Area Analysis

The following is a contextual overview and analysis of the various physical planning elements and conditions related to the study area. The emphasis of the inventory and analysis effort is the identification of key factors which directly or indirectly influence the development of specific recommendations. Although certain topic areas, such as the Office, Residential & Retail Market Study require a larger contextual evaluation (provided as a separate appendix to this plan document), the emphasis here is placed on performing a study area-level analysis. This analysis can be used to determine the various infrastructure and inter-related physical factors that should be considered when developing site specific redevelopment plans for three former industrial sites.

The following analysis is organized following a "ground-up" approach. It looks first at the broadest geographically based factors such as geographic context, geology, soils, and hydrology. It then considers factors formed by the existing built environment, including land use patterns, zoning, transportation, utility infrastructure and civic facilities.

The goal of this effort is to ensure that proposed reuse scenarios are viable and sustainable. In this case sustainable not only means having environmental and economic longevity but that they are also compatible with their surrounding environment. In essences, each project should solve both site specific issues and serve as models for how new development can serve a larger role in improving the quality-of-life for all residents of a neighborhood and ultimately the Borough as a whole.

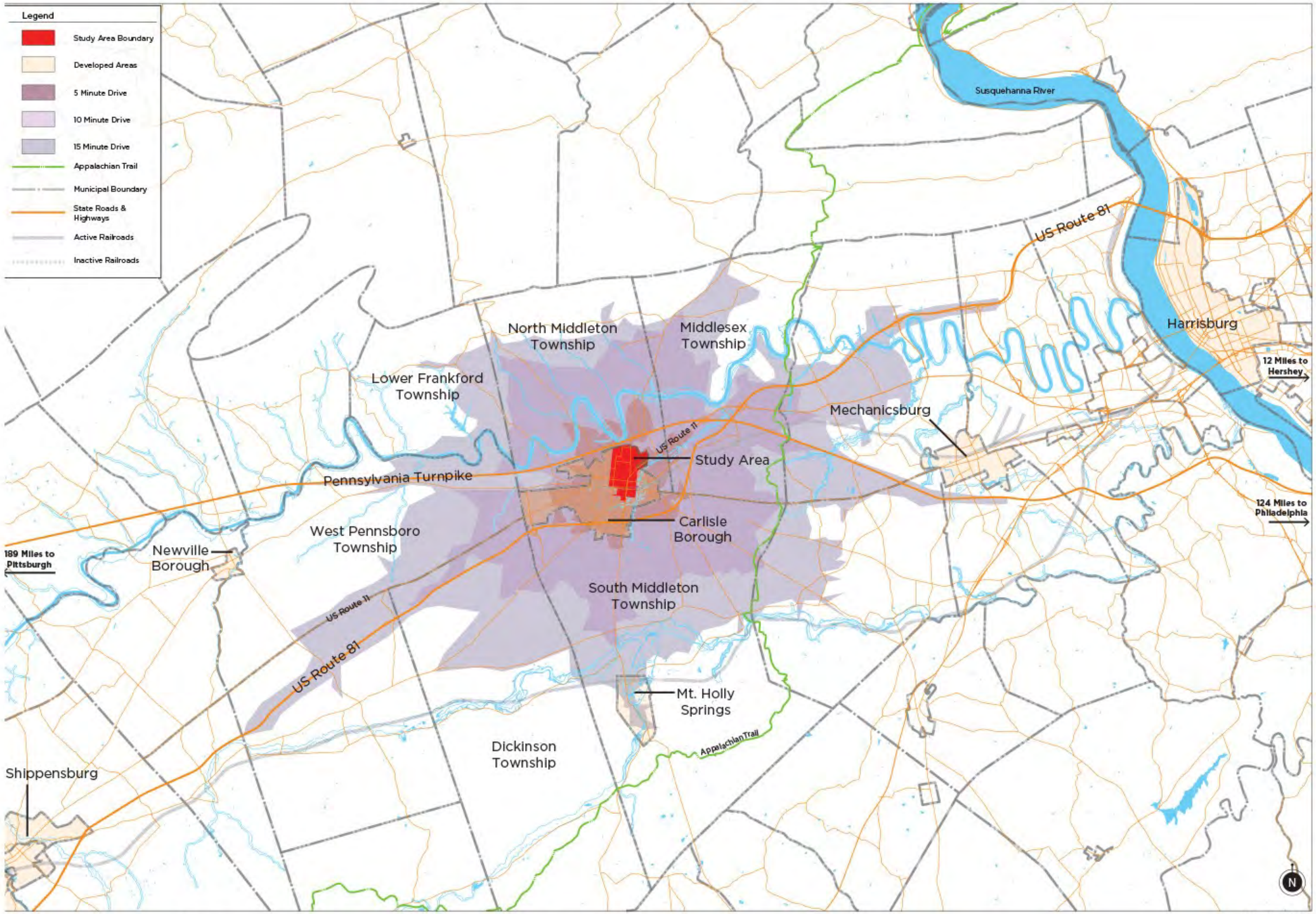
Study Area Context

The Borough of Carlisle is located in the Cumberland County, Pennsylvania, in a region referred to as the Cumberland Valley. Carlisle is located along the I-81 and Pennsylvania transportation corridors, approximately 22 miles southwest of the City of Harrisburg and approximately 120 miles to the northwest of Washington, D.C. and 90 miles from Baltimore, Maryland. Carlisle is the county seat of Cumberland County and the home to two prominent institutions: Dickinson College and the U.S. Army War College. The Carlisle Fairgrounds is home to Carlisle Events which primarily hosts automobile-oriented collector and specialty events that attracts thousands of visitors to the Borough each year.

Study Area

The following is a formal description of the study area which is depicted on the Study Area Map. Although the study area boundary includes a large area, the emphasis of the planning effort is focused on the former industrial areas, their surrounding neighborhoods and the strategic infrastructure locations and corridors that serve them. It is important to note that the study area includes a portion of North Middleton Township along the U.S. Route 11/N. Hanover Street corridor, which is directly adjacent to the 759 Hamilton Street redevelopment site.

Starting at the northern extent of the study area, the boundary roughly includes: the northern Borough limits along the Pennsylvania Turnpike from Franklin Street, through PA Route 34/Carlisle Springs Road to U.S. Route 11/N. Hanover Street; the boundary travels southwest from this point roughly along Letort Spring Run, to N. Hanover Street at Henderson Street; from this point the boundary travels south and west and includes all of the downtown historic district to W. High Street; it continues west along W. High Street to Franklin Street where it turns north along Franklin Street to the point of beginning near the Pennsylvania Turnpike.



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STUDY AREA AERIAL

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Topography, Geology, Soils, & Hydrology

Topography

To a large extent the topography of Carlisle and the study area reflects the geologic features beneath its soils. The basic limestone bedrock that is the foundation of Carlisle creates the soft undulating topographic changes noticed on the soil surface. Periodically, stone outcroppings of the underlying geology occur, such as the area along the east side of Carlisle Springs Road, in the area of the former IAC/Masland parking lot. One of the most dramatic changes to elevation in this region comes from sinkholes that form depressions in the landscape. These sinkholes occur when acidic water infiltrates the ground and reaches basic materials, in this case limestone. Pockets are created in the earth that can either remain as such in the form of caves, or they may collapse forming sinkholes above ground. Both situations are found in the region.

The highest points within the study area are located in the area west of PA Route 34/Carlisle Springs Road along H Street and Courtyard Drive. The lowest areas are dispersed linear depressions running in a southwest/northeast orientation, roughly paralleling U.S. Route 11/N. Hanover Street. One such depression extends from Fairground Avenue to the northeast between Hamilton Street and U.S. Route 11/N. Hanover Street. The majority of the depressions within the study area parallel, yet eventually feed into, Letort Spring Run.

Smaller man-made topographic changes can also be seen in study area. The Norfolk/Southern rail line and its supporting embankments have created subtle depressions in the landscape and are echoed by the underground location of major storm sewer lines.

