

SECTION 4: TOWN PROFILE

The Town of Shandaken profile information is presented in the plan and analyzed to develop an understanding of a study area, including the economic, structural, and population assets at risk and the particular concerns that may be present related to hazards analyzed later in this plan (e.g., low lying areas prone to flooding or a high percentage of vulnerable persons in an area). This profile provides general information for the Town of Shandaken (physical setting, population and demographics, general building stock, and land use and population trends) and critical facilities located within the Town.

GENERAL INFORMATION

The Town of Shandaken is located in the Catskill Mountains, in the northwest corner of Ulster County. The Town's name is of Native American origin and means 'land of rapid waters'. The Town is located along the Route 28 corridor within the Catskill Park and State Forest Preserve. The Town lands are over two-thirds state-owned and include Slide Mountain which is the highest peak in the Catskill range at 4,180 feet. The Town was originally settled around the Revolutionary War period and was formally established on April 9, 1804 (Town of Shandaken, Date Unknown) (<http://www.shandaken.us/about-2/>).

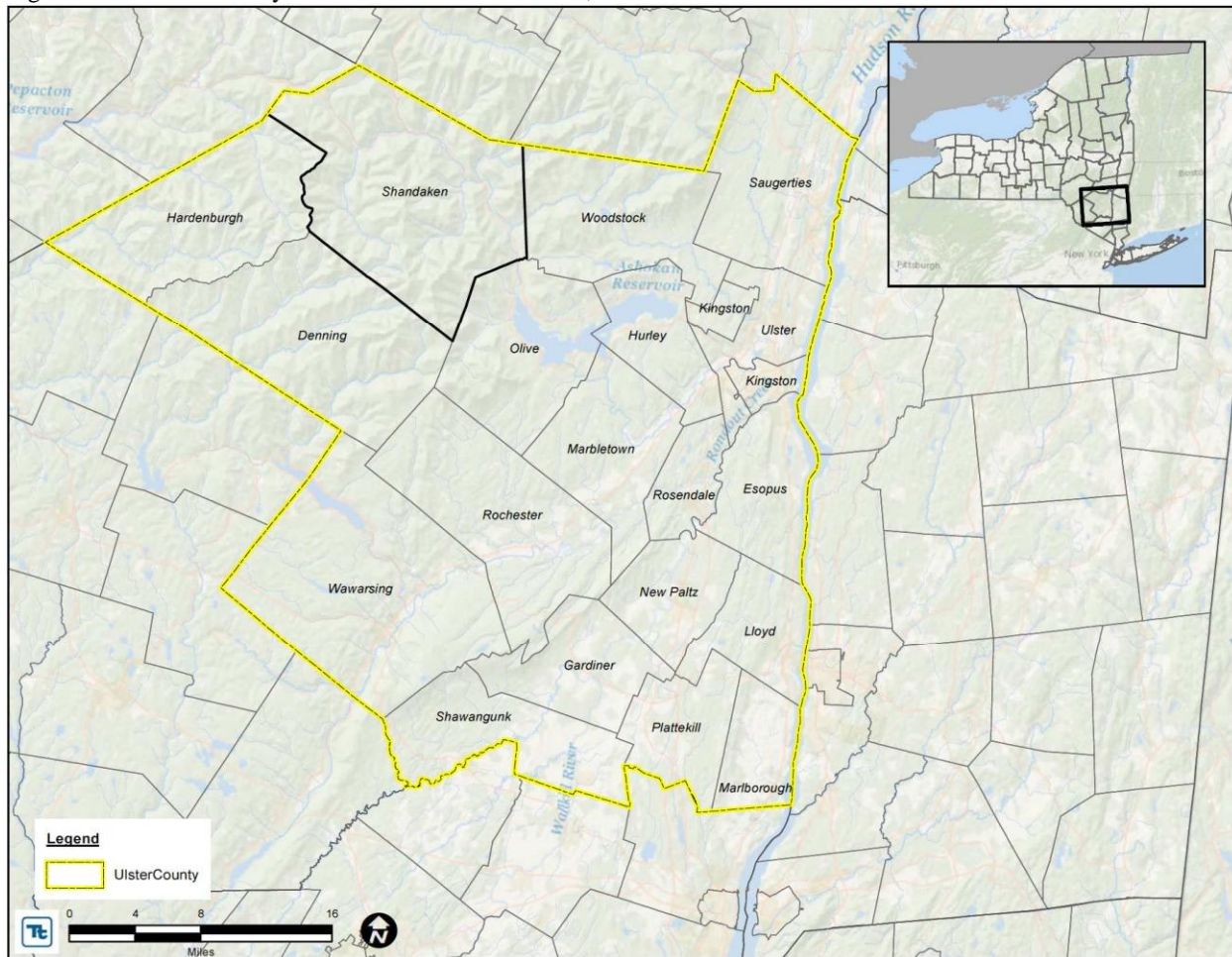
Physical Setting

This section presents the physical setting of the Town, including: location, hydrography and hydrology, topography and geology, climate, and land use/land cover.

Location

The Town of Shandaken is one of the 24 municipalities that make up Ulster County. Ulster County is located in southeast New York State, in the Mid-Hudson Region of the Hudson Valley. It has a total area of 1,161 square miles. Ulster County is bordered to the north by Greene County, to the northeast by Columbia County, to the east by Dutchess County, to the south by Orange County and to the west by Sullivan and Delaware Counties (Ulster County Hazard Mitigation Plan, 2009). Figure 4-1 illustrates the location of the Town of Shandaken within Ulster County.

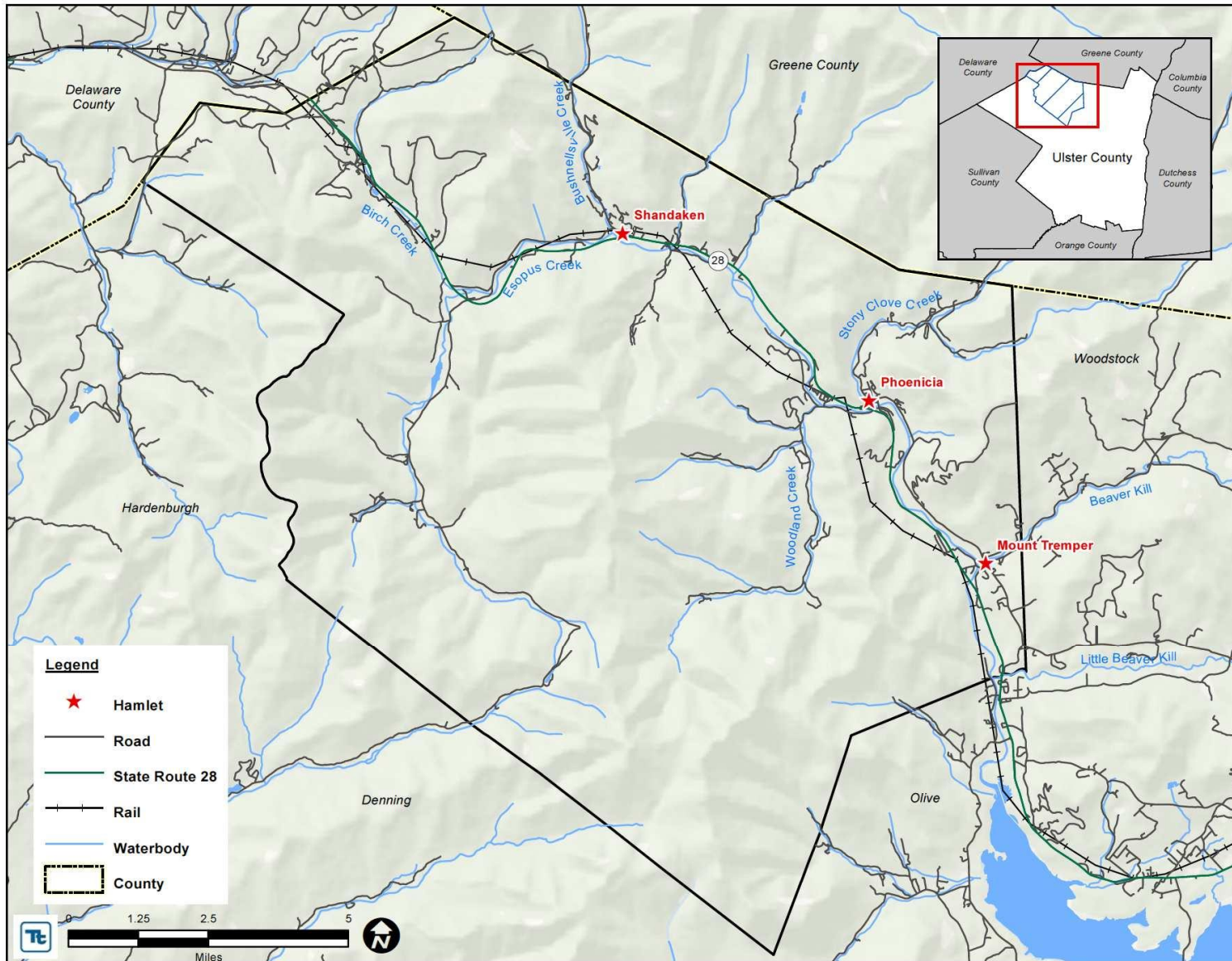
Figure 4-1. Ulster County and the Town of Shandaken, New York



Source: Ulster County, 2012; ESRI Ocean Map

The Town of Shandaken is located within the Central Catskill region of New York State (Town of Shandaken Comprehensive Plan, 2005). The Town is found in the northwestern portion of Ulster County. The Town of Shandaken is bordered to the east by the Town of Woodstock, to the south by the Towns of Denning and Olive, to the west by the Town of Hardenburgh, to the west and north by the Town of Middletown, and to the north by the Towns of Hunter and Lexington (FEMA, 1989). The Town is made up of 12 hamlets: Woodland Valley, Olivera, Chichester, Bushnellsville, Mt. Pleasant, Mt. Tremper, Phoenicia, Shandaken, Allaben, Big Indian, Pine Hill and Highmount (Town of Shandaken Comprehensive Plan, 2005). Figure 4-2 illustrates the location of the hamlets of Shandaken, Phoenicia, and Mt. Tremper.

