:

- Agricultural
- Building Lot
- Commercial
- Wooded
- Industrial / Manufacturing
- Miscellaneous / Vacant
- Open Space / Recreation
- Public / Exempt
- Residential
- Transportation
- Water



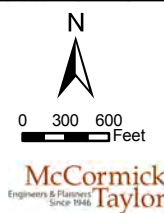


US 15 Corridor Study
HYDROLOGIC FEATURES

Figure 2.2: Hydrologic Features

- | | |
|-----------------------|--------------|
| Study Corridor | Hydric Soils |
| Floodway | Watersheds |
| FEMA 100yr Floodplain | Wetlands |
| Water Resource | |

Source: Union County, PASDA, McCormick Taylor.

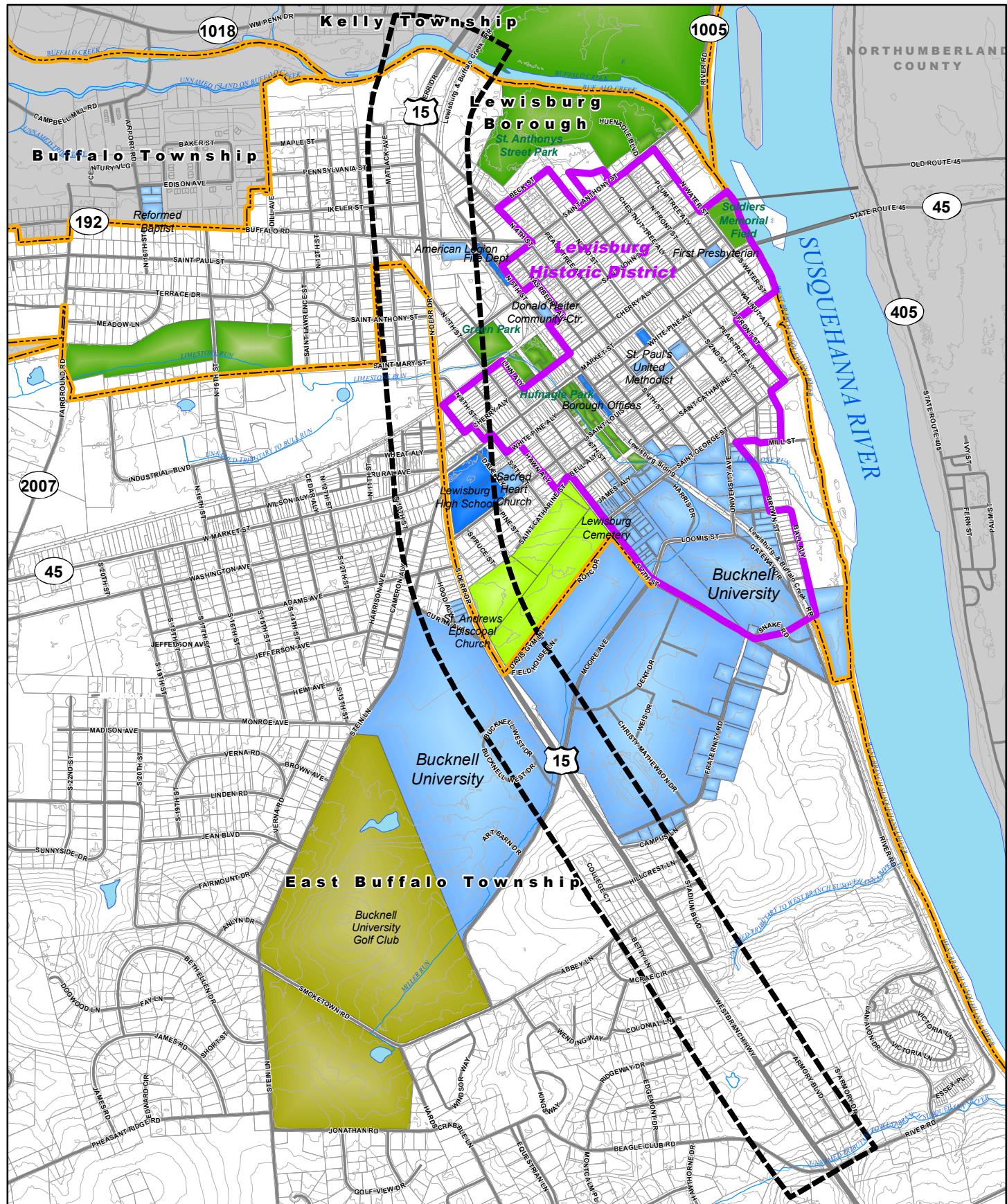


Waterways & Floodplains

The Hydrologic Features map (Figure 2.2) illustrates waterways and their associated floodplains in the corridor area. The presence of these natural features may enhance the ecological value of the area, but may also restrict development opportunities.

Buffalo Creek is at the northernmost section of the study area, running west to east. It creates a very broad floodway that impacts the properties in the northern part of the study area. Near Saint Mary Street is Limestone Run, which flows west to east until it crosses US 15 and travels southeast towards the Susquehanna River. Both Buffalo Creek and Limestone Run are tributaries of the Susquehanna River, and are associated with hydric soils in the entire northern half of the study area. The majority of the study area is in the Limestone Run watershed, except the northern tip, which is in the Buffalo Creek watershed.





Historic & Community Features

Historic features and community facilities are important cultural elements for the communities along the US 15 corridor. The Lewisburg Historic District as well as community facilities such as schools and churches are identified in Figure 2.3.

Lewisburg Historic District, created in 1985, consists of 871 contributing historic buildings, structures, and sites. Market Street is the main commercial corridor with a mix of local independent retail and service providers fronting the sidewalk, and the surrounding streets include the residential neighborhoods of Lewisburg. Lewisburg Borough also has a series of small park areas on the east side of US 15. However, Lewisburg Area Recreation Park, the Borough's largest recreational space, is located on the west side of US 15, distant from a large portion of Lewisburg residents.

Lewisburg Area High School is currently located on the southeast corner of US 15 and Market Street. Recent discussions that have occurred would entail moving the high school to a new location outside the study area; however, no firm decisions have been reached regarding this issue.

Lewisburg Cemetery is another prominent feature along US 15, abutting the north boundary of Bucknell University. It is approximately 25 acres, bound by US 15, Saint Catherine Street, 7th Street, and ROTC Drive.

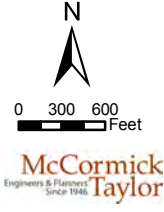
Bucknell University's 450-acre campus is primarily on the east side of US 15; however, its sports and athletic fields, student housing, and golf course are on located on the west side of US 15.

US 15 Corridor Study COMMUNITY FEATURES

Figure 2.3: Historic & Community Features

Source: Union County, McCormick Taylor.

Legend			
	Study Corridor		Private Institutional
	Historic District		Cemetery
	Municipal Boundary		Golf Course
	Property Parcel		Public Institutional
	Recreation		



Visual and Architectural Character of the Corridor

Visually, US 15 is characterized by a diverse mix of land use throughout the corridor. The southern section is largely rural/residential with typical low density buildings and scattered open spaces. The central section of the corridor is dominated by the Bucknell Campus, its buildings and facilities. While none of the campus buildings adjacent to the US 15 is architecturally unique, they do reflect the identity of the Bucknell campus and contribute to the university identity of the Lewisburg area. These views of the campus, buildings, athletic fields and stadium hold special meaning for students, alumni and area residents sharing the university experience.

The northern section of the corridor from Market Street to William Penn Drive is primarily urbanized, with mixed, highway commercial uses. Because this commercial strip is largely auto-oriented and has developed over the last 60 plus years, it has little consistent visual identity or unifying architectural quality. Many buildings have been built or modified to accommodate changing commercial activity, access and parking. Building heights, sizes and shapes vary widely with no specific architectural context. Some buildings support drive-through, fast food establishments while others are vacant and in disrepair. The Penn House parcel has been cleared and awaits redevelopment. Generally this section of the corridor is visually cluttered with signs, varied building setbacks, varied building materials and excessive parking. Most of the buildings and urban form precedes current zoning and development regulations.

There are two notable buildings in the corridor which have been recognized as assets and could be catalysts for new development and redevelopment. These are the Lewisburg High School on the corner of US 15 and Market Street and the Creamery Building on Buffalo Road.



Transportation Context

The focal point of the study is the US 15 corridor. Historically, this corridor originated as a parent route in the 1926 United States Highway Plan, as initiated by the American Association of State Highway Officials (AASHO) and formalized by the federally appointed Joint Board of Interstate Highways. The first sections of US 15 were completed from Harrisburg, Pennsylvania to Rockingham, North Carolina. Starting in 1936, the highway was extended from Harrisburg through Union County to Lawrenceville, Pennsylvania. Below is an aerial view of Lewisburg and the alignment of US 15 soon after its construction in 1938. The intersection of US 15 and Market Street is in the center of the photograph.

Currently, US 15 is part of the United States Department of Transportation's National Highway System and the Department of Defense's Strategic Highway Network. US 15 is the only non-interstate roadway in Pennsylvania to be included in this network. According to the Federal Functional Class System, US 15 is classified as a principal arterial, recognizing its importance as a continuous roadway that provides regional mobility for higher volumes of personal and commercial traffic.



PennDOT Roadway Design Typology

PennDOT’s roadway design process (PennDOT Publication 13M) incorporates a system of typologies that consider both roadway and adjacent land use context when selecting appropriate design criteria. In such a system, the design criteria may change along a continuous route as the context changes.

The roadway typology for US 15 reflects the “Regional Arterial” functional category throughout the Study Area. The roadway typology changes progressively along the corridor as a function of the roadside land use and roadway cross-section. Table 2.1 gives the roadway typologies established for use in the *US 15 Smart Transportation Corridor Improvement Plan*.

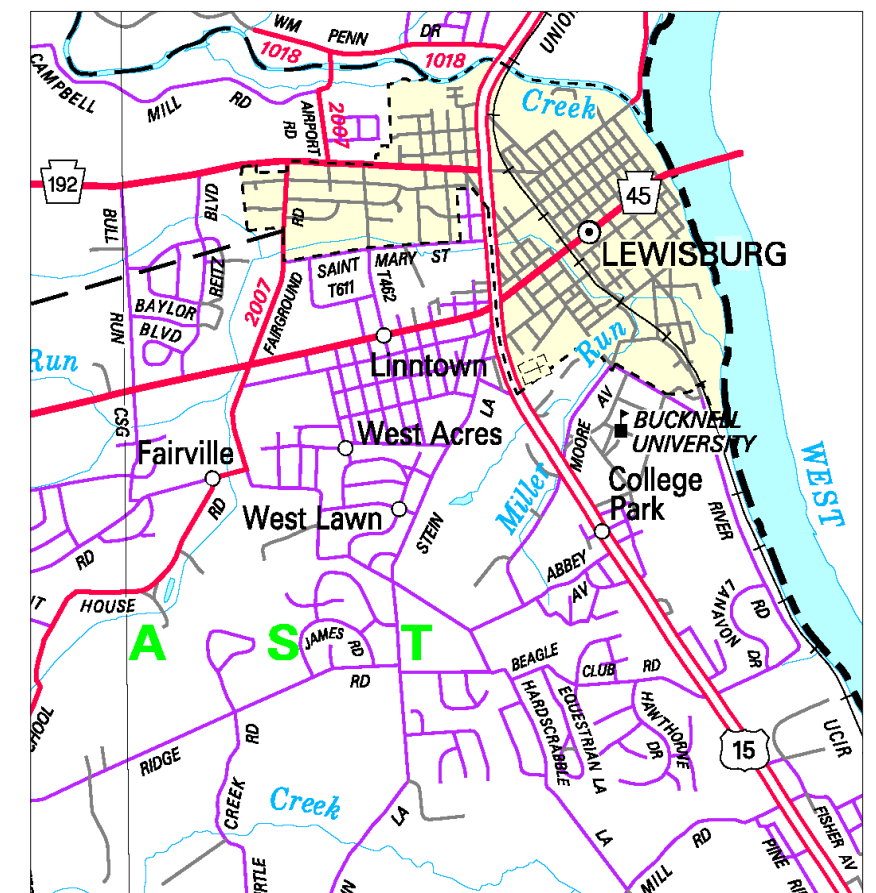
Table 2.1 PennDOT Roadway Typologies for Study Area Sections of US 15

Section		Roadway Classification	Land Use Classification	Typology Characteristics
From	To			
William Penn Drive	4th Street	Regional Arterial	Suburban Corridor	<ul style="list-style-type: none"> Open roadway cross-section with wide lanes, shoulders, and median. Regular traffic signals at ~1,300 foot spacing. 45 MPH. Large building set-backs indicative of suburban “big-box” commercial style development. Few access points and managed access to land development.
4th Street	Market Street	Regional Arterial	Suburban Center	<ul style="list-style-type: none"> Compressed roadway cross-section with narrow lanes, curb/gutter, and center turn lane. Regular traffic signals at ~1,100 foot spacing. 35 MPH. Minimal building set-backs indicative of older towns and activity centers with mixed land use. Many access points and minimal management of access.
Market Street	McRae Circle	Regional Arterial	Suburban Neighborhood	<ul style="list-style-type: none"> Open roadway cross-section with wide lanes and shoulders and no median. Turn lanes provided at major intersections. Traffic signals at major intersections, irregular intervals. 45 MPH. Moderate building set-backs indicative of town fringe with residential, small lots and institutional, large-lot land uses. Mixture of managed and unmanaged access.
McRae Circle	Beagle Club Road / River Road	Regional Arterial	Suburban Corridor	<ul style="list-style-type: none"> Open roadway cross-section with wide lanes, shoulders, and center turn lane. No traffic signals. 50-55 MPH. Mixture of small and large building setbacks indicative of highway commercial development. Many access points with minimal management of access.

Transportation Elements of the Urban Form

Surrounding the US 15 corridor is a diverse network of transportation facilities that serve the Lewisburg and East Buffalo Township communities and interact with the US 15 corridor itself. The schematic in Figure 2.4 illustrates the layout of highways, streets, railroads, and waterways that serve the corridor area.

Figure 2.4: Schematic of Transportation Elements



Highway & Street Systems

The system of streets adjacent to US 15 is generally an interconnected grid, however with strong fundamental differences to the east versus the west. To the east of US 15 and north of Bucknell University, the layout and orientation of the core Lewisburg Borough grid—with a fine-grained layout of streets, sidewalks, and alleys—was established when the town was laid out in the late 1700s, long before the creation of US 15. The grid is interrupted by the active Lewisburg & Buffalo Creek Railroad line between 5th Street and 6th Street.

Market Street (PA 45) is the main street through Lewisburg Borough, with significant cross streets and traffic signals at 7th Street, 4th Street, 3rd Street, and 2nd Street. Most other intersections are stop-controlled. Streets are generally narrow, with on-street parking and sidewalks provided throughout the core of the Borough.

With parking, pedestrian activity, and multi-use/multi-story buildings close to the street, vehicular traffic speeds are slow. Vehicular delay and queues along Market Street are pronounced during peak traffic periods.

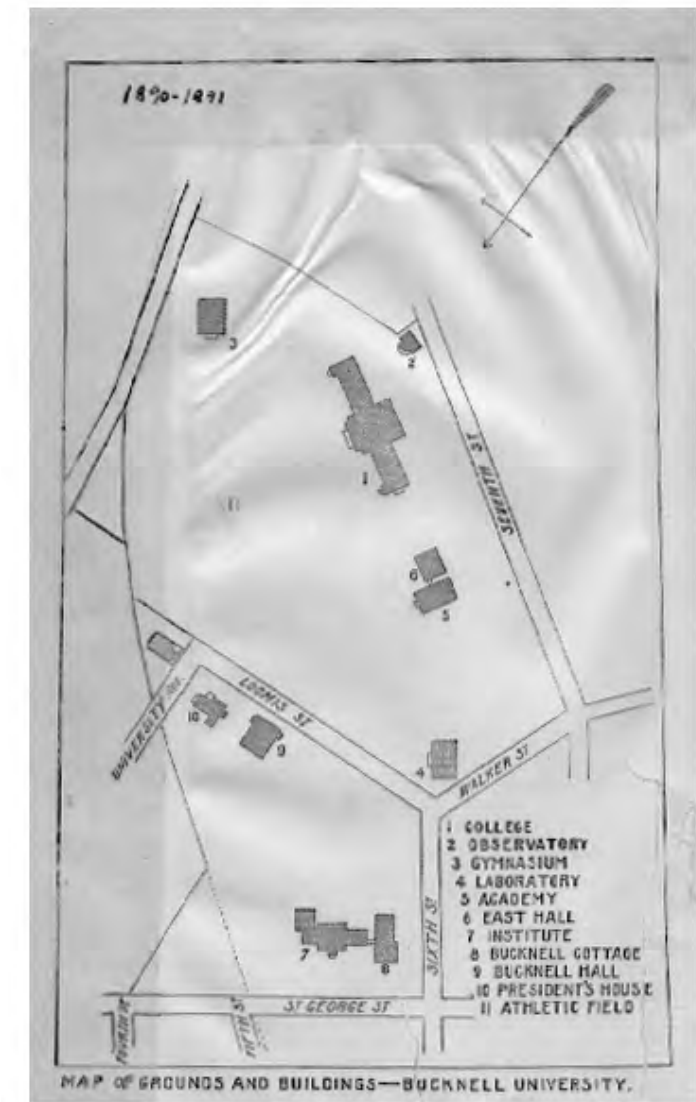
The grid system of Lewisburg ends at Saint George Street, which has been the traditional nexus between the Borough and Bucknell University, since it was founded in 1846. An 1890 map of the Bucknell campus is shown in Figure 2.5. Note the location of Saint George Street at the bottom of the sketch. During the 20th century, the University has expanded both away and somewhat into Lewisburg, with a more pastoral campus environment to the south and a campus network of streets and pathways that is more insular to discourage through traffic and make pedestrian travel

safer. Bucknell University maintains its own system of streets and parking facilities. However, the following streets remain municipal roadways: Moore Avenue, 7th Street, Walker Street, Loomis Street, Malcolm Street, Barton Street, Mill Street, Brown Street, Linn Street and University Avenue.

Much of the land development west of US 15 and south of Bucknell University occurred after 1936, when the corridor was constructed. Along this north-south axis, the grid system was pivoted to be parallel to the US 15 corridor. Except for Linntown along Market Street where the street and alley system was extended, the network east of US 15 consists of larger blocks without alleys or sidewalks. The larger grid reflects mid-century suburban trends and more commercial/industrial land uses that occupy larger parcels south of Saint Mary Street. South of Linntown, neighborhood streets become more curvilinear and less connected, with loop & cul-de-sac systems prevalent south of Abbey Lane.



Figure 2.5: 1890 map of Bucknell University's campus



Sidewalks, Trails & Pathways

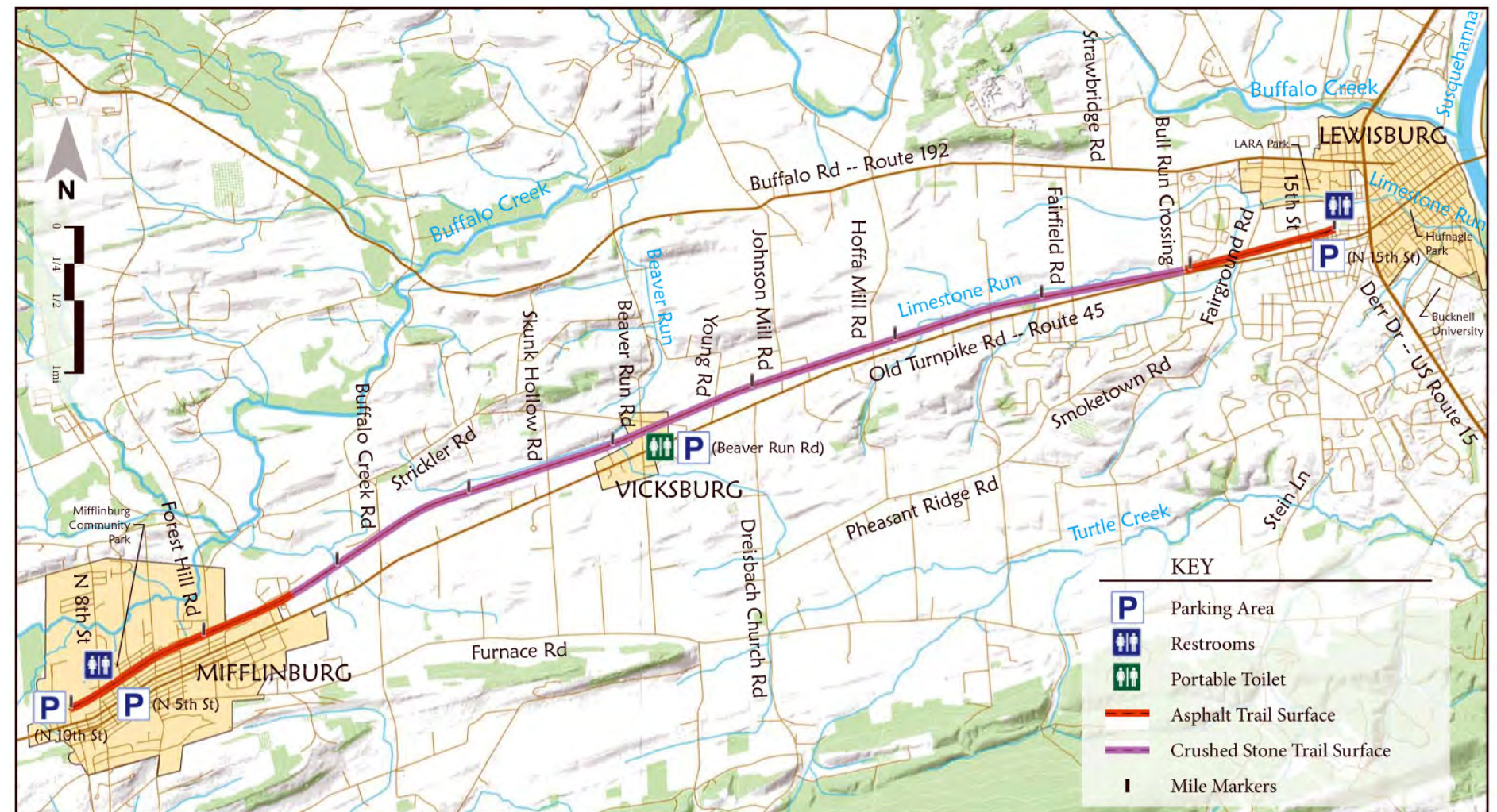
As noted previously, the core area of Lewisburg Borough and the Bucknell Campus are the only two parts of the study area with consistent and continuous sidewalk coverage. Outside of this area, continuous sidewalk does exist along the north side of Market Street, from US 15 to 20th Street. On the south side, sidewalk is present along some properties but is discontinuous. Elsewhere throughout Lewisburg Borough and East Buffalo Township, roadside sidewalk is seldom provided.

The Buffalo Valley Rail Trail (Figure 2.6) parallels PA 45 to the west of Lewisburg, and provides a pedestrian and bike connection on the former West Shore Rail Road right-of-way between Mifflinburg and East Buffalo Township. The Lewisburg Area Recreation Authority has sponsored the development of the trail. Following planning and design activities in 2009 and 2010, 9.2 miles of finished trail, trailheads, facilities and parking areas at both ends, and interpretive signage along the route were completed at the end of October 2011. The potential exists for future phases of rail trail development to cross US 15, go through Lewisburg, and then cross the Susquehanna River to Northumberland County.

Railroads

The Lewisburg & Buffalo Creek Rail Road is the single active rail line within the Study Area. North of Lewisburg, the track parallels US 15. Within Lewisburg, the track turns to parallel 5th Street, until it crosses Brown Street and continues along the Susquehanna River and River Road south of Lewisburg.

Figure 2.6: Buffalo Valley Rail Trail (BVRT)



Transit

Currently, no agency sponsored fixed-route transit system exists within the corridor, although the Union and Snyder Counties Fixed Route Public Transportation Feasibility Study (2004) and North Central Pennsylvania Regional Public Transportation Needs Assessment (2011) have investigated the potential need, issues, and benefits of such a system.

On-demand transit services are currently provided by the Union-Snyder Transportation Alliance (USTA). USTA provides free and reduced-fare transportation through the following programs:

- Shared-Ride Program for Seniors (age 65+)
- Shared-Ride Program for Persons with Disabilities
- STEP Program (Welfare-to-Work)
- Medical Assistance Transportation Program (MATP)

Shared-ride transportation is available to the general public at full-fare prices. USTA also provides contracted transportation services through various local agencies.

Bucknell University currently operates a fleet of shuttles that provides multiple services to students and faculty. A circulator service, called Downtown Shuttle, is provided on a daily loop from campus to the Barnes & Noble bookstore downtown and to the Wal-Mart Plaza in Kelly Township along US 15. Also, at the beginning and end of terms, as well as holidays and breaks, on-demand service is provided to nearby airports, train stations, and bus terminals. Reservations in advance are required. Finally, non-emergency student medical transportation is also provided by the University, through the Student Health Service.

Parking

Except for the core area of Lewisburg Borough, parking is generally free, and the municipal ordinances specify the amount of parking that is to be provided according to the land use type.

Within the core area of Lewisburg Borough, parking meter zones, pricing, and enforcement schedule have been established by ordinance (§345 35). Parking meters are enforced 9:00 AM to 5:00 PM on all days except Sundays and legal holidays. Maximum parking time is 2 hours.



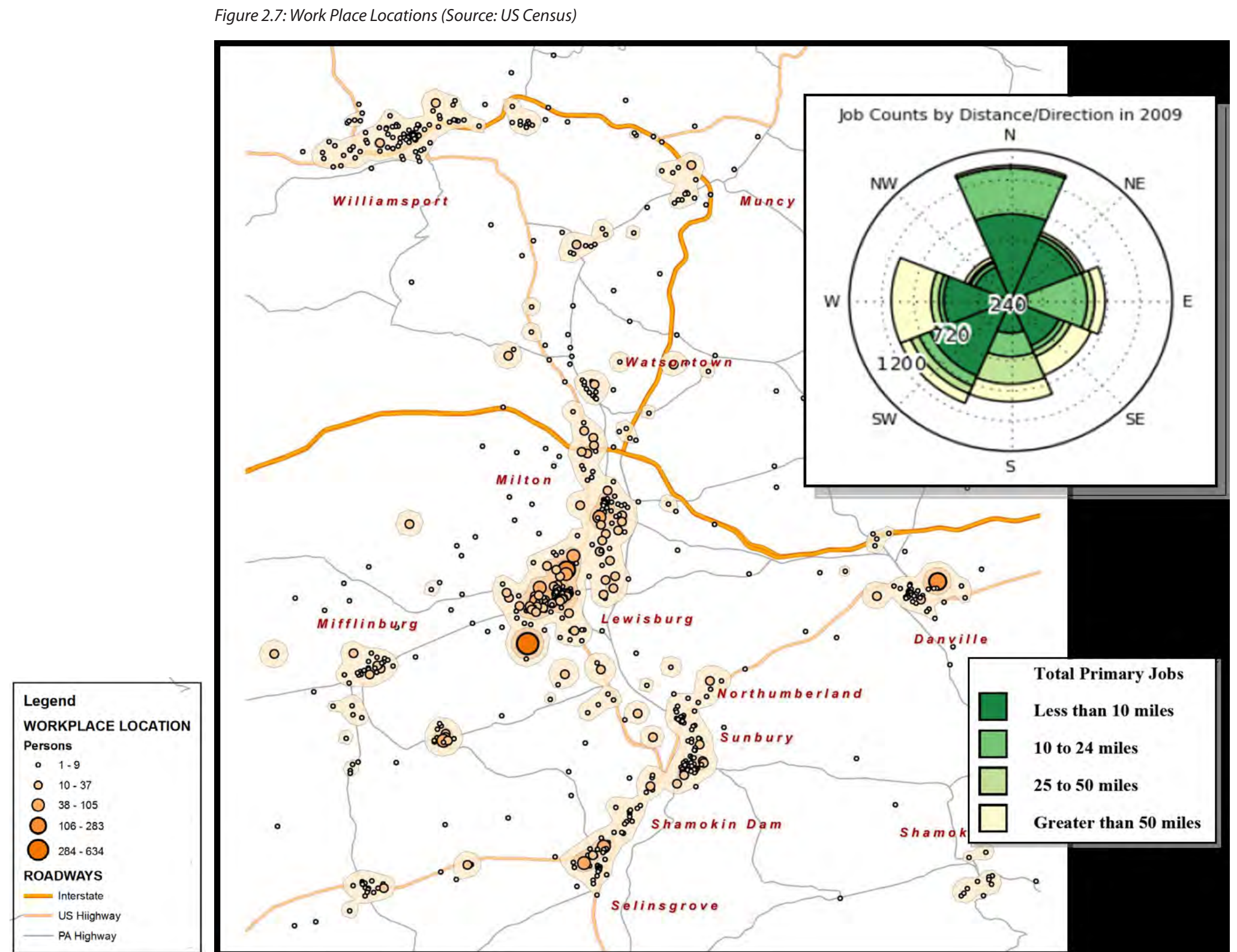
Travel Activity & Patterns

Longitudinal Employment-Household Dynamics (LEHD)

The US Census Bureau's Longitudinal Employment-Household Dynamics (LEHD) program combines federal and state administrative data on employers and employees with Census data and other surveys, including the Quarterly Workforce Indicators (QWI) datasets. QWI is built upon the wage records in the Unemployment Insurance system, which covers over 90% of total wage and salaried civilian jobs.

Information from the 2009 LEHD dataset was extracted to pair workplace location and residential location (both by Census block) to identify travel activity related to commuting patterns. In Figure 2.7, the orange dots and thermals illustrate workplace locations of people who reside in Lewisburg & East Buffalo Township. Concentrations of employment are evident in Lewisburg, Sunbury, Selinsgrove, Williamsport, and Mifflinburg. The directional job count illustrates the relative number of commuters (size of pie slice) according to travel distance (band color). The largest commuting directions are to the north and southwest, most likely relying on US 15 for mobility to reach these places of work. The longest commuting distances are to the west and southeast, perhaps to the State College and Harrisburg/Southeastern PA areas, respectively. About half of Lewisburg and East Buffalo Township residents have a commute less than 10 miles, while about 20 percent accept commutes of 25 miles or more.