TOPOGRAPHY

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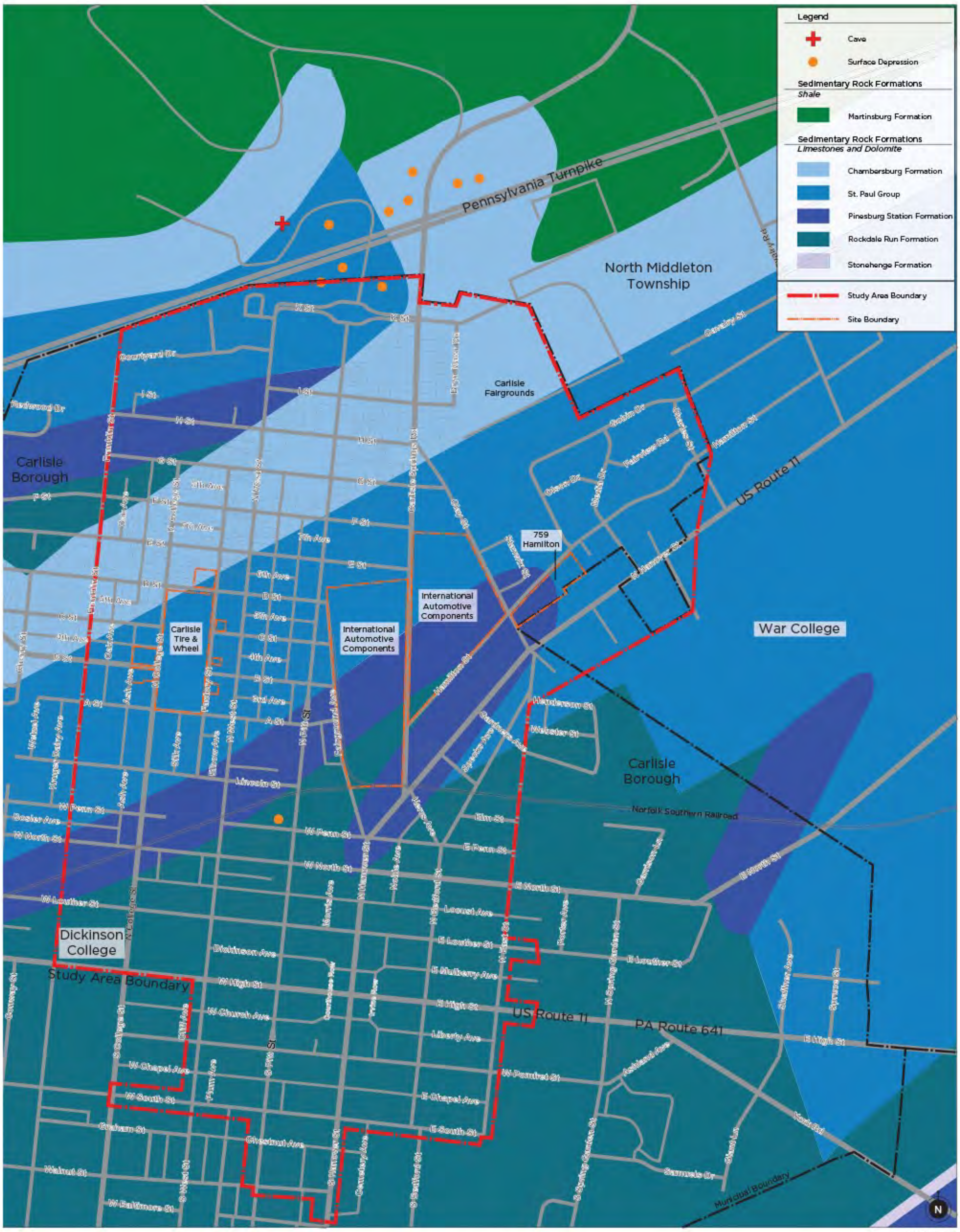
Geology

A large portion of Cumberland County, including Carlisle Borough and especially within the study area, are underlain by Cambrian bedrock formations. Formations from the Cambrian Period of the Paleozoic Era (formed 542-488.3 million years ago) are often heavy in limestone and dolomite. These types of rock are prone to weathering rapidly, causing what are known as karst formations. Karst formations are systems of faults and caverns which can form in calcareous rock formations like limestone and dolomite from physical and chemical weathering. These formations present several different challenges, both structurally and hydrologically.

The specific geologic units underlying the study area are known as the Chambersburg, Pinesburg and Rockdale Formations. These forms of bedrock are made primarily of limestone and dolomite, with seams of shale and other rock in sporadic locations. This particular geologic unit is prone to some karst formations. An outcome of karst are the caverns and sink holes that are observed in the area, especially in the northern-most portions of the study area and just beyond, along the Pennsylvania Turnpike and PA Route 34/Carlisle Springs Road.

From a structural standpoint, karst formations present the possible hazard of sink holes, which can form when excessive amounts of the rock have weathered away and the roof of a cavern collapses. The damage due to sink holes can be significant, so it is in the best interest of property owners to be aware of any possible hazards a certain karst formation can present. In order to avoid the hazards that come with sink holes, it is best to map out significant voids in the bedrock, then design new structures with the hazards in mind or try to avoid problem areas all together, if possible.

Karst geologies raise many challenges when it comes to stormwater runoff pollution control. The large faults and voids in the rock lead to high underground flow rates and the potentially rapid spread of pollutants. The large openings in the bedrock allow for quick transmission of groundwater when compared to the typical cracks and faults in bedrock. This causes major concerns in areas which can have runoff heavy in pollutants. These hydrologic characteristics make it more difficult to have on-site infiltration-based stormwater management systems which emphasize on-site infiltration, as any concentration of water can percolate quickly into groundwater supplies.



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Soils

The performance characteristics of soils, especially from the standpoint of their ability to drain, can impact the design of site related facilities as well as building foundations. The prominence of calcareous rock can often lead to residual soils that are heavy in fines (particles), as chemical degradation can lead to the production of more clay soils as opposed to physical weathering. This is somewhat evident in the soils found in the Carlisle area as they do contain fairly high amounts of fines but do not appear to be overly abundant as to cause too many issues when designing new facilities.

Given that much of the land within the study area has already been developed and is mostly classified as 'urban land,' the U.S Department of Agriculture (USDA) provides limited information about the soil characteristics within the study area. In a setting like this, the soil is usually just classified as an "urban" soil and little data is provided since much of the surface in an urban setting is impervious, being covered in paving or buildings, and therefore data is difficult to collect. Exposed areas have also likely been mixed with some non-native fill or top soil, so the conditions can be variable and hard to quantify.

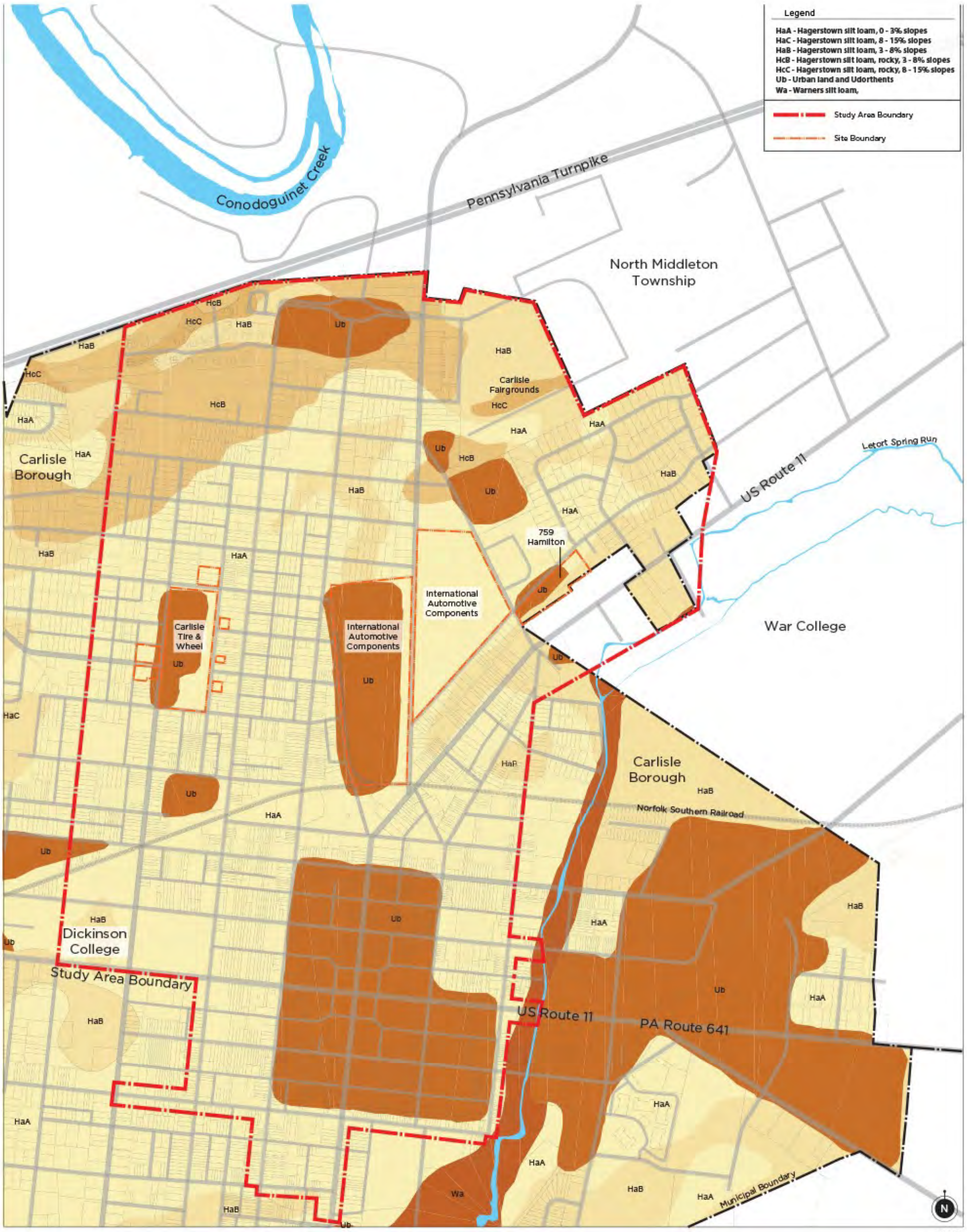
In some cases the USDA will include a native soil mixed with the urban soil unit in the description of a soil's characteristics. This can give some insight into what soils are actually underlying the area. The soil unit that has been combined with the urban unit can often be found nearby, just outside the developed area. This unit can then be utilized to acquire some information on the underlying soils in the area classified as 'urban.' Since much soil has been replaced in developed areas, the data must be used cautiously and only as a partial picture of what dynamics may exist in terms of urban soil's capacity to drain and support various types of development activities.