Figure 4-2. Town of Shandaken, New York



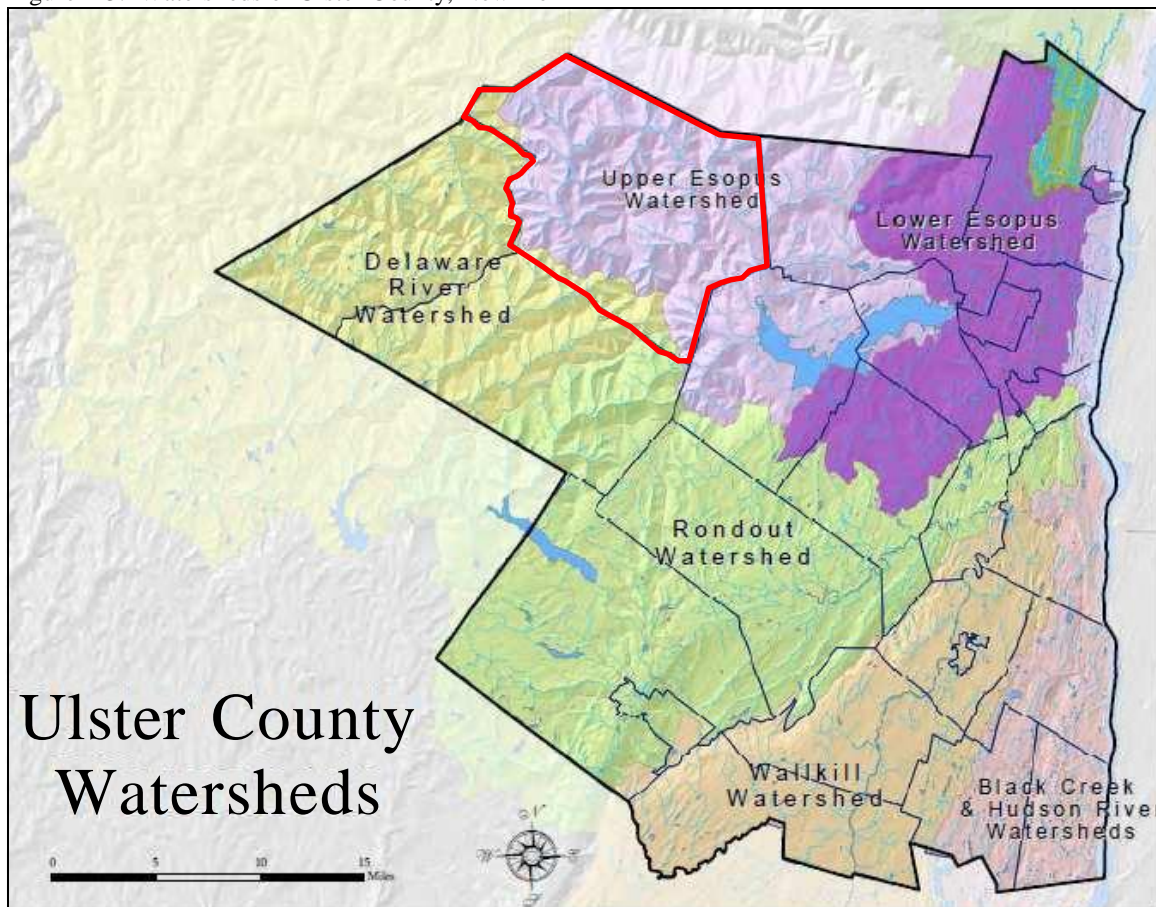
Source: Ulster County, 2012; ESRI Ocean Map

Hydrography and Hydrology

Every single piece of land and water is part of a watershed. A watershed is the land area that drains water into a particular waterbody, such as a stream or wetland. The Town of Shandaken is located within the Upper Esopus and Delaware River Watersheds (Town of Shandaken, 2012; Ulster County, Date Unknown).

The Town of Shandaken is located within the 425-square mile Esopus Creek Watershed in the Catskill Mountains (Figure 4-3). The watershed is divided into two parts by the Ashokan Reservoir; the area above the dam is referred to as the Upper Esopus Watershed and the area below the dam is the Lower Esopus Watershed. The Town of Shandaken is located in the Upper Esopus Watershed.

Figure 4-3. Watersheds of Ulster County, New York

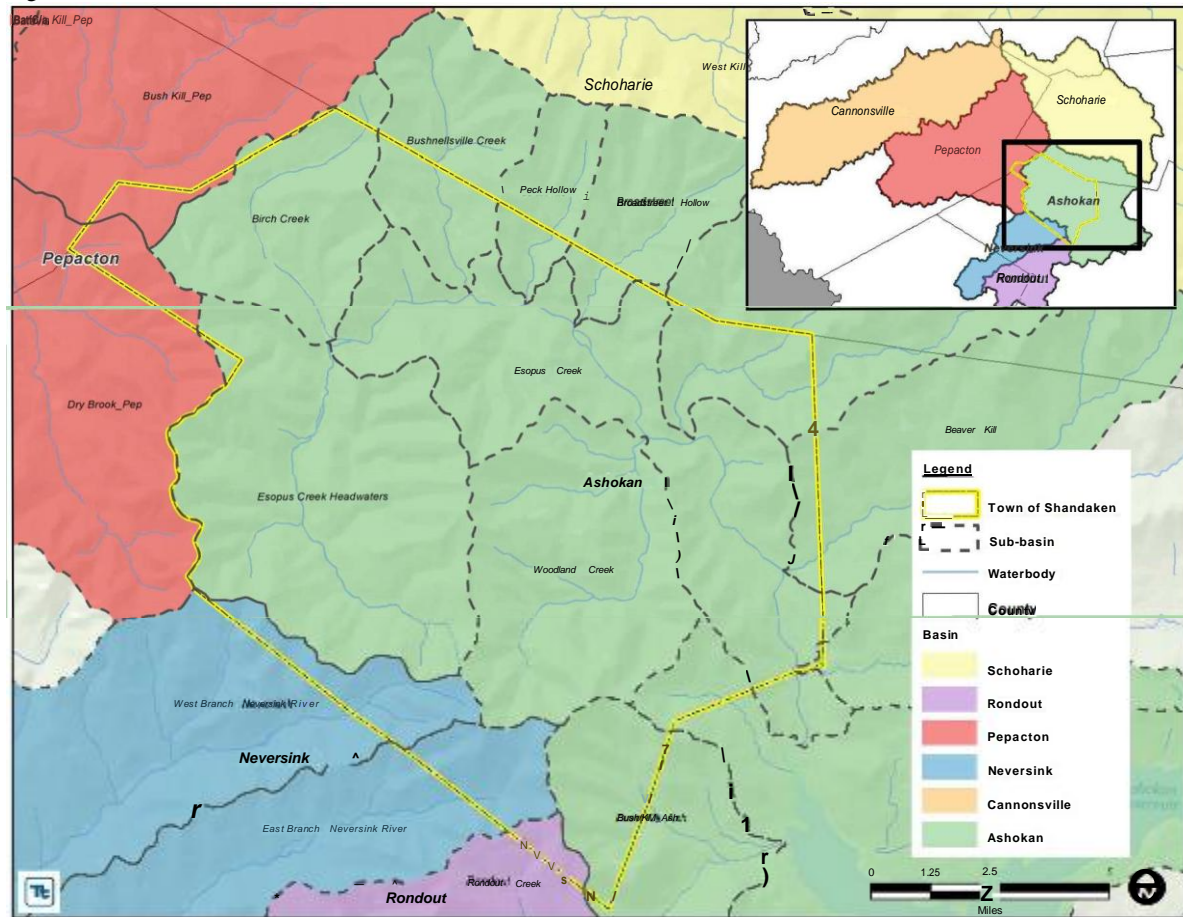


Source: Ulster County Environmental, Date Unknown (http://www.co.ulster.ny.us/environment/docs/county_watersheds.pdf)

Note: Red highlight added to outline the approximate boundary of the Town of Shandaken.

The Town of Shandaken is in the Ashoken, Neversink, Pepacton and Rondout basins (refer to Figure 4-4) (NYCDEP, 2012). The Town is within 17 sub-basins. Refer to Table 4-1.

Figure 4-4. Basins and Subbasins of the Town of Shandaken, New York



Source: NYCDEP, 2012

Table 4-1. Basins and Subbasins of the Town of Shandaken, New York

Basin	Sub-Basin		
Ashokan	Bushnellsville Creek	Neversink	West Branch Neversink River
	Birch Creek		East Branch Neversink River
	Peck Hollow	Pepacton	Bush Kill_Pep
	Broadstreet Hollow		Dry Brook_Pep
	Stony Clove Creek	Rondout	Rondout Creek
	Beaver Kill		
	Esopus Creek		
	Esopus Creek Headwaters		
	Woodland Creek		
	Little Beaverkill		
	Ashokan Reservoir		
	Bush Kill_Ash		

The Upper Esopus Creek runs mostly through the Town of Shandaken and crosses the Town of Olive for approximately one mile before reaching the Ashokan Reservoir. The Upper Esopus Creek Watershed covers approximately 192 square miles in the south-central Catskill Mountain Region of southeast New York State. The Upper Esopus Creek is a regulated river by inter-basin transfer of water. The Shandaken Tunnel and its outfall, often referred to as the “Portal” is a handmade, 18-mile aqueduct that connects the Schoharie Reservoir to the Upper Esopus. The Catskill District of New York City’s West-of-Hudson water supply is one of the three systems that provides water to New York City and it includes the Schoharie Reservoir, Shandaken Tunnel, Ashokan Reservoir, and the Catskill Aqueduct west of the Hudson River. Approximately 40% of the City’s average water supply is provided by the Catskill System (Cornell Cooperative Extension – Ulster County, 2007). Figure 4-5 displays the water supply system of New York City. Figure 4-6 displays the water supply system from the Catskill District.

The Esopus Creek Watershed is an important source of water for the City of New York. According to the Upper Esopus Creek Management Plan, the water supply of the Catskill District System is summarized as the following: ‘The Upper Esopus Creek is a regulated river by inter-basin transfer of water. The Shandaken Tunnel, and its outfall – often referred to as the “Portal,” is a handmade 18 mile aqueduct that connects the Schoharie Reservoir to the Upper Esopus. The Catskill District of New York City’s West-of-Hudson water supply system is one of three systems that supply water to New York City, and it includes the Schoharie Reservoir, Shandaken Tunnel, Ashokan Reservoir and the Catskill Aqueduct west of the Hudson River. Approximately 40% of the City’s average water supply demand is provided by the Catskill System.