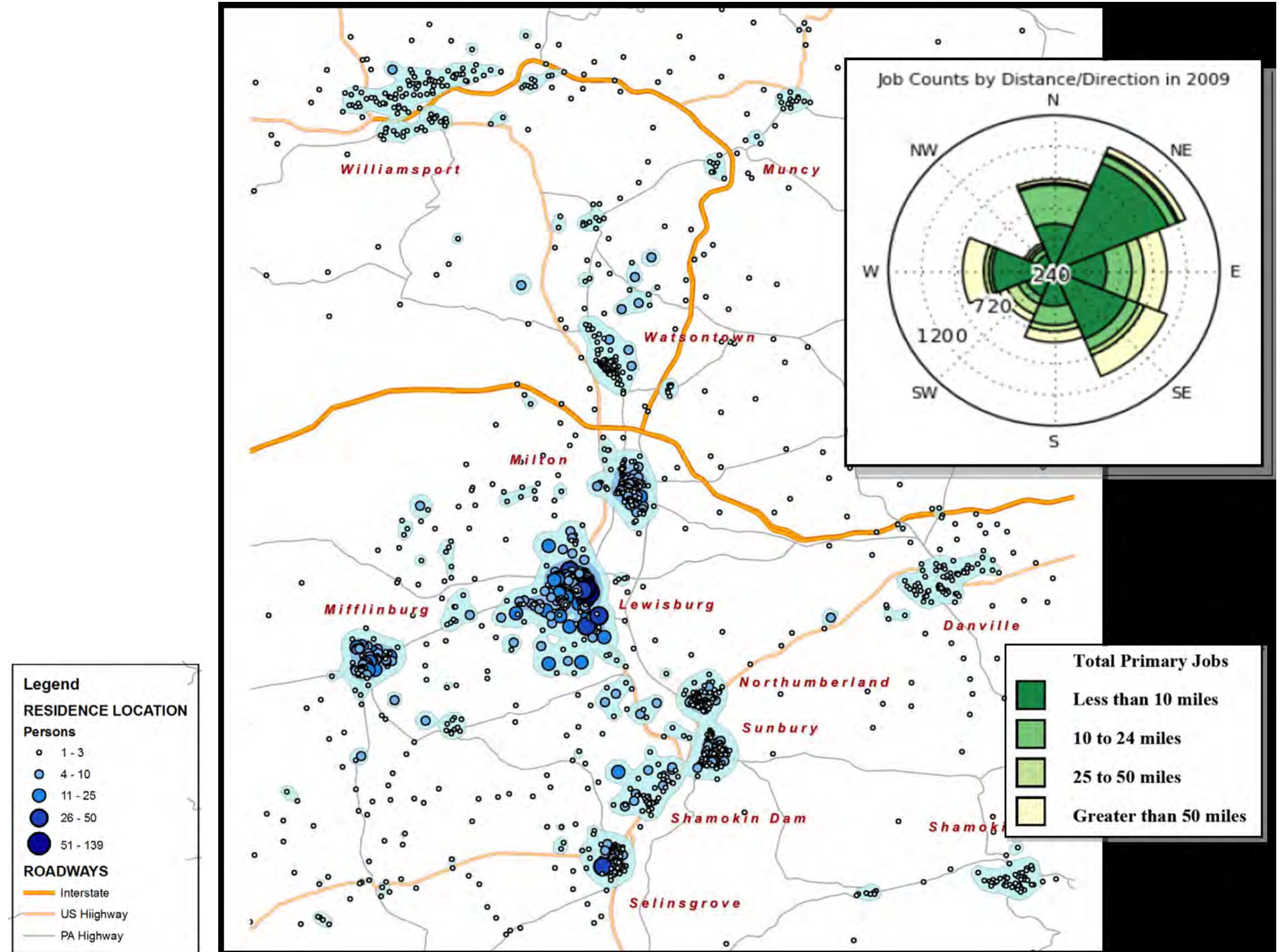
Note: The large orange dot southwest of the intersection of Route 45 and US 15 collectively represents the job location of Bucknell University.



Note: Point locations are intended to be at the "centroid" of the Census geometries (tract, block group, and block). In cases where geometries are irregularly shaped, centroids may appear outside of the particular geometry represented.

In Figure 2.8, the blue dots and thermals illustrate the residence locations of people who work in Lewisburg Borough and East Buffalo Township. These patterns differ substantially from the previous workplace analysis, both in terms of location and directionality. Concentrations of residences are closer to the workplace, with more than 60 percent of workers living within 10 miles of their workplace in Lewisburg Borough and East Buffalo Township. Concentrations of these workers are noted in Milton, Northumberland, Sunbury, Selinsgrove, Danville, and Mifflinburg. Primary commuting directions are to/from the northeast and southeast.

Figure 2.8: Residence Locations (Source: US Census)



Note: Point locations are intended to be at the "centroid" of the Census geometries (tract, block group, and block). In cases where geometries are irregularly shaped, centroids may appear outside of the particular geometry represented.

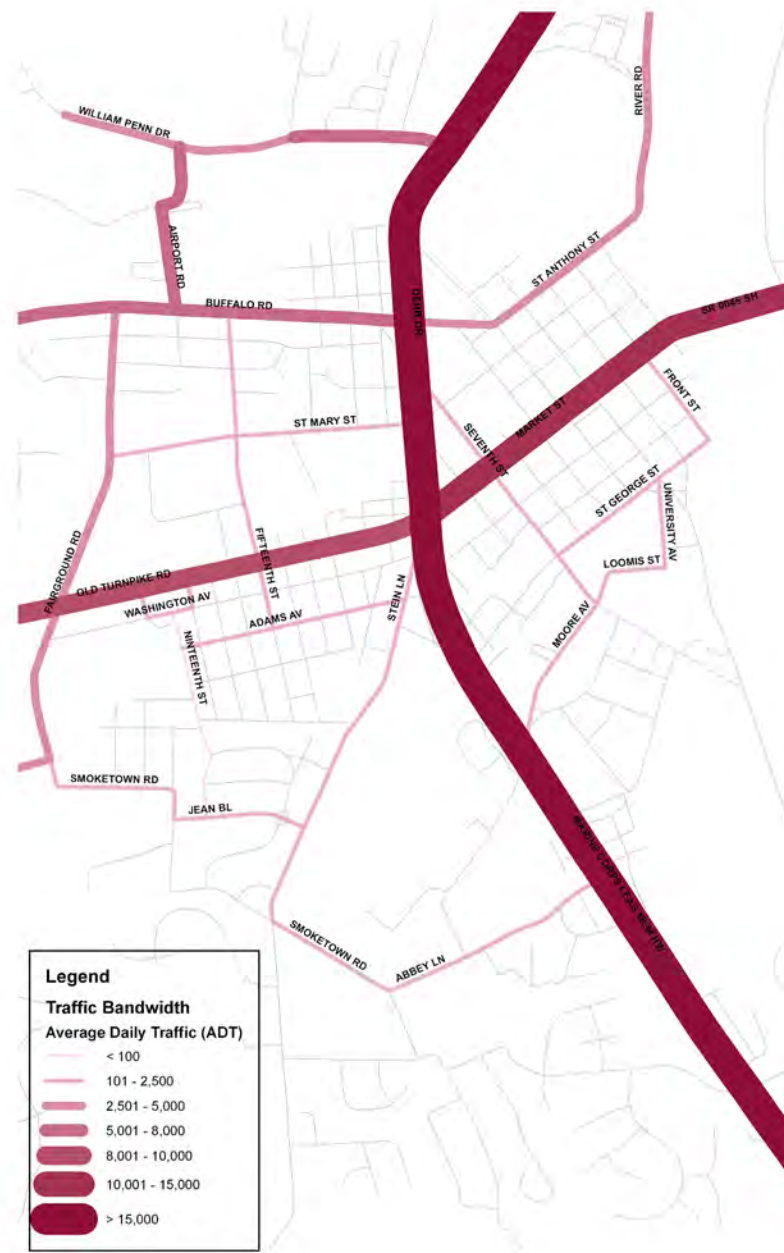
Daily Traffic Volume Counts

Daily traffic volume count data from 2007-2010 was provided by PennDOT District 3-0 and charted to evaluate traffic activity trends along US 15 and the network of state routes within the Study Area. Figure 2.9 illustrates these volumes as bandwidths, where the color and width indicate the 24-hour volume of traffic—e.g., average daily traffic (ADT) volumes. Currently, US 15 carries an ADT of approximately 25,000, with about 10 percent of this volume (2,400 vehicles) being heavy trucks. Table 2.2 provides current daily volumes for other roadways in the region.

Table 2.2. ADT Volumes on other Regional Roadways

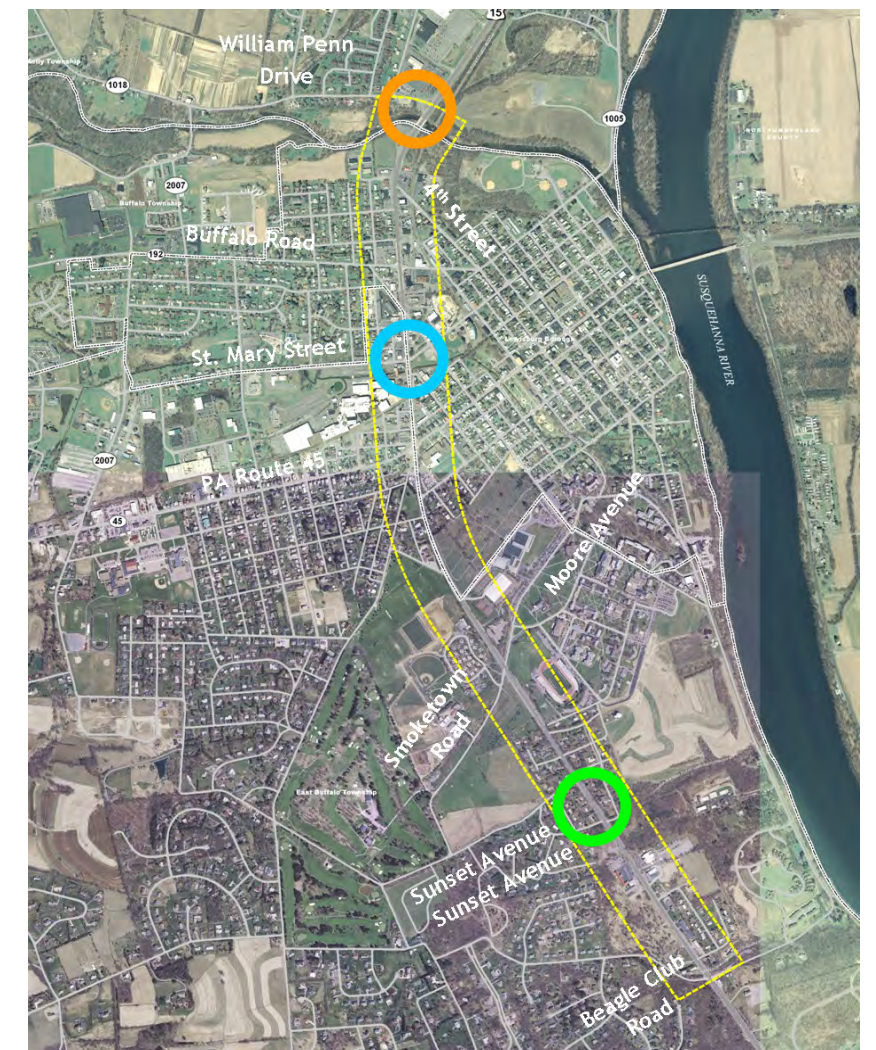
Location	ADT
I-80, at interchange with US 15	27,600
US 15, Shamokin Dam	39,500
PA 45, to the west of Lewisburg	9,900
PA 45, to the east of Lewisburg	13,600
PA 405, at interchange with PA 45	5,000
Airport Road, to the north of Buffalo Road	6,000

Figure 2.9: Average Daily Traffic (ADT) Volumes



Hourly breakdowns of the traffic count volumes at various locations along US 15 (Figure 2.10) were also investigated and charted throughout the day. Figures 2.11, 2.12, and 2.13 illustrate these hourly vehicular traffic volumes—passenger and heavy vehicles—at different locations along US 15 within the Study Area.

Figure 2.10: Location Map for Traffic Count Volumes



In general, traffic volume peaks in the afternoon between 4:00 and 6:00 PM, which is typical for principal arterial routes carrying regional commuter traffic.

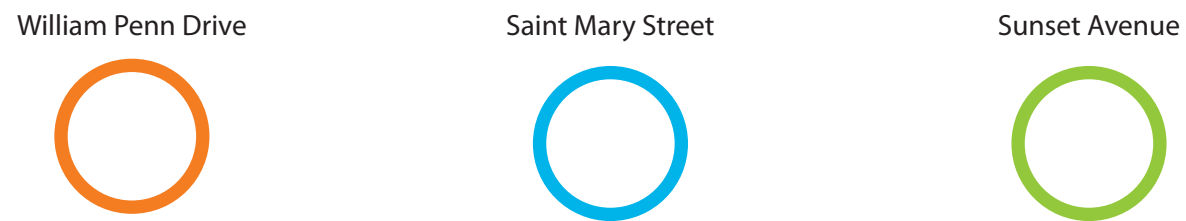


Figure 2.11: Hourly Traffic Volumes on US 15 near William Penn Drive

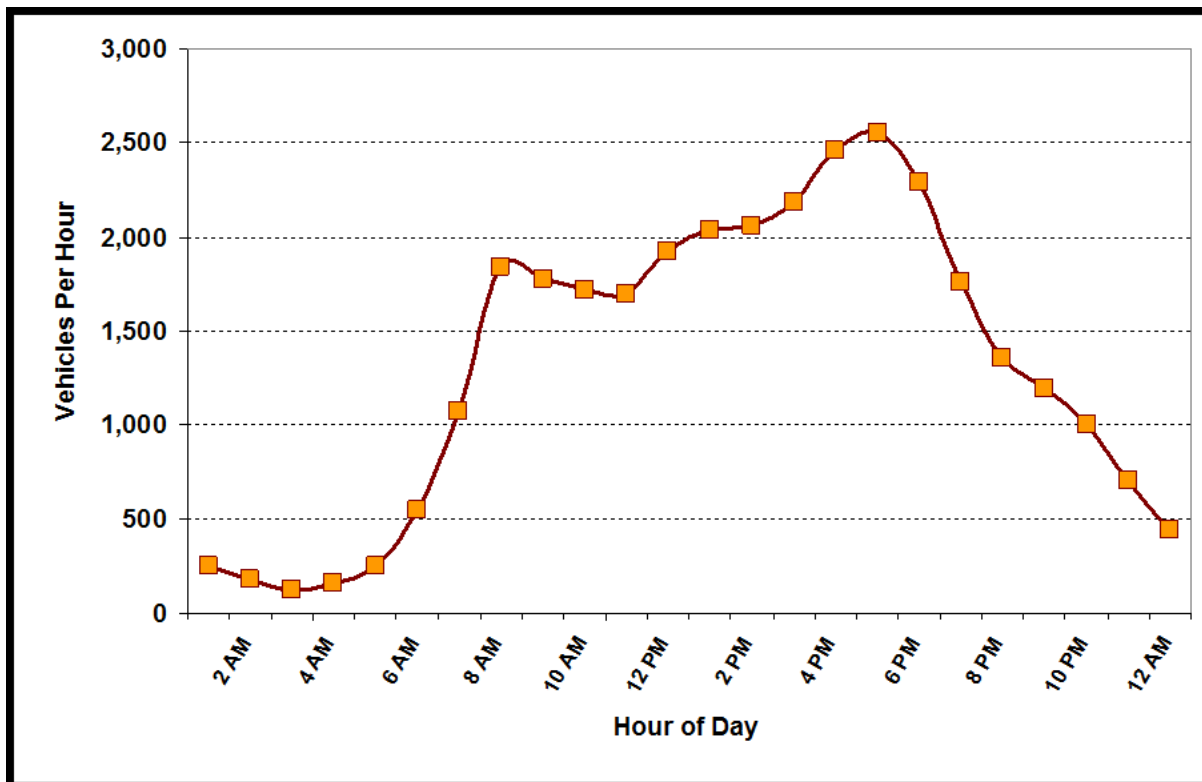


Figure 2.12: Hourly Traffic Volumes on US 15 near Saint Mary Street

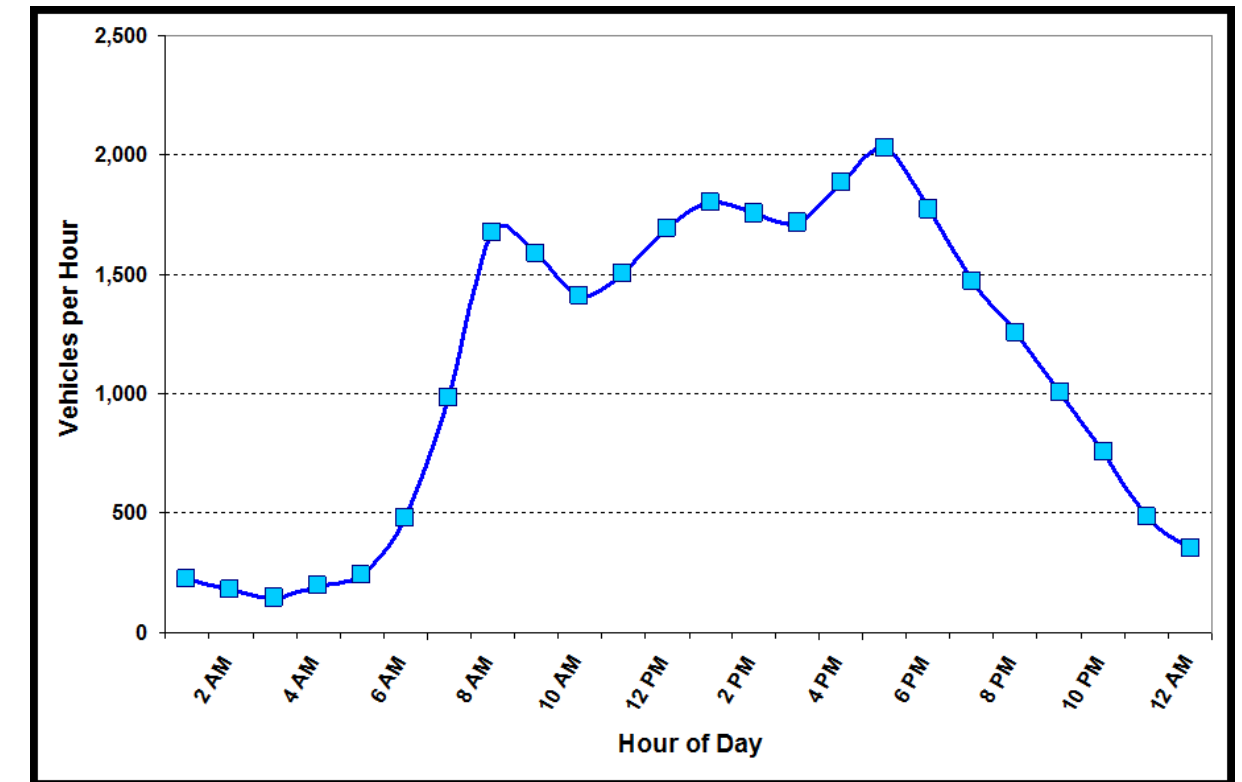
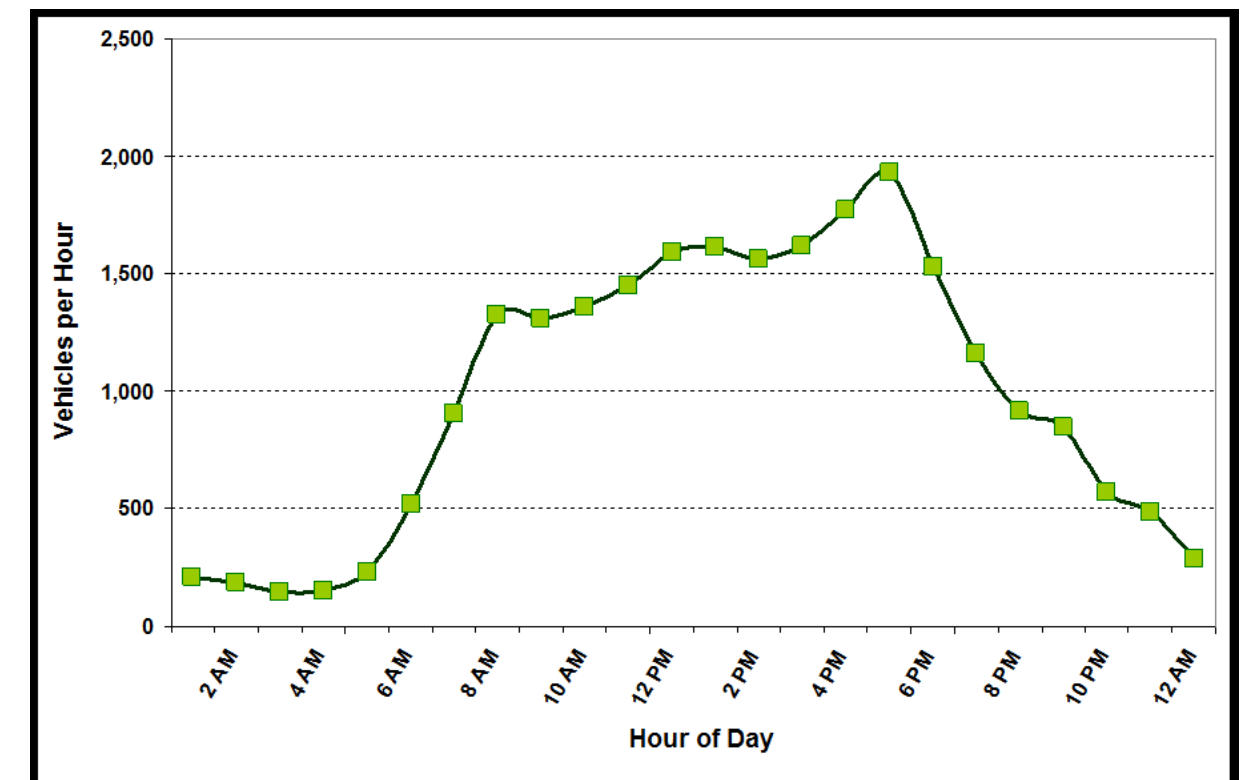


Figure 2.13: Hourly Traffic Volumes on US 15 near Sunset Avenue



Peak Hour Traffic Volumes

To complete the analysis of traffic volume, peak hour intersection traffic count data was extracted from various sources, including the Penn House Commons Traffic Impact Study, the Union County Comprehensive Plan, and the US 15 Safety Study. Figure 2.14 illustrates these counts in terms of total vehicles per intersection during the highest peak hour of the day.

The highest intersection volumes were observed at the US 15 intersections with Market Street (PA 45) and Buffalo Road (PA 192). Other intersections along US 15 were also above 2,000 vehicles per hour, indicating the dominant north-south flow of traffic through the study area during the peak hour.

Network Traffic Pattern Analysis

Traffic patterns and the directionality of traffic entering the study area were analyzed on a proportion basis by examining intersection turning movement volumes at key points in the network. Figure 2.15 illustrates traffic entering the study area from the east and west on Market Street (PA 45). Significant bypass routes along Airport Road and River Road are indicated, whereas the use of River Road and Fairground Road are subdued, in comparison. Delay and the perception of safety at intersections to the south may influence these patterns. Figure 2.16 illustrates traffic entering the study area from the north and south on US 15. Airport Road is again indicated as a strong bypass route. River Road and Fairground Road also see significant bypassing traffic volume. Bypassing traffic is a strong indicator that delay, safety, and other route perceptions are negative for the area being bypassed. In this case, drivers are avoiding the traffic signals and compressed roadway area along US 15 between Market Street and 4th Street.