Much of the study area falls into the category of "Urban-Hagerstown Complex" meaning that soil from the Hagerstown group is likely underlying much of the area. Looking at the USDA data for the surrounding area, the Hagerstown group is prominent in the areas surrounding the Borough. The Hagerstown soil is described as a silty clayey loam, meaning there is a fairly high amount of fines present in this soil. The soil also has moderate levels of plasticity, meaning it could possibly have some slowly draining areas and possible inconsistent strength properties. The Hagerstown group is described as moderately well drained and falls into hydrological group B, so while infiltration in this soil is not rapid, water will percolate at moderate rates. This, combined with some underlying karst geologies means that pollutants can likely be transmitted fairly quickly through the ground. It also means that existing soils would likely only require moderate amending to properly support landscaping, street trees and on-site stormwater management facilities even if such facilities are not designed for infiltration due to the underlying karst condition.

Hydrology

Carlisle Borough is located in the Lower Susquehanna stormwater sub-basin. As a result, it is part of the Chesapeake Bay watershed and therefore is subject to the guidelines set forth by the Chesapeake Bay Program. Much of the study area and the Borough, drains directly into Letort Spring Run. Letort Spring Run flows from the south to the northeast through the Borough of Carlisle and drains into the Conodoguinet Creek, with small portions of northern quadrant of Carlisle draining directly into the Conodoguinet Creek. The Conodoguinet runs west to east through the entirety of Cumberland County, becoming more meandering as it goes eastward. Conodoguinet Creek passes Carlisle Borough to the north, crossing through North Middleton Township on its way towards the Susquehanna River, with its confluence located in East Pennsboro Township, across the Susquehanna River from the City of Harrisburg.

Locally, Carlisle does have its own set of stormwater issues. Most of the study area drains to Letort Spring Run at two key points within the area of the Army Way College property. Letort Spring Run has some prevalent flooding issues, especially in downtown Carlisle, primarily east of N. Hanover Street. Within the study area, flooding has been reported along Fairground Avenue, south of A Street. There are also several low depressions with day-lighted stream areas between PA Route 34/Carlisle Springs Road and Clay Street, in the area of C Street. With regards to the overall flooding characteristics of the Letort Spring Run watershed, a majority of the flooding issues are located upstream of the study area; however, it is important to minimize additional runoff as the run is clearly near its carrying capacity in some areas.



SOILS

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Utilities

Sanitary Sewers

Unlike many older urban municipalities, the Borough has the benefit of separate sanitary and storm water sewer systems which means that the sanitary treatment plant is not subject to significant overwhelming during major storm events resulting in the bypassing of the treatment plant and the direct discharge of raw sewage into the surface water bodies.

The entire study area is served by public sanitary sewers. There are no capacity issues that have been identified through the planning process related to the ability of the current sanitary sewer system to serve future redevelopment on the three former industrial sites.

Through discussions with the IAC/Masland property owners, it was determined that the current sanitary (and water supply) lines run north/south through the middle of the current parcel. It may be desirable to relocate all underground utilities under PA Route 34/Carlisle Springs Road and/or Fairground Avenue in order to not conflict with the location of future buildings within the proposed block structures.

WATER AND SEWER UTILITIES

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Storm Sewers and Stormwater Management

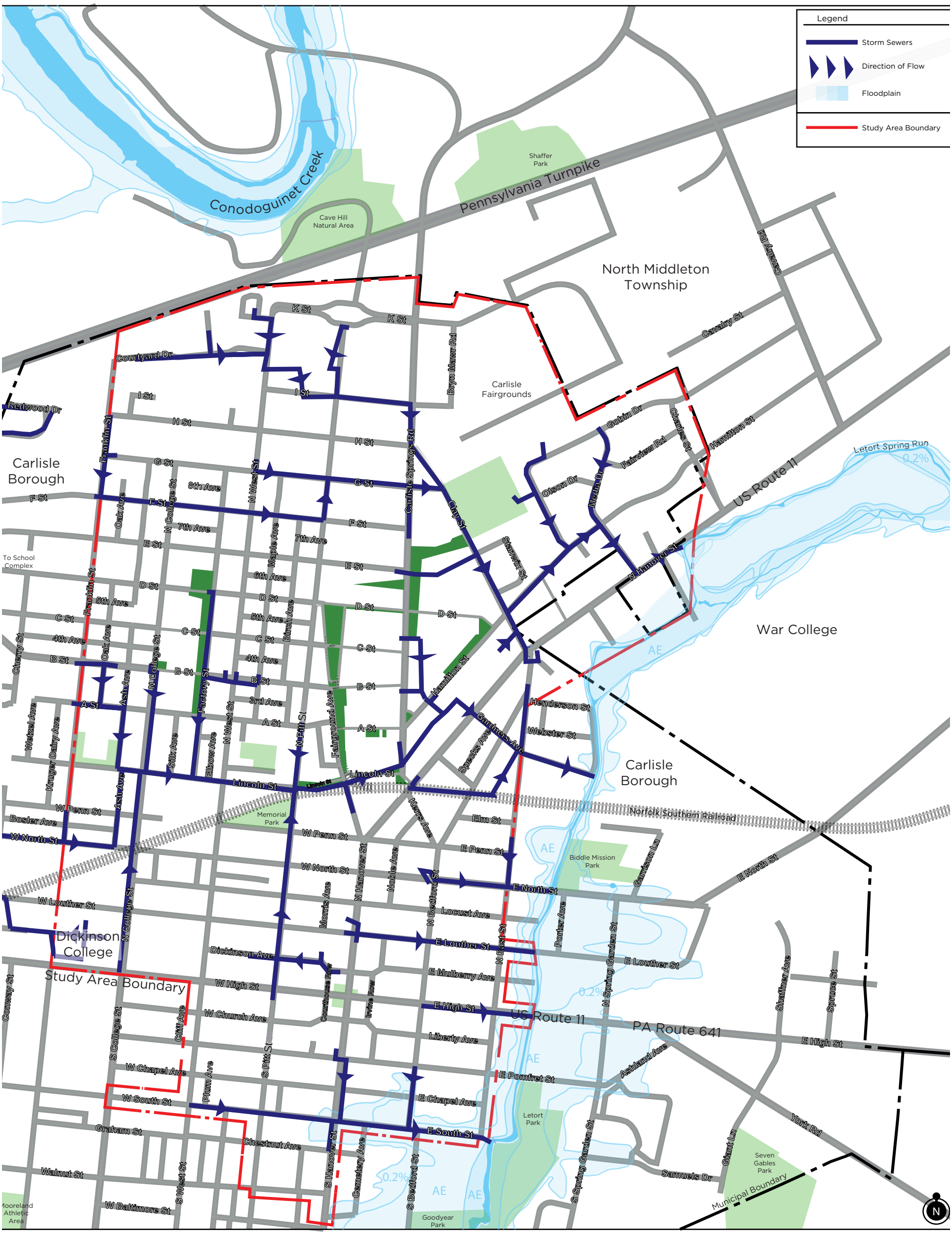
Carlisle Borough has a dedicated stormwater sewer system. The area south of the Norfolk/Southern rail line and east of Hanover Street is served by lateral lines that run west to east along North Street, Louther Street, High Street and South Street (this line extends west of Hanover Street to West Street).

The majority of the stormwater within the portion of the study area located west of Hanover Street, south of the Norfolk/Southern rail line, runs north via lines under Pitt Street and College Street to a large interceptor line that travels along Lincoln Street from west to east. This major sewer line continues eastbound through the southern portion of the IAC/Masland site, across PA Route 34/Carlisle Springs Road, through the rear portions of residential properties to roughly Gardners Avenue. It then travels east along Gardners Avenue until its outfall into Letort Spring Run. All of the stormwater runoff from the Carlisle Tire and Wheel site and the majority of the runoff from the IAC/Masland site drain into this major stormwater line.

The portions of the study area north of E Street drains entirely into a major storm sewer line that runs underneath Clay Street and then northeast along Hamilton Street to Media Drive. At this point the line turns east and travels under Media Drive and via a short stretch of U.S. Route 11/N. Hanover Street, before it reaches its outfall with Letort Spring Run.