New York City must abide by two regulatory documents administered by the New York State Department of Environmental Conservation (DEC) when operating the Shandaken Tunnel: Title 6 NYCRR Part 670 “Reservoir Release Regulations: Schoharie Reservoir - Shandaken Tunnel – Esopus Creek” and a State Pollution Discharge Elimination System or “SPDES” permit. Together, these two regulations provide for flow, temperature, and turbidity thresholds to protect aquatic biota. Also, Part 670 allows up to four recreational releases for whitewater recreation to be granted per year by the NYSDEC (Cornell Cooperative Extension – Ulster County, 2007).

It is important to note that a separate “Catskill Turbidity Control Study” has been conducted in parallel with this effort. The recently concluded Phase II of that study has outlined structural and operational modification options for controlling turbidity releases from the Shandaken Tunnel that are currently being considered by Federal, State, and local authorities’ (Cornell Cooperative Extension, January 2007)

Figure 4-5. New York City's Water Supply System



Figure 4-6. Catskill District Water Supply System



Source: Cornell Cooperative Extension – Ulster County, 2007

Note: Red circle indicates the approximate location of the Town of Shandaken.

Flow from the Upper Esopus Watershed has been regulated by the Ashokan Reservoir since 1913. The Upper Esopus Creek is a regulated river by inter-basin transfer of water. Additional water enters the Esopus Creek through the Shandaken Tunnel, approximately 12 miles upstream of the Ashokan Reservoir (Lower Esopus Watershed Partnership, Date Unknown) (<http://www.loweresopus.org/watershed/overview/>).

Approximately 95% of the total Upper Esopus Watershed consists of forested land. Historical practices of logging and bark peeling activities have altered the stream flow. The watershed receives approximately 50 to 60 inches of precipitation each year (From Section 905(b) Reconnaissance Study – Esopus and Plattekill Creeks Watershed, Ulster and Greene Counties, New York (August 2008).

According to the Stony Clove Creek Stream Management Plan, the Stony Clove Creek watershed is also partially located in the Town of Shandaken. It is located in the central Catskill Mountain region of southeast New York State and drains an area of 32.3 square miles. The Stony Clove Creek flows from its

headwaters at Notch Lake to its confluence with the Esopus Creek in the hamlet of Phoenicia. Approximately 80% of the watershed is located in Greene County and the remainder of it is located in Ulster County. The Stony Clove Creek watershed is bounded by some of the highest peaks in the Catskills, ranging in altitude from 2,220 to 4,040 feet (Greene County Soil and Water Conservation District, 2005).

Topography

Mountaintops and valleys, wooded and steep hillsides, and natural communities of beech, maple, hemlock, ash, oak, and other northern hardwood and conifer forests, all makeup the landscape of the Town of Shandaken. There are few relatively flat plateaus in the Town and many streams that feed the main watercourse, Esopus Creek. There are also expanses of relatively flat land and open fields along the Esopus Valley (Route 28 Corridor). Interspersed throughout the natural land features are the Town's hamlets, developed over the years where the terrain was accessible and conducive, mainly in the valleys and along major streams, such as the Esopus Creek, Woodland Valley, Birch Creek, and the Stony Clove.

Many of the mountaintops in the Town of Shandaken are protected under the New York State Constitution Forest Preserve and are to be kept "Forever Wild". There are portions of several significant mountains in the Town that are not included in the Forest Preserve and include Belleayre and Rose Mountain (Shandaken Comprehensive Plan, 2005; Town of Shandaken, 2012).

Climate

The climate of New York State is very similar to most of the Northeast U.S. and is classified as Humid Continental. Differences in latitude, character of topography, and proximity to large bodies of water all have an effect on the climate across New York State. Precipitation during the warm, growing season (April through September) is characterized by convective storms that generally form in advance of an eastward moving cold front or during periods of local atmospheric instability. Occasionally, tropical cyclones will move up from southern coastal areas and produce large quantities of rain. Both types of storms typically are characterized by relatively short periods of intense precipitation that produce large amounts of surface runoff and little recharge (Cornell, Date Unknown).

The cool season (October through March) is characterized by large, low-pressure systems that move northeastward along the Atlantic coast or the western side of the Appalachian Mountains. Storms that form in these systems are characterized by long periods of steady precipitation in the form of rain, snow, or ice, and tend to produce less surface runoff and more recharge than the summer storms because they have a longer duration and occasionally result in snowmelt (Cornell, Date Unknown).

The climate of the Town of Shandaken features substantial precipitation, with cold, snowy winters and short, cool summers. The annual precipitation averages 46 inches in the valleys and up to 60 inches in the mountains, and is evenly distributed throughout the year (FEMA FIS, 1989). Mean annual precipitation in the Upper Esopus watershed ranges from approximately 52 inches at Ashokan Reservoir and approximately 63.5 inches at Slide Mountain (Cornell Cooperative Extension – Ulster County, 2007). The average annual high temperature is approximately 57°F and average annual low temperature is approximately 35°F, with a minimum temperature in January averaging 11°F and a maximum July temperature averaging 81°F (The Weather Channel, 2012).

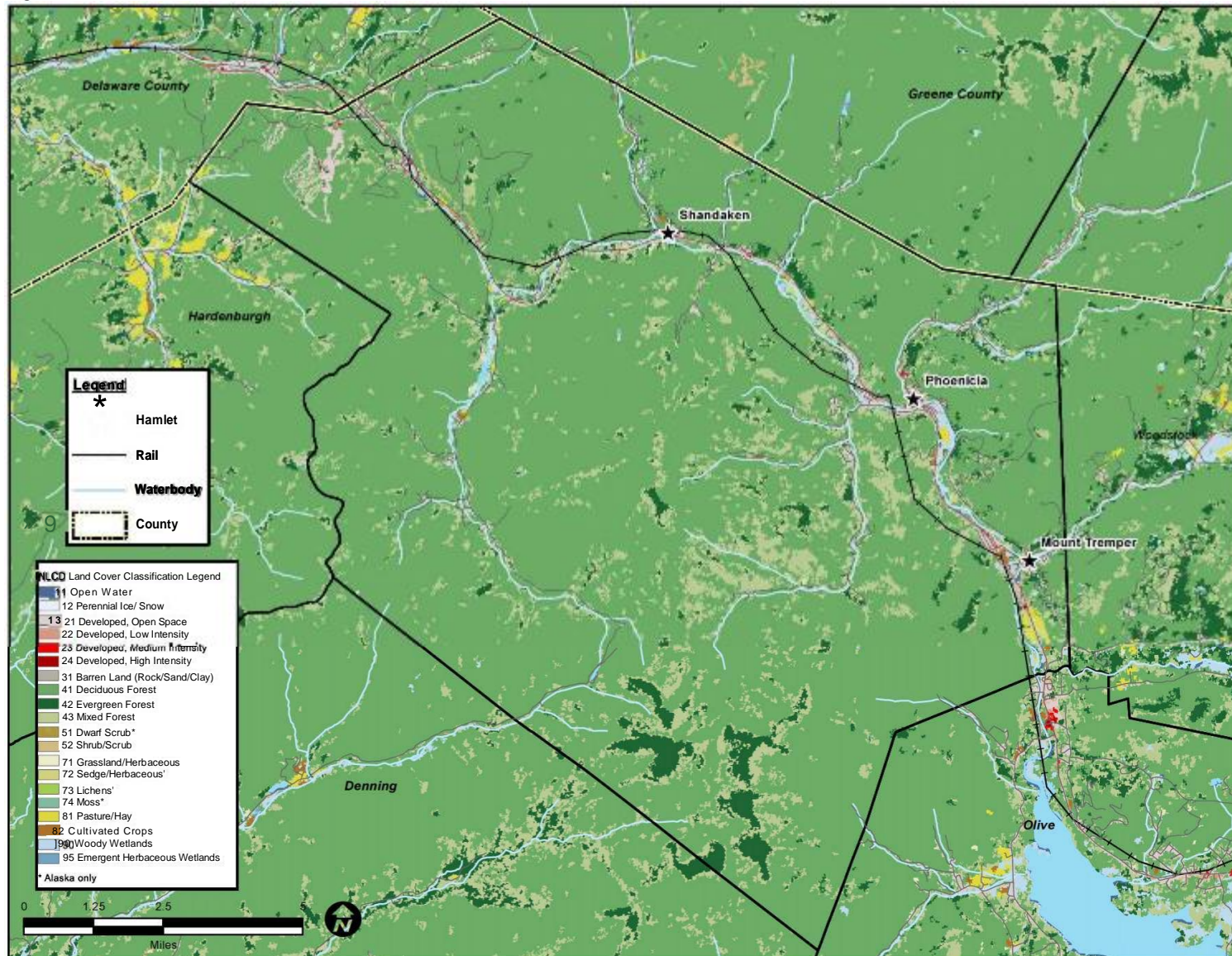
Land Use and Land Cover

The land use pattern of the Town of Shandaken has been influenced by the historic pattern of hamlet development, highway-oriented transportation, and state land ownership. Roadside development includes

older dwellings and tourist-oriented businesses. Areas of resource-related industries, such as sawmills and bluestone, still exist but are not considered an economic factor that they were a century ago. Other factors such as floodplains, environmental legislations, and land acquisitions by the NYCDEP, in addition to the scenic natural terrain characteristics, have affected and limited land use and development. As per the 2005 Comprehensive Plan for the Town of Shandaken, 94% of the Town is developed, has significant development limitations or is highly regulated. The Town is comprised of approximately 79,200 acres with 66% of its land under public ownership and designated as public open space; 14% is residential land use; 9% private open space; 7% vacant land; and 4% miscellaneous (Shandaken Comprehensive Plan, 2005).

Figure 4-7 illustrates land use throughout the Town of Shandaken. Table 4-2 below shows the land use categories and their total square miles and percentages in the Town.

Figure 4-7. Land Use in the Town of Shandaken



Source: USGS, 2011 (2006 National Land Cover Database)

Table 4-2. Land Use (2006) in the Town of Shandaken

Land Use	Total Area (sq. mi.)	Percent of Town (%)
Open Water	0.14	0.11
Developed	2.86	2.32
Barren	0.016	0.01
Forested	118.81	96.31
Farmland	0.39	0.32
Wetlands	1.15	0.93
Total	123.37	100

Source: FEMA, 2012; USGS, 2011 (2006 National Land Cover Database)

Note: sq. mi. = square miles

POPULATION AND DEMOGRAPHICS

According to the 2010 U.S. Census, the Town of Shandaken had a population of 3,085 people. The U.S. Census data in HAZUS-MH is based on the 2000 data in which there were 3,235 people in the Town. Table 4-3 presents the population statistics for the Town of Shandaken based on the 2010 U.S. Census data. Figure 4-8 shows the distribution of the general population density (persons per square mile) by Census block. For the purposes of this plan, U.S. Census 2010 data was used where possible for exposure analysis; however, estimated results from HAZUS-MH represents 2000 data. Because of the decrease in population from 2000 to 2010, the HAZUS results are considered conservative.