Figure 2.14: Total Vehicles per Intersection during the Highest Peak Hour

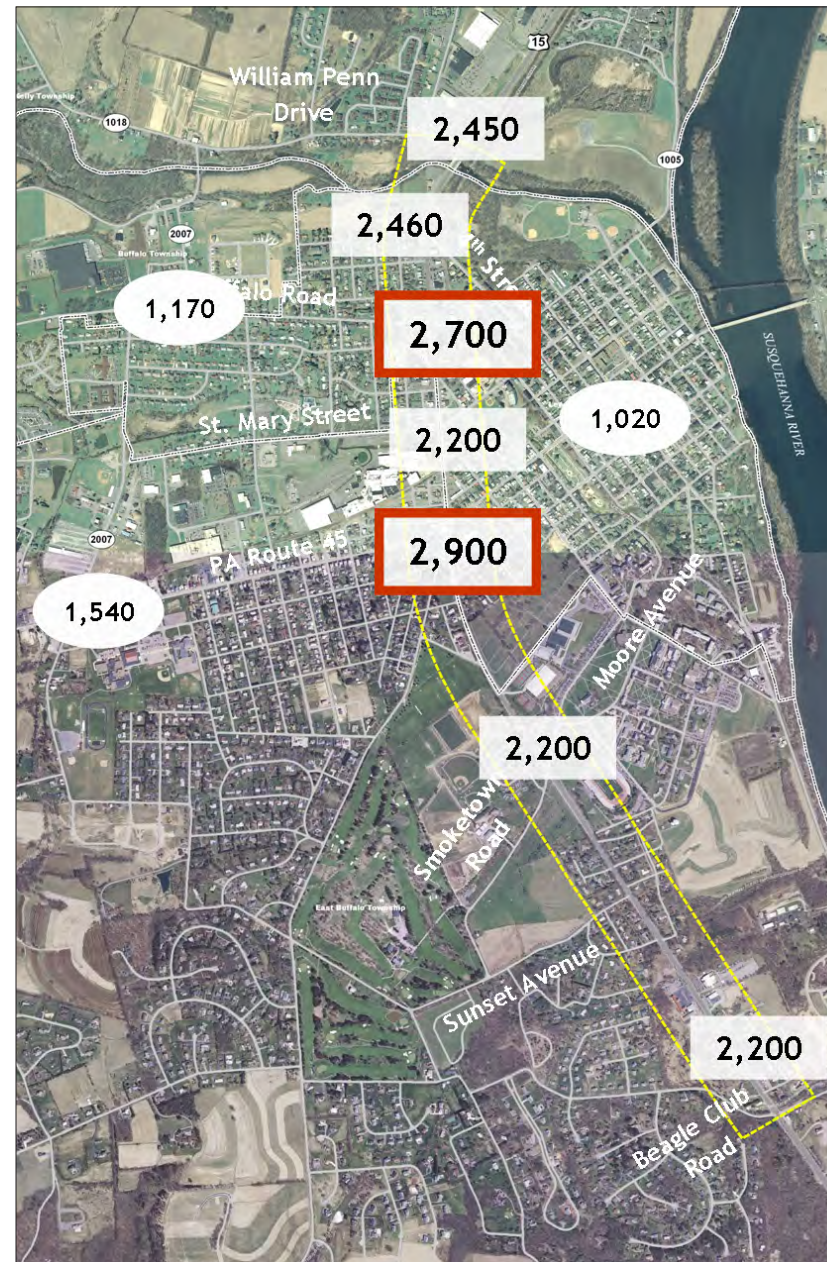


Figure 2.15: East / West Trip Distribution

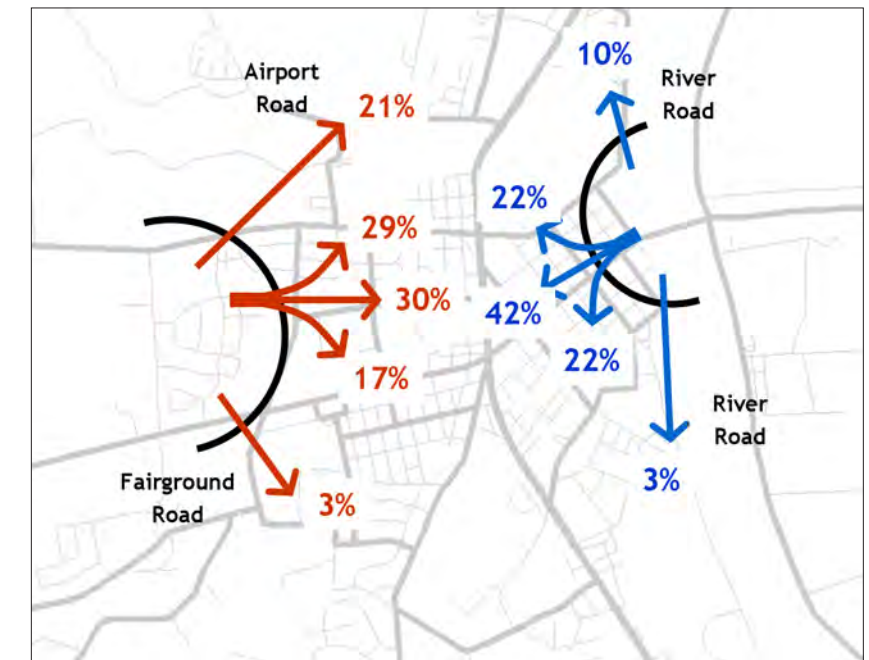


Figure 2.16: North / South Trip Distribution

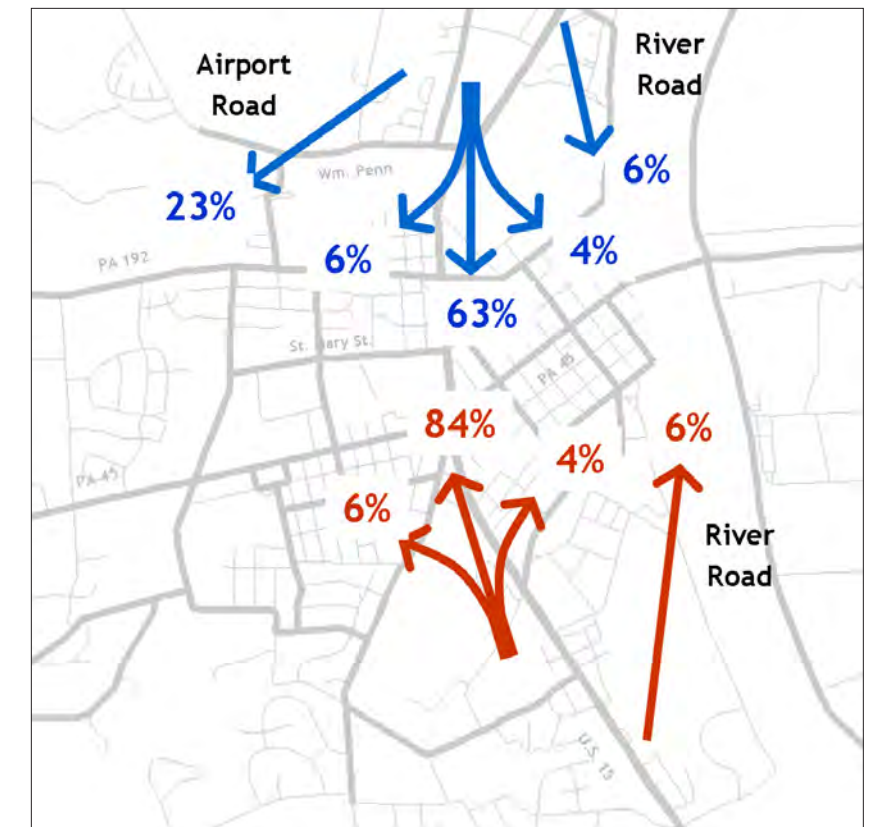
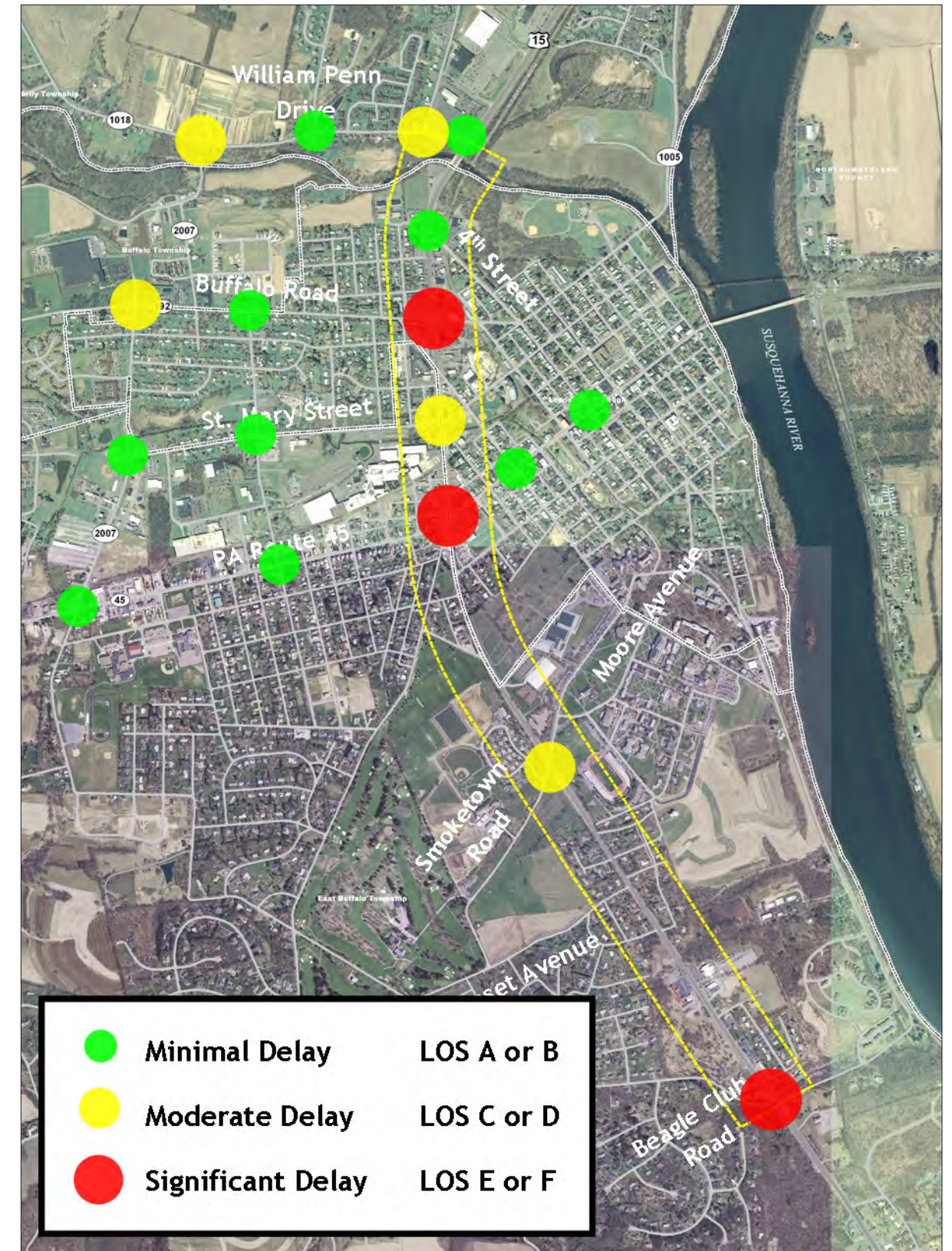


Figure 2.17: Level of Service (LOS)



Vehicular Delay and Level-of-Service (LOS)

Delay analysis evaluates traffic operations in terms of the average delay experienced by vehicles on a roadway facility—in this case, at intersections along US 15 and throughout the broader network. To put the delay estimates into context, letter-grades are given to certain ranges of delay. Level of Service (LOS) A or B represents minimal delay. LOS C & D represent moderate delay. LOS E & F represent significant and, typically, unacceptable levels of delay. Figure 2.17 illustrates levels of service according to the average delay experienced by all vehicles traveling through the intersection. Delay and LOS values were derived from various sources, including the Union County Comprehensive Plan, Penn House Commons Traffic Impact Study, Bucknell University Gateway Study, Giant Food Store/Retail Center Traffic Impact Study, and US 15 Safety Study. All traffic analyses were completed according to the methodology published by the Transportation Research Board in the Highway Capacity Manual.

Pedestrian & Bicycle Crossings

Figure 2.18 illustrates counts of pedestrian and bicycle crossings during a 4-hour period between 2:00 PM and 4:00 PM in April 2011. This time period was chosen to capture crossings associated with the end of school peak, the peak hour of vehicular traffic, and the peak of evening recreational activity along US 15. The figure indicates the number of persons crossing US 15 (white box) and the number of persons crossing the side streets, parallel to US 15 (blue box). For instance, at Market Street, equal numbers of pedestrians and bicycles cross Market Street and US 15. On the other hand, pedestrians and bicycles tend to use Saint Mary Street and Buffalo Road mostly for crossing US 15. This infers that pedestrians and bicyclists do not walk along US 15. Rather they use the signalized intersections as points to cross US 15.

Crash Trends

The 10-year crash history from 2000 to 2009 was investigated to identify safety issues within the Study Area. PennDOT District 3-0 provides the reportable crash history. Table 2.3 gives the crash trends on each major roadway in the corridor.

Table 2.3 Reportable Crashes (2000-2009)

State Route	Reportable Crashes
US 15	247
PA 45	135
PA 192	46
SR 1018 (William Penn)	13
SR 2007 (Fairground/Airport)	9
TOTAL	451

Figure 2.18: Pedestrian & Bicycle Crossing Location & Counts

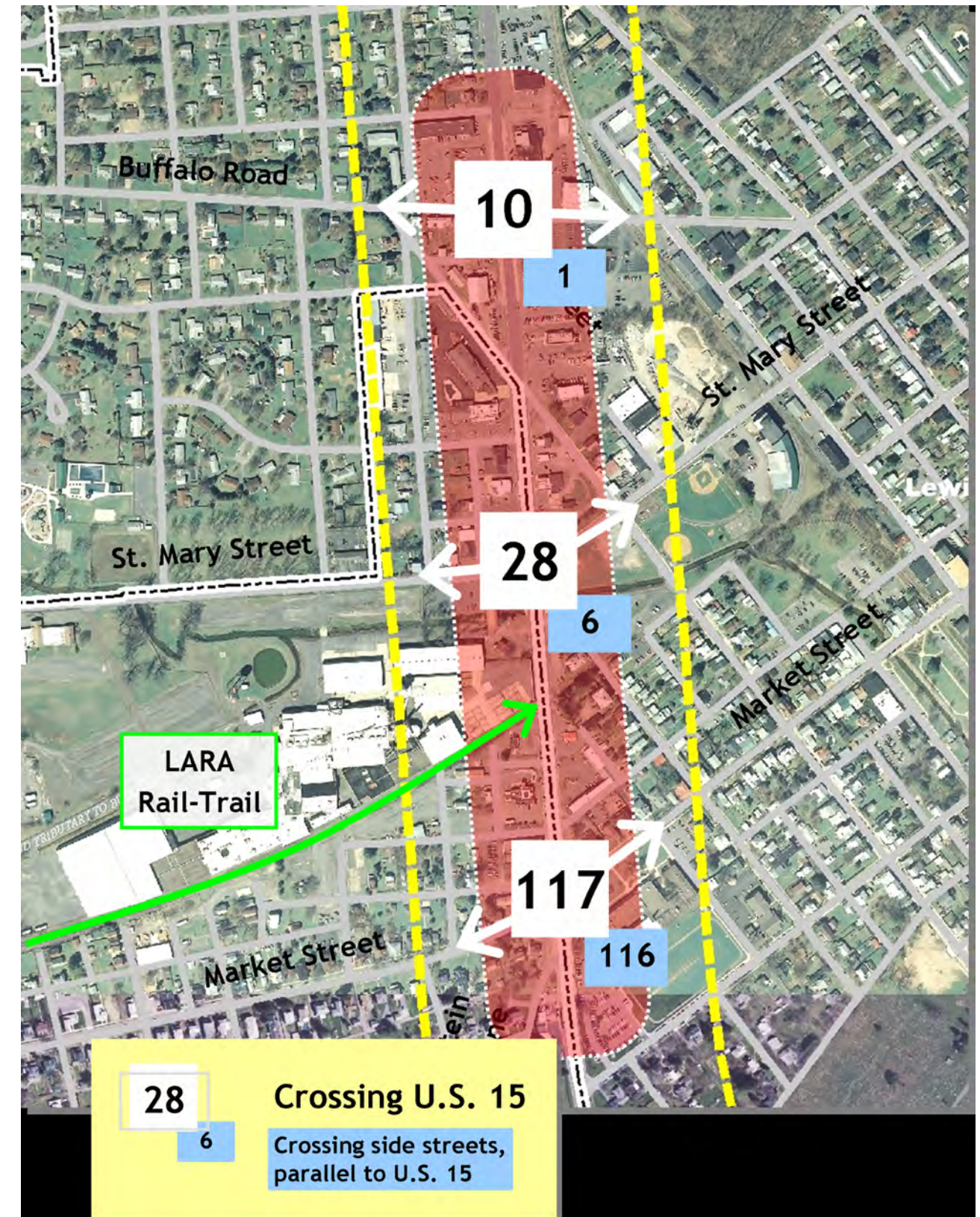
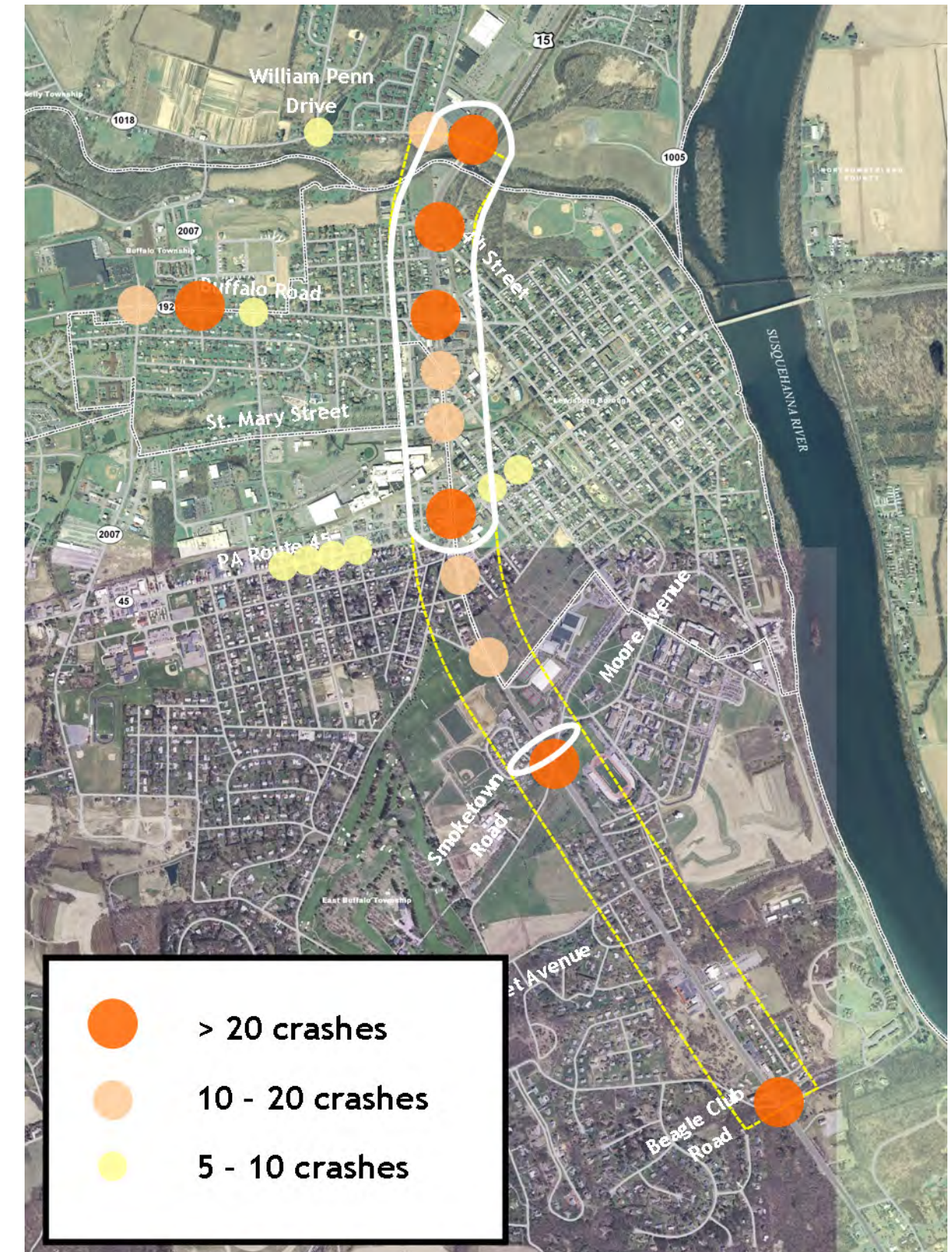


Figure 2.19: Intersection Crash Hot Spots



The following breakdowns of crashes throughout the Study Area were noted:

- **Crash Type:** 183 angle; 152 rear-end; 96 hit “object”
- **Vehicle/Mode:** 30 truck-related; 14 pedestrian-related; 2 bicycle-related; 2 “phantom vehicle”
- **Driver:** 22 DUI; 355 aggressive driving (87 speeding; 70 distracted; 56 improper/careless maneuver)

Location

Crashes were also located relative to roadways and intersections to identify hot spots and clusters by location. Figure 2.19 shows the intersection crash hot spots. The following were noted:

- A total of 299 crashes were at intersections, with 114 at intersections with signals and 185 at non-signalized (stop, yield) intersections.
- 152 crashes were located at non-intersection/mid-block locations.
- There was a high intensity of crashes just north of Moore Avenue, which contributes to the hot spot at Moore Avenue.
- Clusters of crashes were noted at both signalized and certain non-signalized intersections from William Penn Drive to Beagle Club Road/River Road.
- Previous systematic evaluations of roadway safety have identified US 15 Segments 120 and 130 (approximately Bucknell Gateway to Beagle Club Road/River Road) as a “Top 25” crash location. This designation would be considered when prioritizing projects for Highway Safety Improvement Program (HSIP) funding.

Regional Influences, Local Development & Redevelopment

Central Susquehanna Valley Throughway (CSVT)

There are several planned transportation projects of regional significance that may have measurable beneficial effects on this Lewisburg section of US 15. Chief among these is the Central Susquehanna Valley Throughway or CSVT. This major expressway project along the Susquehanna River has been in planning and design for several decades. With a price tag of approximately one half billion dollars, the project has suffered delays primarily due to shortages of State and Federal funding. This expressway would connect communities and important state highways along the Susquehanna River north of Harrisburg to Interstate 80, providing a much needed north-south expressway connection for through traffic to Interstate 80. Over 50% of the cars and over 90% of the trucks traveling in the Susquehanna Valley do not have an origin or destination within the Valley.

Southern sections of the CSVT were located close to and accessible from communities like Shamokin Dam and Sunbury where the project would reduce truck traffic, moderate congestion and improve safety along the Golden Mile, one of the busiest sections of Routes 11 and 15. The northern section of CSVT would cross the Susquehanna River and follow a route to the east of US 15 essentially providing a bypass of the Lewisburg section of US 15. This would result in significant reductions in traffic volumes including through traffic and trucks traveling to and from Interstate 80 just a few miles to the north.

If and when completed, CSVT has the potential to transform the Lewisburg and East Buffalo Township area by returning US 15 to the highway it used to be 50 years ago when it carried half the traffic

it sees today. The current planning for traffic, pedestrian safety, aesthetic and land use improvements along the US 15 corridor will be greatly facilitated by completion of the CSVT.

Former Pennsylvania House Furniture Parcel Redevelopment

The parcel formerly occupied by the Pennsylvania House Furniture Company is one of the largest redevelopment projects in the US 15 corridor planning area. Consisting of approximately 42 acres, the site is strategically located adjacent to US 15, the new Buffalo Valley Rail Trail and the Lewisburg Area Recreation Park. Downtown Lewisburg business district and Bucknell University are located nearby. The project would include 200 residential units, about 250,000 square feet of commercial space and will be anchored by a major grocery chain and/or a CVS. The CVS store would be relocated from its current location on US 15 north of Buffalo Road in the Borough. The project is proposed by Meridian Development Corporation. The site plan includes an interconnected street network that provides connections between Market Street and Saint Mary Street. The developer is to construct capacity and operational improvements at the US 15 / Saint Mary Street and US 15 / Market Street intersections.

Lewisburg Area High School Site

The Lewisburg Area High School occupies 6½ acres at the southeast corner of US 15 and Market Street, at the center of the study area. The School District has an intention to move the high school to a site on Newman Road in Kelly Township, although financial considerations have delayed a decision about when to undertake this move. When the present high school is vacated, however, a relatively large, strategically-located site will then be available for an alternative use. How this site will be used is a key element in the long-term future of the US 15 corridor.

East Buffalo Township (EBT) Municipal Offices and Complex

The existing Township offices are located on Fairground Road and housed in an older building, which was formerly associated with agricultural operations adjacent to the Union County Fair Grounds. Because the administration building and associated maintenance buildings are substandard and do not meet the current or growing needs of the Township, Township Officials have conducted a needs assessment and feasibility study for a new facility. The new buildings and facility would be located on Township land adjacent to the existing buildings and would include space for the administrative, police and other functions of Township government. Although the area is partially located in a floodplain, the site design and site preparations would raise the building elevations to acceptable levels. Although the new Township building complex was designed and released for construction bids, costs were determined to be in excess of estimates, so the project is on hold.

Although the new Township Complex will be reconsidered at a later time and will be located within the Township boundaries, some Township government functions, such as the police, are being considered as a shared operation with other local jurisdictions. For instance, the regional police department has leased office space along the south side of SR 0045 in East Buffalo Township, between West Milton State Bank and the US Postal facility, east of Fairground Road.

Bucknell University Campus Planning

The Bucknell campus consists of extensive property and facilities on the east and west side of US 15. Generally, administrative, academic and student buildings are part of the campus area adjacent to Lewisburg Borough on the east side of US 15. Property west of US 15 is primarily reserved for sports, athletics and open space including

the golf course. One major exception is the student residential area known as the “mods”. These residential structures were built in the 1970s as temporary student housing. Bucknell is currently in the process of a campus building program which includes plans for new student housing on the east side of US 15. Completion of this new housing will allow for the ultimate demolition or re-use of the mods.

Another important capital project for the University involves the relocation and reconstruction of the Moore Avenue / Smoketown Road intersection with US 15. This signalized intersection is the primary access point for the campus and it is situated at the bottom of a steep grade on US 15. Safety concerns have been prompted due to the vehicular speeds and the high volume of trucks traveling US 15. In inclement winter weather trucks have failed to stop at the intersection and on occasion have been involved in accidents at this location. The presence of students crossing at this location has increased concerns about safety. A pedestrian underpass has been constructed for students crossing US 15 in this area, but some students, bicyclists, runners and joggers continue to cross at-grade and travel along the shoulders of US 15.

Plans include relocation and redesign of the intersection, which would move it approximately 500 feet to the north and away from the steep grades on US 15. The design would include better signals and crosswalks for pedestrian safety, new landscaping and other improvements. All necessary funding is not available; therefore, no timetable for construction has been established.

Kelly Township Commerce

Kelly Township, through which US 15 travels north of Buffalo Creek, was largely rural until about 20 years ago, but since that time has

had a number of significant commercial and institutional land developments occur on the west side of the highway. The character of this part of US 15 is different than that south of Buffalo Creek, with the former consisting of development parcels of 10 acres (or more), large-footprint buildings often set 500 to 600 feet back from the right-of-way, and a view from the road that is dominated by off-street parking lots and satellite fast food and retail establishments.

Kelly Township’s businesses represent strong competition for those on US 15 south of Buffalo Creek as both areas seek to draw customers from Lewisburg Borough and East Buffalo Township and from visitors and pass-through traffic. One of the challenges for the latter municipalities is to protect their economic base in commerce along US 15, an area that has its roots in the more traditional form of highway commercial activity, including multiple, small-lot businesses with buildings sited close to the road, and frequently with cramped on-lot vehicular circulation and parking.

Former Giant Foods Site

The Giant Foods site occupies a 15 acre, commercially zoned parcel located near the southern end of the study corridor. This vacant parcel has been the topic of discussion during the steering committee meetings and development of the corridor plan. The site was previously proposed for development of a Giant Foods store in 2001. New access to the site was problematic resulting in the denial of the PennDOT highway occupancy permit. After litigation, the development application was withdrawn. The site continues to be of interest because it is one of the largest commercially zoned parcels in East Buffalo Township representing a potentially significant traffic requiring access and egress on US 15. Its future development is likely under stronger economic conditions.

Zoning Discrepancies

The boundary between East Buffalo Township and Lewisburg Borough runs down the centerline of US 15 from 7th Street to the Bucknell campus, including the intensively developed commercial areas from 7th Street to Market Street. Each municipality has its own zoning designation for lands on its side of the line (H-C for East Buffalo Township and C-H for Lewisburg Borough) and development standards under the respective designations. The lack of consistency in standards between one side of the road and the other may contribute to a lack of a consistent, high-quality character for this portion of the corridor. Certainly, one way to approach gaining a more high-quality character for this portion of the corridor may be to enact development regulations that are the same for both sides of the street.



CHAPTER 3



US 15

Smart Transportation Corridor Improvement Plan

Assessment of Strengths, Weaknesses, and Opportunities

Corridor Assessment

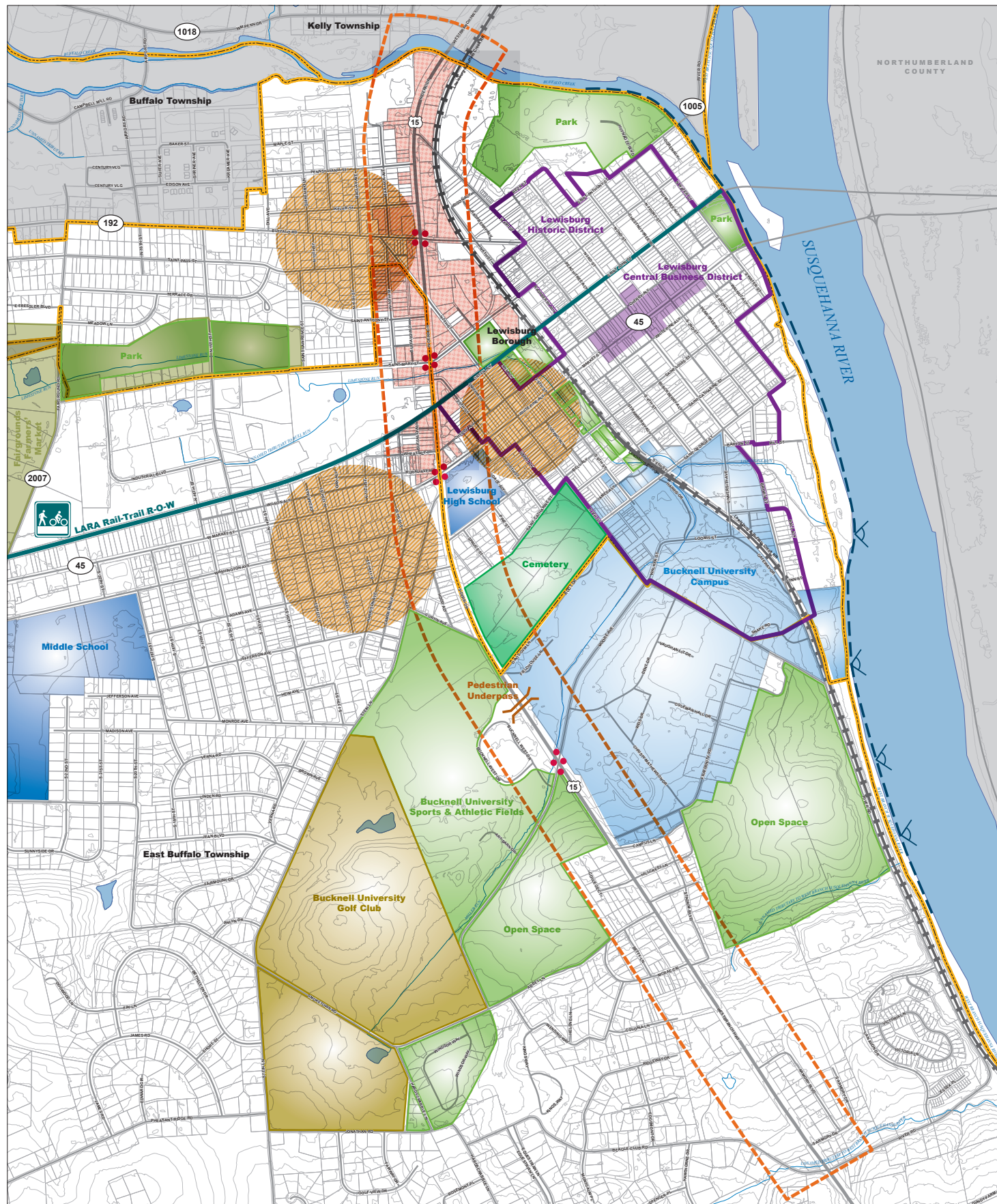
As part of the *US 15 Smart Transportation Corridor Improvement Plan*, the Project Team completed an inventory of existing conditions in the corridor, which is summarized in a series of maps called Strengths, Weaknesses, and Opportunities.

Strengths (Figure 3.1)

These are aspects of the corridor's current situation that are positive factors for the US 15 corridor and that may form a foundation upon which to capitalize.

- US 15 has an existing commercial corridor with a variety of services and retail.
- There is a strong Central Business District in Downtown Lewisburg, adjacent to US 15.
- There is a pedestrian underpass of US 15 that provides pedestrian access between both sides of Bucknell University.
- Bucknell University's campus straddles US 15.
- US 15 has many existing signalized intersections that allow for pedestrian cross-movement.





- The majority of Lewisburg Borough and part of Bucknell University are within the Lewisburg Historic District.
- Large open spaces about US 15, of which some are located within walking distance of US 15.
- There are many existing parks and recreational facilities in East Buffalo Township and Lewisburg Borough.
- There is a strong grid roadway network on both sides of the corridor.
- There is a year-round Farmers Market on Fairground Road.
- The Lewisburg Area High School is on a parcel that is centrally located on US 15.
- The Buffalo Valley Rail Trail's right-of-way bisects US 15.
- There are many opportunities to view the Susquehanna River along its riverbanks, including Soldiers Memorial Field.
- Lewisburg is consistently praised as a local and regional destination.