The three former industrial sites subject to redevelopment were nearly completely covered with impervious surfaces. As a result, the opportunity exists through the integration of various pre-treatment and detention techniques to have a significant net reduction in the stormwater runoff generated at each site while still supporting substantial, urban-style development patterns. Furthermore, the retro-fit of existing infrastructure, specifically public streets and thoroughfares represents an opportunity to broaden the applications of such techniques to create an area-wide approach to stormwater management; reducing the potential for flooding and also improving the overall environmental quality of the watersheds through the point-source removal of pollutants.

Utilizing a palette of Best Management Practices (BMPs) to handle stormwater as an interconnected chain of facilities will likely be the most effective method to support urban-style infill without having to necessarily meet stormwater management standards with facilities on each individual parcel, yet ensures, when combined, that the overall net runoff is managed properly. The simplest way to achieve this outcome is to create interconnected stormwater management facilities which are integrated into public parks and open spaces as well as through streetscape treatments and then supported by site specific rain gardens, flow-through planters, grey water detention/reuse systems and green roofs. A key aspect of utilizing landscape-oriented solutions is the requirement to design detention versus retention systems as result of the karst geology and the potential that concentrated infiltration of stormwater could lead to the degradation of the limestone geology and cause potential sink hole related issues. Such systems should be designed to hold peak storm volumes and promote evapotranspiration and the slow release of stormwater into the conveyance system, post storm event.



STORM SEWER SYSTEM

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Land Use and Zoning

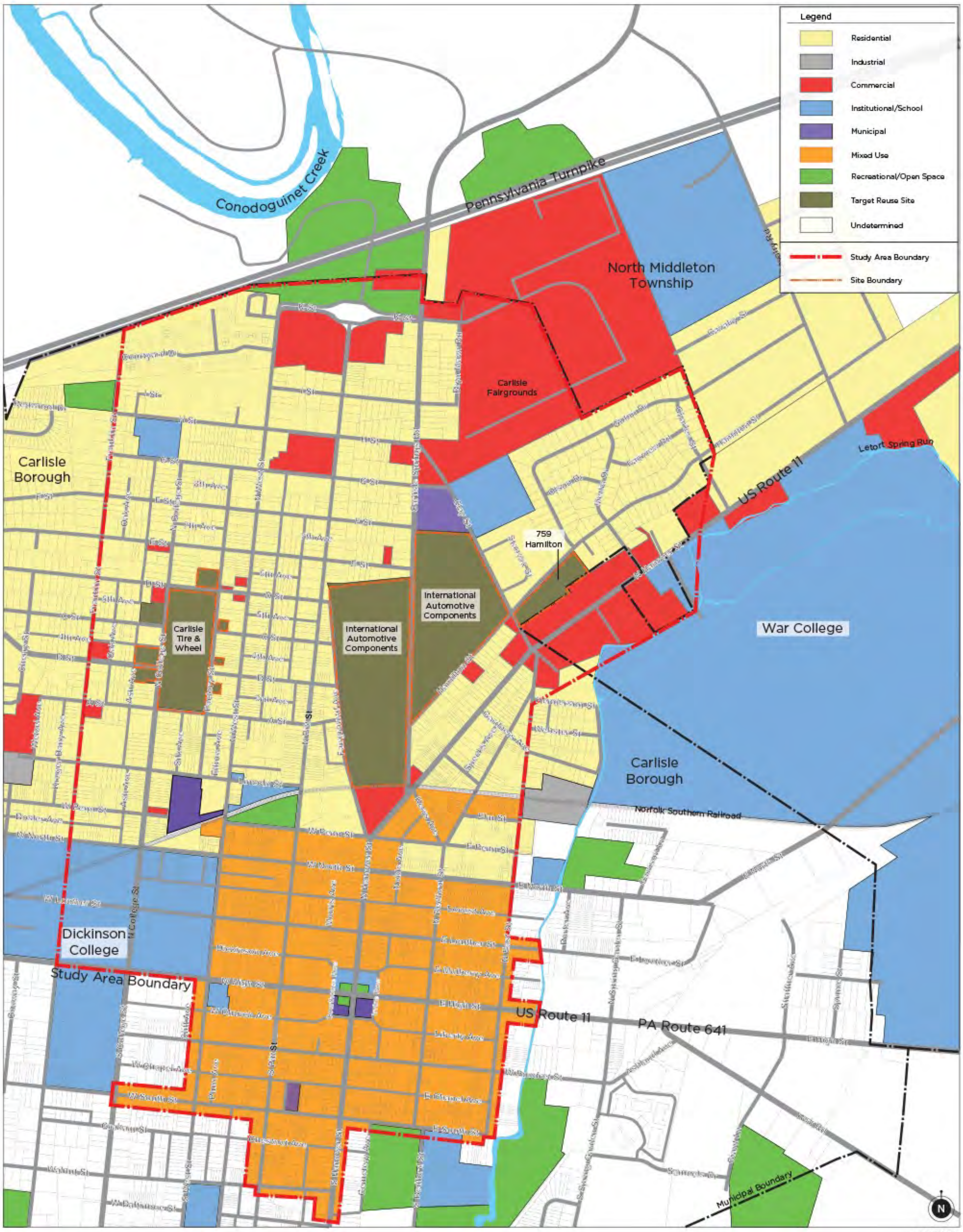
Land Use

The study area can be divided into a few key land use types. The bulk of the southern third of the study area consists of the mixed-use portions of the Borough's downtown. At the southwestern portion of the study area is Dickson College. The remaining portion of the study area consists of various types of single family residential with minor commercial uses scattered throughout. The U.S. Route 11/N. Hanover Street corridor from Clay Street to the northeast, is primarily suburban style commercial. The Carlisle Fairgrounds occupies a major portion of the northeastern portion of the study area along with a small cluster of commercial at the intersection of PA Route 34/Carlisle Springs Road and Clay Street. There is also a small cluster of surburban format land uses in the triangle-shaped area between N. Hanover Street, Penn Street, Fairground Avenue and the Norfolk/Southern rail line. This area is especially inconsistent with the surrounding land uses which follow a more traditional urban pattern and building form.

Residential density and lot sizes are generally smaller south of E Street including duplexes, townhomes/row homes, although single family detached homes are located throughout most of the study area.

There are several municipal, institutional and recreational uses within the study area including: the Hamilton Elementary School and Clay Street; the Police Department of Lincoln Street, Memorial Park and Hope Station on W. Penn Street; the YMCA on G Street and the Stuart Community Center. The downtown area includes a mixed of civic and municipal uses such as the Bosler Library, the Carlisle Theater, the Carlisle Arts Learning Center, the Historical Society, the Visitors Center as well as the main square with the County Government Complex and Courthouse and significant historic religious buildings.

The three former industrial properties total approximately 50 acres of post-industrial property and represent a significant amount of land available for redevelopment or reuse, especially when considering the urban context and the close proximity to the downtown core commercial area of the Borough.



LAND USE

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Zoning

The existing zoning is fairly reflective of the existing land use patterns. The Borough has been progressive in updating its zoning ordinances to reflect current planning practices and legal requirements as provided by the State of Pennsylvania's Municipalities Planning Code (MPC). The Borough recently adopted a new district designation, Urban Mixed Use (UM), which was designated for the bulk of the various parcels associated with the three former industrial parcels. The intent of the UM District is to allow a mixture of complimentary land uses that support the downtown and include housing, retail, services, offices, light industrial, and civic uses to create economic and social vitality that connect with the town center, primarily targeted on the reuse of older industrial buildings and properties, with the over-arching goal of creating vibrant places with a strong sense of community and place with quality community design.

The evaluation of land uses and the current zoning requirements identified several elements related to zoning that should be considered for further review and possible revisions and/or modifications.

1. The UM District's parking and land coverage requirements may be overly stringent and not consistent with the communities desire to promote new development which is consistent in character with the traditional mixed-use patterns of the core of the Borough. The current requirements could indirectly create an abundance of surface parking lots and create expansive breaks in what is commonly referred to as the "street" wall which is formed by a continuous line of adjacent building fronts.

2. The UM District's maximum height requirements may yield development that is not consistent "in form" to the bulk of the Borough's existing building stock. The current limitation of "maximum height in feet" versus a "maximum number of occupied floors" could yield a significant amount of buildings with flat roofs versus more traditional sloped or peaked roofs as result of the desire to maximize the number of occupied floors by property developers.