The Disaster Mitigation Act of 2000 (DMA 2000) requires that hazard mitigation plans (HMPs) consider socially vulnerable populations. These populations can be more susceptible to hazard events, based on a number of factors including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. For the purposes of this study, vulnerable populations shall include (1) the elderly (persons aged 65 and over) and (2) those living in low-income households.

Table 4-3. Town of Shandaken Population Statistics (2010 and 2000 U.S. Census)

Census 2010 Pop.	HAZUS-HM 2000 Pop.	HAZUS-MH Pop. Over 65*	Percent of HAZUS-MH Pop. Over 65*	HAZUS-MH Low-Income Pop. **	Percent of HAZUS-MH Low-Income Pop. **
3,085	3,235	569	17.6	647	20

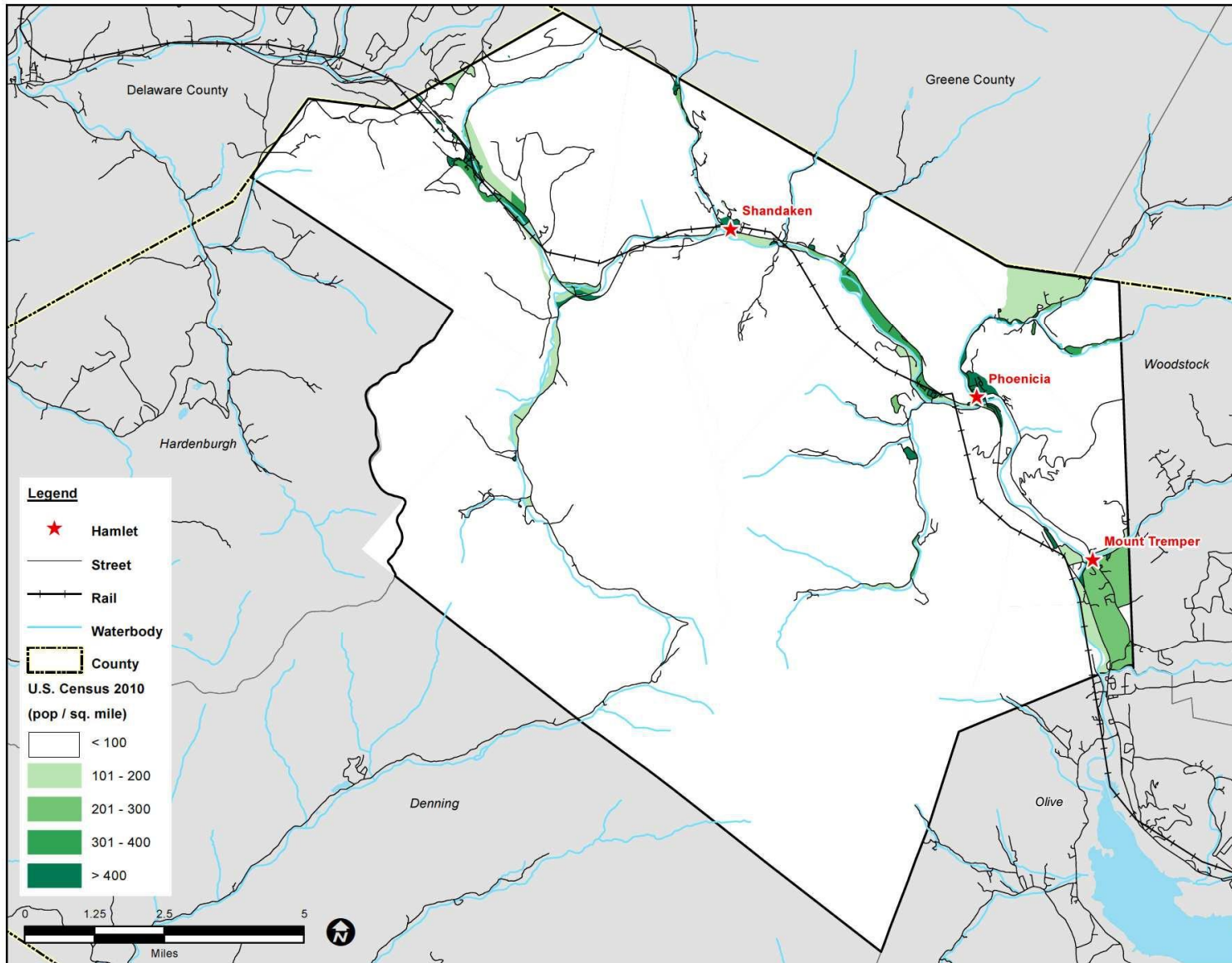
Source: Census 2010 (U.S. Census Bureau); HAZUS-MH 2.1

Note: Pop. = population

* Individuals over the age of 65. Percentage is calculated out of U.S. Census 2000 total population of municipality.

** Households with an income of less than \$25,000. Percentage is calculated out of U.S. Census 2000 total population of municipality.

Figure 4-8. Distribution of General Population for the Town of Shandaken, New York



Source: U.S. Census, 2010

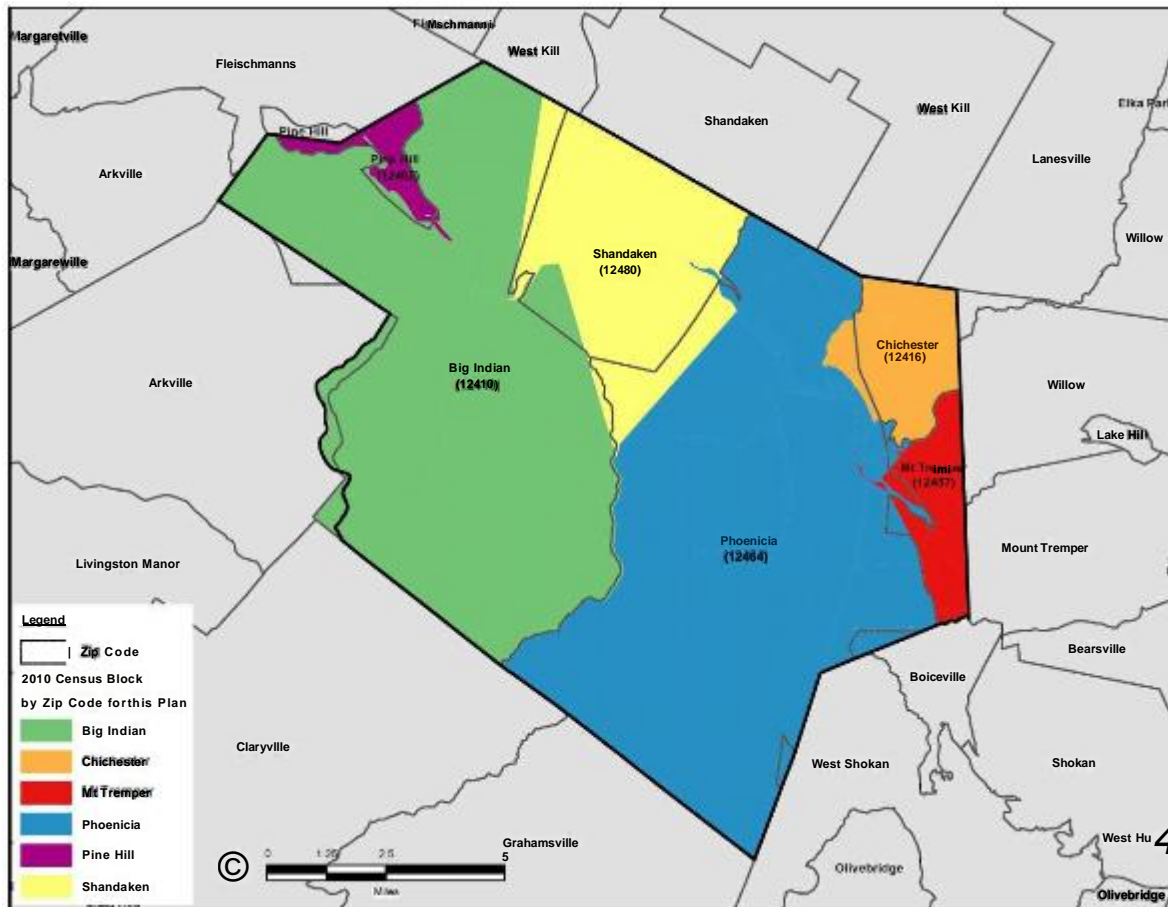
Table 4-4 presents a summary of the 2010 U.S. Census general population statistics for the Town of Shandaken by zip code. Census blocks do not follow the boundaries of each zip code. The Census blocks with their centroid in the zip code boundary was used to calculate the population within the zip code. Figure 4-9 displays the Census blocks relative to the zip code boundaries used for this Plan. Please note Census Block 361119553001065, located in the Town of Shandaken, has two zip codes: Phoenicia and Boiceville. For the purposes of this analysis, the entire block is considered within the Phoenicia zip code and is reported as such in this Plan. Further, the zip codes may not accurately portray the hamlet boundaries or demographic statistics.

Table 4-4. Town of Shandaken Population Statistics by Zip Code (2010 U.S. Census)

Zip Code	Total Population (U.S. Census 2010)	Percent Population
Big Indian	457	14.8
Chichester	345	11.2
Mt Tremper	478	15.5
Phoenicia	1,021	33.1
Pine Hill	242	7.8
Shandaken	542	17.6
Total – Town of Shandaken	3,085	100

Source: Census 2010 (U.S. Census Bureau); HAZUS-MH 2.1

Figure 4-9. U.S. Census 2010 Blocks by Zip Code for Plan Analysis



Source: U.S. Census 2010; Ulster County GIS

It is noted that the census data for household income provided in HAZUS-MH includes two ranges (\$0-10,000 and \$10,000-\$20,000/year) that were totaled to provide the “low-income” data used in this study. This does not correspond exactly with the “poverty” thresholds established by the U.S. Census Bureau, which identifies households with an annual household income below \$15,000 per year as “low income” for this region. This difference is not believed to be significant for the purposes of this planning effort.

The 2010 U.S. Census data also identified 330 of the 1,520 households as having an annual income of less than \$15,000. The 2000 U.S. Census data indicates a total of 647 persons living in households below the annual income level of \$25,000 (20%). Figure 4-10 shows the distribution of persons over age 65 in the Town, while Figure 4-11 shows the distribution of low income persons. Viewing exposure distribution maps can assist communities in visualizing areas of high exposure and in evaluating aspects of the study area in relation to the specific hazard risks.