Figure 3.1: Strengths

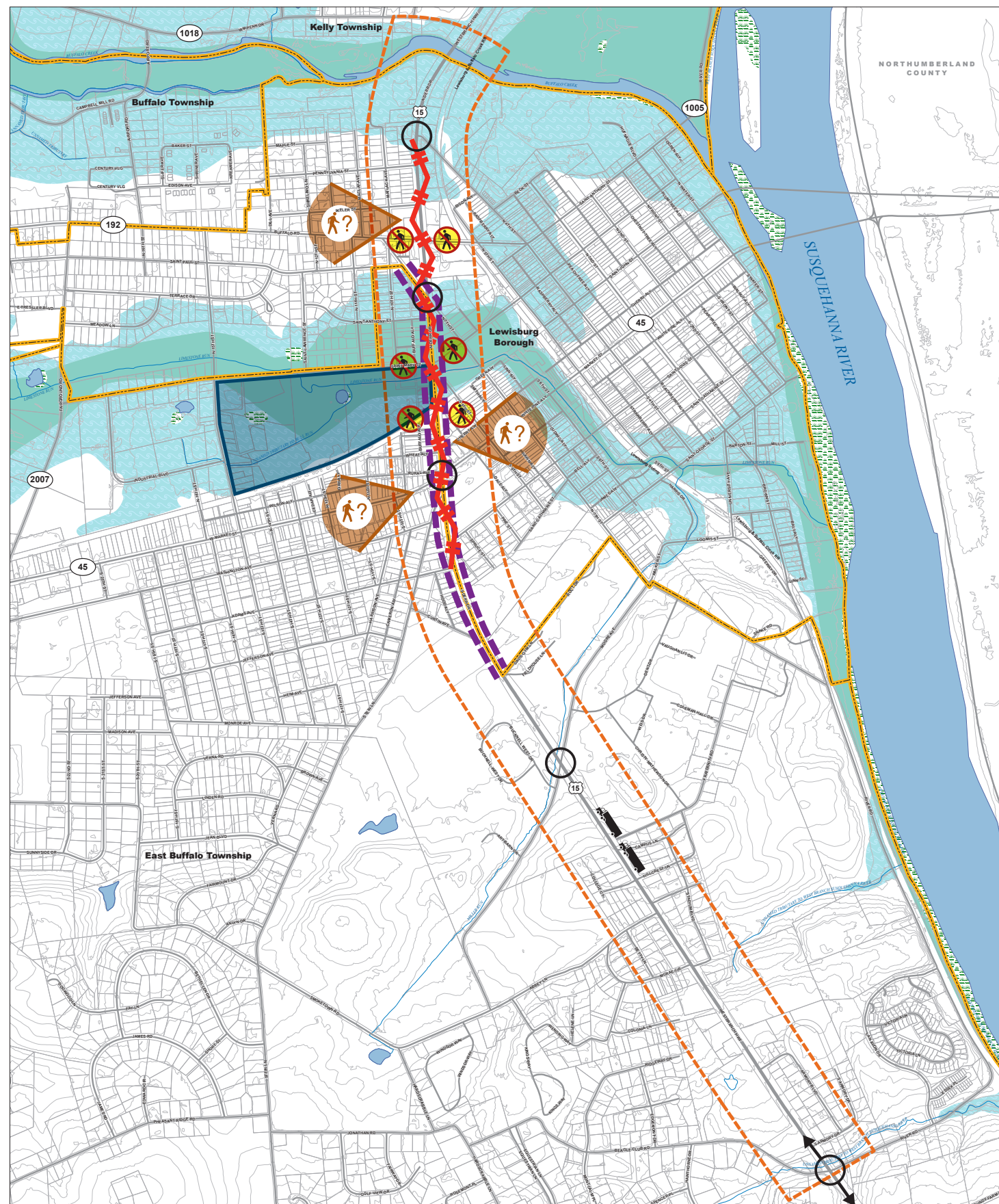
US 15
Smart Transportation
Corridor Improvement Plan

US 15 Corridor Study
STRENGTHS
(ASSETS)

0 300 600 Feet

McCormick Taylor
Engineers & Planners
Since 1961
Source: Union County, McCormick Taylor,
March, 2011

- LEGEND**
- Study Corridor
 - Municipal Boundary
 - Good Roadway Network
 - Commercial Area
 - Open Space
 - LARA Rail-Trail Right-of-Way
 - View of River
 - Traffic Signal Provides Pedestrian Cross-Movement
 - Fairground, Farmers' Market



US 15 Corridor Study

WEAKNESSES (PROBLEMS)

 0 300 600 Feet

 Source: Union County, McCormick Taylor, March, 2011

LEGEND

 Study Corridor

 Municipal Boundary

 Barrier to East-West Movement, Especially Pedestrian

 Pedestrian Movement along Corridor Inhibited

 Problem Intersection - Geometry

 Floodplain

 "Superblock" is Impediment to Circulation

 Truck Traffic - Volume - Speeds - Noise

 Jurisdictional Boundary - Lack of Access Controls - Lack of Sidewalks - No Green - Impervious Cover - Borough/Township Development Standards Inconsistency

 Lack of Sidewalks Approaching the Corridor

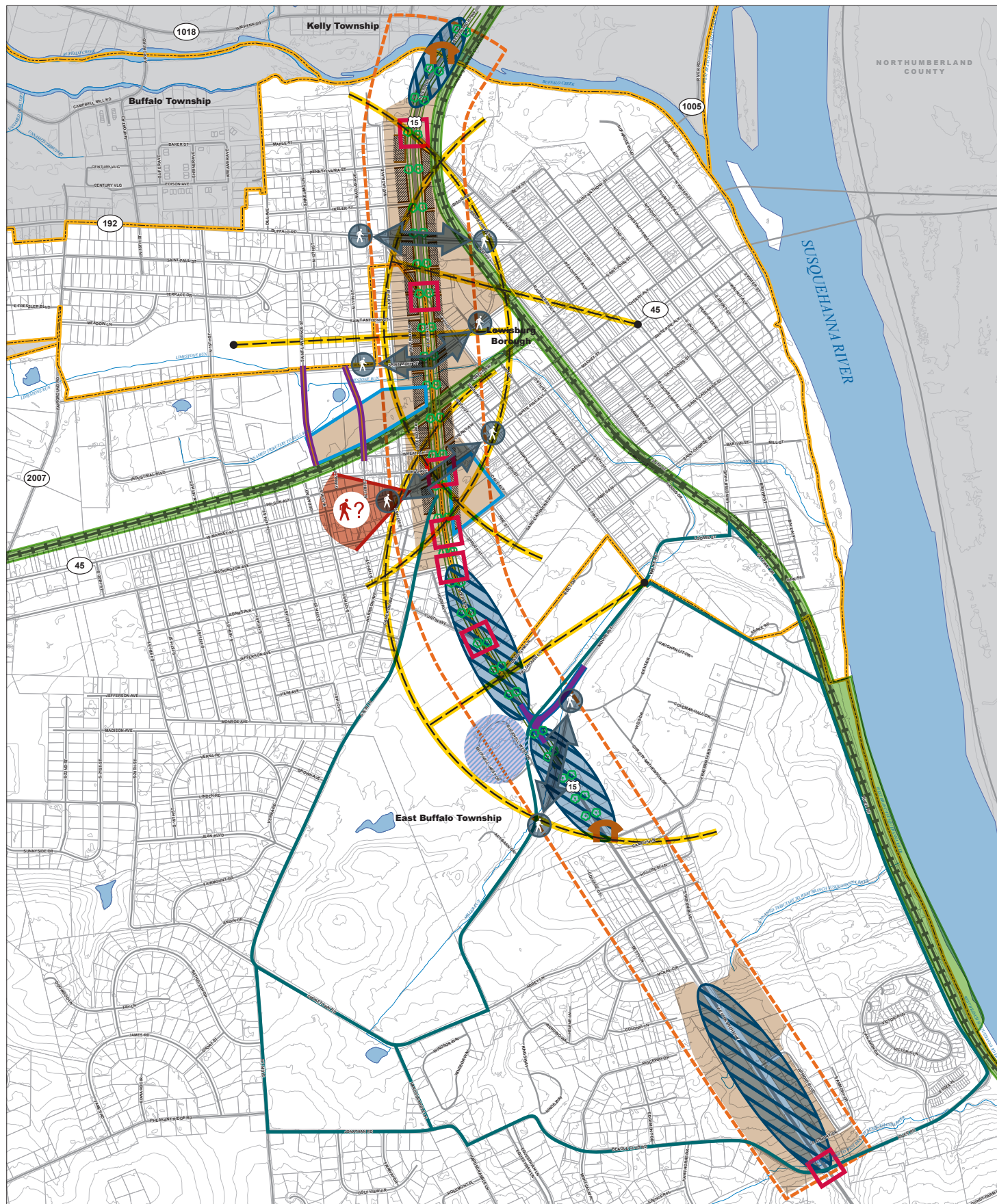
Figure 3.2: Weaknesses

Weaknesses (Figure 3.2)

Weaknesses are aspects of the corridor that are negative factors and that will have to be overcome in some manner to realize a better future.

US 15 acts as a barrier, not allowing communities and facilities on either side to easily connect. US 15 is characterized with high peak travel flows and speeds; significant truck traffic, and limited safe pedestrian and bicycle crossings.

- US 15 has few sidewalks, crosswalks, or refuges, which discourages safe pedestrian movements.
- Uncontrolled access and driveways along US 15 create a more chaotic traffic pattern.
- There are very little landscaping elements or other plant amenities along US 15.
- There is no "gateway" to identify Lewisburg Borough.
- There is no wayfinding signage system in place to alert people about what is located just off US 15.
- There are gaps in the local roadway grid.
- There are 5 intersections that have problematic geometry.
- The prospective Buffalo Valley Rail Trail crossing of US 15 presents a challenge for safe multi-modal crossing.
- Extensive floodplain areas and wet soils characterize much of the urban corridor.
- A majority of US 15 is a political boundary between Lewisburg Borough and East Buffalo Township, where inconsistent development and land use regulations make it very difficult to create a comprehensive vision for the corridor.
- Small and irregular parcels of land dominate the urban frontage along US 15, creating difficulties for redevelopment.



LEGEND			
	Study Corridor		Revised & Consistent Development Standards
	Municipal Boundary		Visual Gateway
	Better Crossing Conditions for Peds/Bikes at Signalized Intersections		Address Geometric & Safety Issues
	1/2 Mile (10-minute Walk) from Downtown Bucknell, Lewisburg Area Recreation Park		Incorporate a Mix of Land Uses in a Walkable Setting
	Significant Redevelopment Sites		Convenient & Safe Routes for Walking/Running/Biking to & through Open Space
			Additional Network/Connectivity
			New Open Space/Trails
			Revamped Bucknell Entrance
			Landscape the Corridor
			Sidewalks along Both Sides
			"Mods" Redevelopment
			Streetscape Modification for Traffic Calming & Access Management
			Logical, Convenient & Safe Pedestrian Access from West

Figure 3.3: Opportunities

Opportunities (Figure 3.3)

Opportunities include potential possibilities that will help shape a more improved future.

- Create gateways that announce arrival of destinations along US 15.
- Provide a wayfinding system that provides direction in a consistent manner.
- Provide streetscape modifications for traffic calming and access management along US 15.
- Implement the Moore Avenue Intersection Plan, which reconfigures the intersection to be a more conventional "X".
- Improve pedestrian crossings at signalized intersections to be more safe and comfortable.
- Add sidewalks and parallel pedestrian crossings along US 15.
- Develop consistent development standards for US 15 between East Buffalo Township and Lewisburg Borough.
- Provide a safe pedestrian/runner network to and through neighborhoods and open space along both sides of US 15.
- Landscape US 15 along the dense commercial core.
- Further analyze future development parcels near the US 15 corridor.

Seeing the Future through Opportunities

The synthesis of Strengths, Weaknesses, and Opportunities provides a foundation for an examination of a variety of integrated land use and transportation ideas for the future of the US 15 corridor. These ideas derived from the identified Opportunities for the corridor, supported by its Strengths, and responsive to the needs implied by its Weaknesses.

The Team developed four different themes to spur discussion with the SC related to prioritization of proposed improvement ideas:

- **Gateways & Nodes** focused on creating gateways at either end of the US 15 corridor and identified three mixed-use nodes at critical intersections in the northern half of the corridor. Bucknell University's strategic presence in the center of the corridor offered another opportunity to create a node to give a more prominent identity to the University's main entrance.
- **Green Boulevard** highlighted the ability to create opportunities for landscaping along US 15. A variety of green vegetation, including instances of natural feature crossings, could provide both a visual cue to manage traffic speeds and help manage stormwater runoff along the corridor.
- **Intersection & Parallel** theme called attention to two routes running parallel to the north portion of US 15 that could be imagined as more pedestrian-oriented mixed use streets, with major intersecting roads traversing the parallel roads and US 15. (Parallel routes are Matlack / N. 10th Street west of US 15 and 7th / 5th / 4th Streets, with connector elements, east of US 15.)

- **Multi-Municipal Main Street** illustrated the concept of a more compact building form and frontage along the northern section of US 15, and providing pedestrian amenities to create a more walkable environment along US 15.

These diverse themes were visualized and presented to the SC and public to generate thought, discussion, and some debate. Unfavorable elements of these themes were dropped while favorable elements and aspects were modified and retained for further consideration and incorporation into the proposed Corridor Improvement Framework described in Chapter 4.



CHAPTER 4

Corridor Improvement Framework



US 15 Smart Transportation Corridor Improvement Plan

This chapter describes the proposal of the *US 15 Smart Transportation Corridor Improvement Plan*. Many of the suggestions apply corridor-wide, while others are more focused on identity areas within the corridor. Collectively, the ideas fall within three major spheres, as follows:

- Infrastructure additions and changes to facilitate safety and mobility in the corridor, including support for multi-modal transportation, thereby improving connections between destinations within the study area and linkages to destinations outside the study area;
- Infrastructure additions and changes to enhance the character, livability, and sustainability of the corridor as well as upgrade the quality of the visual image and the experience of being in and traveling through the corridor;
- Locations and characteristics of future land use, development, and redevelopment.

In general, the corridor-wide strategies are intended to provide improved conditions for motorists, pedestrians, and cyclists as they travel into, along, and across the corridor. Functional improvements to the systems for movement have been identified. In addition, a set of streetscape conditions, relative to sidewalks, crosswalks, side buffers, a center median, street trees, parking, and lighting are

proposed in support of the functional systems for movement and for land use, as well as to provide a visual identity for the corridor (Figure 4.1). When implemented, the common physical elements of the streetscape can provide visual unity for the corridor and make it a safer and more comfortable place for all modes of travel as well as a desirable place for shopping, working, living, and recreating.

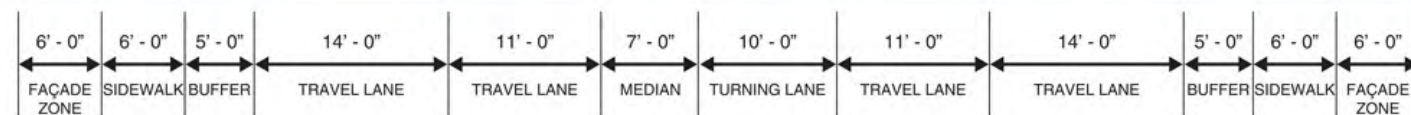
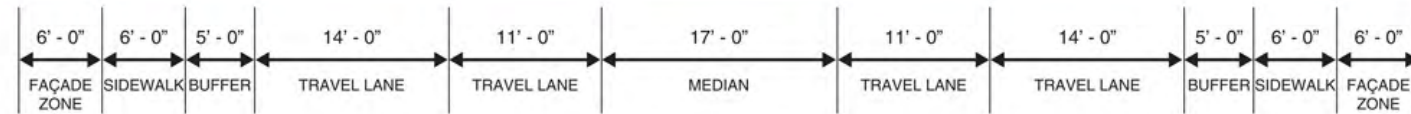
The Corridor Improvement Framework (Figure 4.2) includes the following key mobility and streetscape components:

- Changes to the US 15 cross-section through most of the corridor to provide for multi-modal access, especially for walking;
- Inclusion of a center landscaped median and landscaped side verges (buffers) through most of the corridor;
- Changes to intersections, most-notably the intersections in the northern half of the corridor, including US 15 and Market Street (PA45), Saint Mary Street, 7th Street, Buffalo Road (PA192), and 4th Street;
- Relocated Saint Mary Street east of its intersection with US 15;
- Relocated Stein Lane to a position opposite Saint Louis Street;

- Closure of Rural Avenue to through traffic;
- Interim/short-term Buffalo Valley Rail Trail alignment from Thirteenth Street along Rural Avenue;
- Relocated Moore Avenue and Smoketown Road alignments to form a 90° intersection with US 15 about 500 feet north of the existing intersection; and,
- Deceleration lanes for right turns into Beagle Club Road and River Road, respectively.



Figure 4.1: Suggested US 15 Cross Sections



The urbanized, commercial area of US 15, generally extending from William Penn Drive to Market Street, is a "hard-scape", almost entirely dedicated to auto oriented uses.

The General Conditions rendering (A) illustrate how a more balanced allocation of space is possible by accomodating a pedestrian zone, a landscaped buffer and a green median; all while retaining four through lanes and limited turning lanes. Although the right-of-way varies along the corridor, the average cross-section distance of approximately 100 feet, which allows adaquate opportunity for implementation of sidewalks, pedestrian amenities and landscaping.

The Signalized Intersection Conditions rendering (B) illustrates how the suggested cross section elements work at a signalized intersection.

Key Cross Section Components

- Multi-modal access
- Center landscaped median
- Landscaped side verges (buffers)
- 2 vehicle travel lanes in each direction
- Dedicated turn lanes at designated intersections
- Wide curb lane to accommodate cars, trucks, bikes, & rubber-tired transit vehicles
- Roadway and pedestrian-oriented lighting
- Sidewalks
- Street trees
- Pedestrian- and storefront-oriented façade zone adjacent to buildings

Figure 4.2: Corridor Improvement Framework Plan

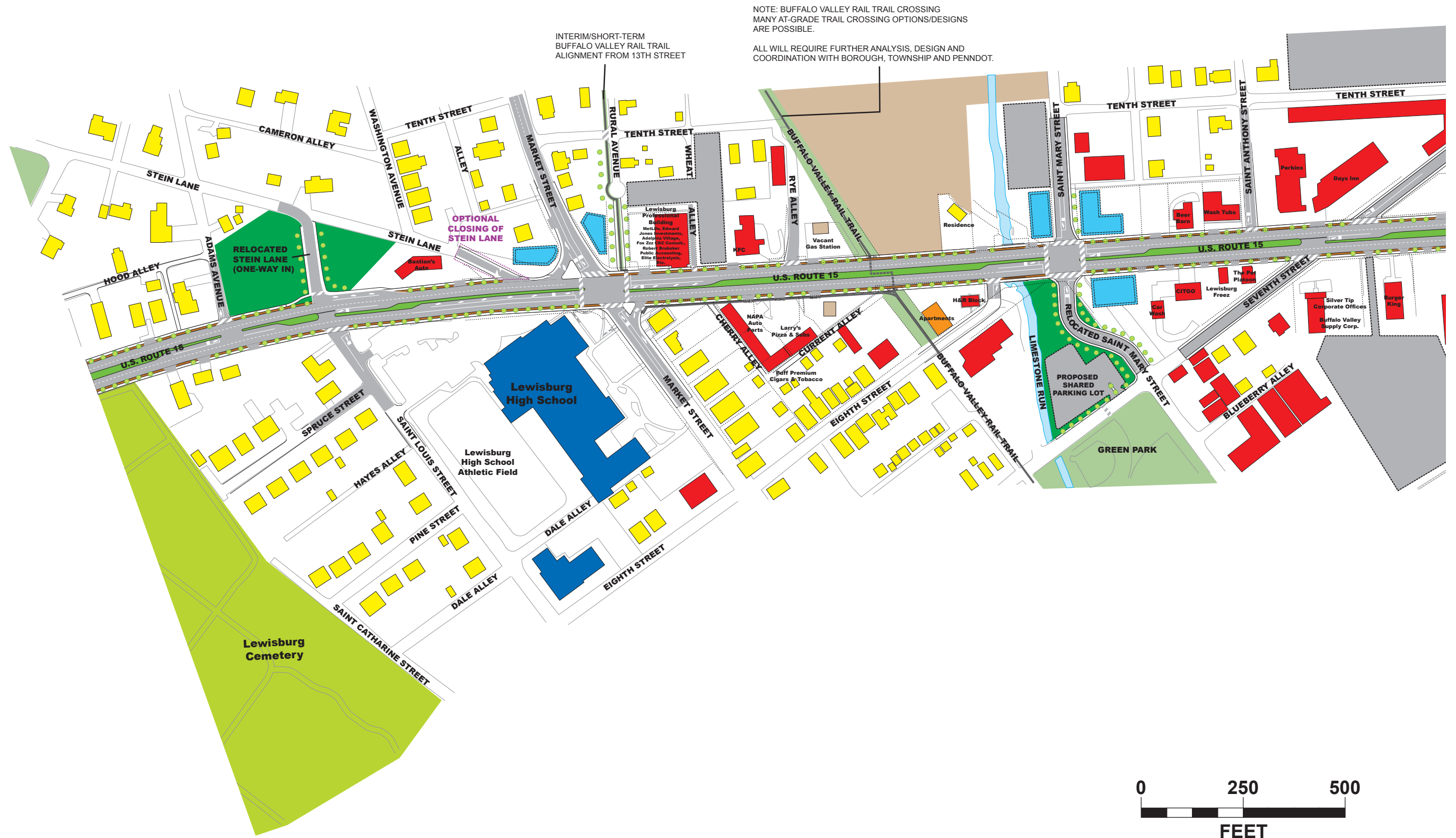


Figure 4.2: Corridor Improvement Framework Plan



U.S. 15 Smart Transportation Corridor Improvement Plan

LEGEND

EXISTING LAND USE

- | | |
|---------------------------|---------------|
| Agricultural | Institutional |
| Single-Family Residential | Open Space |
| Multi-Family Residential | Recreational |
| Commercial | Vacant |
| Cemetery | |

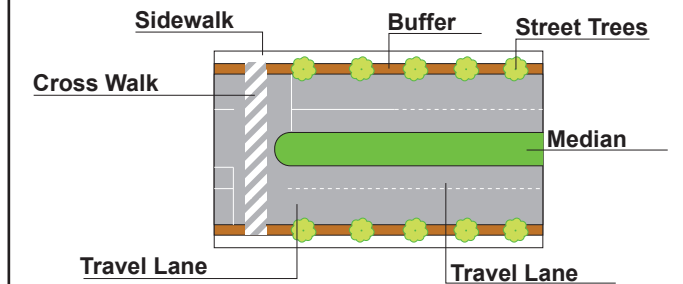
EXISTING FEATURES

- | | |
|--------------------|--------------------|
| Legal Right of Way | Recreational Trail |
| Edge of Pavement | Structure |
| Topography | Hydrology |

PROPOSED FEATURES

- | |
|--------------------|
| Mixed-Use Building |
| Shared Parking Lot |
| Removed Roadway |

PROPOSED IMPROVEMENTS



0 250 500

FEET



Figure 4.2: Corridor Improvement Framework Plan

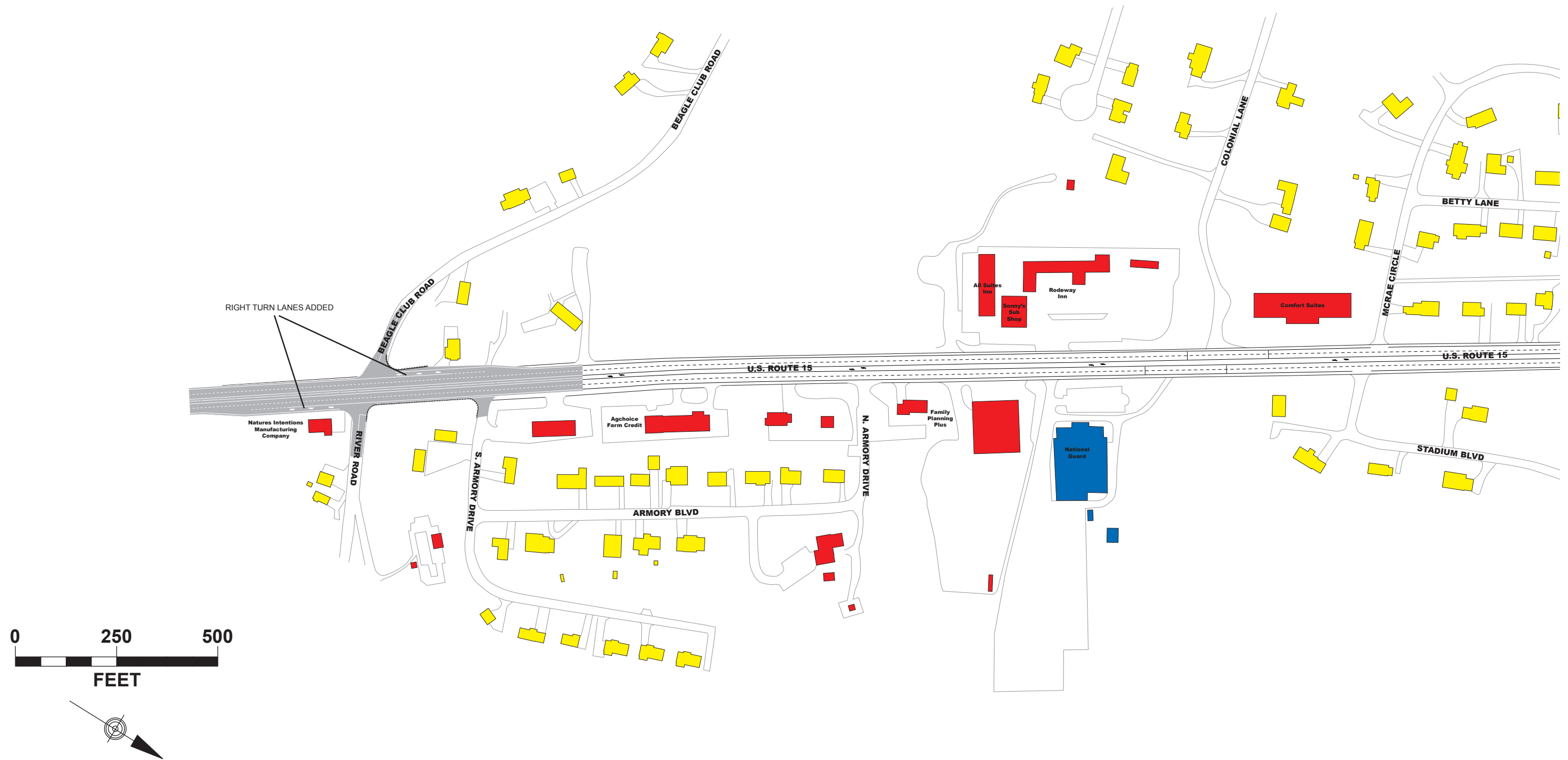
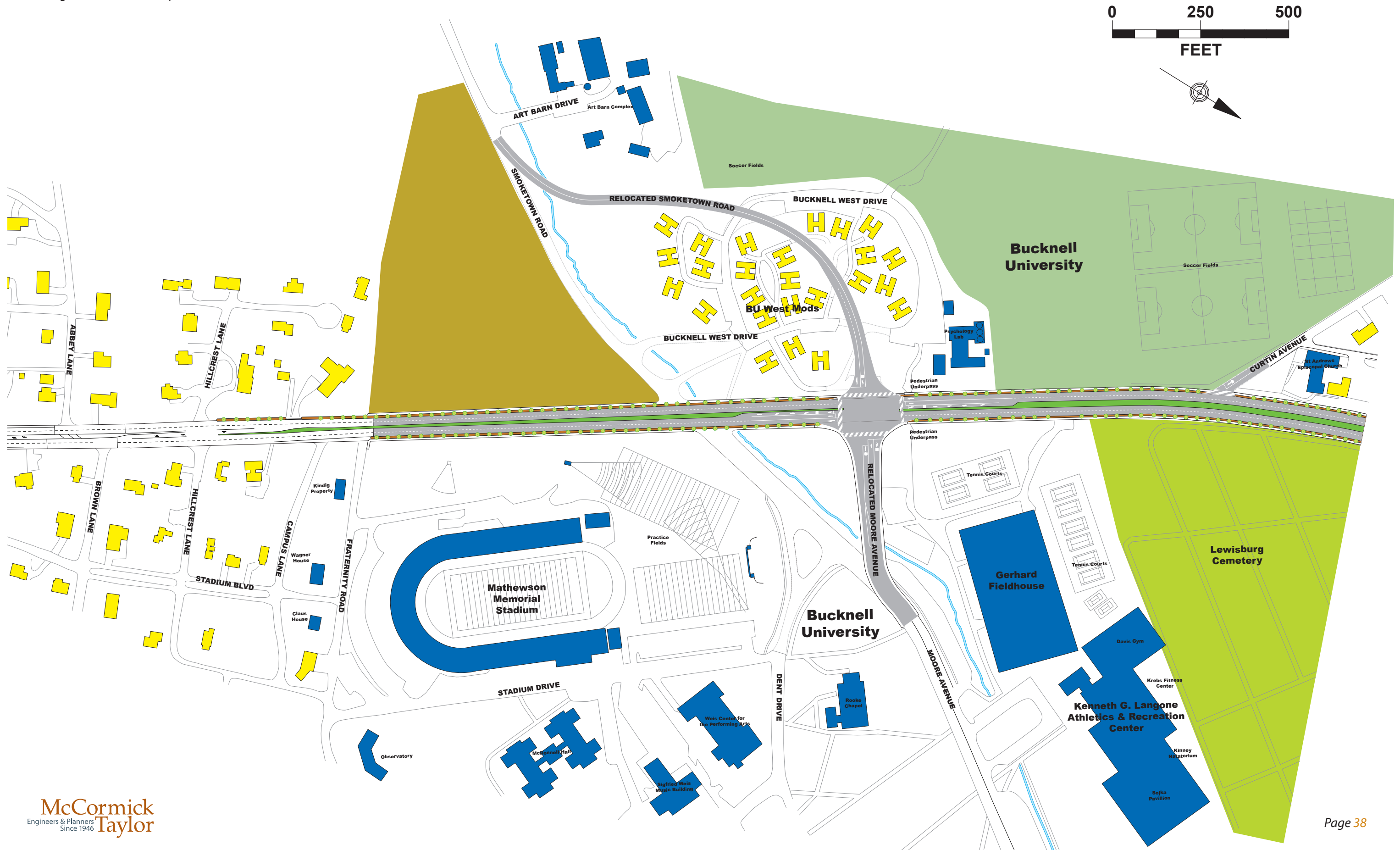


Figure 4.2: Corridor Improvement Framework Plan



U.S. 15 Smart Transportation Corridor Improvement Plan

SYSTEM PLAN: VEHICULAR CIRCULATION

The northern half of the corridor is where most of the land use and walkability ideas are concentrated. Specifically, lands that adjoin the intersections of US 15 with Market Street, Saint Mary Street, and Buffalo Road are identified as part of a first phase of an intended long-term transformation of this half of the corridor into a pedestrian-friendly, mixed-use environment through the development and redevelopment of properties. In addition, a system of shared parking lots for businesses and activities is indicated for the Market Street-to-Buffalo Road area. Other land use changes along the corridor include the following components:

- Publicly-accessible green space east of the corridor alongside Buffalo Creek; between US 15 and 7th Street, at Saint Mary Street; and associated with a relocated Stein Lane; and,
- Removal of at least some of Bucknell University’s West Mods structures in conjunction with a relocation of Moore / Smoketown Road.

The land use and transportation strategies work together and support each other. For example, intersection improvements at Market Street, Saint Mary Street, and Buffalo Road, among other benefits, support the prospect of the development and redevelopment of properties at this intersection. Such land developments encourage the emergence of a comfortable environment for pedestrians and cyclists to cross US 15 at these intersections and reach destinations such as parks and schools on the opposite side of the roadway. A major part of how the land use-transportation integration would occur is through the implementation of Complete Streets throughout the corridor. Complete Streets refers to roads constructed or upgraded so that they serve the needs of all users, not just motorists, making it easier than before to walk, bike, or even use transit. Nationally and state-wide, Complete Streets have received widespread endorsement from policymakers. Pennsylvania’s Smart Transportation Initiatives and handbook represents this new model for transportation design and function.