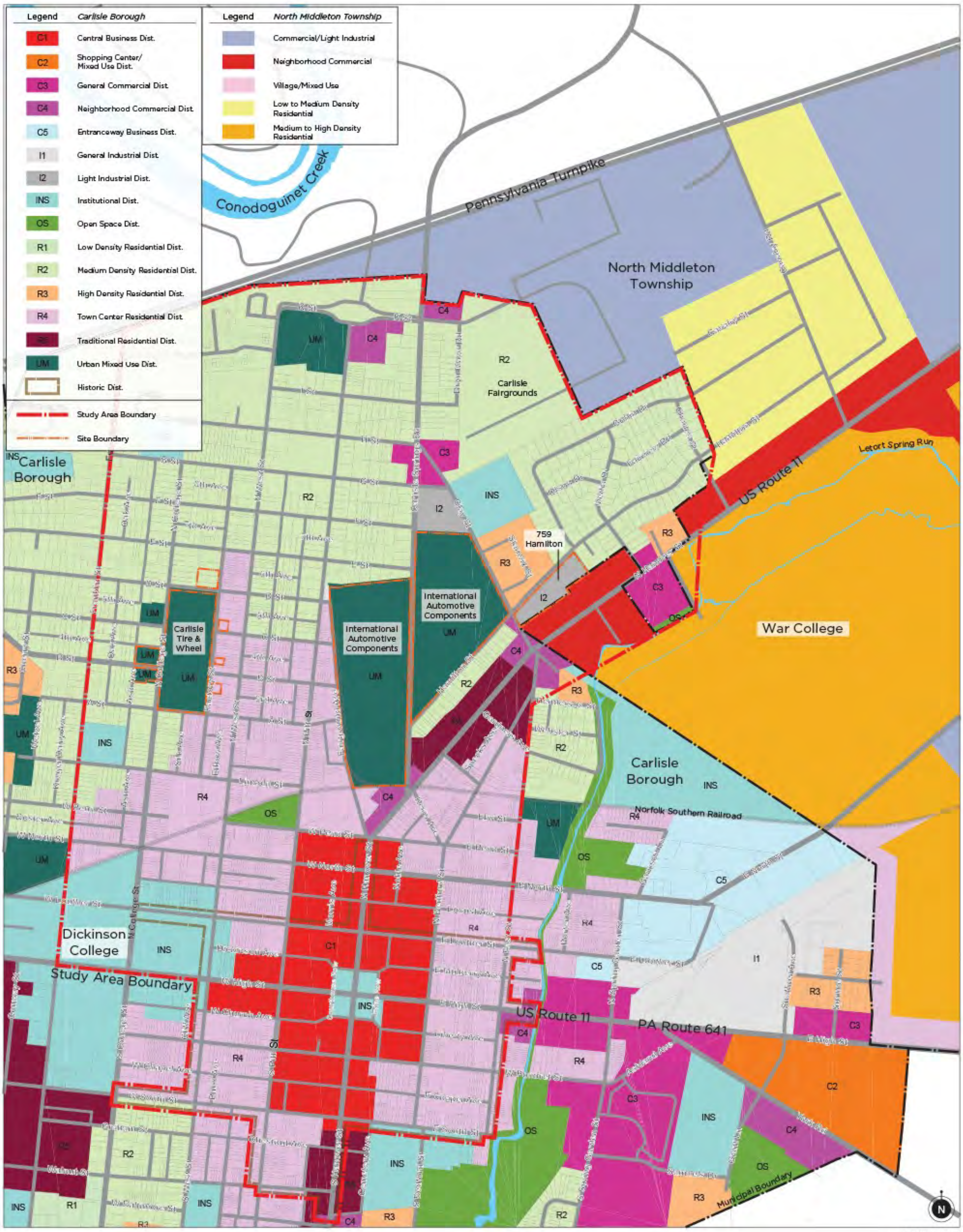
3. Standards for the private/public set aside of public space as part of larger redevelopments within the UM as well as the long term maintenance, management and public access of such land may need to be formalized to ensure that badly needed public spaces are created and maintain as truly public facilities.

4. Some areas currently zoned Neighborhood Commercial (C4) (such as the triagular area between N. Hanover Street, Fairground Avenue and the Norfolk/Southern rail line) may be better suited to be designated UM to ensure maximum consistency with adjacent land use patterns and to discourage single-use suburban development patterns that impede pedestrian connectivity and multi-modal transit use along with large front yard surface parking lots and building setbacks.

5. There is small portion of North Middleton Township which wraps around, and in essence, into the Borough along the U.S. Route 11/N. Hanover Street corridor from the Clay Street intersection to Cavalry Road. The current land use patterns are not consistent between the two municipalities, with the Township's ordinance promoting a more suburban format of development which is not necessarily consistent with the character of the Borough and the bulk of the historic land use patterns along this important gateway corridor into the Borough, especially from the Pennsylvania Turnpike Interchange.

6. More extensive promotion of Best Management Practices (BMPs) for stormwater management may be needed to fully integrate potential green techniques within urban-infill redevelopment.

7. Form-based urban design standards are needed to link the design of buildings with public spaces and "complete" streets to ensure that all aspects of redevelopment complement each other and are fully functional.



ZONING MAP

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Transportation and Circulation

From transportation planning standpoint the fundamental aspect of creating a truly balanced transportation environment which supports all modes of circulation and travel is critical. Based on the existing relationship of the study area to the downtown commercial core and its traditional circulation framework of small blocks and emphasis on pedestrian mobility, this analysis evaluates the ability to create a highly pedestrian-friendly walking environment that builds upon that framework and ensures that any new transportation infrastructure that is constructed serves all modes of travel.

Pedestrian friendliness or "walkability," as used in this effort, describes the extent to which places are comfortable for pedestrians, cyclists and transit users. Walkable places require a mix of uses, public spaces, a fine-grained network of connected streets that provides many options for travel, managed vehicle speeds and human-scaled development placing amenities and services within a ¼ mile radius of one's home. A walkable community is one that encourages the use of a mix of modes (pedestrian, bicycle, transit and motor vehicle). Walkable communities are created by a number of factors; a few are listed below:

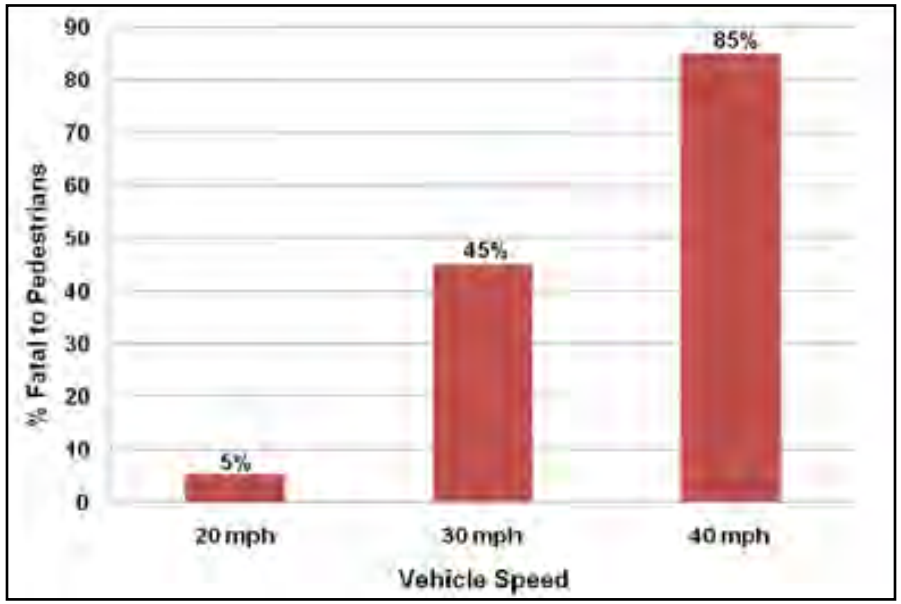
- On-street parking
- Mixture of uses and densities
- Streets with managed speeds
- Connected network of streets
- Consistent and relatively short block lengths
- Buildings fronting streets
- Sidewalks
- Narrow streets

The existing transportation system was evaluating utilizing the following design standards to support thoroughfare (the street plus all of the supporting aspects of urban design) functions of enhanced walkability, bikability and transit-friendliness. These concepts include the complete thoroughfare design standards emerging nationally. The goal is to balance the needs of motor vehicle mobility and pedestrian mobility. As a general rule, as conflicts arise between the two, priority should be given to the pedestrian.

What is "Walkable" Urban Design?

Vehicular Speed and Walkability

Vehicular speed is a key factor in urban design because it plays a critical role in the walkability of an area, due to its relationship with pedestrian fatalities. As shown in the following graph, a pedestrian's chance of being killed in a crash is graphed against vehicular speed. The graph indicates that pedestrian fatalities average 45% in a crash with a vehicle traveling at speeds of 30 mph, while pedestrian fatalities are almost double – 85% - in a crash with a vehicle traveling at 40mph. The intent is to create thoroughfares that provide needed capacity but at a safe and appropriate speed in relations to the surrounding urban design patterns.



Percent of Crashes Fatal to Pedestrians, Related to Vehicle Speed
Source: U.K. Department of Transportation, *Killing Speed and Saving Lives*.