Race, Ethnicity, and Language

Research shows that minorities are less likely to be involved in pre-disaster planning and experience higher mortality rates during a disaster event. Post-disaster recovery can be ineffective and is often characterized by cultural insensitivity. Since higher proportions of ethnic minorities live below the poverty line than the majority white population, poverty can compound vulnerability. According to the 2010 U.S. Census Bureau’s American Community Survey, the racial composition of the planning area is predominantly white, at 92.9 percent. The largest minority populations are Asian at 1.6 percent and two or more races at 2.4 percent. **Error! Reference source not found.** shows the racial distribution in the planning area. (U.S. Census, 2012)

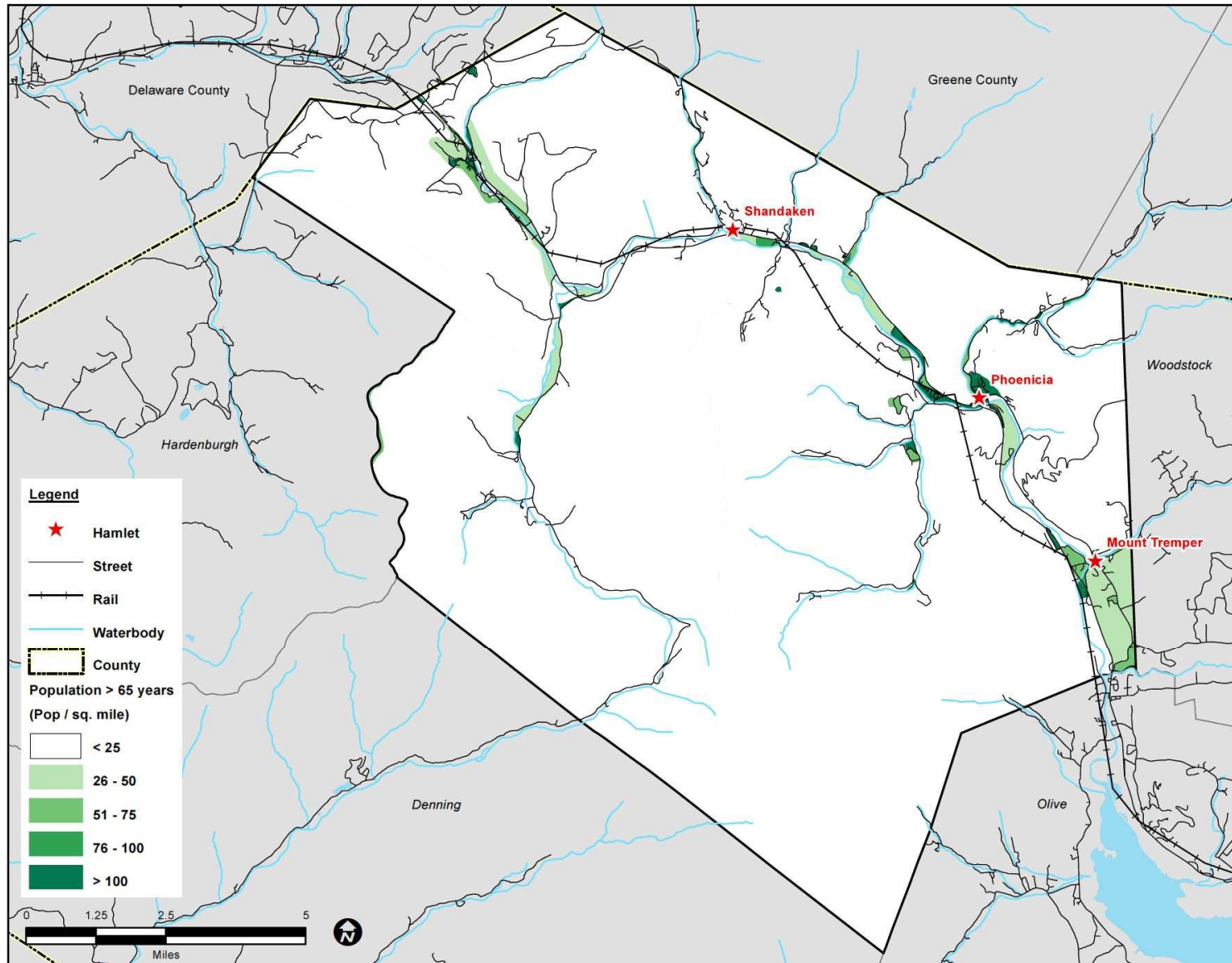
The planning area has a 7.1-percent foreign-born population. Other than English, the most commonly spoken languages in the planning area is Spanish at 3.3 percent. The census estimates that 0.6 percent of the residents speak English “less than very well.” (U.S. Census, 2012).

Disabled Populations

The 2010 U.S. Census estimates that 54 million non-institutionalized Americans with disabilities live in the U.S. This equates to about one-in-five persons. People with disabilities are more likely to have difficulty responding to a hazard event than the general population. Local government is the first level of response to assist these individuals, and coordination of efforts to meet their access and functional needs is paramount to life safety efforts. It is important for emergency managers to distinguish between functional and medical needs in order to plan for incidents that require evacuation and sheltering. Knowing the percentage of population with a disability will allow emergency management personnel and first responders to have personnel available who can provide services needed by those with access and functional needs.

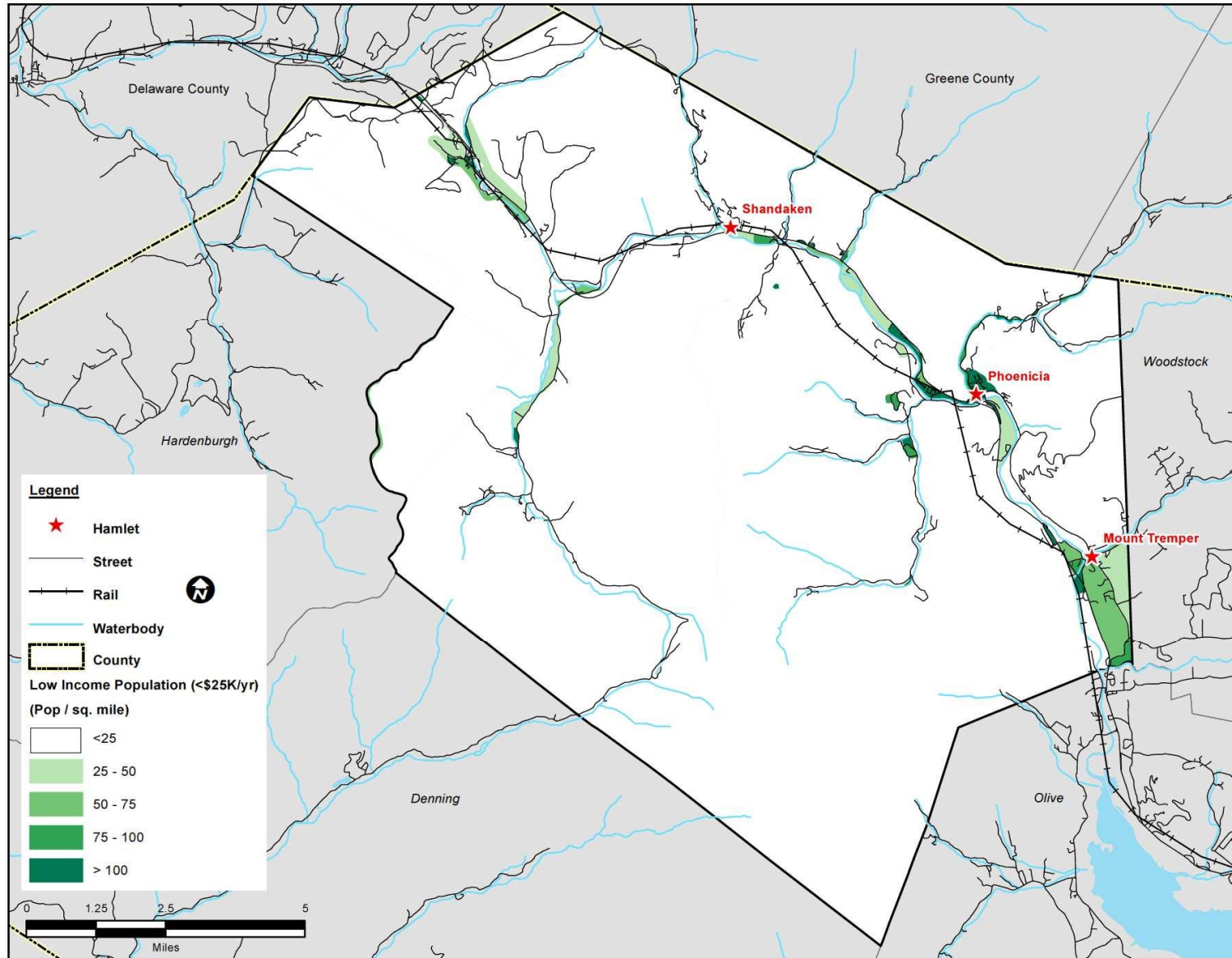
Specific statistics on disabilities in the planning area are not available through the US Census Bureau

Figure 4-10. Distribution of Persons over the Age of 65 in the Town of Shandaken, New York



Source: HAZUS-MH 2.1 (U.S. Census 2000)

Figure 4-11. Distribution of Low-Income Population in the Town of Shandaken, New York



Source: HAZUS-MH 2.1 (U.S. Census 2000)