The identified locations for development and redevelopment have specific land use potential for the future, but may also serve as catalyst sites for the rest of the corridor; as the identified areas at Market Street, Saint Mary Street, and Buffalo Road are improved, spontaneous investment is likely to spread further along the corridor. The identified areas are Smart Growth-oriented, in particular focusing on the following principles:

- Mixing of land uses;
- Revitalizing commercial areas;
- Providing a variety of transportation options;
- Creating walkable and bikable communities;
- Expanding housing opportunities;
- Establishing permanent and usable open space;
- Fostering distinctive, attractive settings with a strong sense of place.

Vehicular Circulation

Vehicular circulation occurs through the corridor on US 15 and via its intersecting routes (Figure 4.3). US 15 continues as an arterial route with 2 travel lanes in each direction. The current center turning lane would become a curbed and planted median from north of Fraternity Road through to William Penn Drive, with dedicated left turn lanes at important intersections. For a discussion of impacts, see Operational Traffic Analysis of the Corridor Improvement Plan, beginning on page 58)

North of the high school, full vehicular turning movements would be permitted along US 15 at Market Street (PA45), Saint Mary Street, Buffalo Road (PA192), and William Penn Drive. Southbound traffic on US 15 could make left turns into 4th and 7th Streets, but left

LEGEND

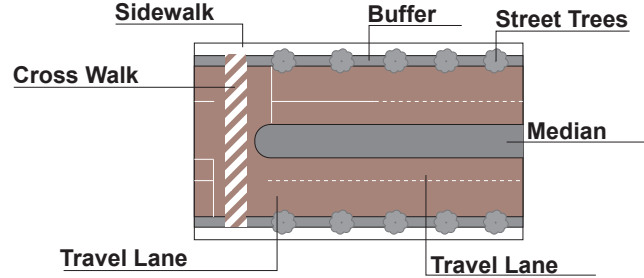
EXISTING FEATURES

- Legal Right of Way
- Edge of Pavement
- Topography
- Recreational Trail
- Structure
- Hydrology

PROPOSED FEATURES

- Mixed-Use Building
- Shared Parking Lot
- Removed Roadway

PROPOSED IMPROVEMENTS



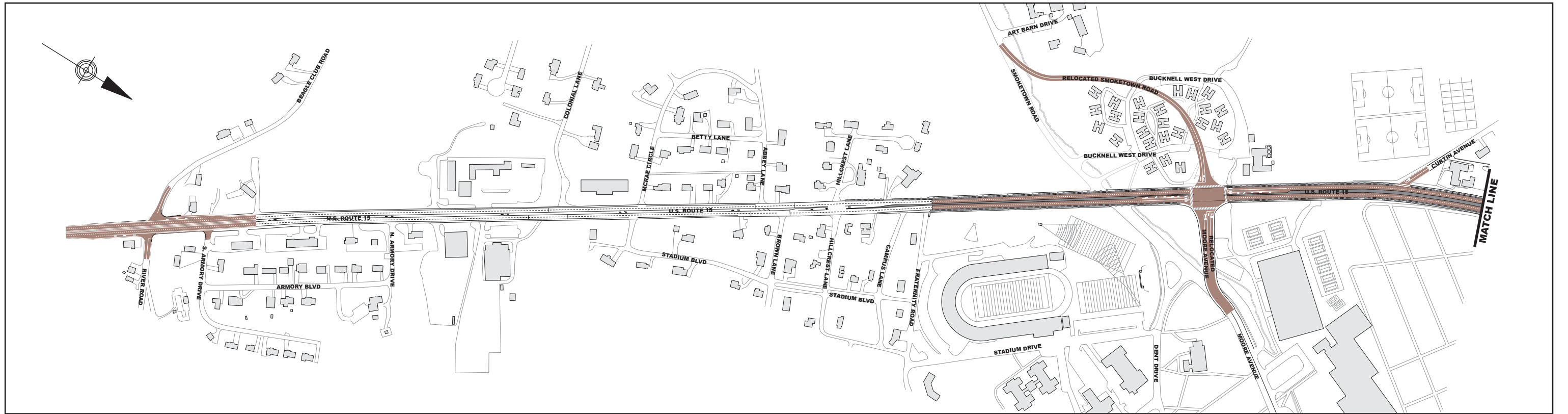
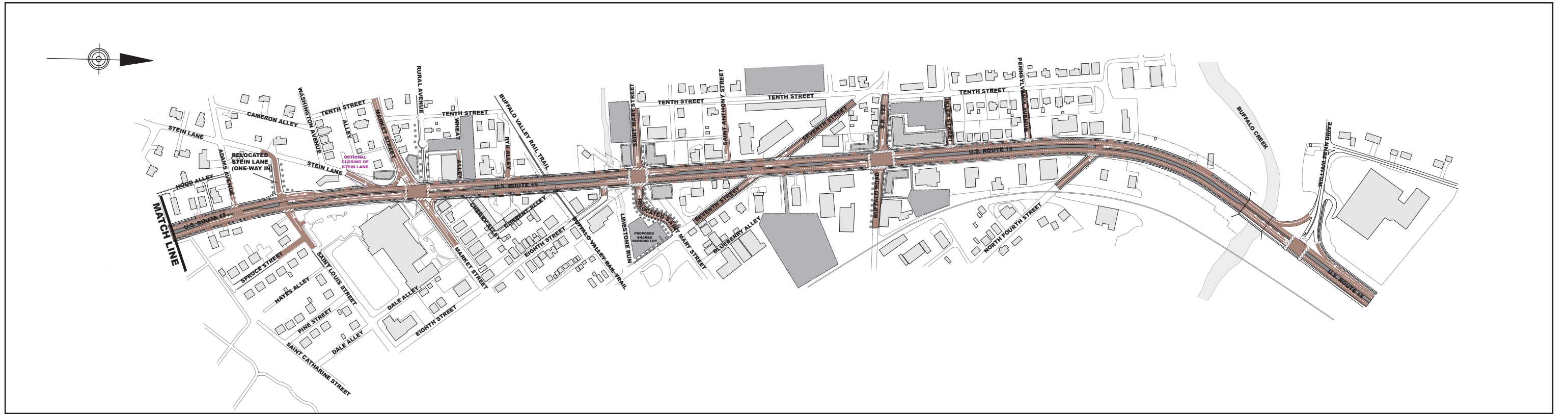
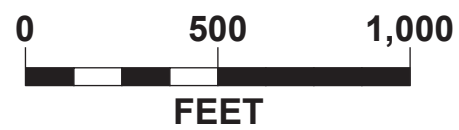


Figure 4.3: System Plan - Vehicular Circulation



turns out of these streets onto US 15 (or, in the case of 7th Street, movement all the way across US 15) would be prohibited. Right turns out of all intersecting streets onto US 15 would continue to be permitted.

South of the high school, southbound traffic on US 15 could make left turns into Saint Louis Street but only right turns out of Saint Louis Street would be permitted. Only right turns out of Curtain Avenue would be permitted. In contrast, full movements to and from Adams Avenue could occur.

The prospect of moving access to Stein Lane to a position away from Market Street has been included as a safer option than the continued operation of the existing one-way roadway that leads southwest directly from the busy US 15 / Market Street intersection. The relocated Stein Lane would also be one way inbound and would have a southbound deceleration lane on US 15. There would be no connection between the relocated Stein Lane and Saint Louis Street.

The relocation of the alignments of Moore Avenue and Smoketown Road so as to form a 90° intersection with US 15 about 500 feet north of the existing intersection is consistent with the long-term plans of Bucknell University. Such a change will benefit pedestrian safety by directing pedestrians to the existing tunnel—where pedestrians can cross without exposure to traffic on US 15—or by reducing the overall crossing distance for pedestrians who choose to cross at grade. The existing Moore Avenue/Smoketown Road crossing is more than 100 feet, while the new Gateway intersection crossing would be less than 75 feet. In addition, with approaches intersecting at right angles, vehicles will be optimally placed to see pedestrians in the crosswalks, as well as other vehicles on conflicting approaches. The relocation would also position the intersection further from the hill to the south, which poses risks to pedestrians

and motorists in inclement weather, as northbound vehicles on US 15 are prone to skid when they try and slow for the intersection and/or stop at the signal.

Pedestrian and Bicycle Circulation

The inclusion of continuous sidewalks along both sides of US 15 from Fraternity Road north to William Penn Drive (Figure 4.4) is a significant change in the circumstances for pedestrians in the US 15 corridor. The opportunity to safely and comfortably walk along this thoroughfare to reach destinations on it and on intersecting and adjacent streets has the potential to transform the way in which the corridor is used.

In addition to US 15's sidewalks, located behind a landscaped verge (buffer) along the curbline, pedestrian crosswalks are present at all signalized intersections (William Penn Drive, Buffalo Road, Saint Mary Street, Market Street, Moore Avenue / Smoketown Road) to permit safe crossing of US 15. Other crosswalks occur at unsignalized intersections, for passage parallel to US 15.

The emergence of a pedestrian system of movement, via sidewalks and crosswalks, along US 15 should lead to the installation of sidewalks, where they are currently lacking, on streets that intersect with US 15. In this way, pedestrians can safely and comfortably reach destinations both along the corridor (Figure 4.5) and across the corridor.

U.S. 15 Smart Transportation Corridor Improvement Plan

SYSTEM PLAN:
PARKS & GREEN SPACE WITH
BICYCLE & PEDESTRIAN CIRCULATION

LEGEND

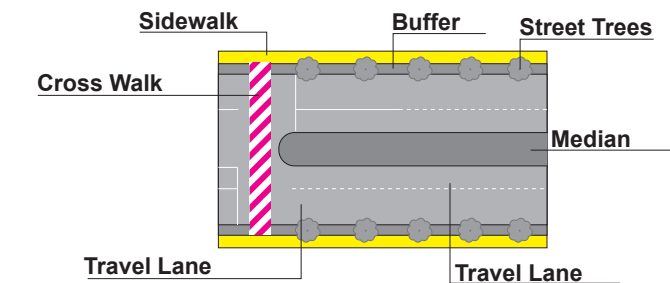
EXISTING FEATURES

- Legal Right of Way
- Edge of Pavement
- Topography
- Recreational Trail
- Structure
- Hydrology

PROPOSED FEATURES

- Mixed-Use Building
- Shared Parking Lot
- Removed Roadway
- Street Trees
- Median and Buffer
- Potential Pedestrian Route & Connections
- Agricultural
- Cemetery
- Open Space
- Recreational
- Recreational Trail
- Potential Bicycle Route & Connections

PROPOSED IMPROVEMENTS



NOTE: Colors in the figure are for graphic illustration purposes only.

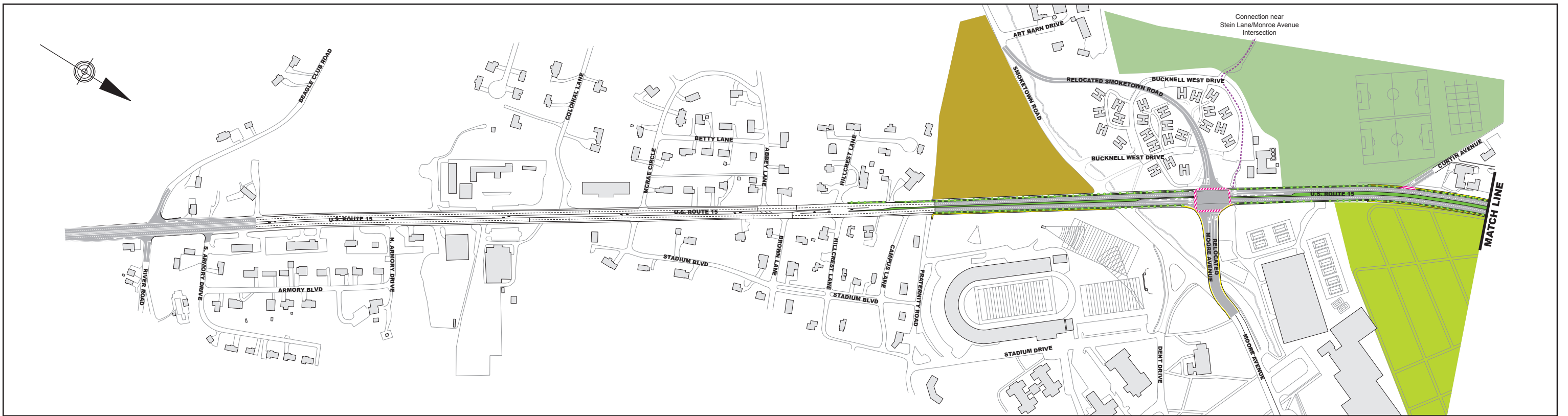
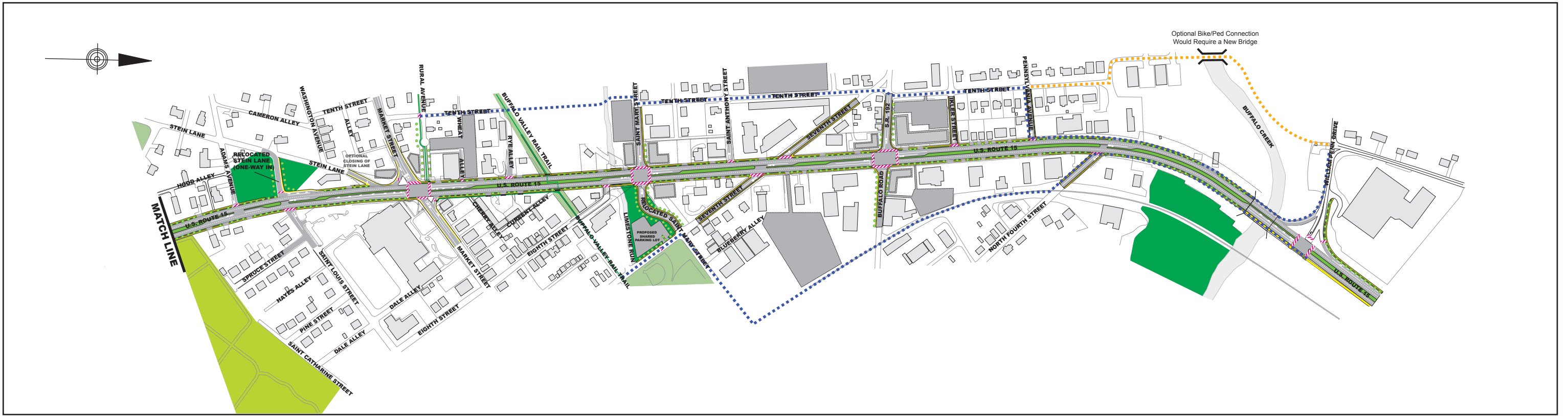


Figure 4.4: System Plan - Pedestrian, Bicycle, and Green Space

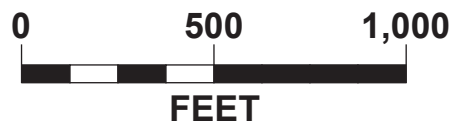


Figure 4.5: Buffalo Creek Before & After Vision



Before: Design Deficiencies

- Thin support for walking – no sidewalks or lighting
- Excessive concrete paving in median, sparse landscaping on west side
- Weak visual & functional connections to properties from right-of-way – vacant west side parcel
- No sense of arrival into/departure from Lewisburg Borough & East Buffalo Township

After: Key Design Features

- Multi-modal access
- Center landscaped median
- Gateway
- Landscaped side verge (buffer), west side
- Two vehicle travel lanes in each direction
- Roadway and pedestrian-oriented lighting
- Sidewalks
- Street trees
- Modest number & size of commercial signs



Although the combination of the BVRT and new sidewalks along US 15 will provide much needed improvements for non-auto mobility, additional network enhancements will benefit residents who prefer to walk or bicycle for shorter trips in the area. One easy improvement for this group would be the designation of short bike routes on existing roads. Because of the well developed local roadway network, many options are available. Specifically, north-west bike routes can be designated and signed along local roads one or two blocks off US 15. These roads have lower traffic volumes and lower travel speeds which are much more compatible with bicycle travel.

These designated bike routes, parallel to US 15, can provide an alternative to riding a bicycle along US 15 to access the shopping areas in Kelly Township. Young bicycle riders have been observed riding in travel and turning lanes of US 15 and occasional riders will cross US 15 at random and mid block locations. Designated routes parallel to US 15, along with new crosswalks, will provide a safer option and enhance the riders experience. These designated routes can connect to the BVRT and other east west roads and travel through residential neighborhoods to facilitate and encourage bicycle use while improving safety and driver awareness. Signs and directional information for the bike routes can be integrated with the wayfinding efforts when initiated.



BVRT Crossing Alternatives

The recently developed Buffalo Valley Rail Trail (BVRT) parallels Market Street (PA 45) to the west of Lewisburg. Phase 1 construction of the rail trail was completed in 2011 with the easternmost trailhead located at 12th Street –just south of the former Pennsylvania House Furniture site. The undeveloped rail right-of-way to the east crosses US 15 on a diagonal alignment between Saint Mary Street and Market Street. The vision for future phases of trail development includes a crossing of US 15, additional connections to the historic Borough of Lewisburg, and eventual crossing of the Susquehanna River.

Various options were examined from Pennsylvania and from around the US to consider the range of possible solutions. These are summarized in a matrix of alternatives and presented in Table 4.1. An interactive discussion of these alternatives was facilitated at the July 20, 2011 Steering Committee Meeting.

From a trail continuity standpoint, a crossing located on the current rail alignment is more convenient and in line with users' expectations than an indirect route that takes users off the rail alignment. Such a crossing located on the current rail alignment was strongly supported by rail-trail advocates, Lewisburg Borough, and East Buffalo Township municipal representatives.

Grade-separated crossing alternatives

These options consist of a tunnel or bridge to carry the trail over or under US 15. These would be located on or near the current rail alignment have been previously investigated by PennDOT and/or engineering consultants. Implementation/construction costs

for both options were relatively high (approximately \$1M+) and there were considerable design, utility and construction challenges to be overcome. Visual impact, security, ongoing maintenance, and ultimate utility of the grade-separated crossing were notable concerns. It was the consensus of the SC that these options were currently not practical, but should not be ruled out in the long term.

At-grade crossing alternatives

These crossing options would be generally located on the current rail alignment where it crosses US 15. For purposes of the *US 15 Smart Transportation Corridor Improvement Plan*, three typical crossing designs were defined and evaluated. These include:

- Unsignalized Crossing with Median Refuge (Figure 4.6)
- Full Signalized Crossing with Median Refuge (Figure 4.7)
- Rapid Rectangular Flashing Beacon with Median Crossing (Figure 4.8)

At grade crossing options may be considered favorable over grade separated options because of their lower costs, perceived ease of implementation, likelihood of use by bicycle and pedestrian traffic, and their compatibility with the median corridor concept. The median refuge is considered a critical element in making the crossing safer for pedestrians and bicyclists. A signalized crossing option was generally viewed as safer for pedestrians and bicyclists than an unsignalized crossing, since the signal would stop vehicles and allow pedestrian and bicycle traffic to cross unimpeded.

PennDOT expressed strong concerns about these at-grade crossing options based on the safety of pedestrians and bicyclists and potential vehicle queuing on US 15. During the peak traffic periods,

Table 4.1: Buffalo Valley Rail Trail Crossing Alternatives

	Crossing at Adjacent Signalized Intersection	Grade Level Crossing on Existing Rail Alignment			Grade-Separated Crossing on Existing Rail Alignment
	Market Street or Saint Mary Street Crossing	Unsignalized Crossing with Median Refuge	Full Signalized Crossing with Median Refuge	Rapid Rectangular Flashing Beacon Crossing with Median Refuge	Bridge or Tunnel Crossing
Description	Provide an “off-trail” crossing of US 15: <ul style="list-style-type: none"> South of the existing rail alignment at the Market Street (PA 45) signalized intersection; or North of the existing rail alignment at the Saint Mary Street signalized intersection. 	Provide an unsignalized rail-trail crossing of US 15 on the existing rail alignment	Provide a fully-signalized rail-trail crossing of US 15 on the existing rail alignment.	Provide a RRFB rail-trail crossing of US 15 on the existing rail alignment.	Provide a grade-separated crossing on the existing rail alignment via a bridge over US 15 or a tunnel under US 15.
Benefits	<ul style="list-style-type: none"> Provides a signalized crossing at an existing traffic signal within 700 feet of trail crossing. Allows peds/bikes to cross on a controlled pedestrian phase at an established signal. 	<ul style="list-style-type: none"> Provides most direct crossing of US 15 to rail-trail ROW east of US 15. Crossing <u>location</u> has strong community support. Minimal disruption to coordinated traffic flow if peds/bikes wait for gaps. 	<ul style="list-style-type: none"> Provides most direct crossing of US 15 to rail-trail ROW east of US 15. Crossing <u>location</u> has strong community support. Signal provides full control and exclusive assignment of right-of-way. Can be coordinated with the signal system 	<ul style="list-style-type: none"> Provides most direct crossing of US 15 to rail-trail ROW east of US 15. Crossing <u>location</u> has strong community support. 	<ul style="list-style-type: none"> Provides a semi-direct crossing of US 15 to rail-trail ROW east of US 15. Crossing <u>location</u> has strong community support. No disruption to coordinated traffic flow.
Issues	<ul style="list-style-type: none"> The indirect, “off-trail” crossing would add ~1,500 foot diversion from trail ROW and be inconvenient and out-of-line with trail users’ expectations. Market Street option requires closure of Rural Avenue connection to US 15. Saint Mary Street option requires coordination with Penn House Commons land development. 	<ul style="list-style-type: none"> Crossing safety – Conflict with vehicles queued back from Market Street or Saint Mary Street. Relies on gaps in traffic stream for safe crossing. Ambiguous assignment of right-of-way – Does “yield to ped in crosswalk” apply? 	<ul style="list-style-type: none"> Conflict with vehicles queued back from Market Street or Saint Mary Street. Likely to increase rear-end crashes near signal. Moderate disruption of coordination traffic flow, due to uneven signal spacing. 	<ul style="list-style-type: none"> Conflict with vehicles queued back from Market Street or Saint Mary Street. Does not provide exclusive assignment of right-of-way; risk of vehicles not stopping in both lanes for peds/bikes to cross. Moderate to significant disruption of coordinated traffic flow, depending on integration with signals. Likely to increase rear-end crashes near signal. 	<ul style="list-style-type: none"> Construction cost. Long-term maintenance cost. Visual impact. Utility impact. Security. Use.
Design Elements, Criteria & Implications	<ul style="list-style-type: none"> Requires “off-trail” route to get bicyclists to/from current rail-trail ROW. Market Street option might follow Rural Avenue to US 15, then along US 15, or on-street through Lewisburg Borough (Market to 7th Street to trail). Wider crosswalk and bike actuation buttons would be desirable at the US 15/Market Street intersection at the crossing location Saint Mary Street option might be on-street through Penn House Commons or along US 15 (bridge over Limestone Run is an obstacle). New crosswalk location, curb ramps, and bike actuation buttons would be necessary at the US 15/Saint Mary Street intersection at the crossing location. 	<ul style="list-style-type: none"> FHWA GUIDELINE: Unsignalized crossings are not appropriate where the average daily traffic volume (ADT) > 15,000 veh/day—regardless of whether or not a median refuge is provided. <p>DATA: US 15 ADT ~ 25,000 veh/day; Guideline ADT is exceeded.</p>	<p>WARRANT: Signal is warranted at crossings with:</p> <ul style="list-style-type: none"> 75 or more peds/bikes crossing per hour for each of 4 or more hours on an average day; or 93 or peds/bikes crossing per hour for one hour on an average day. <p>DATA: < 60 peds/bikes per hour observed crossing US 15 at Market Street and Saint Mary Street combined during highest hour (April 2011).</p> <p>Warrant is not satisfied by current pedestrian and bike traffic. Projections of ped/bike traffic may be used to warrant the signal but must be documented in an engineering study. If used, the installation should be studied within one year to determine if the signal is justified. If not justified, the municipality will be required to remove the signal or take it out of “stop and go” operation.</p>	<ul style="list-style-type: none"> GUIDELINE: Quantitative criteria for this new device have not been established. Effectiveness/safety of new device is based on studies conducted in Florida, New Mexico, Illinois, and Washington DC. Approval is handled on a “case-by-case” basis. 	
Coordination, Agreements & Approvals	<ul style="list-style-type: none"> Requires agreement/approval with municipal roadway owners for placement of directional signage, pavement markings, etc. Coordination with community recommended. 	<ul style="list-style-type: none"> Indemnification agreement required. Municipal maintenance agreement possibly required. Approval required from PennDOT Central Office and Engineering District. 	<ul style="list-style-type: none"> Indemnification agreement likely required. Municipal maintenance agreement required. Approval required from PennDOT Engineering District. 	<ul style="list-style-type: none"> Indemnification agreement possibly required. Municipal maintenance agreement required. Approval required from PennDOT Central Office, PennDOT Engineering District, and appropriate municipal officials. 	<ul style="list-style-type: none"> Municipal maintenance agreement possibly required. Approval required from PennDOT Central Office, PennDOT Engineering District, and appropriate municipal officials.
Infrastructure Needs & Estimated Cost	5,000 to \$10,000 <ul style="list-style-type: none"> Signage, bike accommodations at signals (Does not include new ROW or cost of bike lane/path along US 15) 	\$10,000 to \$15,000 <ul style="list-style-type: none"> Signage, crossing material (Does not include roadside work, median treatment, or removal of existing crossing) 	\$80,000 to \$90,000 <ul style="list-style-type: none"> Signage, signal equipment, overhead sign/signal mast arm(s) and poles, crossing material (Does not include median treatment, or removal of existing crossing) 	\$55,000 to \$65,000 <ul style="list-style-type: none"> Signage, signal equipment, overhead sign/signal mast arm(s) and poles, crossing material (Does not include median treatment or removal of existing crossing) 	\$1M + <ul style="list-style-type: none"> Bridge or tunnel structure, utility relocation, approach infrastructure, revised drainage facilities.



Figure 4.6: Unsignalized Crossing with Median Refuge



Figure 4.7: Fully Signalized Crossing with Median Refuge

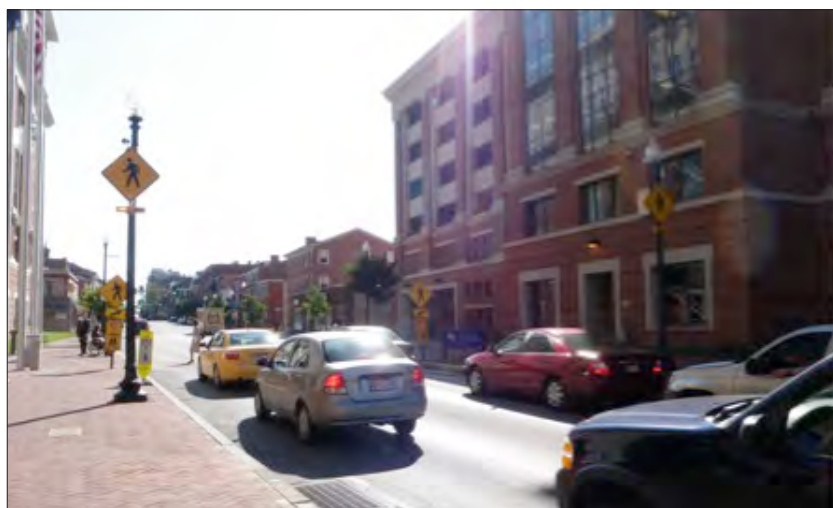


Figure 4.8: Rectangular Rapid Flashing Beacon

vehicle queues spillback from the adjacent traffic signals causing vehicles to stop on the current rail alignment. With or without a signal, vehicle queues may partially obstruct the trail crossing, and pedestrians and bicyclists would likely attempt to weave through the queued vehicles to cross US 15. If vehicle queuing on US 15 could be substantially and reliably reduced (either by improving the efficiency of the signal system or as a result of traffic volume reductions), an at-grade alternative may become favorable.

A new traffic signal installation at the crossing must be warranted according to the signal warrants established in the Manual on Uniform Traffic Control Devices (MUTCD), published by the Federal Highway Administration. Based on the pedestrian and bicycle traffic count data collected during the study, a traffic signal would not meet established warrants at the rail trail even if all the pedestrian and bicycle traffic crossing at Market Street and Saint Mary Street were diverted to the rail-trail crossing. The legal liability related to any unwarranted signal is generally undesirable by any agency, since there is no legally defensible justification for the signal. However, unwarranted traffic control devices may still be installed if the liability issue is resolved through indemnification.

A new signal at the rail-trail alignment will disrupt coordinated traffic flow on US 15. Closed-loop coordinated signal systems on arterials are most effective if the signal spacing is consistent and greater than a certain minimum—typically ¼ mile.

In the absence of a preferred option for the at-grade crossing options, an interim/short-term solution was advanced for the *US 15 Smart Transportation Corridor Improvement Plan*. This solution would propose a rail-trail alignment from 13th Street along Rural Avenue to the US 15 / Market Street intersection. From here, trail users would cross US 15 on a wider, bike-friendly crosswalk and continue on their way, either eastward along Market Street into the Lewisburg downtown, or northward back to the rail alignment on the east side of US 15.

Buildings, Land Use, and Parking

The Corridor Improvement Framework has already described the key locations in the corridor for land use change, investment, and place-making activities. The intersections of US 15 with Market Street, Saint Mary Street, and Buffalo Road are where new mixed-use buildings are encouraged, to spark new retail business, to support pedestrian use, to add to the municipalities' tax base and employment, and to provide a higher quality image for the corridor. Investment at these locations, it is hoped, will lead to additional investment along the corridor (Figure 4.9).

Buildings fronting the corridor define the space of the streetscape and contribute significantly to the experience of being in that space and creating a sense of place. Ideas for the corridor's special identity areas include both improving existing buildings and defining future buildings along the corridor (Figures 4.10 and 4.11). With regard to the former, routine maintenance and focused refurbishing of existing building façades along the corridor are encouraged to improve the ambiance. Future development should contribute to the pedestrian-friendly character proposed for the corridor. Buildings should be sited up close to the sidewalks.