A New Paradigm – Land Use First, Transportation Second

Urban places with greater safety, capacity and economic viability require pedestrians, bicycles, and transit vehicles as part of the mobility mix. To achieve these places, the patterns of proposed development must be specified first, during the community planning stage. This is why the development of the urban design plan is critical to determining the future transportation strategy. Then, transportation plans for balanced mobility can be developed with walkability considered first and vehicle mobility second (land use first, transportation second). This is not to imply that motor vehicle mobility will be dramatically reduced, but instead that pedestrians, exposed to the open environment are more vulnerable than are drivers, and solutions for their safety and comfort are more complex. Often, greater walkability yields only small reductions in vehicle capacity, even though vehicle speeds are lower. Generally, more streets per square mile result from a more open network and drivers can avoid the degree of peak hour congestion that occurs when a limited number of large streets break down because more options exist and volumes can be dispersed.

Conventional Transportation Engineering – the Arterial Approach

Walkable policies often stand in sharp contrast to suburban or conventional policies whose core focus/function is motor vehicle mobility. While walking, biking and transit have been emphasized more recently, many existing systems are mono- modal; resulting in the singular use of the automobile for mobility. Places that are created following these conventional transportation and parking policies promote higher speeds (serving the need of automobile users) and, thus, are much less walkable or human scale. The physical layout of America has always been overwhelmingly influenced by its transportation system. Yet little thought was given to the resulting community form when modern roadway design standards were being established. For instance, highways designated as “arterials” change little as they approach developed areas. In transportation engineering terms, the surrounding context changes, but thoroughfare designs change very little. Speeds generally drop from 55 to 45/35 mph, but on-street parking is rarely allowed in emerging areas and is often removed from older areas. In recent decades, arterial streets are excluding most intersections with side streets, leading to longer block sizes (600 to 1,000 feet and longer) and higher speeds, which both cause difficulties for pedestrians. Without context-sensitive designs, through roads can overwhelm the communities they should be designed to serve.

Arterial, Collector, and Local Streets

Conventional transportation planning and engineering embeds thoroughfares in a "functional classification" hierarchy that defines a thoroughfare's type in the overall network. This hierarchy is based on the thoroughfare's desired operation, which then governs certain design criteria such as design speed, travel lane width, and amount of access from adjoining land.

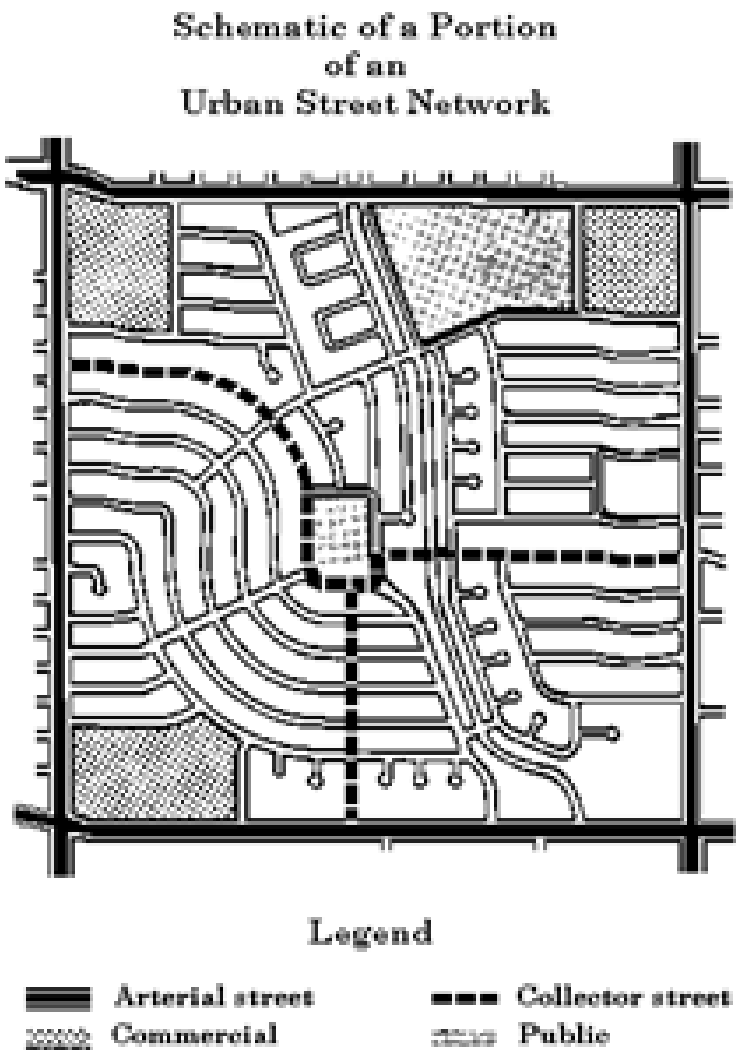
Carlisle post-WW II transportation network is comprised mostly of these three types, as defined in *A Policy on the Geometric Design of Highways and Streets* (the "Green Book" by AASHTO, 2011):

- **Arterials** are intended to provide the highest level of service at suburban speeds for the longest uninterrupted distance with some degree of access control. Arterials, therefore, provide higher levels of vehicle mobility and lower levels of land access.
- **Collectors** provide a less highly developed level of service at a lower speed for shorter distances than arterials, by collecting traffic from local roads and connecting them with arterials. Collectors specifically balance vehicle mobility and land access.
- **Local** roads primarily provide access to land, with little or no through movement.

Community Vision of a Transportation System

The Borough of Carlisle has retained much of its historic gridded thoroughfare network. Over time, some streets have been widened and some intersections have been modified to permit higher capacity traffic flow. This yielded unintended consequences, one of which is reduced pedestrian friendliness based on higher speed traffic flow, especially during off peak periods. These speeds are higher than desired for a walkable area. The Borough has realized the values of having a truly balanced transportation network and recently implemented as "rethinking" of its two main downtown thoroughfares, High and Hanover Streets through the '"Road Diet" program.

The urban-form design vision for the proposed redevelopment sites, as defined by the community, Borough staff and refined by the design team during and after the community planning and design workshop, build on this fundamental approach of "complete" streets and thoroughfares following a traditional gridded pattern to reconnect the large former industrial sites back into the overall block structure of the town. The Borough desires a return to a more walkable structure, with a variety of housing types, places to shop and dine, and enhancement of civic centers within the study area.



Classic "Green Book" Illustration of Functional Classification Hierarchy

As one participant stated in the transportation topic meeting during the community planning and design workshop, ***"Why can't we design streets that attract and invite people into Carlisle instead of creating the quickest method for them to leave?"***

This urban design vision is directly linked to the transportation design criteria for the study area and the Borough as a whole. Neither urban design guidelines nor transportation design standards can accomplish this alone. The establishment of a fully walkable community requires managing traffic speeds to pedestrian friendly levels and ensuring connectivity of the thoroughfare system for specific areas the Borough, block-by-block.

Based on these principals, an analysis of the existing transportation system was performed with following finding:

- Achieving a safe pedestrian and bicycle connection between PA Route 34/ Carlisle Springs Road and U.S. Route 11/N. Hanover Street is extremely important to connect the IAC/Masland site redevelopment and the Fairgrounds activity to the downtown.
- Improvements are needed along U.S. Route 11/N. Hanover Street in the area between Penn Street and PA Route 34/Carlisle Springs Road to improve pedestrian and bicycle safety as well as improve crossing safety improvements at each intersection.
- The Penn Street, U.S. Route11/N. Hanover Street, Fairgrounds Avenue intersection needs significant improvement to increase traffic and pedestrian/bicycle safety. Many senior residents residing in the retirement apartment tower frequently walk along Penn Street and N. Hanover to visit the Medicine Shop. There are significant conflicts with turning movements and the flow of traffic from various directions.
- Fairground Avenue requires a comprehensive upgrade and should be studied as a two-way complete street.
- Implementing on-street, metered parking on PA Route 34/ Carlisle Springs Road should be considered as part of a comprehensive streetscape upgrade.
- The intersection of Clay Street and U.S. Route 11/N. Hanover Street is problematic due to the awkward intersection alignment along with driveway access points close to the intersection.
- Discussions should occur with PennDOT regarding the options and ability to redesign PA Route 34/Carlisle Springs Road at least from U.S. Route 11/N. Hanover Street and Clay Street.
- B Street should be extended to connect to at least PA Route 34/ Carlisle Springs Road and possibly Hamilton Street.
- Extending C or D Streets should also be considered to replicate the current street block units of the overall study area. The design of these streets should be looked at in the entirety including the existing sections with the new segments to form a single cohesive thoroughfare.
- Extending the Borough's Road Diet program with bike routes and dedicated bicycle facilities should be encouraged.
- PennDOT's 2014 has programmed the milling and resurfacing – U.S Route 11/N. Hanover Street (from High St. to the Pennsylvania Turnpike entrance) and PA Route 34/Carlisle Springs Road (from U.S. Route 11/N. Hanover Street to Calvary Road). Discussion should occur with PennDOT to determine if all of these improvements make sense with pending redevelopment activities. The Pennsylvania Turnpike Commission will also be reconstructing the PA Route 34/Carlisle Springs Road Bridge within the next few years.
- Factory Street should is excessively wide and options to narrow or somehow utilize this right-of-way should be studied. Factory Street currently has very few building fronting it from A to D Streets. Its current 40' cartway is the result of a former railroad siding that served the Tire & Wheel plant.
- The intersection of G Street and PA Route 34/Carlisle Springs Road needs safety improvements given the high accident rates at this location. The Borough has taken corrective actions by removing a tree obstruction and increasing signage, but further improvements should be considered.
- Street Design Classifications – The Borough consider the following roadways collectors: West, Pitt, Bedford, East, Clay, South and Hamilton. E Street and a portion of B Street currently function as local roads.
- Additional bicycle and pedestrian facilities should be explored to serve the Hamilton School.
- The transit circulator project should be promoted and the routing should consider ways to serve the future redevelopment sites and surrounding neighborhoods.