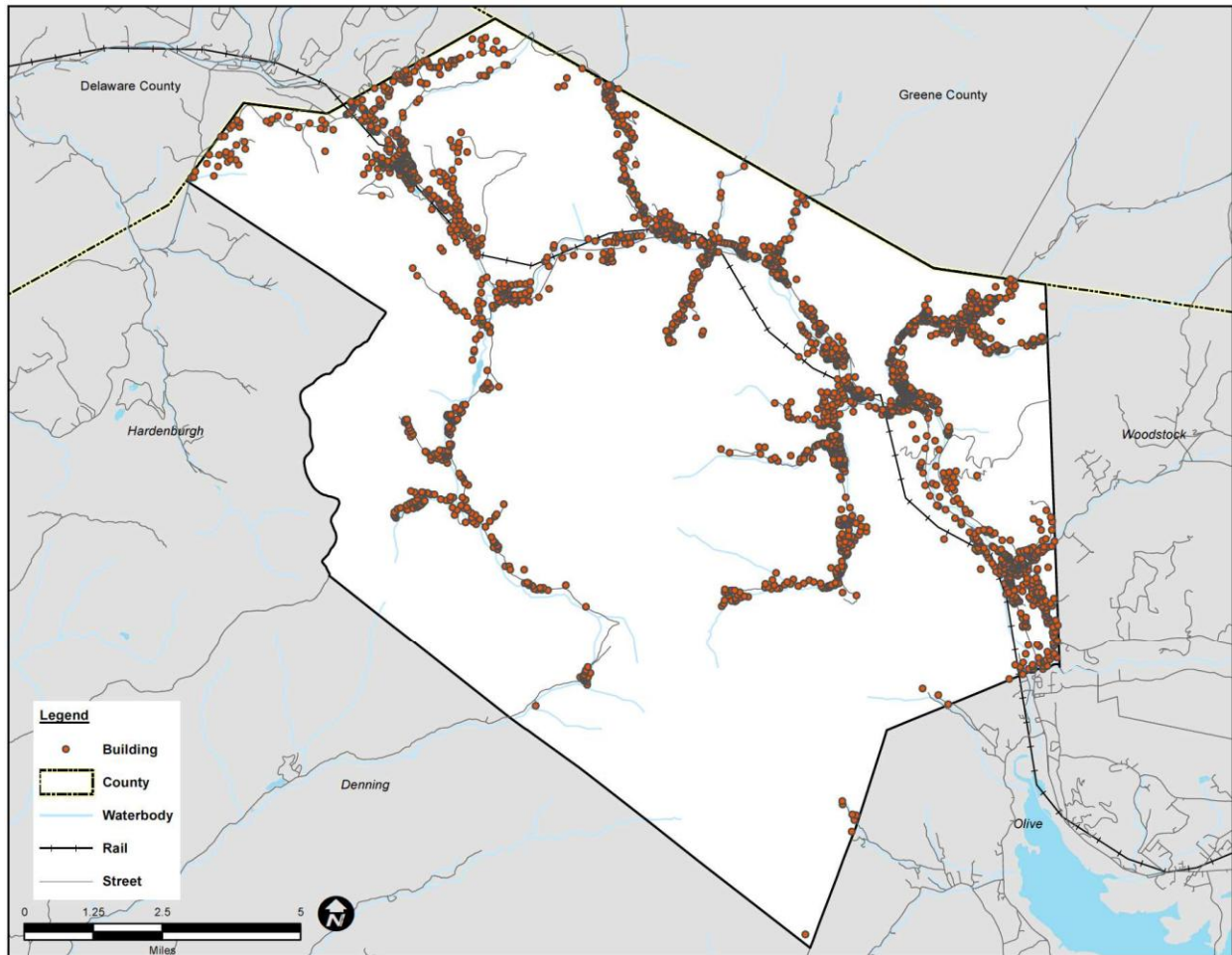
GENERAL BUILDING STOCK

The 2010 U.S. Census data identifies 1,520 households in the Town of Shandaken. The U.S. Census data identified 2,776 housing units in the Town of Shandaken in 2010, with 1,505 of those being occupied housing units and 1,271 being vacant housing units. . The median price of a single family home in the Town of Shandaken was estimated at \$218,800 in 2010 (U.S. Census, 2010).

The HAZUS-MH default building inventory was updated and replaced at the structure level for the Town of Shandaken. A custom building inventory was developed using detailed structure-specific assessor data, as well as parcel and address point location information. Structural and content replacement cost values were calculated for each building utilizing available assessor data and RSMeans 2011 values.

The building inventory generated for the Town contains 2,381 structures with a total building replacement value (structure and content) of \$815,199,625. According to the building inventory developed for this plan, approximately 2,235 buildings (\$581,837,608) or approximately 94% of the total buildings are residential housing. More specifically, the 2010 Census data identify that more than 80% of housing units in the Town are single-family detached units. Table 4-5 and Figure 4-12 the building stock for the Town of Shandaken used for this analysis. As Figure 4-12 illustrates, the majority of the buildings are along the riverine reaches in the Town.

Figure 4-12. Distribution of Buildings in the Town of Shandaken



Source: Ulster County, 2012; Tetra Tech, 2012

Table 4-5. Building Stock Count and Replacement Value by Occupancy Class

Zip Code								
	Count	Value	Count	Value	Count	Value	Count	Value
Big Indian	443	\$150,118,372	423	\$123,265,186	19	\$24,391,902	0	\$0
Chichester	276	\$72,636,483	271	\$60,240,253	4	\$3,842,730	0	\$0
Mt Tremper	259	\$90,876,459	244	\$63,663,324	6	\$6,542,570	2	\$873,956
Phoenicia	791	\$289,931,165	724	\$172,537,840	54	\$64,914,297	1	\$436,978
Pine Hill	244	\$96,548,248	223	\$73,913,958	19	\$19,588,585	0	\$0
Shandaken	368	\$115,088,897	350	\$88,217,047	12	\$11,791,084	1	\$436,978
Town of Shandaken	2,381	\$815,199,625	2,235	\$581,837,608	114	\$131,071,168	4	\$1,747,911

Zip Code	Agriculture		Religious		Government		Education	
	Count	Value	Count	Value	Count	Value	Count	Value
Big Indian	0	\$0	0	\$0	1	\$2,461,284	0	\$0
Chichester	0	\$0	0	\$0	0	\$0	1	\$8,553,500
Mt Tremper	0	\$0	3	\$13,705,200	4	\$6,091,410	0	\$0
Phoenicia	0	\$0	9	\$48,729,600	3	\$3,312,450	0	\$0
Pine Hill	0	\$0	0	\$0	2	\$3,045,705	0	\$0
Shandaken	0	\$0	2	\$9,136,800	3	\$5,506,989	0	\$0
Town of Shandaken	0	\$0	14	\$71,571,600	13	\$20,417,837	1	\$8,553,500

Source: Ulster County, 2012

LAND USE AND POPULATION TRENDS

Land use regulatory authority is vested in New York State's towns, villages, and cities. However, many development and preservation issues transcend location political boundaries. Land use trends significantly impact exposure and vulnerability to various hazards. For example, significant development in a hazard area increases the building stock and population exposed to that hazard.

This Plan provides a general overview of population and land use and types of development occurring within the study area. An understanding of these development trends can assist in planning for further development and ensuring that appropriate mitigation, planning, and preparedness measures are in place to protect human health and community infrastructure.

Land Use Trends

The following section presents an overview of the Town's land use trends.

Economy

The County Business Pattern is provided by the U.S. Census Bureau and is an annual series that presents sub-national economic data by industry. County Business Patterns covers most of the country's economic activity. The ZIP Code Business Patterns data is available after the release of the County Business Patterns and provides the number of establishments by employment-size classes by detailed industry in the U.S. (U.S. Census Bureau, 2010).

According to the 2010 ZIP Code Business Pattern for the Town of Shandaken and several hamlets, the Town had a total of 109 business establishments, with accommodation and food services having the highest number of establishments in the Town and hamlets. Table 4-6 provides the 2010 business pattern information for the Town of Shandaken and the hamlets of Mt. Tremper, Phoenicia, Chichester, Big Indian, Pine Hill, and Highmount.

Table 4-6. The Town of Shandaken 2010 Business Patterns

Industry	Number of Establishments
Accommodation and food services	28
Administrative and Support and Waste Mang and Remediation Srvs	1
Arts, entertainment, and recreation	5
Construction	13
Finance and insurance	3
Health care and social assistance	8
Information	4
	3
Other services (except public administration)	8
Professional, scientific, and technical services	11
Real estate and rental and leasing	6
Retail trade	11
	4
Wholesale trade	4
Total	109

Source: U.S. Census Bureau, 2010

Population Trends

Table 4-7. Town of Shandaken Population Trends, 1950 to 2010

1990	3,013		
2000	3,235	222	7.3%
2010	3,085	(150)	(4.6%)

Source: U.S. Census Bureau, 2012

Future Growth and Development

At present no areas are targeted for future growth and development. Growth is expected to be minimal due to the steep slope topography of available land parcels and the amount of state owned land which prohibits development. Any areas of growth could be potentially impacted by the flood hazard if located within the identified hazard areas.

CRITICAL FACILITIES

A comprehensive inventory of critical facilities in the Town of Shandaken was developed from various sources including Ulster County GIS and input from the Planning Committee. The inventory of critical facilities presented in this section represents the current state of this effort at the time of publication and used for the risk assessment in Section 5.

Essential Facilities

This section provides information on emergency facilities, hospital and medical facilities, shelters, schools, and senior care and living facilities.

Emergency Facilities

For the purposes of this Plan, emergency facilities include emergency operation centers (EOCs), police, fire and emergency medical services (EMS). Table 4-8 through Table 4-10 provide an inventory of EOCs, police stations, fire stations and EMS facilities in the Town of Shandaken. Figure 4-13 displays the location of these facilities based on the HAZUS-MH inventory data, County GIS and input from the Planning Committee.

Critical Facilities are those facilities considered critical to the health and welfare of the population and that are especially important following a hazard. As defined for this HMP, critical facilities include essential facilities, transportation systems, lifeline utility systems, high-potential loss facilities, and hazardous material facilities.

Essential facilities are a subset of critical facilities that include those facilities that are important to ensure a full recovery following the occurrence of a hazard event. For the County risk assessment, this category was defined to include police, fire, EMS, schools/colleges, shelters, senior facilities, and medical facilities.