Front façades of buildings should utilize awnings, columns, offset roof lines, cornices, and transoms to articulate architectural styles and provide an articulated first story and entryway. Building façades should include windows and glazed doors to provide a minimum of 60% transparency on the ground floor façade. Window displays for retail stores are encouraged. The maximum signage area should be no more than 5% of the total façade area. A minimum of two feet in front of the entrance and apart from the effective sidewalk area (pedestrian throughway) should be free of obstacles to provide adequate space for entering and exiting the building.

A gradual evolution to a mixed-use character for the northern half of the corridor will need to be supported by planning and zoning measures on behalf of East Buffalo Township and Lewisburg Borough. The current dominant zoning designations (H-C for East Buffalo Township and C-H for Lewisburg Borough) and the development standards under the respective designations will need to be changed to underpin mixed-use development, including multi-story buildings. In order to encourage a consistent, high-quality character for this part of the corridor, the two municipalities should work together for a single mixed-use zoning district that can be applied as an overlay to properties that have frontage on US 15.

One of the shortcomings of the current parcel layout of this part of the corridor is that the multiple, small lots frequently have cramped on-lot vehicular circulation and parking. Business operators in traditional shopping areas with similar circumstances have sometimes realized that their ability to compete with newer districts may depend on their ability to act together and provide customers attractive and convenient parking lots at strategic locations and to operate these facilities cooperatively. The *US 15 Smart Transportation Corridor Improvement Plan* identifies some potential sites for such "shared" parking lots and recommends that the concept be studied further by a Task Force made up of business operators and the municipalities. These shared parking areas, together with sidewalks and pedestrian amenities, will contribute to a walkable mixed-use environment.

For a discussion about prospective zoning for this area, please see Chapter 5.

U.S. 15 Smart Transportation Corridor Improvement Plan










SYSTEM PLAN: BUILDINGS & PARKING WITH LAND USE

LEGEND




EXISTING FEATURES

 Legal Right of Way	 Recreational Trail
 Edge of Pavement	 Structure
 Topography	 Hydrology

EXISTING LAND USE

 Agricultural	 Institutional
 Single-Family Residential	 Open Space
 Multi-Family Residential	 Recreational
 Commercial	 Vacant
 Cemetery	

PROPOSED FEATURES

 Mixed-Use Building
 Shared Parking Lot
 Removed Roadway

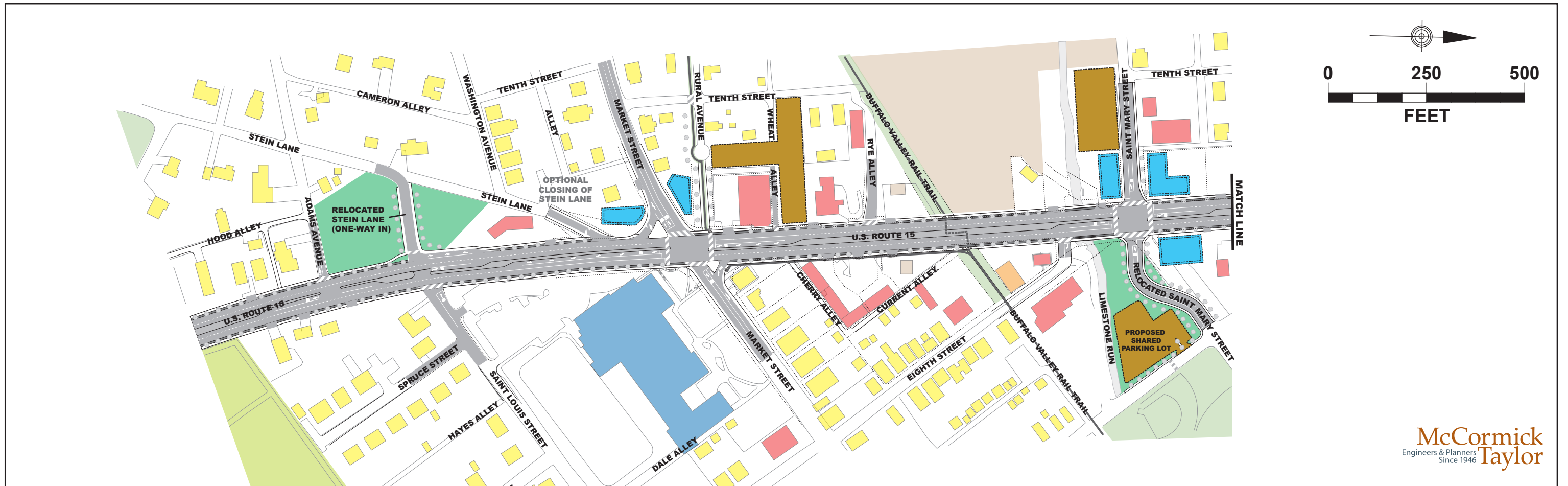
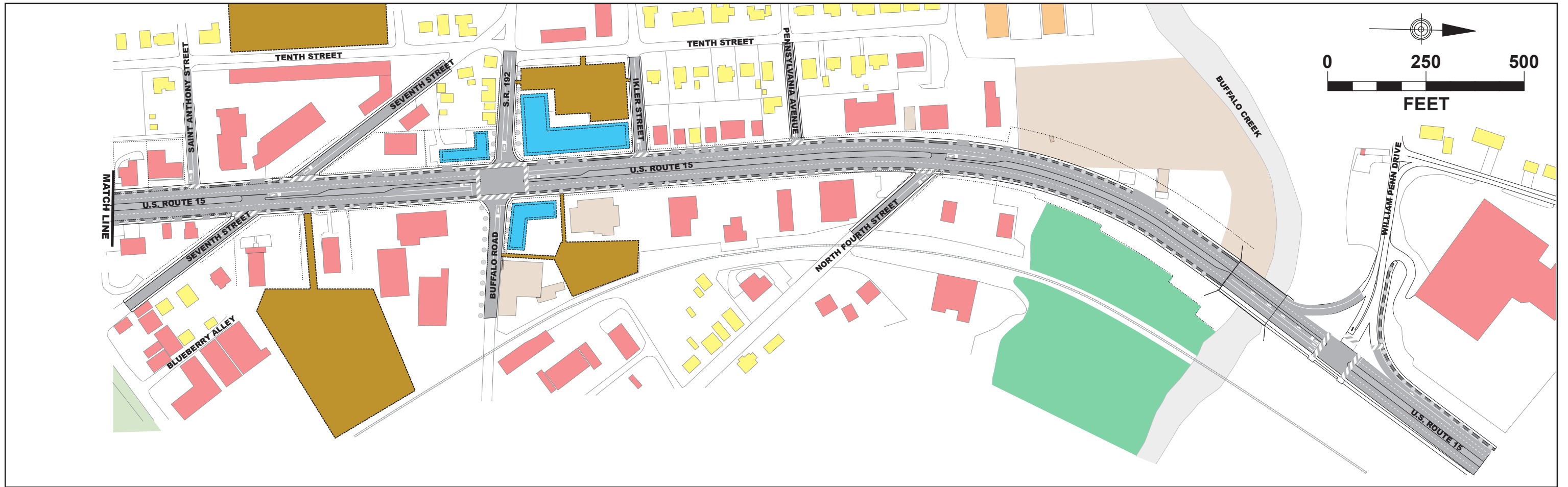


Figure 4.9: System Plan - Buildings & Parking with Land Use

Figure 4.10: Buffalo Road Before and After Vision



Before: Design Deficiencies

- Thin support for walking – marginal sidewalks, no pedestrian-oriented lighting
- Absent landscaping
- Weak visual & functional connections to properties from right-of-way – vacant corner parcel

After: Design Guidelines Compliant

- Anchor building on corner parcel
- Generous sidewalks, with potential for future transit shelter
- Landscaped side verges (buffers)
- Pedestrian-oriented lighting
- Street trees
- Multi-story buildings, with ground floor retail and office and/or residential above
- Pedestrian- and storefront-oriented façade zone adjacent to buildings
- Building access from doors on front façade, with special corner treatment
- Weather protective devices – awnings, overhangs
- Transparent façade
- Articulated façade
- Modest number & size of commercial signs



Figure 4.11: Market Street Before and After Vision



Before: Design Deficiencies

- Thin support for walking – no sidewalks or pedestrian-oriented lighting
- Sparse landscaping
- Weak visual & functional connections to properties from right-of-way

After: Design Guidelines Compliant

- Sidewalks
- Landscaped side verges (buffers)
- Pedestrian-oriented lighting
- Street trees
- Multi-story buildings, with ground floor retail and office and/or residential above
- Pedestrian- and storefront-oriented façade zone adjacent to buildings
- Building access from doors on front façade
- Weather protective devices – awnings, overhangs
- Transparent façade
- Articulated façade
- Modest number & size of commercial signs
- Outdoor seating for restaurants/cafés
- Bike racks



Transit

A potential by-product of achieving concentrations of mixed-use development at the intersections of US 15 with Market Street, Saint Mary Street, and Buffalo Road may be the emergence of a market for transit service. Dispersed locations for residences, jobs, and shopping are very difficult to support economically with transit, whereas intensifying and mixing activities places prospective riders in nodes that can be conveniently served.

The corridor should aim to become “transit ready” and provide the infrastructure in order to be able to make a convincing case in the future to a transit provider. For example, the proposed cross-section for US 15 includes curb lanes that are generous enough for buses and the 5-foot buffer and 6-foot sidewalk are, together, a reasonable base area for a bus shelter. But the new buildings should also contribute, putting entrances adjacent to prospective transit stops and perhaps adjusting façades to integrate a comfortable transit waiting area, including providing a bench, newspaper bins, and canopy.

Wayfinding

The various ways in which people orient themselves along US 15 should be considered as part of the system of corridor improvements. Gateways can convey a message to travelers that they are entering a place of significance along a route and provide a means to relay a message about Lewisburg Borough’s and East Buffalo Township’s character and unique features. Key aspects of gateway design can include such elements as wayfinding and “branding” text, interpretive signs referencing the history or environment of the community, specialty lighting, art displays, seating areas, landscaping, walls, and/or fences.

A common experience for travelers along this section of US 15, is the inability to know about or find the high value attractions nearby and adjacent to the corridor. The best example of this is the Lewisburg Historic Downtown and Shopping District which is just a few blocks from US 15. Typically, travelers and visitors along major arterials like US 15, can be easily directed to local attractions with a simple wayfinding system. This consists of a set of simple yet attractive and strategically placed directional signs. These are usually designed with an architectural or visual theme. This design theme is usually developed through a local committee and is defined with a local context. Specific attractions for a wayfinding system in the Lewisburg area could include:

- Historic Downtown
- Shopping
- River Access
- Buffalo Valley Rail Trail Access
- Local/regional Parks
- Shared Parking

Signage along the corridor should clearly direct vehicular, bicycle, and pedestrian traffic, including to such destinations as shared parking lots, parks, and the Lewisburg Central Business District. Custom-designed signs for US 15 can also help establish the corridor as a distinct entity. Signage should be designed to provide wayfinding for drivers and be able to be read from a distance and at speeds between 25 and 35 mph. Pedestrian-oriented and -scaled signs within the northern half of the corridor, in particular, should provide more detailed wayfinding, including vicinity maps and community events listings (Figure 4.12). Lewisburg Borough and East Buffalo Township are strongly encouraged to reduce the number and size of commercial signs along the corridor in conjunction with new corridor overlay zoning district regulations.



Figure 4.12: Driver and Pedestrian-oriented Wayfinding Signage for the northern half of the corridor.

Sustainability

The suggestions for the US 15 corridor include mixing of land uses, increasing the intensity of uses at specified locations, improving the pedestrian and bicyclist environments, and siting development close to access points, such as sidewalks and future transit stops. These support the future sustainability of the study area. A more mixed-use character and multi-modal access should result in increased walking and biking, helping to reduce auto-dependency and to promote healthier lifestyles and environmental stewardship.

In addition to these planning principles, other steps should be taken toward improving the sustainability of the US 15 corridor. Sites along the corridor should be developed with environmentally-sustainable designs, including provisions to capitalize on building orientation, minimize stormwater runoff, harvest solar and/or wind power, adapt and reuse existing materials, improve existing infrastructure, and minimize atmospheric pollutants. The Leadership in Energy and Environmental Design (LEED) certification, developed by the US Green Building Council (USGBC), provides a list of standards for environmentally-sustainable construction. Developers of proposed development sites along the corridor should be encouraged to seek LEED certification through a Green Building Rating System offered by the USGBC. According to the USGBC, LEED emphasizes the creation of compact, walkable, vibrant, mixed-use neighborhoods with good connections to nearby communities.

Water quality, air quality, noise, and energy efficiency should be considerations in all roadway and development/redevelopment projects. Approaches should include innovative methods to capture and treat stormwater runoff, as well as measures to decrease the amount of stormwater runoff. Stormwater Management Best Management Practices (BMPs) is a manual prepared by the Pennsylvania Department of Environmental Protection's Bureau of

Watershed Management that sets guidelines to control the volume, rate, and water quality of stormwater runoff. BMPs for the US 15 corridor might include the use of permeable paving, rain gardens, bioretention recharge basins, tree trenches, green roofs, detention cisterns, and rainwater harvesting.

Intersections

Pedestrian, Crosswalk, and Americans with Disabilities (ADA) Provisions

Updates and enhancements are recommended to current pedestrian accommodations at intersections in order to reduce pedestrian exposure and improve pedestrian comfort in crossing US 15. Updates are suggested at the signalized intersections of US 15 with Market Street, Saint Mary Street, and Buffalo Road, in consideration of current volumes of pedestrians observed at these intersections and the future role for them in the corridor. The following measures are recommended:

- **Straightening of Crosswalks** – Minimize pedestrian crossing distance by realigning crosswalks perpendicular to US 15, so that they pass through the median, creating a pedestrian refuge;
- **Add Countdown Pedestrian Signals** – Provide hardware with digital countdown timer, showing the crossing time remaining;
- **Retime Pedestrian Crossing Times** – Update pedestrian phase times using MUTCD 2009-compliant parameters (i.e. use 3.5 feet per second crossing speed versus 4.0 feet per second);
- **Construct ADA-Compliant Ramps** – Desirable ADA accommodation includes separate ramps for each direction on each corner.

Realignment of Stein Lane

The current intersection of Stein Lane with US 15 is immediately south of the US 15/Market Street intersection, with the channelized right-turn from Market Street virtually overlapping the diverge-area for Stein Lane. The physical arrangement of this area raises safety concerns about weaving movements on US 15 and high speed access to Stein Lane. In turn, the speed and weaving movement issues so close to the US 15/Market Street intersection contribute to the level of intersection complexity experienced by pedestrian and bicycle users. The speed and volume of traffic accessing Stein Lane also impact its use as a community pedestrian and bicycle connection to the adjacent neighborhoods.

The preferred concept for addressing these issues involves the relocation of Stein Lane to an intersection point further south along US 15. This concept was determined by the following three considerations:

- The crash history near the US 15/Market Street intersection contains rear-end, angle crashes, and side swipe crashes that may be related to the intersection layout and complexity.
- The existing traffic volume on US 15 approaching Stein Lane, combined with the traffic volume turning onto Stein Lane, meets the PennDOT justification for a 150-foot right turn lane. Right-turn lanes typically reduce rear-end crashes and clarify traffic operations, since they provide space outside of the through traffic lanes for turning vehicles to slow and make their turn.
- Stein Lane provides a desired community connector to the East Buffalo Township neighborhoods west of US 15, conducting a significant traffic volume (2,400 ADT). Given the choice of closing or relocating Stein Lane, members of the Steering Committee expressed their preference for

relocating the roadway, in order to maintain the street connection. It was also noted that Adams Avenue does not provide a reasonable alternative for Stein Lane traffic, because of roadway geometry issues at the Adams Avenue/Stein Lane intersection.

To provide adequate space for the 150-foot right turn lane, the *US 15 Smart Transportation Corridor Improvement Plan* includes the relocation of Stein Lane to intersect US 15 opposite Saint Louis Street. No cross-connection with Saint Louis Street is proposed as a part of this concept, and the relocated Stein Lane would provide one-way southbound (i.e., “right-in” traffic movement) at the intersection with US 15.

Beyond the point where Stein Lane diverges from US 15, the roadway becomes an integrated part of the Linntown neighborhood, and the *US 15 Smart Transportation Corridor Improvement Plan* recognizes the opportunity for more localized planning goals to be considered before a design is attempted. Rather than designing one or two streets “in a vacuum”, such neighborhood studies are more comprehensive in evaluating operational changes (intersection control, traffic diversion, one-way, etc.), traffic calming (speed control, cut-turn traffic control, etc.), and street conversions (street to pedestrian way, etc.). As such, the design and operation of Stein Lane beyond the intersection with US 15 is not defined in the *US 15 Smart Transportation Corridor Improvement Plan*.

Stein Lane-Saint Louis Street Cross-Connection

With Stein Lane relocated opposite Saint Louis Street (as described above), there is some future potential for creating a 4-way signalized intersection that would provide another connection across US 15.

With this full-access intersection, the Adams Avenue connection to US 15 could then be closed, mitigating the sight distance issues associated with left turns out of Adams Avenue. However, as with the design of the relocated Stein Lane, the design and impacts of the cross-connection should be considered as part of a neighborhood traffic plan.

Implementing this concept will likely require the following precursors:

- Construction of the Central Susquehanna Valley Throughway (CSVT)– CSVT would reduce the total traffic and truck volumes on US 15 through the Study Area, thereby making operations at adjacent intersections (queues, delay) amenable to adding the new intersection.
- Implementation of an Adaptive Traffic Signal (ATS) system– The spacing between Market Street and Saint Louis Street is not conducive for standard signal coordination, which relies on regular signal spacing for its effectiveness. ATS systems can provide effective coordination for irregularly spaced signals.

Realignment of Saint Mary Street

Saint Mary Street’s westbound approach currently intersects US 15 at an awkward angle, which creates operational and safety issues related to vehicular turning movements, the location of pedestrian crossings, the siting of signal heads, and motorist and pedestrian lines-of-sight. The recommended realignment of the westbound approach would introduce an “S” curve between 7th Street and US 15, thereby achieving the optimal intersection angle of 90° at US 15. Accompanying the realignment would be a left-turn lane on the westbound approach.

Also note that, in conjunction with redevelopment of the Pennsylvania House site, changes to the eastbound Saint Mary Street approach to US 15 may come about, including vehicle capacity increases and the potential for efficient protected left-turn signal phasing (left-turn arrows).

Bucknell University Gateway Intersection

Bucknell University has completed a number of internal planning and design studies related to the creation of a new “gateway” intersection with US 15. The university’s preferred design, which is included in the *US 15 Smart Transportation Corridor Improvement Plan*, relocates the existing Moore Avenue and Smoketown Road intersection approximately 500 feet north, near the current pedestrian tunnel under US 15. The relocated alignment of Smoketown Road is still only conceptual at present, but would likely require the removal of several student residence “mods” located west of US 15.

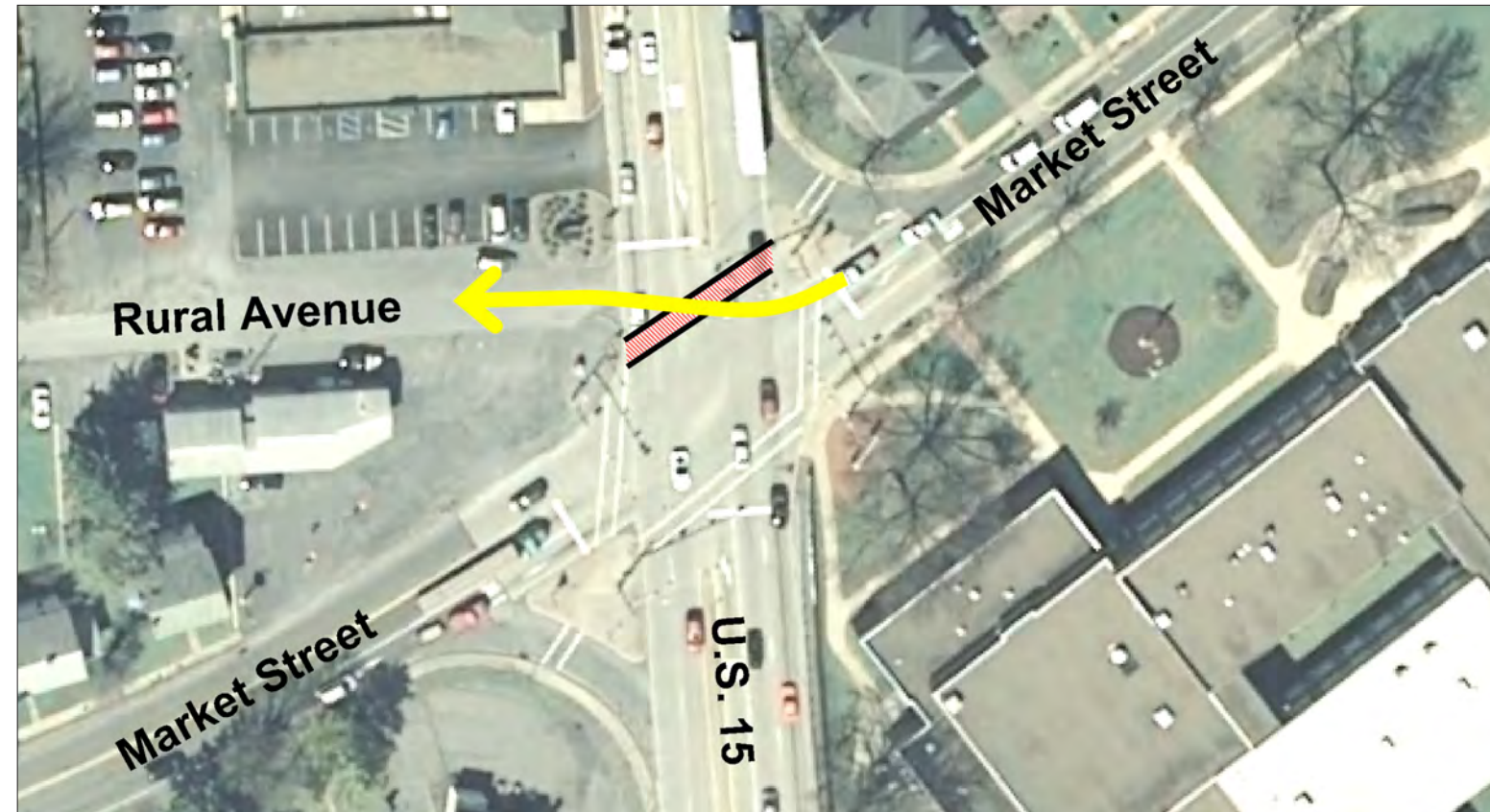
The university’s gateway intersection design incorporates a median on US 15, with two through lanes in each direction and left-turn lanes. The Moore Avenue approach includes separate left, through, and right-turn lanes. The Smoketown Road approach consists of a left-turn lane and a shared through/right-turn lane. These approaches would be aligned to intersect US 15 at 90°. It is expected that the pedestrian underpass would continue to be maintained.

Rural Avenue

Rural Avenue currently intersects US 15 within the US 15 / Market Street intersection, creating an awkward fifth leg to the intersection (Figure 4.13). While Rural Avenue is one-way in (westbound), access to Rural Avenue from Market Street and US 15 through the traffic signal is ambiguous, creating substantial complexity and raising concern for safety -- particularly with respect to pedestrians crossing US 15 on the north crosswalk. Specifically, during the Market Street "through" signal phase, pedestrians on the north crosswalk are given the WALK signal while vehicles westbound on Market Street are permitted to pass through the same crosswalk. While right-turn vehicles are required to yield to pedestrians on a conflicting crosswalk when turning, the westbound Market Street movement feels much more like a through movement than a right-turn, and drivers are not accustomed to yielding in this situation.

Resolution of the pedestrian issue is imperative, and it is recommended that vehicular access to Rural Avenue be closed at its intersection with US 15. All businesses at this corner have redundant access (both direct and reverse access) via US 15 and Market Street from all directions of travel. The closure will further simplify intersection operations and should, in fact, improve operations. Finally, the closure of Rural Avenue works in tandem with suggestions for pedestrian, crosswalk, and ADA enhancements at the US 15/Market Street intersection, which were high priorities expressed by community participants in this study.

Figure 4.13: Rural Avenue



Beagle Club Road/River Road

Members of the public and Steering Committee frequently noted safety concerns related to crossing traffic, vehicular speeds, and right-turns off of US 15. This section of US 15—including PennDOT roadway segments 120, 121, 130, and 131—was previously identified as one of SEDA-COGs “Top 25” high crash locations. A significant cluster of crashes is noted at the intersection of US 15 and Beagle Club Road/River Road.

The formulation of improvement strategies considered crash history, sight distance, traffic volumes, geometric conditions, and traffic delay.

Crash History – The 10-year crash history (2000 to 2009) identifies the following prevalent collision types for the 18 reportable crashes at the intersection:

- 10 angle collisions
- 3 hit-fixed object collisions
- 2 rear end collisions
- 2 same direction sideswipe collisions
- 1 pedestrian collision
- 1 unknown

Angle collisions were the most common, with 9 out of the 10 angle crashes resulting from a vehicle “proceeding without clearance” from the minor street (Beagle Club or River Road) while making a through movement or a left-turn movement. Two fatalities occurred in one of these angle crashes. Two rear-end collisions were noted in the northbound US 15 direction. These may be associated with vehicles slowing to make a right-turn onto River Road.

Sight Distance – A field investigation of intersection sight distance did not reveal any prominent deficiencies. However, depending on a vehicle’s stopping point, vegetation may impact sight distance. In fact, 8 of the 9 angle crashes noted previously (i.e., “proceeding without clearance”) occurred between May and October, when trees would have had their leaves. Of the four intersection corners, vegetation on the embankment south of Beagle Club Road is the most likely to become problematic.

Traffic Volumes & Geometric Conditions – Traffic Volumes & Geometric conditions were evaluated to determine if PennDOT criteria for right-turn lanes would be met at the intersection. Based on the method in the Department’s Publication 46 and the existing traffic data, right-turn lanes are warranted on US 15 approaching both River Road (northbound, 235-foot turn lane) and Beagle Club Road (southbound, 235-foot turn lane).

Traffic signal warrants are not met by existing or forecasted traffic volumes. We also note that PennDOT has previously rejected a signalized land development driveway north of the Beagle Club Road/River Road intersection.

Traffic Delay – The analysis of intersection capacity and vehicular delay indicates that, since the traffic volumes are expected to increase in the future, delay will also increase—particularly for vehicles turning from River Road and Beagle Club Road. Using the 10-year forecast of traffic, vehicles turning from River Road would experience delays of 40 or more seconds per vehicle during the PM peak hour (see Table 4.2).

The diverse issues noted in this evaluation are typical where lower-volume (but locally important) roadways intersect a high-speed, arterial roadway. The improvement options for Beagle Club Road/

River Road are also limited by the roadway geometry and other practical considerations. For instance, installing a new traffic signal is not feasible considering the roadway grades, volumes of trucks, vehicle speeds, and winter weather conditions. Introducing a grade-separated interchange may solve many of the issues, but is impractical because of the cost.

With this in mind, two primary alternatives were created that deal with the location and alignment of Beagle Club Road.

Alternative A (Figure 4.14) leaves Beagle Club Road on its current alignment, intersecting US 15 at a slightly offset, 4 way intersection. The justified right-turn lanes may be added to provide a deceleration area and some clarification to motorists and pedestrians the intent of vehicles approaching the intersection. Sight distance issues with vegetation and the embankment south of Beagle Club Road should be addressed.

This alternative is likely less expensive than Alternative B but does not specifically target the angle crash history. It also has several design complications. Addition of the turn lanes may adversely affect access and/or viability of the business and residence at the intersection corners. Also, it is likely that the drainage structure on the west side of US 15 would need to be extended and/or modified to accommodate the turn lane.

Alternative B (Figure 4.15) relocates Beagle Club Road to the north of River Road to create a system of dual, 3-way, “T intersections”. The alignment of Beagle Club Road is illustrative only, as it is one of several suitable alignments. The justified right-turn lanes may be added to provide a deceleration area and some clarification to motorists and pedestrians the intent of vehicles approaching the intersection. The vacated section of Beagle Club Road would

remain as pedestrian right-of-way for access to River Road. This arrangement is aimed at mitigating the history of angle crashes at the intersection. The dual T-intersection arrangement has fewer conflict points than the 4-way arrangement, and vehicles emerging from the side street do not have to consider the opposing side street approach when making turns. Support for this strategy was developed from the material found in NCHRP Report 500, A Guide for Addressing Unsignalized Intersection Collisions (2008).

This alternative is likely more expensive than Alternative A but it has more potential for mitigating the crash history while accommodating some degree of access to the developable parcel between Beagle Club Road and US 15. The alternative does impact the developable acreage of the bisected parcel. The feasibility of Alternative B is directly related to the traffic generation and access potential of the vacant parcels in this area, such that a signal is not required for access. Finally, depending on the final location of Beagle Club Road and the amount of highway access permitted, the ability to obtain sufficient sight distance should be evaluated. The crest vertical curve is the controlling sight distance feature.

Figure 4.14: Alternative A for Beagle Club Road



The following **Supplemental Strategies** are complementary to Alternatives A or B for further addressing the crash history and improving overall traffic safety at the intersection:

- Implement a “Goal Post” Treatment – As illustrated in Figure 4.16, this strategy adds pavement markings and/or flexible roadside markers on the major roadway and “goal post” information signage on the minor street to give drivers an additional point of reference for judging speeds and choosing an acceptable gap before pulling out of the minor street. This and other strategies were developed by PennDOT for two-way rural roadways and are further documented in the Florida DOT Report, Innovative Operational Safety Improvements at Unsignalized Intersections (2008).
- Implement the “Approach and Transition Plan” described later in this report, which is aimed at reducing vehicle speeds in the corridor and raise drivers’ awareness about the settled area they are entering.

Figure 4.15: Alternative B for Beagle Club Road



Figure 4.16: Goal Post Treatment



Traffic Adaptive Signal System

The most current PennDOT traffic signal plans indicate that the traffic signals along US 15 are permitted for interconnected coordination. However, it is clear that the signals are not operating consistently as an effective coordinated system. An “arrival-type” study completed in August 2011 during the PM peak hour indicated that more than 90 percent of southbound US 15 vehicles were arriving on red at the US 15/Market Street intersection. In an effective coordinated system, less than 50 percent of vehicles should arrive on red; for excellent progression, less than 10 percent of vehicles should arrive on red. A more effective coordinated signal system is needed in the corridor.