The Borough has an established wayfinding signing system

which could provide additional directional information to connect the downtown with the redevelopment sites.

Rail Freight Movement

Norfolk/Southern Railroad operates an active rail freight line that traverses the entire study area from east to west and provides freight shipments to a variety of industrial users located on the western portion of the Borough. The rail line includes 10 at-grade crossings with Borough streets with eight of these located within the study area boundaries. A field evaluation of these eight crossings confirmed the various levels of protection afforded through a combination of flashing signals, gates, and crossbuck signs.

Of the eight crossings located within the project study area, the U.S. Route 11/N. Hanover Street and PA Route 34/Carlisle Springs Road crossings pose the most serious risk given that the two crossings are located immediately adjacent to each other at the oblique intersection of PA route 34/Carlisle Springs Road and U.S. Route 11. The risk imposed includes southbound traffic queuing on PA Route 34/Carlisle Springs Road and on the railroad crossing. Although no reportable incidents are known to have occurred recently at these intersections, discussions with Norfolk/Southern demonstrated the opportunity to eliminate at least one of the two crossings through the redevelopment process. Elimination of a crossing is the greatest level of protection that may be afforded.

Railroad Crossings Level of Protection

At-Grade Crossing	Level of Protection		
	Flashing Signals	Gates	Crossbuck Signs
N. East Street	Yes	No	Yes
Bedford Street	Yes	No	Yes
N. Hanover Street (U.S. Route 11	Yes	Yes	Yes
Carlisle Springs Road (PA Route 34)	Yes	Yes	Yes
Fairgrounds Avenue	Yes	No	Yes
N. Pitt Street	Yes	No	Yes
N. West Street	Yes	Yes	Yes
Cherry Street	Yes	No	Yes

Source: Michael Baker Jr., Inc., March, 2013.

ROAD CLASSIFICATIONS

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Carlisle Urban Redevelopment Plan
Carlisle, PA

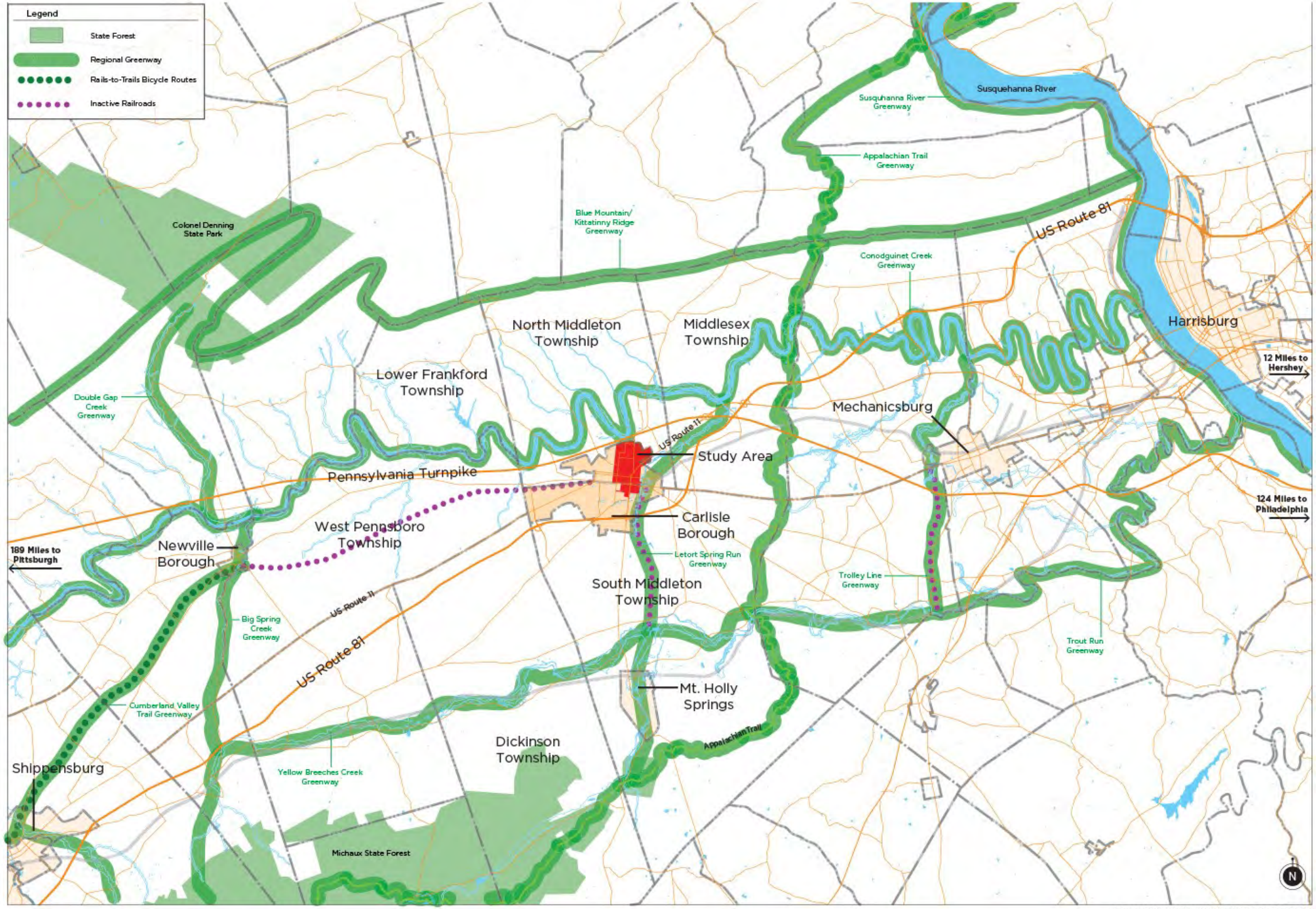
Parks, Recreation, and Greenways

Memorial Park is the only major Borough Park located within the study area and it is approximately two acres in size. The ¬park is heavily utilized and includes a mix of active court facilities and passive recreation opportunities. Memorial Park is also the location of the former Pennsylvania Railroad Station which has been restored and is now the home of the Hope Station Organization. This organization's council oversees efforts and programs to lift up the entire neighborhood through education, technology, job development and most importantly, teaching children to become leaders by learning to respect themselves and others. The only other significant public open within the study area is the Square. There are two large Borough owned open spaces, just north of the study area; the Cave Hill Natural Area and Shaffer Park. Connections to these areas should be enhanced to better serve the residents of the study area. The Stuart Community Center, the YWCA and the Carlisle Community Pool provide recreation opportunities for residents. The Dickinson College campus essentially functions a major open space that is utilized by the northwest neighborhood. The Hamilton Street School is another public space that could function as a neighborhood park if site improvements are made.

The Borough has placed an emphasis on improving bicycle and pedestrian circulation and access as a way to increase connectivity throughout the town, for both transportation and recreational purposes. The Borough adopted a Bike and Pedestrian Trail Plan which includes proposed routes on N. West Street, G Street and Clay Street within the study area.

As redevelopment plans are formalized they should include significant public open spaces in the form of urban parks/plazas, neighborhood parks with small footprint active recreation, such as tot lots, ball courts, skate parks, spray pads, dog parks, as well as community gardens and natural areas.

The proposed pedestrian and bicycle network improvements should be included and further expanded. All new streets should consider a complete palette of pedestrian and bicycle facilities to expand connectivity as much as possible.