Table 4-8. Emergency Operation Centers in the Town of Shandaken

Name	Address	Municipality (Hamlet)	Building Type	Backup Power
Shandaken Town Hall	7209 Route 28	Shandaken (Shandaken)	Wood	Yes (phone and lighting for 12 hours)
Phoenicia Fire House		(Phoenicia)	Wood	Yes
Belleayre Mt Ski Center		Shandaken (Pine Hill)	Wood	Yes

Table 4-9. Police Stations in the Town of Shandaken

Name	Address	Municipality (Hamlet)	Building Type	Backup Power
Shandaken		(Shandaken)	Steel	TBD
Ulster County Sheriff Sub Station	7209 State Route 28	Shandaken (Shandaken)	Wood	TBD

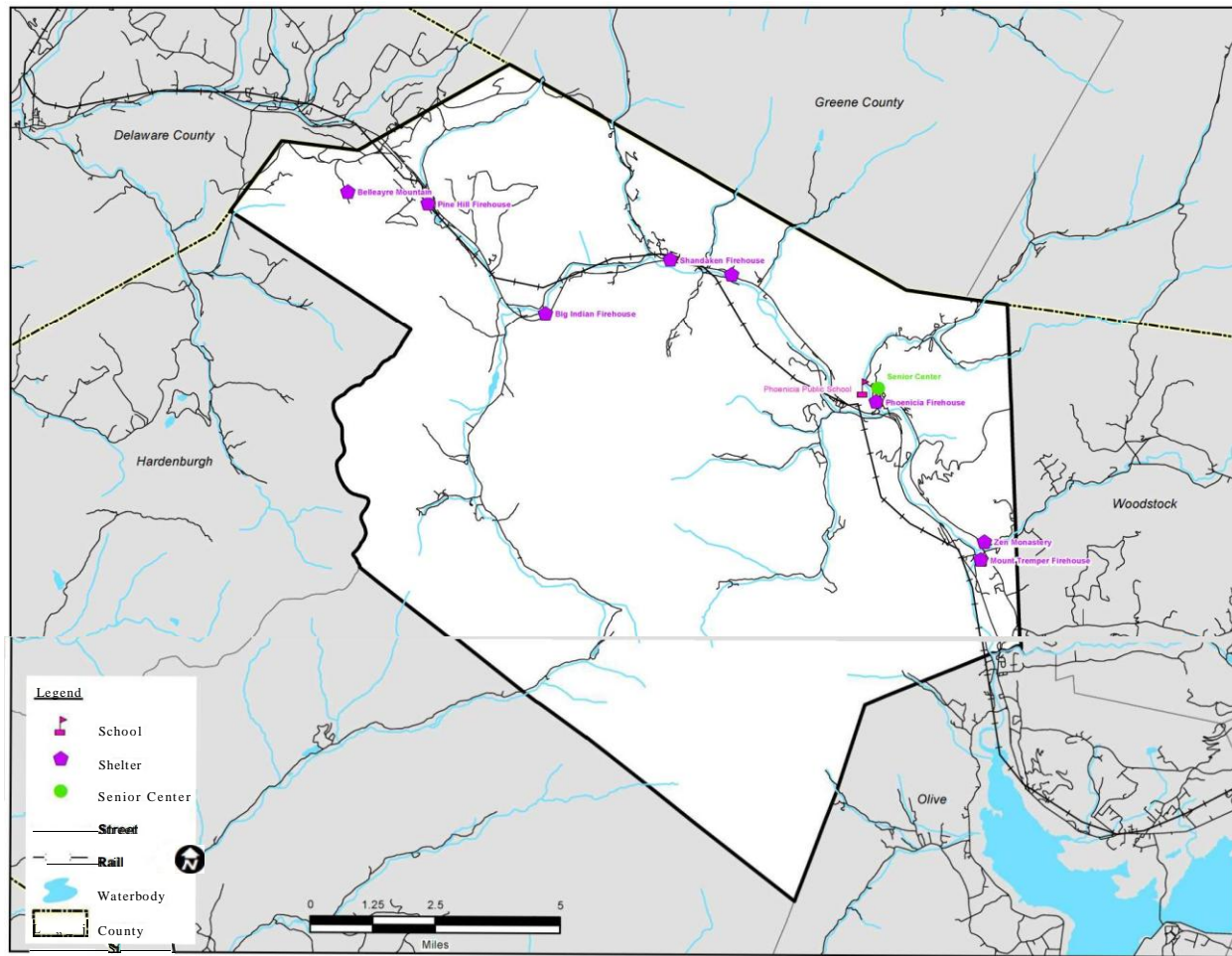
Table 4-10. Fire/EMS in the Town of Shandaken

Name	Address	Municipality (Hamlet)	Type	Building Type	Backup Power
Mount Tremper Firehouse		(Mt. Tremper)	Fire/EMS	Wood	TBD
Pine Hill Firehouse		(Pine Hill)	Fire/EMS	Steel	Yes
Big Indian Firehouse		(Big Indian)	Fire/EMS	Masonry	Yes
Shandaken Firehouse		(Shandaken)			Generator)
Phoenicia Firehouse	58 Route 214	Shandaken	Fire/EMS	Concrete	Yes

Table 4-11. Education Facilities in the Town of Shandaken

Name	Address	(Hamlet)	Enroll.	Designated Shelter /Shelter Capacity	Type	Power
Phoenicia Elementary	School Lane	Shandaken (Phoenicia)	TBD	TBD	Masonry	Yes

Figure 4-14. Schools, Shelters and Senior Centers in the Town of Shandaken



Shelters

Table 4-12 provides an inventory of the shelters in the Town of Shandaken.

Table 4-12. Shelter Facilities in the Town of Shandaken

Name	Municipality (Hamlet)	Capacity	Building Type	Backup Power
Belleayre Ski	Shandaken	TBD	Wood/Concrete	Yes
Town Hall		TBD	Wood/Concrete	TBD
Zen Monastery		TBD	Masonry	Yes
Mount Tremper Firehouse		TBD	Wood/Concrete	TBD
Pine Hill Firehouse		TBD	TBD	TBD
Big Indian Firehouse	Shandaken	TBD	Wood/Concrete	TBD
Shandaken Firehouse		TBD	Wood/Concrete	TBD
Phoenicia Firehouse		TBD	Wood/Concrete	TBD

Senior Care and Senior Living Facilities

Table 4-13 provides an inventory of senior facilities in the Town.

Table 4-13. Senior Facilities in the Town of Shandaken

Name	Address	Municipality (Hamlet)	Building Type	Backup Power
Senior Center	Ave Maria Drive	Shandaken	Masonry/Concrete	Yes

Figure 4-14 displays the location of the Shelter and Senior Living/Senior Care facilities.

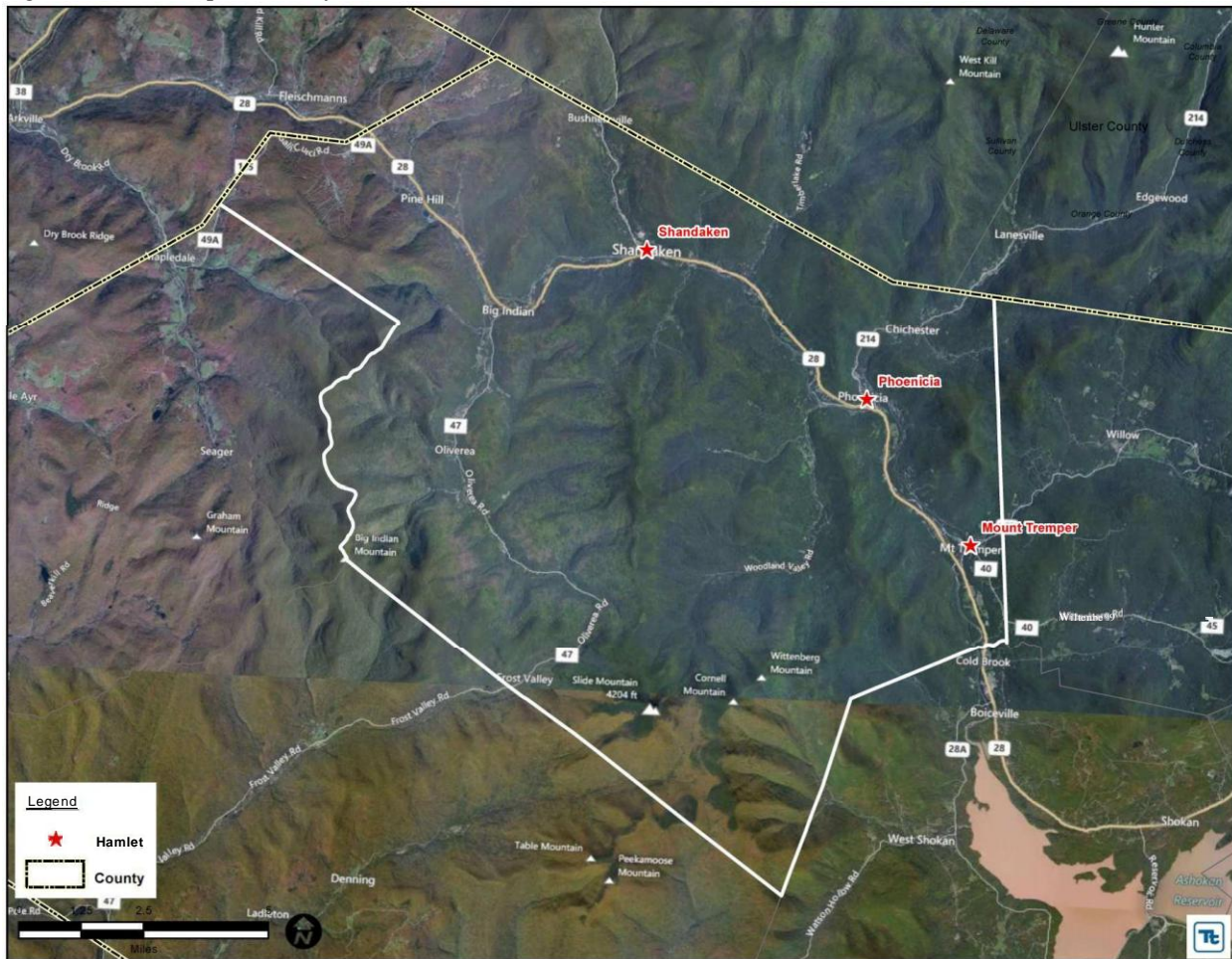
Transportation Systems

This section presents available inventory data for major transportation systems in the Town of Shandaken. There are no airports in the Town. Figure 4-15 shows regional transportation lifelines serving the Town of Shandaken.

Highway, Roadways and Associated Systems

The Catskill Mountain Railroad services the Town of Shandaken, through the hamlets of Pine Hill, Shandaken, Phoenicia, and Mount Tremper. Currently the railroad is inactive from the hamlet of Phoenicia west to the Town line. State Route 28 enters the Town from Delaware County and is the main highway that generally runs east to west across the Town following sections of the Esopus Creek. County Route 47 runs north to south connecting the hamlets of Big Indian and Oliverea. Routes 42 and 214 connect the Town with Greene County to the north. Figure 4-15 below illustrates the major transportation systems in the Town.