It is known that traffic patterns and volumes in the Lewisburg area—both on US 15 and through the adjacent network—are inconsistent and unpredictable, fluctuating substantially day-to-day depending on the regional events, local events, and the Bucknell University schedule. For such situations, adaptive traffic signal control systems have been developed as an alternative to the conventional “closed-loop” systems. Adaptive control systems are self-optimizing. They allocate green-time and implement coordination based on actual traffic conditions observed in realtime. As such, they can better accommodate inconsistent traffic volumes and patterns.

Several different national vendors have developed adaptive signal systems, including Rhythm Engineering’s InSync system. Tom Cooper of Rhythm Engineering visited the study area on August 30, 2011 to present the InSync adaptive system and answer questions. Even though the presentation was not an official project meeting, it was attended by several members of the Steering Committee, including representatives of Lewisburg Borough, East Buffalo

Township, Bucknell University, Union County, SEDA-COG, PennDOT District 3-0, and McCormick Taylor. Response to the presentation was overwhelmingly positive from both agency and local representatives.

Therefore, it is recommended that an adaptive signal system be pursued for implementation in the US 15 corridor. Initially, the system would encompass the current closed loop system that includes Market Street (PA 45), Saint Mary Street, Buffalo Road (PA 192), and William Penn Drive (SR 1018); but with the possibility of extending the system north into Kelly Township and/or south to the Bucknell Gateway intersection. The investment in such a system will have lasting value regardless of the other changes that may or may not occur within the corridor (e.g., CSVT, Pennsylvania House Furniture site redevelopment, Lewisburg High School relocation).

Approach and Transition Plan

In response to concerns expressed by community participants in this study with respect to high vehicle speeds on US 15 between Beagle Club Road/River Road and Market Street, an Approach and Transition Plan has been developed. The overall goal of the Approach and Transition Plan is to reduce vehicular speeds in this part of the corridor, based on methods and research compiled in NCHRP Synthesis Report 412, Speed Reduction Techniques for Rural High-to-Low Speed Transitions (2011). The research conclusions emphasize the need for greater attention on “treating the transition zone between high and lower speeds as a length of highway upstream of the rural to urban threshold, rather than as a specific point.” The research identifies four “zones” of interest: the Rural Area (high speed limit), Approach Zone, Transition Zone, and the Settled Area (low speed limit). Warning and psychological measures are recommended for the Approach Zone. Physical roadway and

roadside changes, as well as land use measures, are recommended for the Transition Zone.

Applying this framework to the US 15 corridor, the roadway environment was evaluated and various “zones” were defined as shown in Figure 4.17. Gundy Road was designated as the nexus between the Rural Zone (to the south) and the Approach Zone, which leads up to Beagle Club Road/River Road. To accommodate the developed land uses north of this intersection, three Transition Zones were established—lettered A, B, and C. Transition Zone A extends to McRae Circle; Transition Zone B to the future Bucknell Gateway intersection; and Transition Zone C to Market Street. The Settled Area starts at Market Street. Each transition zone is described according to its PennDOT Design Typology, length, target speed, and the amount of time for a vehicle to traverse the zone at the target speed.

The roadway features and character of US 15 south of Beagle Club Road / River Road to Shamokin Dam are generally consistent for high speed travel. Drivers on this seven-plus-mile stretch of highway travel at speeds regularly in excess of 60 mph and, south of Saint Louis Street, there are only nominal visual, land use, and physical roadway changes that tell a driver that he or she is approaching a much more settled area. Today, much of the speed reduction occurs suddenly, within the very short distance between Saint Louis Street and Market Street. The intent of the Approach and Transition Plan is to get the attention of drivers and alert them to the change within the Approach Zone and then implement changes in the roadway and roadside design that slow traffic incrementally through the Transition Zones. As such, the plan allows drivers to maintain moderate-range arterial speeds through the initial Transition Zone(s), so that average traffic speeds are more consistent and steady traffic flow is maintained.

Figure 4.17: US 15 Transition Zones

Speed Goal	35 MPH	40-45 MPH	45-50 MPH	55 MPH	55-60 MPH
<p>Settled Area Low speed zone</p> <p>Design Typology: Suburban Center Regional Arterial</p>	<p>Transition Zone C</p> <p>~ 2,700 feet ~ 45 seconds @ 40 MPH</p> <p>Design Typology: Suburban Neighborhood Regional Arterial</p>	<p>Transition Zone B</p> <p>~ 3,000 feet ~ 45 seconds @ 45 MPH</p> <p>Design Typology: Suburban Neighborhood Regional Arterial</p>	<p>Transition Zone A</p> <p>~ 2,400 feet ~ 30 seconds @ 55 MPH</p> <p>Design Typology: Suburban Corridor Regional Arterial</p>	<p>Approach Zone</p> <p>~ 1,600 feet ~ 20 seconds @ 55 MPH</p> <p>Design Typology: Rural Regional Arterial</p>	<p>Rural High speed zone</p> <p>Design Typology: Rural Regional Arterial</p>
<p>Lewisburg Penn House Commons High School Linntown Bucknell University Smoketown Road College Park Armory Beagle Club Road River Road Supplee Mill Road</p>	<p>Narrow lanes to match cross-section North of PA 45.</p> <p>Introduce cues from suburban center design: street trees, sidewalks, street banners, wayfinding signage.</p>	<p>Gateway treatment.</p> <p>Introduce median cross-section off of the turn lanes at Hillcrest.</p> <p>Extend the Hillcrest neighborhood "tree-lined street" feel.</p>	<p>Modify roadway & roadside elements to reflect transition from Rural to Suburban typology.</p> <p>Create median or islands at Beagle Club Road / River Road.</p> <p>Add speed feedback signs.</p>	<p>Introduce warning & psychological measures: signage, transverse & edgeline treatments.</p>	

The following strategies by zone are recommended:

- **Approach Zone** – Implement warning and psychological measures that indicate something different ahead. Signage, edge-line treatments, and transverse pavement striping (possibly including the “Goal Post” treatment described previously) are candidate measures. No speed reduction is targeted for this zone, and speeds 55-60 mph are expected.
- **Transition Zone A** – Implement roadway and roadside changes that reflect the transition from a rural to a suburban area. Revise zoning and subdivision setback requirements to achieve long-term visual change in land use. Speed limit reductions and a speed feedback or flexible, changeable message sign (CMS) system are candidate measures. This CMS system is suggested to partially address truck-related issues at the Moore Avenue/Smoketown Road signal. It has been observed that trucks traveling downhill on northbound US 15 cannot stop at the signal if it turns red, so the signal is frequently put into flash during winter weather. However, members of the Steering Committee have expressed concern that this practice may endanger pedestrians crossing at the intersection. This study considers that trucks may be cresting the hill at inappropriate speeds because they do not have adequate advance warning of the roadway grade and conditions ahead. As an “early-action” measure, this particular CMS/ITS installation is proposed to incorporate a “weather-activated” system that monitors conditions and provides ample advance warning of the likely conditions ahead. Ultimately, moving the Bucknell Gateway intersection further away from the downhill grade will further improve the safety of the US 15 corridor in this area. A speed reduction of 5-10 mph is targeted for this zone, and speeds of 45-55 mph are expected during clear weather. Lower speeds are targeted for winter weather,

and the CMS may suggest car and truck speeds that are appropriate for the detected conditions.

- **Transition Zone B** – Work off of the “narrowing” feel of the wooded Hillcrest Neighborhood, introducing the median treatment off of the turn lane islands at Hillcrest Lane. Additional tree cover on the Bucknell University campus south of Fraternity Road would extend the wooded feel. Incorporate features of the Bucknell Gateway intersection at the realigned Moore Avenue/Smoketown Road. A speed reduction of 5 mph is targeted for this zone, and speeds of 40-45 mph are expected.
- **Transition Zone C** – Implement elements of the Corridor Improvement Framework roadway cross-section: median, narrower lanes, street trees, and sidewalk. Allow buffers between roadway and sidewalk to be wider than the cross-section north of Market Street. Add urban design banners and way-finding signage. Incorporate three-globed Lewisburg lighting. A speed reduction of 5-10 mph is targeted for this zone, and speeds of 35-40 mph are expected.
- **Settled Area** – Continue the Corridor Improvement Framework roadway cross-section, with sidewalk buffers appropriate to the right-of-way width. No speed reduction is targeted for this zone, but consistent speeds of 35 mph are expected.

Operational Traffic Analysis of the Corridor Improvement Framework

The Corridor Improvement Framework proposes a variety of roadway, roadside, and intersection modifications that will impact the users’ experience of US 15 through the study area. Each physical modification has certain implications for traffic flow, pedestrian / bike crossings, vehicular queuing, etc. While many of the proposed modifications will provide a net benefit to all users; others may result in tradeoffs that improve the experience of certain users at the expense of other users. As such, the operational analyses that accompany this Corridor Improvement Framework were completed to both inform the plan’s design and evaluate the plan’s performance. The following major issues and elements were considered:

- Shifts in traffic expected with implementation of the green median:
 - Reallocation of green time to accommodate U-turns at intersections
 - Impact of revised green times on US 15 through movements
 - Impact of revised green times and added U-turn vehicles on turn lane storage lengths (Turns from the center turn lane were counted, and these volumes were assigned as U-turns at the next, downstream intersection or median opening.)
- Net effect of reduced pedestrian crossing distances and increased time for pedestrian phases, which are compliant with 2009 MUTCD standards.

- Revisions to closed-loop signal coordination parameters (not including adaptive signal implementation).
- Trend increases in traffic volumes added by the Pennsylvania House Furniture site redevelopment, Evangelical Hospital expansion, and general “background” traffic growth that are reasonably expected during the next 10 years (not including CSVT).
- Impact of roadway network modifications that accompany the Pennsylvania House Furniture site redevelopment project.

To contrast the operation benefits and tradeoffs of the Corridor Improvement Framework, a “base year” analysis of existing conditions was also completed as a reference point.

We note that this operational does not investigate the impacts of the adaptive traffic signal system, nor does it anticipate the effects of building the Central Susquehanna Valley Throughway (CSVT). An accurate assessment of the impacts of these projects requires a level of analysis sophistication that is beyond the scope of this project.

Analysis Inputs & Assumptions

Vehicular Traffic Conditions

Vehicular traffic volumes and patterns of arrival over certain “peak periods” are the primary input to the analysis of traffic capacity and delay. Methods to assess these measures have been established by the Transportation Research Board in the Highway Capacity Manual. On most roadway networks, traffic during the afternoon commuter peak period is the most problematic. Therefore, this “PM peak hour” was chosen as the benchmark period for analysis.

Existing traffic volumes that represent Base Year 2010 traffic conditions were either counted in the field or assembled from secondary sources, including the following: Union County Comprehensive Plan (2009), Penn House Commons Traffic Impact Study (2010), Bucknell University Gateway Study (2008), Giant Food Store/Retail Center Traffic Impact Study (2003), and US 15 Safety Study (2009). Traffic volumes not collected in 2010 were factored and balanced across the network to estimate 2010 conditions.

Future traffic volumes, that represent the 10-Year Forecast of the PM Peak Hour traffic volumes, were developed by adding together various components of traffic growth to the existing, base year 2010 traffic volumes. Background traffic growth is traffic added to roadways according to current trends in regional economic activity, land development, and population distribution. PennDOT’s Traffic Growth Factor method estimates this background traffic growth as a percentage per year of the existing traffic volume, depending on the type of roadway. For Non-Interstate roadways in Union County, background traffic growth may be estimated at 1.57 percent per year (compounded), for a total 16.9% increase over existing traffic volumes during the ten-year forecast period. The other major component of traffic growth is associated with two land development projects within or near the study area—Pennsylvania House Furniture site redevelopment and the Evangelical Hospital Expansion and Medical Park development. New trips associated with both projects—as documented in traffic impact studies—were added when developing the 10-Year Forecast. Other, much smaller land development projects are known to exist, and traffic from these projects is assumed to be represented within the background traffic growth.

The 10-Year Forecast does not include traffic volume and pattern shifts that might occur with completion of the Central Susquehanna

Valley Throughway (CSVT) highway project. The traffic volume impacts of such large scale projects are complex and are difficult to estimate without origin/destination studies and travel demand modeling.

Pedestrian & Bicycle Traffic Conditions

Pedestrian and bicycle traffic volumes, particularly at intersections, play a role in how the traffic signal allocates green time to the various movements. This, in turn, influences the delay experienced by vehicles and the length of vehicle queues.

Similar to the Base Year 2010 vehicular traffic volumes, pedestrian and bicycle volumes were either counted in the field or assembled from secondary sources, including the following: Penn House Commons Traffic Impact Study (2010), Bucknell University Gateway Study (2008), and US 15 Safety Study (2009). To ensure up-to-date data that included school and recreational trips, detailed counts of pedestrian and bicycle activity were conducted in April 2011 from 2:00 PM to 6:00 PM on a weekday afternoon at the Market Street, Saint Mary Street, and Buffalo Road intersections along US 15.

Few reliable methods exist for developing forecasts of pedestrian and bicycle volumes. However, the following trends and local influences are noted:

- Regional and state-wide trends, which indicate a stagnation of growth in non-vehicular trips associated with existing land uses. NEUTRAL.
- Relocation of the Lewisburg High School—which was the strongest generator pedestrian / bike trips along the corridor—will tend to reduce pedestrian / bike volumes. VOLUME REDUCTION.

- Redevelopment of the Lewisburg High School site may or may not result in land uses that attract or produce pedestrian and bicycle trips. NEUTRAL.
- Development of the Buffalo Valley Rail Trail is expected to draw recreational bicycle and pedestrian traffic to the US 15 corridor. VOLUME INCREASE.
- Redevelopment of the Pennsylvania House Furniture site has proposed a grocery store, residential condominiums, and office uses that are likely to attract or produce pedestrian and bicycle trips from the surrounding areas. VOLUME INCREASE.
- Re-occupancy of vacant parcels and redevelopment of existing uses are more likely to increase pedestrian and bicycle trips than decrease them, particularly if pedestrian and bicycle facilities are provided along US 15 and connections are established to the downtown Lewisburg and the existing recreational . VOLUME INCREASE.

Considering these factors, a trend toward increased volumes of pedestrians and bicycles is revealed. Therefore, the operational analysis assumes a 50% increases in the number of conflicting pedestrians throughout the study area, an increase in conflicting bicycles at the US 15/Market Street intersection, and a doubling the number of times that the pedestrian buttons are activated (e.g., “pedestrian calls per hour”).

Roadway Network Conditions

The Corridor Improvement Implementation Matrix (Table 5.1) and the Corridor Improvement Framework Plan (Figure 4.2) illustrate network conditions assumed in the traffic analysis. The Framework and the traffic analysis incorporate elements suggested above as well as traffic mitigations recommended in the Penn House Commons Traffic Impact Study and the Bucknell University Campus Entrance Concept study, as follows:

- Introduction of the “green median”, which replaces the existing center turn lane between intersections.
 - Existing turn lanes at the signalized intersections of William Penn Drive, Buffalo Road, Saint Mary Street, and Market Street would be maintained.
 - The center turn lane between intersections would be removed.
 - Travel lanes are narrowed.
- Crosswalks at the intersection of Buffalo Road, Saint Mary Street, and Market Street are straightened, and pedestrian signal timings are updated to be MUTCD 2009 compliant.
- Certain turn lanes at signalized intersections would be lengthened, according to PennDOT policy and the estimation of vehicle queues from the operational analysis.
- Access and turn lanes at the 4th Street intersection are maintained as in existing condition. The 4th Street approach is maintained as right-in/right-out.
- Access and turn lanes at the 7th Street intersection are modified to allow only SB left-turns from US 15 to 7th Street. The 7th Street approaches are maintained as right-in/right-out.

- The WB leg of Saint Mary Street is realigned and widened to add a left turn lane on the WB Saint Mary Street approach to US 15.
- The EB leg of Saint Mary Street is widened to add a left-turn lane on the EB Saint Mary Street approach to US 15. (This element is part of the Pennsylvania House Furniture site redevelopment.)
- Access to Rural Avenue at the US 15 / Market Street intersection is closed.
- Stein Lane is relocated and maintained as right-in/right-out. A new SB 15 right-turn lane is added at the relocated Stein Lane.
- At Adams Avenue, a new NB US 15 left-turn lane is created within the median.
- The Bucknell Gateway intersection of US 15 with Moore Avenue/Smoketown Road is moved approximately 500 feet north, and Moore Avenue and Smoketown Road are realigned to intersect US 15 at right angles. (This element is part of the Bucknell Gateway project.)
- At Beagle Club Road, a SB US 15 right-turn lane is added. At River Road, a NB US 15 right-turn lane is added.

Vehicular Delay & Level-of-Service

Intersection-level traffic analyses of the Base Year and 10-year Forecasted PM Peak Hour conditions with the Corridor Improvement Framework was completed using the Synchro software package according to the methodology published by the Transportation Research Board in the Highway Capacity Manual. Table 4.2 compares the Existing Condition Base Year and 10-Year Forecast intersection delay and level-of-service results.

Table 4.2: Comparison of Baseline and 10-year Forecast Intersection Delay and Level-of-Service PM Peak Hour

US 15 Intersection	Existing Condition Baseline LOS (Delay - seconds per vehicle)	Corridor Improvement Framework 10-year Forecast LOS (Delay - seconds per vehicle)
William Penn Drive	B (10.9)	C (21.1)
4th Street, SB Left	b (13.8)	c (20.3)
Buffalo Road	D (36.4)	D (45.1)
7th Street, SB Left	b (10.7)	b (13.7)
Saint Mary Street	B (13.5)	C (23.0)
Market Street	F (82.0)	F (117.1)
Moore Avenue / Smoketown Road	D (43.6)	C (22.8)
Beagle Club Road / River Road	c (23.5)	e (42.7)

UPPERCASE = Signalized Intersection LOS

Lowercase = Stop-Controlled Intersection LOS; Delay shown is for the movement with highest delay

Vehicle Queuing & Turn Lane Lengths

The lengths of vehicle queues (i.e., stacking of vehicles back from signals) and calculated design-level turn lane storage lengths were both evaluated to determine the appropriate lengths of turn lanes with the Corridor Improvement Framework. Vehicle queues were estimated according to the Synchro software’s “95th Percentile Queue Length” value. Design turn lane storage length calculations were completed according to the PennDOT methodology (Publication 46, Chapter 11.17).

Intersection Crossing Distance & Time

The intersection crossing distance and amount of time that pedestrians and bicycles have to cross at signalized intersections were evaluated for the Existing condition (used in the Base Year analysis) and the Framework condition (used in the 10-year Forecasted analysis).

Under Base Year conditions, crosswalks are skewed, increasing the distance that a pedestrian is exposed to moving traffic within an intersection. In addition, the amount of time allocated to pedestrian phases was shorter than the recently adopted MUTCD 2009 standard. For the 10-Year Forecasted conditions, the pedestrian phases were increased to meet the new standard, and crosswalks were realigned and shortened to reduce pedestrian and bicycle exposure at the intersections. Table 4.3 illustrates this evaluation as a measure of improvement for non-motorized users of the corridor.

Table 4.3: Comparison of Intersection Crossing Distance & Time: Existing vs. Framework Conditions

	Crossing Distance		Crossing Time	
	Existing	Framework	Existing	Framework
Buffalo Road	90 feet	74 feet	21 seconds	28 seconds
Saint Mary Street	75 feet	66 feet	21 seconds	26 seconds
Market Street	85 feet	69 feet	21 seconds	27 seconds

Crossing Distance is for the longest crosswalk across US 15 at the intersection.
Crossing Time is the total WALK interval plus flashing DONT WALK interval.

Access Impact of Median Treatment

Implementation of the “green median” treatment, as proposed in the Corridor Improvement Framework, would have access implications for selected parcels immediately adjacent to US 15—particularly in the section between 4th Street and Saint Louis Street. Access implications of the median treatment were investigated in this area.

Using the County’s tax parcel data, 53 parcels were identified that currently have full access to US 15 (i.e., left and right turns are currently permitted into and out of these parcels). These parcels are identified in Figure 4.18 with a yellow outline. Parcels near the signalized intersections that currently have left-turn access restricted by mountable curb or median islands are not highlighted, since their access would not change with the median treatment.

Left-turn access implications of the median treatment according to three different categories are indicated in Figure 4.19. Right turn access to and from US 15 will not be affected by the median. Nine parcels (green) currently have direct access from major cross streets. To access these parcels, vehicles would turn left at a signal or planned and directly enter the parking area from the cross street. This method of access is generally well-understood, and some drivers prefer it, rather than entering directly from a center turn lane on the arterial.

Twenty-seven parcels (blue) currently have indirect “reverse” access via the street network. To access these parcels, vehicles would need to turn left at a signal or planned median break and then use a secondary network street to enter the parking area. This method of access generally requires directional and wayfinding street signage that indicates how to reach certain businesses. While these arrangements are not foreign to most drivers, they may be viewed as a hassle, and increased traffic on local, neighborhood streets is likely.

The remaining seventeen parcels (orange) do not have reverse access connections to the street system, so the parking areas would be accessed by making a U-turn at a signalized intersection or median break and entering via a right-turn from US 15. Exiting vehicles would depart with a right-turn onto US 15 and another U-turn to go back in the direction they came. This method of access is also reasonably well-understood, but it would increase the traffic volumes and delay on the left-turn/U-turn lanes at the signalized intersections.

Figure 4.20 shows the amount of traffic activity observed using the center left turn lane in 2011 during the PM peak hour of traffic. This includes vehicles making left-turns from US 15 to the parcels and

vehicles making left-turns from the parcels to US 15. The number of cars is given first, with the number of heavy trucks given in parentheses. We note that these volumes are representative of only one hour of the day, and a more targeted understanding of truck traffic and would be compiled during the design process.

With implementation of the median concept, vehicles will require alternative access arrangements that modify either the roadway geometry or the approach and departure paths of the vehicles. For the green parcels, both passenger cars and heavy trucks would be accommodated with minimal geometric modifications at the US 15 intersections. More involved modifications may be required at the parcel driveways along the primary cross streets. For the blue parcels, passenger cars would be accommodated on the existing secondary network streets. The potential for truck access will require a detailed investigation of intersection and driveway geometries on the secondary network, to determine where modifications and, perhaps, new links may be appropriate. For the orange parcels, passenger cars would be accommodated on U-turn movements at signalized intersections and median breaks. However, heavy trucks will not have enough room to make these U-turns, and a more complete understanding of the truck access needs of these parcels is required. Many of these parcels—particularly those west of US 15 and north of Buffalo Road—may have no need for truck access. For others that require deliveries via heavy trucks, new reverse access links may be considered or, as an interim measure, the routes of approach and departure could be coordinated so that trucks enter and exit the parcel on right turns.

In conclusion, the conclusion of a median means some vehicles will need to reverse direction. Cars will be permitted to make U-turns at signalized intersections. In the case of trucks that need to reverse direction for deliveries, signs can direct trucks to appropriate U-turn or jughandle locations.

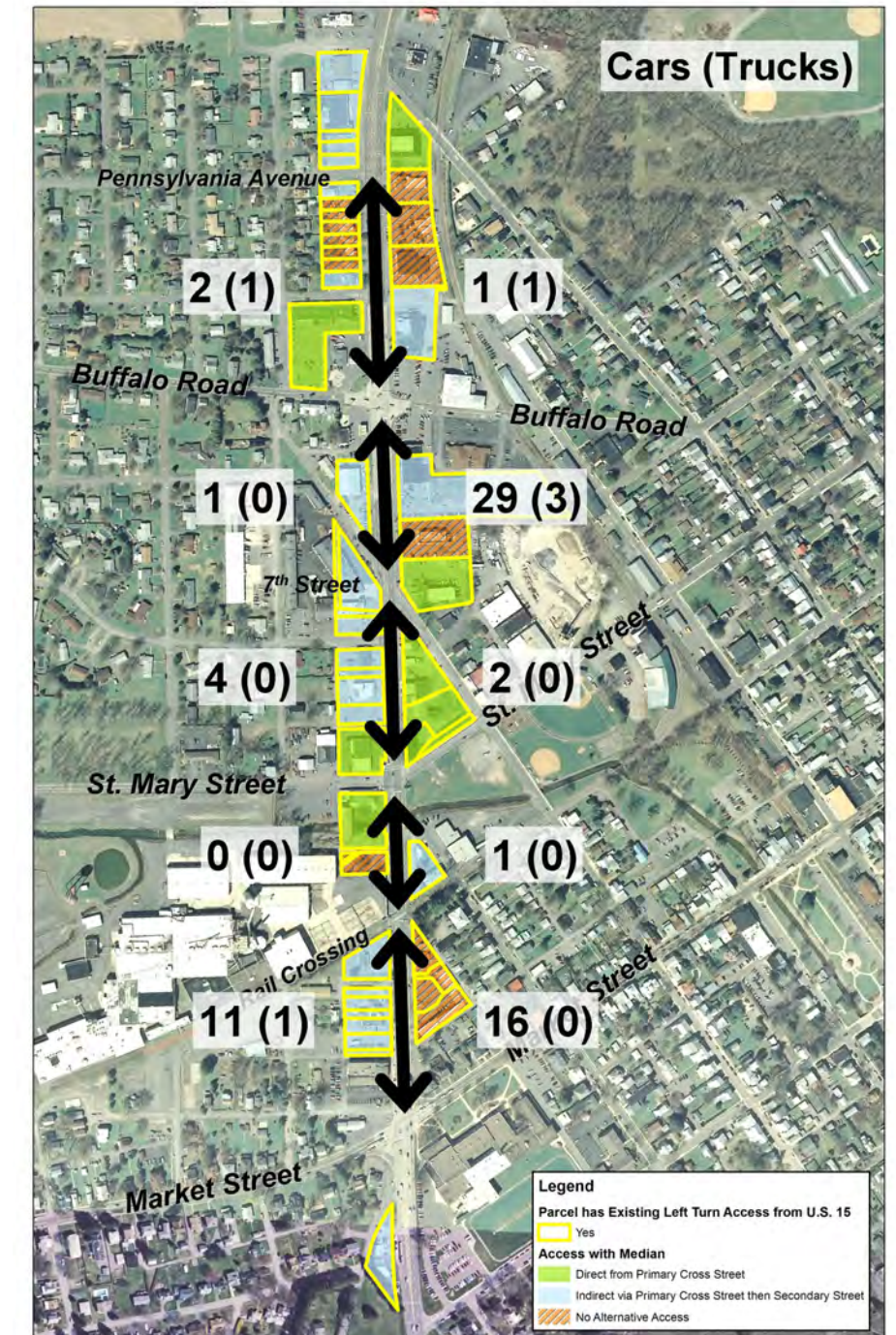
Figure 4.18: Existing Access Conditions along US 15: Parcels that currently have Unrestricted Left Turn and Center Turn Lane Access to / from US 15



Figure 4.19: Modified Access Conditions along US 15 with Implementation of Green Median Concept: Parcels labeled according to type of access to / from US 15



Figure 4.20: Left Turn & Center Turn Lane Activity between US 15 Intersections (2011 PM Peak Hour)



CHAPTER 5

Implementation Tools & Strategies



US 15

Smart Transportation Corridor Improvement Plan

What are the strategies for implementing the Future Corridor Framework and other components of the corridor plan described in Chapter 4? They are a combination of strategies for land use and strategies for transportation, to be undertaken over the coming months and years by a variety of parties. Some strategies will be relatively inexpensive, some will be more costly. It makes sense to try and achieve some successes early, to energize residents, business operators, and potential investors about the possibilities to achieve success in this corridor. The roles and responsibilities of the primary responsible parties should be clear and the parties' mutual cooperation is required.

Table 5.1 provides details related to implementation strategies and tools. In the short term; however, ten key actions should be pursued, as follows:

Short-Term Action Plan

- Incorporate the *US 15 Smart Transportation Corridor Improvement Plan* as an amendment to the Union County Comprehensive Plan;
- Establish US 15 Corridor Task Force to investigate implementing wayfinding, access management, shared parking, and a new Corridor Mixed Use overlay zoning district in the corridor;

- Begin preliminary engineering/environmental phase for new US 15 roadway cross-section, including median, side verges, sidewalks, street trees;
- Complete early-action rail-trail connector on Rural Avenue;
- Implement traffic-calming elements of Approach and Transition Plan for southern third of corridor;
- Consider devising and adopting an Official Map.
- Consider greening programs, including TreeVitalize and Growing Greener Program.
- Install demonstration streetscape improvement projects, including sidewalks, street trees, pedestrian-actuated signal devices, and crosswalks at one or more intersections;
- Adopt new Corridor Mixed Use overlay zoning district;
- Implement wayfinding in coordination with PennDOT's Wayfinding Program;
- Implement access management; and
- Implement shared parking.



Access Management

The Access Management Manual published by the Transportation Research Board in 2003 defines access management as the “systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges and street connections to a roadway.” Access management for US 15 primarily means controlling the number of opportunities for vehicles to access bordering properties via driveways, thereby minimizing conflicts between vehicles and between vehicles and pedestrians, although it also applies to the number, spacing, geometry, and design features of street connections to US 15. The Corridor Improvement Framework Plan recommends a number of measures to implement access management, including the creation of a planted median through much of the corridor and changes to the manner in which streets intersect with US 15. These measures will produce a safer corridor.

Further access management measures are recommended. A systematic consolidation and elimination of driveways will reduce the raw number of openings and the occurrence of conflicts between vehicles and between vehicles and pedestrians, but the determination of which driveways to close and how to consolidate is linked closely to two other ideas. The first is the maintenance of adequate access to properties and the second is shared parking lots.

Access Impact of Median Treatment (see page 61) is a preliminary feasibility assessment, determining that the installation of a planted median down the center of US 15 will still allow for adequate access to bordering properties in most cases. But access will need to be ensured to all bordering properties before a planted median can be constructed.

Shared Parking Lots is an important action of the Corridor Improvement Plan, but the prospect of shared parking lots will depend on achieving the support of property owners and business operators. An Access Management Task Force consisting of the Borough, Township, County, PennDOT, and property owners and business operators for the portion of the US 15 corridor between Market Street and Buffalo Creek needs to be convened to consider the access/shared parking question(s). (This Task Force may also consider a new CMX zoning district, including overlay provisions, in the corridor, wayfinding, and other corridor implementation strategies.)