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REGIONAL GREENWAYS AND RECREATION
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PARKS AND RECREATION

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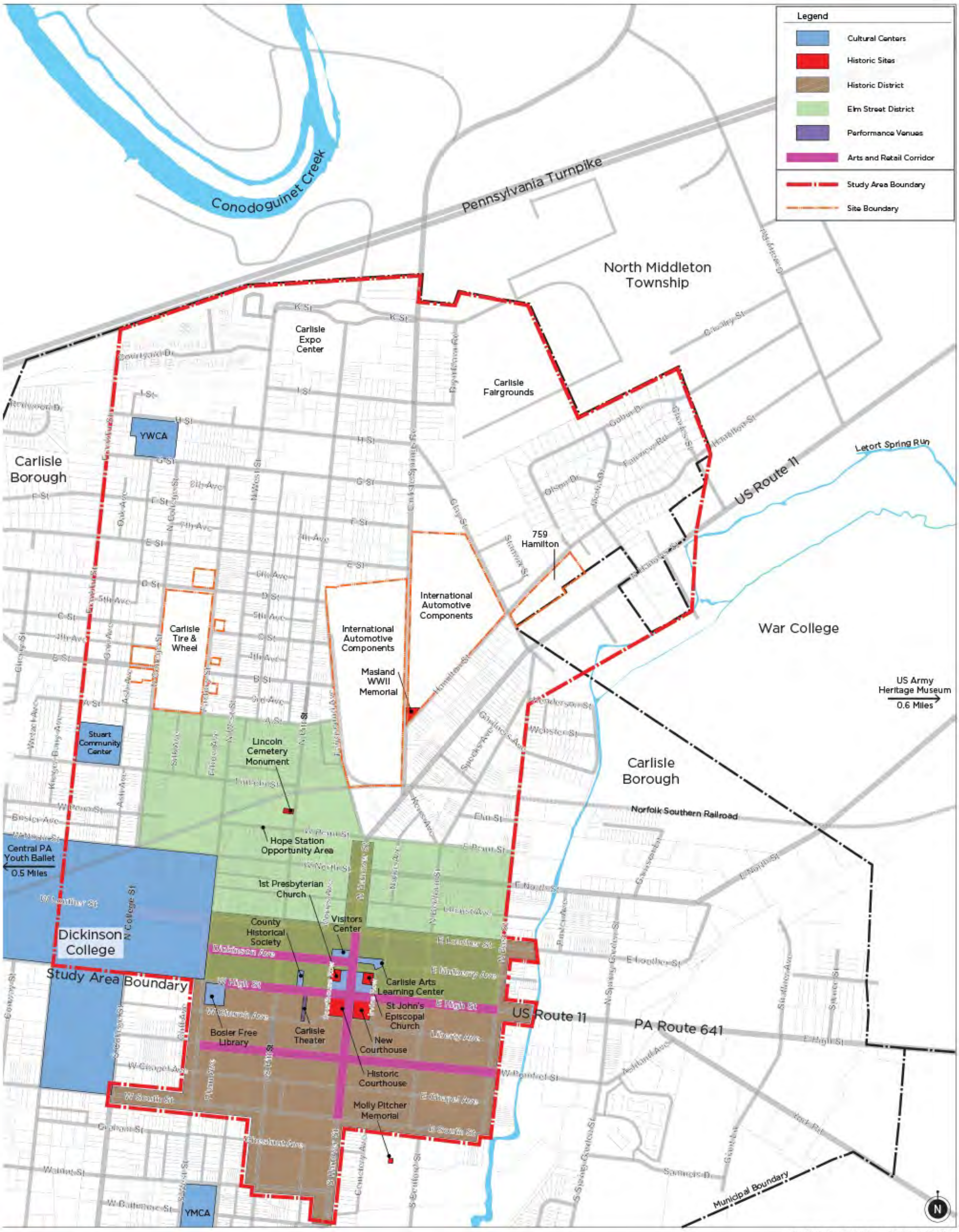
Historic and Cultural Resources

Carlisle is rich in historical and cultural resources and its wealth of significant history permeates the overall character of the town, in elements such as its plan with a central square to its architecture and traditional neighborhoods. The preservation and interpretation of historic resources is a priority amongst citizens. A significant amount of the downtown is included within an historic district which extends north to Louther Street and includes the block fronting onto U.S. Route 11/N. Hanover Street, north to Penn Street.

Cumberland County Historical Society (CCHS) is a leader in historic preservation and education of regional history, including directing walking tours of the Borough. The CCHS also operates History on High - The Shop and the Cumberland Valley Visitors Center which are located at 33 West High Street in the heart of downtown Carlisle's historic district. Historic Carlisle, Inc. is a non-profit corporation whose mission is to recognize and promote the history of Carlisle and Cumberland County. Each year, Historic Carlisle. Inc. arranges events ranging from the installation and dedication of new Historic Markers and the Carlisle Summerfair Historic Walking Tours.

There are two historic markers worth noting within the study area. The Lincoln Cemetery Monument on N. Pitt Street between Penn and Lincoln Streets and the Masland Employee WWII Memorial located at the intersection of PA Route 34/Carlisle Springs Road and Hamilton Street.

An Elm Street District exists which extends from the downtown to A Street within the study area. The Downtown Neighborhood Connection is a community board which manages the Elm Street district and focuses on neighborhood strengthening programs under the advisement of Borough and County Housing and Redevelopment Authorities (CCHRA) leadership. These comprehensive goals are implemented by the DNC Board, various neighborhood associations, and a full-time Elm Street Manager which is administratively managed by the DCA. The Elm Street Program focuses on strengthening residential neighborhoods, with an emphasis on encouraging home-ownership, rehabilitating older buildings, improving older neighborhoods and avoiding blight. These programs are especially important in focusing on the rehabilitation of older residential properties in the northwest neighborhood, as redevelopment occurs on the former industrial sites, to ensure that investment is occurring throughout the study area, and not only on the redevelopment site.



HISTORIC AND CULTURAL CENTERS

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Carlisle, PA

Environmental Considerations for the Redevelopment of Brownfields

One of the first questions asked during discussions involving the redevelopment of brownfield properties is whether or not the property can be cleaned up enough to support the desired reuse plans. Planners and residents alike want to know if the property can be safely re-used once the cleanup is complete. Reuse plans must assure that the cleanup performed will be protective for those who will be living, working or playing on the redeveloped property.

Pennsylvania's Land Recycling Program (also called the Act 2 Program) is the voluntary cleanup program that property owners and developers utilize to achieve appropriate cleanup levels. Completion of the cleanup of the property under the oversight of this program assures the public and development investors that the property has been cleaned up to a level that is protective for the uses that have been planned for the redeveloped brownfield property.

The Land Recycling Program is based on cleanup standards that are practical in that they are based on the intended reuse of the brownfield property. Generally, a property will be cleaned up to either "Residential" or "Nonresidential" standards. The standards are calculated using very conservative equations that combine exposure scenarios with U.S. Environmental Protection Agency (EPA) toxicity information for specific contaminants.

For example, a residential standard assumes that someone will be living at the property for 30 years and be there 7 days per week, 24 hours per day, in terms of potential exposure. The equations consider the physical attributes of both children and adults when developing the cleanup standard for each contaminant under a residential reuse scenario.

In addition to typical residential reuses, such as houses and apartments, achievement of a cleanup to the residential standard is required for reuses such as schools, hospitals, and hotels. In addition, any areas proposed for recreational uses such as parks, must also meet a residential cleanup standard.

Any other reuses, such as retail and commercial buildings, may meet the non-residential standards for cleanup under the Land Recycling Program. The non-residential standards are calculated utilizing the same EPA toxicity information, but take into account an exposure scenario that is realistic for the intended reuse. For example, a worker at commercial office building is assumed to work at that former brownfield property 5 days per week, 8 hours per day with 2 weeks off for vacations and holidays.

The cleanup standards are updated as new toxicity information is developed by EPA. In addition, the exposure scenario calculations were developed to be ultra-conservative so as to be protective of sensitive populations such as children and the elderly. Cleanups performed under the Land Recycling Program offer a great deal of assurance that the property can be safely reused and that people utilizing the redeveloped property are protected.

One common misunderstanding regarding brownfield properties is that any contamination that is present is prevalent across the entire property. In fact, widespread contamination of an entire property is very uncommon. Typically, contamination at a brownfield property is limited to specific areas within the property boundary. For example, soil may contaminated by petroleum products in an area of the property where an underground storage tank was located. However, the majority of the property has not been impacted at all. The Land Recycling Program allows for the designation of specific portions of the property as "areas of concern" that are to be remediated. The area of concern will be cleaned up to an appropriate standard while the remainder of the property will have no limitations or cleanup requirements. This approach allows for a more timely and cost-effective remediation and redevelopment effort while still ensuring the environmental concerns are adequately addressed.

Another misconception is that "cleanup" automatically means removal of the contaminated material. While removal of contaminated materials is often part of a cleanup effort, removal is not the only alternative for meeting a cleanup standard. The Land Recycling Program also allows for contamination to be addressed through implementation of measures that will eliminate any pathways for people to be exposed to the contaminated material. These measures include engineering controls such as capping contaminated soil with paving or clean soil or institutional controls such as imposing a deed restriction on groundwater use.

When planning for the reuse of brownfield properties, redevelopment plans must be developed in a manner that incorporates any environmental limitations that may be present on the property once the Land Recycling Program has been completed. The following are just a few examples of such limitations:

- Areas of a property that have been cleaned up to non-residential standards may only be utilized for non-residential reuses.
- Areas of contamination that have been capped with pavement or clean soil may not be left exposed when the redevelopment is complete.
- If a deed restriction has been placed on groundwater use, no drinking water wells may be installed.

Incorporation of such limitations into the reuse plan and site designs is necessary to assure that the cleanup measures remain intact and that the people utilizing the redeveloped property will continue to be protected.