Tools for Access Management

Three access management tools are suggested for the US 15 corridor, to be devised as part of the work of an Access Management Task Force (as described above) and by actions by Lewisburg Borough and East Buffalo Township. The three access management tools work together and include an Access Management Handbook general policy guide for decision-makers, an Access Plan targeted roadway improvements element for the US 15 corridor, and a Controlled-Access Roadway Corridor Overlay District zoning text for the zoning ordinance of each municipality.

1. Access Management Handbook

The Access Management Handbook is intended to be used whenever decisions about the design and construction of transportation improvements, on one hand, and zoning and land development decisions on the other, are being contemplated in the US 15 corridor. Good planning has always involved the simultaneous examination of both land use and transportation questions. The Handbook would be consulted for guidance by

local, county, regional, and state authorities whenever the following circumstances occur with respect to the US 15 corridor:

- Land development proposals are being reviewed;
- Zoning permit applications are being reviewed;
- Driveway modification and construction permit processes are administered;
- Roadway design and capital improvement projects or corridor improvement plans are being considered;
- Comprehensive, master, and land use planning activities occur.

The Handbook would present access management techniques to help address common problems. These techniques would be organized around specific access management tools. Additional information could be included on incentives for implementing access management practices. An Access Management Handbook for the US 15 corridor is a logical implementation tool to be developed by an Access Management Task Force.

2. Access Plan

An Access Plan is a plan adopted as part of, or as an addendum to, the comprehensive plan for a community (in this case the comprehensive plans for Lewisburg Borough and East Buffalo Township, respectively), that establishes conditions of vehicular access for a controlled-access roadway (in this instance US 15). The Access Plan would consist of a map and an accompanying text that locates and describes all of the roadways and driveways that intersect and are planned to intersect with US 15. The Action Plan could be based on the Corridor Improvement Framework Plan (Figure 4.1 of this study and accompanying text). The Access Plan would include the following elements:

- Controlled Access Roadway – In the case of this Access Plan, it is US 15;
- Designated Intersecting Roadways – These are roadways that intersect with US 15 for the purposes of serving as feeder roads to it;
- Other Existing and Planned Roadways – These are existing and planned roadways in the corridor that provide access to properties and connect to Designated Intersecting Roadways;
- Designated Driveways – These are driveways that are identified to be maintained/installed from the consideration of driveway consolidations, eliminations, and the creation of Shared Parking Lots by the Access Management Task Force.

Like the Access Management Handbook, the Access Plan is intended to be used whenever decisions about the design and construction of transportation improvements, on one hand, and zoning and land development decisions on the other, are being contemplated in the US 15 corridor. An Access Plan for the whole US 15 corridor is a logical implementation tool for the Corridor Improvement Plan. Independent adoption by each municipality makes it a formal policy plan to be followed by the respective municipality.

As a planning tool, the Access Plan is intended to have great flexibility. It exists to support the access management goals for the US 15 corridor, but also to advance public and private needs for land development, transportation improvements, access to properties, and economic growth. By laying out a system for future circulation and access in the entire corridor, property owners and elected officials, residents and administrators, and business operators and roadway users, can all participate in a process that will advance the emergence of a comprehensive system for mobility.

Many, if not most, of the planned roadways and driveways shown in the Access Plan would be constructed over time by the private sector, in conjunction with new land developments. These facilities will emerge only when there is a compelling private-sector-generated reason for them to be built. But the Access Plan seeks to guide roadway/driveway construction so that any and all new and improved facilities, whether private- or publicly-funded, support the corridor's need for a sound circulation system, including a high degree of mobility and safety and consistency with the access management principles advanced by the Access Management Handbook. The Access Plan would also be a prerequisite for the adoption of a Controlled-Access Roadway Corridor Overlay District by the respective municipality.

3. Controlled-Access Roadway Corridor Overlay District

The Controlled-Access Roadway Corridor Overlay District would be a new zoning district for a US 15 corridor municipality. It would be an overlay zone, meaning that its regulations apply to a location where certain criteria have been met, and in addition to the regulations that already apply to that location based on the districts delineated on the zoning map. In this instance, the overlay would apply to any location within a long, narrow strip of land that includes the right-of-way of US 15 and an area one hundred feet on either side of its centerline.

A Controlled-Access Roadway Corridor Overlay District for the whole US 15 corridor is a logical implementation tool to be developed jointly by an Access Management Task Force. When completed, the relevant pieces of the overall Controlled-Access Roadway Corridor Overlay District would then be adopted independently by each municipality, thereby making it a formal part of the respective municipality's zoning ordinance.

The text for the Controlled-Access Roadway Corridor Overlay District would be a codification or legal language incorporating and advancing the ideas for access management in the US 15 corridor contained in the Access Management Handbook and the Access Plan. In fact, both of these planning documents may be considered prerequisites for the Controlled-Access Roadway Corridor Overlay District, since the text for the District would specifically reference both the Access Management Handbook and the Access Plan.

The text for the Controlled-Access Roadway Corridor Overlay District would cover all situations where decisions concerning access to properties bordering US 15 would need to be made in the context of zoning. These situations would include land development, change of use, change of intensity of use, change of zoning, application for building permit, application for zoning permit, application for driveway access permit, and application for certificate of occupancy.

The Controlled-Access Roadway Corridor Overlay District would require that new development in the US 15 corridor, in most cases, would gain access from US 15 via Designated Intersecting Roadways or via Other Existing and Planned Roadways or Designated Driveways, as described in the Access Plan, and not via new driveways directly from US 15. In order to gain access directly from US 15, a Conditional Use would need to be granted by the municipality's elected body (Board of Supervisors or Borough Council). This Conditional Use would be granted only when certain criteria are met, including, among others, access arrangements that are consistent with the guidelines contained in the municipality's adopted Access Management Handbook.

Potential Characteristics of a New Corridor Mixed-Use Zoning District (CMX) for the Northern Half of the Corridor

Intent

The intent of the CMX Corridor Mixed-Use district is to provide for the combining of stores and shops, hotels and inns, offices, higher-intensity residential uses, and civic, public, and semi-public uses along the US 15 corridor between Saint Louis Street and Buffalo Creek. It is the purpose of these regulations to encourage a diversification of uses in the district and to promote close interrelationships among different uses; high-quality, visually-attractive, and environmentally-responsible site design and buildings; efficient circulation systems; conservation of land and energy resources; and increased opportunities for pedestrian circulation. In addition, the specific intent of the district is to:

- Encourage the development of land and buildings along US 15 for a variety of uses, either individually or together within the same building, for compatible mixed-use developments;
- Permit the development of functionally-related land uses in a manner that is more efficient, environmentally-sensitive, and mutually-supporting than conventional strip-type, low intensity highway-oriented development;
- Minimize potential traffic hazards by encouraging planned, physically-integrated, multiple-use facilities that utilize a reduced number of access driveways when compared to conventional strip-type development;
- Minimize auto-trip generation through maximizing opportunities for pedestrian movement and patronage of

multiple facilities in a development district that emphasizes the interrelationship of uses and structures;

- Establish a framework for development that anticipates and encourages the necessary conditions for a high level of pedestrian circulation;
- Provide for civic, public, and semi-public uses, including exterior common use areas, convenient to commercial concentrations, so as to function for the general benefit of the community as places for relaxation, recreation, and social activity;
- Enhance the functional values of natural and landscaped areas for developed areas, including groundwater recharge, runoff control, and microclimate moderation.

Permitted Uses

- Retail commerce, including: Stores and personal service shops dealing directly with customers; restaurants or other similar establishments; banks; cinemas or similar recreational or cultural establishments; exercise or fitness facilities; studios for dance, art, music or photography; nursery schools or day care centers.
- Business or professional offices, including: Operations designed to attract and serve customers or clients on the premises, such as the offices of physicians, lawyers, other professions, veterinarians, insurance and stock brokers, travel agents, and government entities; operations designed to attract little or no customer or client traffic other than employees of the entity operating the principal use.
- Hotels, motels, inns, or conference centers.

- Not-for-profit museums, libraries or other educational, cultural, religious, civic or philanthropic uses of a similar nature.
- Public or private not-for-profit open space and recreation uses.
- Transit stations or public utility facilities.
- Multi-family residential dwellings (MF).
- Residences, in mixed-use commercial-residential or institutional-residential buildings.
- Public garage, motor-vehicle sales, service or repair shop, gasoline service station.
- Motor vehicle parking lot, when functioning as part of a designated Shared Parking Lot system.

Development Standards

Maximum Tract Density (floor-area ratio):	1.2
Minimum Tract Density (floor-area ratio):	0.4
Maximum Tract Density (units per developable acre):	20
Minimum Tract Area (square feet)	10,000
Maximum Building Coverage (% of tract)	50
Maximum Impervious Coverage (% of tract)	60
Maximum Height, Principal Structures (feet)	50
Minimum Height, Principal Structures (feet)	20
Minimum Setbacks from Street (feet)	
• Any building face to arterial street ultimate right-of-way	0
• Any building face to collector or local street ultimate right-of-way	0
• Any building face to common parking area	5
• Surface parking areas to arterial street ultimate right-of-way	20
• Surface parking areas to collector street ultimate right-of-way	10
• Surface parking area to local street ultimate right-of-way	10
Maximum setbacks from street (feet):	
• Any building face to arterial street ultimate right-of-way	5
• Any building face to collector or local street ultimate right-of-way	0

Building Size and Spacing

The greatest dimension of a structure, measured parallel to exterior walls, shall not exceed two hundred (200) feet. The minimum distance between structures shall be ten (10) feet, except that all structures connected by a common roof line or effectively connected by means of intervening covered areas shall be considered as one (1) structure.

Pedestrian Circulation Provisions for Natural and Landscaped Areas

All portions of a tract not occupied by buildings and required improvements shall be maintained as landscaped areas consisting of natural environmental features and/or planted vegetation. Natural and landscaped areas shall predominantly consist of natural environmental features or planted and maintained vegetation, but up to twenty (20) percent of the total area may also consist of exterior common use areas such as pedestrian paths, sidewalks, plazas, courtyards, and recreational amenities. Whenever practicable, ground surfaces in common use areas shall be constructed of pavers in a sand setting bed with permeable joints, or similar partly-pervious surface treatments.

Parking

As a Special Exception, off-street parking spaces located within a designated Shared Parking Lot of a use may be credited toward required off-street parking spaces.

Table 5.1: Corridor Improvement Implementation Matrix

System	Elements	Location / Limits	Timing Short (1 - 3 years) Intermediate (3 to 7 years) Long (7+ years)	Cost				Possible Funding Sources	Status / Next Steps / Notes	Agency / Partners
				< \$100K	\$100K - 250K	\$250K - \$1M	> \$1M			
Vehicular Circulation	US 15 Conversion to Median Cross-Section	Hillcrest Lane to Bucknell Gateway	Intermediate to Long			✓		RTP, SRTS TE, PCTI, TIGER, STP	<ul style="list-style-type: none"> Prioritize Segments for Capital Programming Prepare grant applications and/or Level 1 & 2 TIP Screening Forms to secure funding. Coordinate with PennDOT Pavement Management Program Initiate formal Preliminary Engineering Phase 	Municipalities, County, SEDA-COG, PennDOT
		Bucknell Gateway to Market Street	Intermediate			✓				
		Market Street to Saint Mary Street	Short to Intermediate			✓				
		Saint Mary Street to Buffalo Road	Short to Intermediate			✓				
		Buffalo Road to 4th Street	Intermediate			✓				
		4th Street to William Penn Drive	Intermediate to Long			✓				
	US 15 Turn Lane Safety Improvements	SB Right-Turn Lane to Beagle Club Road	Intermediate to Long		✓			HSIP, Developer	<ul style="list-style-type: none"> Prepare Level 1 & 2 TIP Screening Forms to secure funding. 	Municipalities, County, SEDA-COG, PennDOT
		NB Right-Turn Lane to River Road	Long		✓					
	Realignment of Stein Lane	Stein Lane, between Adams Avenue & US 15	Intermediate to Long		✓			HSIP, TE, PCTI, TIGER, Developer	<ul style="list-style-type: none"> Prepare grant applications and/or Level 1 & 2 TIP Screening Forms to secure funding. 	East Buffalo Township, PennDOT
	Realignment of Saint Mary Street	Saint Mary Street, between N. 7th Street and US 15	Long			✓		PCTI, TIGER, TE, Developer	<ul style="list-style-type: none"> Prepare grant applications and/or Level 1 & 2 TIP Screening Forms to secure funding. 	Lewisburg Borough, PennDOT
	Bucknell Gateway	Realignment of Moore Avenue (including removal of existing roadway)	Intermediate to Long			✓		Bucknell Earmark	<ul style="list-style-type: none"> Consider "phased" implementation approach. 	Bucknell, PennDOT
		New signalized Gateway Intersection			✓					
		Realignment of Smoketown Road (including removal of existing roadway)				✓				
	Intersection Pedestrian Hardware, Crosswalk & ADA Enhancements (Countdown pedestrian signal heads, pushbuttons with tactile/visual feedback, wiring, crosswalk realignment, new/revised curb ramps, etc.)	US 15 & Market Street	Short	✓				ARLE, SRTS, New Freedom Program	<ul style="list-style-type: none"> Prepare 2012 ARLE grant application. Liquid fuels program. 	Municipalities, PennDOT
		US 14 & Saint Mary Street		✓						
		US 15 & Buffalo Road		✓						
		US 15 & William Penn Drive		✓						
	Traffic Adaptive System Installation (InSync Component, Video detection, Controller interconnection, etc.)	US 15, between Market Street to Buffalo Road	Short	✓						
	Approach & Transition Zone Implementation	South of Beagle Club Road/River Road (warning signage, Traverse/Edgeline treatments)	Short to Intermediate	✓				HSIP, TE	<ul style="list-style-type: none"> Prepare Level 1 & 2 TIP Screening Forms to secure funding. 	Municipalities, County, SEDA-COG, PennDOT
		Beagle Club Road / River Road to McRae Circle (Lane narrowing, dynamic message/weather/speed feedback sign)			✓					
McRae Circle to Bucknell Gateway (Gateway treatment, additional landscaping to extend Hillcrest "tree-lined street" feel)		✓								
Bucknell Gateway to Market Street (Add urban queues - wayfinding signage, street banners, decorative fencing, etc.)		✓								

Table 5.1: Corridor Improvement Implementation Matrix (continued)

System	Elements	Location / Limits	Timing Short (1 - 3 years) Intermediate (3 to 7 years) Long (7+ years)	Cost				Possible Funding Sources	Status / Next Steps / Notes	Agency / Partners	
				< \$100K	\$100K - 250K	\$250K - \$1M	> \$1M				
Bicycle & Pedestrian Circulation	Continuous US 15 Mainline Sidewalks	PA 45 to William Penn Drive	Short to Intermediate				✓	PCTI, SRTS, TE	• Demonstration streetscape projects.	Municipalities, County, SEDA-COG, PennDOT	
		PA 45 to Fraternity Road	Intermediate to Long				✓				
	Cross Street Sidewalks	<ul style="list-style-type: none"> Buffalo Road 7th Street Saint Mary Street Market Street Stein Lane 	Intermediate			✓		PCTI, SRTS, TE	• Demonstration streetscape projects.	Municipalities, County, PennDOT	
	Buffalo Valley Rail Trail Interim Connection	Rural Avenue Only	Short	✓				PCTI, TE	• Rural Avenue connection	Municipalities, County, SEDA-COG, PennDOT	
	Buffalo Valley Rail Trail Mid-Block Crossing	Between PA 45 and Saint Mary Street	Intermediate			✓			• Traffic Study and Preliminary Engineering for Preferred Option		
	"Share the Road" signage for bike route(s) off US 15	East of US 15	Intermediate to Long	✓					SRTS, TE	• Install signage	Municipalities, County, PennDOT
		West of US 15	Short	✓							
Bucknell Pedestrian Connection to West	Bucknell Underpass to Stein Lane	Short to Intermediate		✓			Bucknell University	• Coordination between Bucknell University and Municipalities	Municipalities, Bucknell		
Green Space & Community Wayfinding	Plant street trees	Throughout corridor, as far south as Fraternity Road/Hillcrest Lane area.	As per US 15 conversion to median cross-section (see above)			✓		As per US 15 conversion to median cross-section (see above)	• Demonstration streetscape projects.	PennDOT, County, Lewisburg Borough, East Buffalo Township, SEDA-COG	
	Landscape median areas				✓						
	New publicly-accessible open space	East side of US 15, South of Buffalo Creek	Long						• Initiate Open Space Study	Municipalities, County, SEDA-COG, DCNR	
		East side of US 15, South of Saint Mary Street	Intermediate	Dependant on acreage land value and other factors					• Initiate Open Space Study	Municipalities, County, SEDA-COG, DCNR	
		Lands on either side of new Stein Lane connector	Intermediate						• Initiate Open Space Study	Municipalities, County, SEDA-COG, DCNR	
Signage and Wayfinding	Strategic locations along corridor with priority to commercial areas	Short to Intermediate	✓				PCTI, CDBG	• Study and design	Municipalities, County, Busienss Improvement District		
Buildings, Land Use & Parking	Development and redevelopment to create mixed-use activity centers (nodes) focused on the three main intersections in the northern half of the corridor.	NE, NW, & SW corners of US 15 and Buffalo Road	Intermediate	Varies by development program and real estate market				Primary private investors	<ul style="list-style-type: none"> Zoning changes required by Borough & Township Marketing outreach by County, Borough, and Township Developers Fair sponsored by County, Borough, and Township 	Property owners, developers, investors, Lewisburg Borough, East Buffalo Township, County, SEDA-COG	
	Modification of the Mods to allow relocation of Smoketown Road	Bucknell University, west side of US 15	Long					Bucknell University		Bucknell University	
	Other development and redevelopment of properties	Various locations along the corridor	Intermediate to Long					Primary private investors	• Consider zoning changes by Borough & Township	Property owners, developers, investors, Lewisburg Borough, East Buffalo Township	

Table 5.1: Corridor Improvement Implementation Matrix (continued)

System	Elements	Location / Limits	Timing Short (1 - 3 years) Intermediate (3 to 7 years) Long (7+ years)	Cost				Possible Funding Sources	Status / Next Steps / Notes	Agency / Partners
				< \$100K	\$100K - 250K	\$250K - \$1M	> \$1M			
Buildings, Land Use & Parking (continued)	Shared off-street parking lots for retail, office, and multi-family residential uses along the corridor from Market Street to just north of Buffalo Road	NW & NE of the intersection of US 15 & Buffalo Road, behind frontage buildings	Intermediate					Public-private partnership, including property owners, business operators, Lewisburg Borough, East Buffalo Township	<ul style="list-style-type: none"> Create Task Force to investigate opportunities for cooperative venture to establish shared off-street parking lots. Zoning changes would be needed to permit relief from current lot-by-lot off-street parking requirements 	Property owners, business operators, Lewisburg Borough, East Buffalo Township, County, SEDA-COG
		West of 10th Street								
		East of US 15 and south of Buffalo Road, behind frontage properties								
		SW & SE of intersection of US 15 & Saint Mary Street, behind frontage buildings / areas								
		N of Wheat Alley and N from Rural Avenue								

Funding Acronyms:

- ARLE – Automated Red Light Enforcement
- HSIP – Highway Safety Improvement Program
- PCTI – Pennsylvania Community Transportation Initiative
- RTP – Recreational Trails Program
- SRTS – Safe Routes to Schools
- STP – Surface Transportation Program
- TE – Transportation Enhancements Program
- TIGER – Transportation Investment Generating Economic Recovery Grant Program

Considering Costs and Benefits

Typically, a cost-benefit analysis is a quantitative analysis of the costs in capital dollars invested vs. the return on the investment including intended benefits and outcomes. Traditionally, cost-benefit analyses have not been conducted or required on transportation investments for many reasons. Each year in Pennsylvania, billions of dollars go into effective transportation infrastructure projects based on many design, safety and traffic criteria with no financial measure of the benefits. This occurs primarily because access, mobility, goods movement and safety benefits are difficult to quantify and even more difficult to place a dollar value on. Typically the benefits of a specific transportation investment project are expressed in terms of transportation performance criteria focused on mobility and safety improvements (AADT, VMT, V:C ratio, LOS, accident reduction, congestion relief, user delay etc). As competition for scarce transportation dollars increases and programs have to be stretched further, government agencies are being asked to look at the costs and benefits of transportation projects and begin to measure the returns on these investments.

Like many transportation planning efforts, corridor studies and corridor plans are, by their nature, broader in scope and more holistic in their purpose. With the acceptance of smart transportation and smart growth policies and programs, the

expected benefits and outcomes of transportation investments can go well beyond mobility and safety benefits. While corridor plans primarily consider mobility and safety benefits, they equally consider a wide range of benefits to the surrounding community, including social, economic, environmental, recreational and even psychological considerations. Many of these community based benefits are even more difficult to quantify and present in terms of dollars and cents. Nonetheless, these “broader” benefits are tangible, can be qualitatively described and presented for consideration in decision-making. To present a more complete, but qualitative picture of the broad-based benefits from environmental infrastructure investments, the concept of “triple bottom line” has been developed. We have modified this concept for the US 15 smart corridor improvement plan and have created the term “super-bottom line” benefits.

This analysis presents the wide range of likely transportation, economic, environmental and community benefits of implementing the Corridor Plan. Where possible the benefits are derived from a specific element or elements of the plan. Table 5.2 summarizes these primary and secondary benefits from each element of the plan. This analysis is intended to increase the recognized benefits resulting from a well balanced, community based plan that carefully integrates transportation and land use objectives.

Table 5.2: Super Bottom Line Benefits Summary

US-15 CORRIDOR PLAN “SUPER BOTTOM LINE” BENEFITS SUMMARY

Benefits Major Plan Elements	Congestion Management	Safety	Walkability	Access to Recreation	Visual Quality	Placemaking	Economic Development & Tourism	Property Values	Energy Conservation	Air Quality & GHG Reduction	Health Benefits	Smart Growth Land Use
Adaptive Traffic Signal Technology	P	S	S	S			S		P	P	S	
Key Intersection Redevelopment and Urban Design Plans		S	P		S	P	P	P	S		S	P
Median Design and access management	S	P	P	S	S	S	S	S		S	S	S
Sidewalks and crosswalk and improved Ped crossing signals		P	P	P		P	P	S	S	S	P	S
Street trees green spaces and green infrastructure			S	S	P	S	P	P	S	S	S	S
Bicycle routes and trail connections	S	P	S	P		S	S	S	P	P	P	S
Shared parking			S	S		P	P	P	S	S		S
Traffic speed management (southern section)	S	P	S	S				S				
Moore Ave intersection relocation		P	P	S			S	S	S			

P = Primary Benefit

S = Secondary Benefit

Potential Funding Sources

Federal

Community Development Block Grants (CDBG). Federal government funding from the Department of Housing and Urban Development (HUD) through their Community Development Block Grant program may be obtained by some municipalities directly from HUD or, as would be the case for Lewisburg Borough and/or East Buffalo Township, through SEDA-COG, Union County's CDBG grant contact.

Safe Routes to School is Federally-available funding for a wide variety of programs and projects, from building safer street crossings to establishing programs that encourage children and their parents to walk and bicycle safely to school.

Transportation Enhancements provides Federal funding to support projects that are designed to foster more livable communities, preserve and protect environmental and cultural resources, and to promote alternative modes of transportation. Funds are available for design, right of way acquisition, and construction.

Recreational Trails Program (RTP) provides funds to the States to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. The RTP is an assistance program of the Department of Transportation's Federal Highway Administration (FHWA). The RTP funds come from the Federal Highway Trust Fund, and represent a portion of the motor fuel excise tax collected from non-highway recreational fuel use: fuel used for off-highway recreation by snowmobiles, all-terrain vehicles, off-highway motorcycles, and off-highway light trucks. The RTP funds are distributed to the States by legislative formula: half

of the funds are distributed equally among all States, and half are distributed in proportion to the estimated amount of non-highway recreational fuel use in each State. Each State administers its own program.

Surface Transportation Program (STP) provides flexible funding that may be used by States and localities for projects on any Federal-aid highway, including the National Highway System (NHS), bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities. STP includes the Safety and Transportation Enhancements (TE) programs, which are funded by federally mandated "set-asides" out of STP funds. STP funds are distributed to the States by legislative formula, according to the extent of the Federal-aid highway system, annual travel on those highways, and the estimated tax paid out of the state into the Highway Trust Fund.

Transportation Investment Generating Economic Recovery Grant Program (TIGER) are competitive, discretionary grants that were available for use on the National Surface Transportation system to achieve "significant impact" and critical national transportation objectives. TIGER and TIGER II grants were funded out of the American Recovery and Reinvestment Act of 2009 and Department of Defense and Full-Year Continuing Appropriations Act of 2011, respectively. It is not clear whether or not additional rounds of grants will be made available in the future.

2012 Discretionary Grant Programs represent special funding categories where FHWA solicits for candidates and selects projects for funding based on applications received. Each program has its own eligibility and selection criteria. The Highways for Life Program serves to advance longer-lasting highways using innovative technologies and practices to accomplish the fast construction of efficient and safe highways and bridges. The goal of the program is to encourage the States to build projects that use proven

innovations that are infrequently used to accelerate the deployment and implementation process of innovation and shall not be used as a supplemental funding source. The Transportation, Community, and System Preservation Program provides funding for a comprehensive initiative including planning grants, implementation grants, and research to investigate and address the relationships among transportation, community, and system preservation plans and practices and identify private sector-based initiatives to improve those relationships.

Tax Credits

- **Low Income Housing Tax Credit** – Credit provided where projects meet rehabilitation guidelines.
- **Historic Rehabilitation Tax Credit** – Credit provided where projects meet rehabilitation guidelines.

Pennsylvania

Department of Community & Economic Development (DCED) (www.newpa.com) identifies resources and strategies for business and community growth in the State. Some of the programs that may benefit the US 15 corridor include:

- **The Land Use Planning and Technical Assistance Program (LUPTAP)** provides grants to local governments for land use planning activities.
- The **DCED New Communities Program** assists communities in integrating the revitalization of downtowns with that of industrial/manufacturing areas.
- **DCED's Community Revitalization Program** provides grants for community revitalization and improvement projects.

- **The Community Action Team (CAT)** creates priority “impact” projects within a community and provides a “team” that assists with all stages of a project and acts as a single point of contact, enhancing communication between agencies and departments so that attention and resources are focused on the most deserving projects.
- **Keystone Innovation Zones (KIZs)** are designated zones that may be established in communities that host institutions of higher education – colleges, universities, and associate degree technical schools. These zones are designed to foster innovation and create entrepreneurial opportunities. They do this by gathering and aligning the combined resources of educational institutions, private businesses, business support organizations, commercial lending institutions, venture capital networks (including angel investors), and foundations (KIZ partners).

Transit Revitalization Investment Districts (TRID) is enabling legislation offering state support for planning and implementing transit-oriented development. The Department of Community and Economic Development (DCED) and PennDOT administer this program.

Pennsylvania Industrial Development Authority (PIDA) provides low-interest loans for eligible commercial projects, including research and development, computer/operations centers, multi-tenant projects, as well as traditional manufacturing and industrial projects.

Pennsylvania Community Transportation Initiative (PCTI) is a program designed to advance Smart Transportation by incentivizing collaborative decision-making, emphasizing regional, multi-municipal, and multi-agency cooperation, as well as advancing integrated land use and transportation decisions.

Linking transportation requires a strong partnership between the Pennsylvania Department of Transportation (PennDOT), Metropolitan Planning Organizations (MPO)/Rural Planning Organizations (RPO), counties and municipalities. To support the second round of PCTI, PennDOT has set aside \$12 million in each of the first two years of the 2011 Transportation Improvement Program (TIP). This program utilizes 100% federal transportation funds. All projects must meet applicable state and federal guidelines, eligibility, and regulations. Both planning and construction proposals are eligible to receive the PCTI funds. Requests for planning proposals may not exceed \$300,000 and construction proposals may not exceed \$1,500,000, including construction inspection.

Automatic Red Light Enforcement (ARLE) Transportation Grant Program funds highway safety and mobility projects or many types that can be completed at a relatively low cost. Many recently selected projects involve applications of new technology (traffic signals, ITS), improvements to pedestrian/bike safety and mobility, new/replacement signage, and other small roadside improvement projects (drainage, delineators, edgeline rumble strips). The ARLE Program involves reimbursement grants funded by the revenue generated from ARLE violations.

Municipal & Private

Business Improvement District (BID) can assess collections from a group of property owners and/or business owners, for the purpose of economic development. Different policing powers and legal implications are implied with the formation of a Special Service District or a Neighborhood Improvement District.

Joint Purchasing (Service Sharing) occurs when multiple municipalities join together with the purpose of reducing the costs of purchases and/or services.

Development Approval Process / Property Owner

Contributions. As part of the land development approvals process, property developers may be required to install improvements to their property frontages, such as sidewalks, street trees, curbs, roadway paving, and street lights. In addition, applicants for land development approvals may enter into development agreements with municipalities and/or other approvals agencies (such as a DOT), in which property owners voluntarily construct or contribute monetarily toward the construction of infrastructure improvements to the property frontage or elsewhere in the vicinity.

Steering Committee Membership

- Brian Auman, East Buffalo Township Bicycle & Pedestrian Committee
- Curtis Barrick, East Buffalo Township Planning Commission
- Jim Buck, East Buffalo Township Board of Supervisors
- John Delvecchio, Union County Planning Commission
- Kevin Gardner, Brynwood Rentals
- Ralph Hess, East Buffalo Township Department of Planning & Zoning
- Stacy Hinck, Lewisburg Borough Planning Commission
- James Hostetler, Bucknell University
- Alan Keller, P.E., PennDOT District 3-0
- Angelo Kifolo, Lewisburg Freez
- Chris King, PennDOT District 3-0
- Leon Liggitt, P.E., PennDOT District 3-0
- Shawn McLaughlin, AICP, Union County Planning Commission
- Andrew Meisener, Business / Development
- Andrew Miller, Susquehanna River Valley Visitors Bureau
- Mike Molesevich, Lewisburg Borough Council
- Michelle Oswald, Bucknell University
- Samantha Pearson, Lewisburg Area Recreation Authority
- James Saylor, SEDA-COG Rural Planning Organization
- Fred Scheller, Lewisburg Area School District
- Ted Strosser, Lewisburg Borough Council
- Kim Wheeler, AICP, Lewisburg Borough Traffic Committee

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