Figure 4-15. Transportation System in the Town of Shandaken

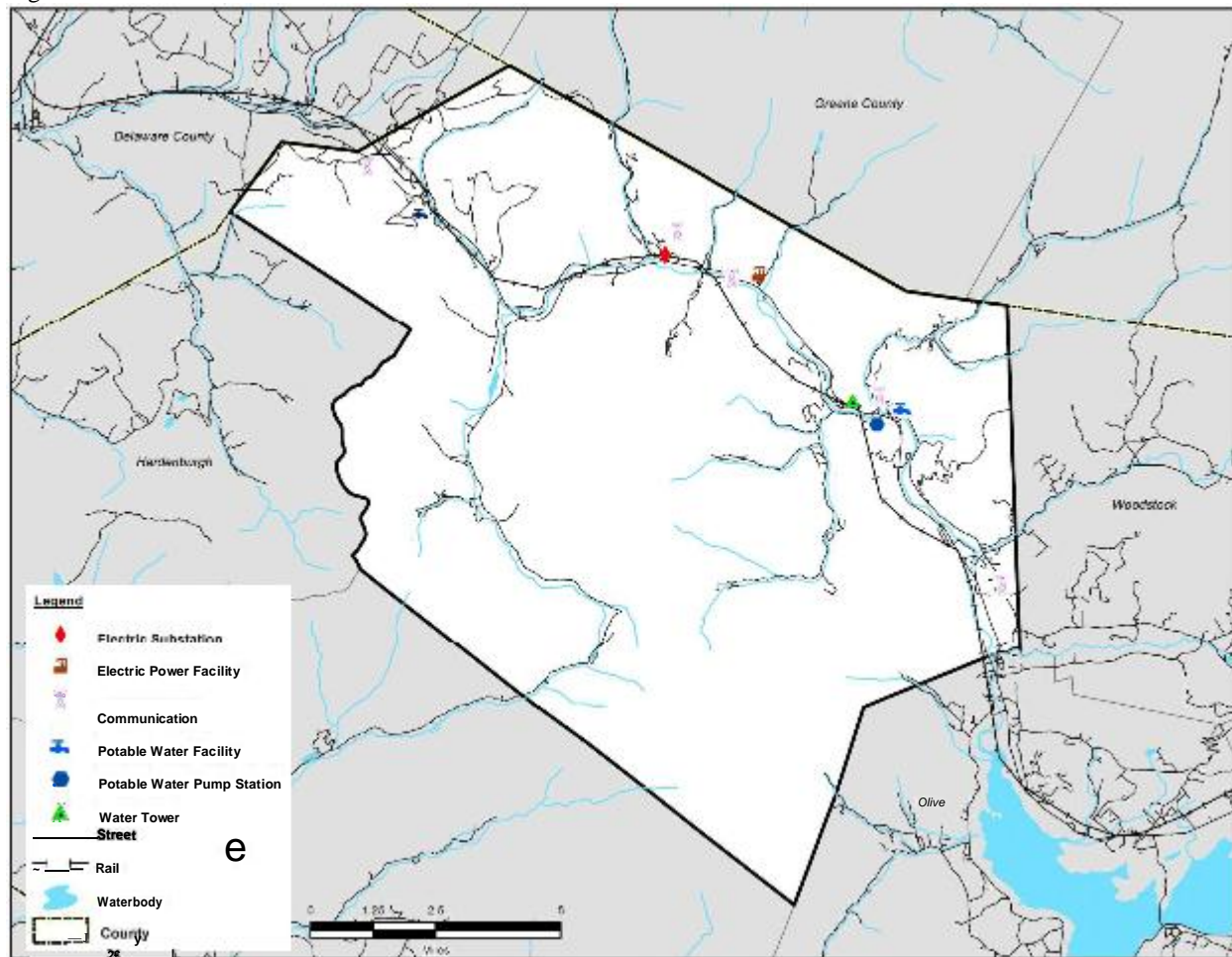


Source: Bing Aerial Photography dated 2010

Lifeline Utility Systems

This section presents potable water, wastewater, and energy resource utility system data. Due to heightened security concerns, local utility lifeline data sufficient to complete the analysis have only partially been obtained. Utility data are included in HAZUS-MH but are not sufficient to support detailed analyses for this Town. Figure 4-16 illustrates the locations of the provided utilities in the Town of Shandaken.

Figure 4-16. Utilities in the Town of Shandaken



Potable Water Supply

The Phoenicia Water District supplies about 40,000 gallons of water per day to residents and businesses in the hamlet of Phoenicia. The water system consists of three water sources; a filtration plant; a storage tank and a water distribution system. Water from two surface water sources, an infiltration gallery and a spring supply, are treated at the water filtration plant. The third source (High Street Wells) consists of two drilled wells that convey water directly into the water distribution system. The Phoenicia treatment building has a back-up generator.

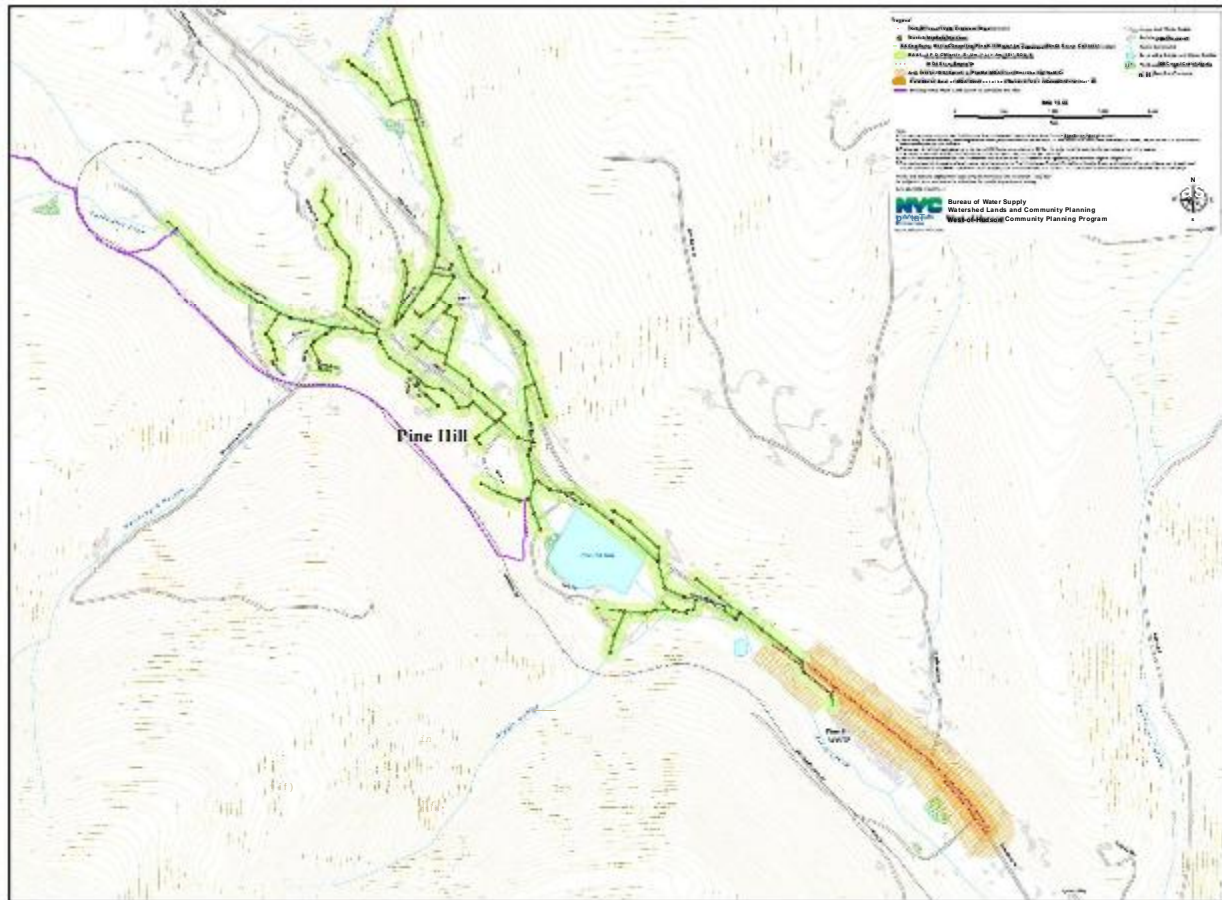
The Pine Hill Water District supplies an average of about 15,000 gallons per day to its largely residential users. The system includes the water supply, storage reservoir, treatment building and distribution system. The water supply consists of several springs and a back up well.

Municipal and public non-municipal wells and water towers are present in the Town of Shandaken. Facilities in the Town include the Phoenicia Water District Main Filtration Plant and the Pine Hill Water District Treatment building. In addition, there is a water tower and a pump house located in the Town.

Wastewater Facilities

NYC DEP owns and operates two wastewater systems in the Town, a wastewater treatment facility on State Route 28 that serves the hamlet of Pine Hill, and a community septic system in the hamlet of Chichester that treats about 13,000 gpd. Figure 4-17 below displays the Pine Hill Water Treatment Plant's sewer collection system service area.

Figure 4-17. Pine Hill Wastewater Treatment Plant's Sewer Collection System Service Area in the Town of Shandaken



Source: Appendix A of the Town of Shandaken's Sewer Use Law

Communication Resources

Table 4-14 lists the communication facilities (facilities, radio stations, radio towers) located in the Town of Shandaken. Figure 4-16 displays the locations of all communication facilities located within the Town.

Table 4-14. Communication Facility

Name	Municipality (Hamlet)	Building Type	Backup Power
Town Hall / TV	Shandaken	Wood	TBD
Highway Garage / Radio	Shandaken	Steel	TBD
Verizon	Shandaken	Concrete	TBD
Verizon	Shandaken	TBD	TBD
Cell Tower	Shandaken	NA	TBD
Cell Tower	Shandaken	NA	TBD

NA = Not applicable

High-Potential Loss Facilities

High-potential loss facilities include dams, levees, nuclear power plants, military installations and hazardous materials (HAZMAT) facilities. No nuclear power plants, military installations or HAZMAT facilities were identified in the Town. Dams and levees are discussed below.

Dams/Levees

There are five dams located within the Town of Shandaken, one of which is classified as a high hazard dam (Pine Hill Lake Dam) (Table 4-15). In addition, the Town has identified locations of four ‘levees’ along Esopus Creek in the Town: Route 212 in Mount Tremper; Dike Road; a former dike on Plank Road which was wiped out in Irene; and on Route 42 in Shandaken. Refer to Figure 4-19 through Figure 4-21. Other small dams include a private on the Birch Creek, and another at the end of Lower Birch Creek Road on New York State Land.

There are 10 USGS riverine gages (one proposed) in the Town of Shandaken summarized below and displayed on Figure 4-15. The Esopus Creek at Coldbrook, New York is located just outside the Town’s boundaries and is also displayed on Figure 4-15.

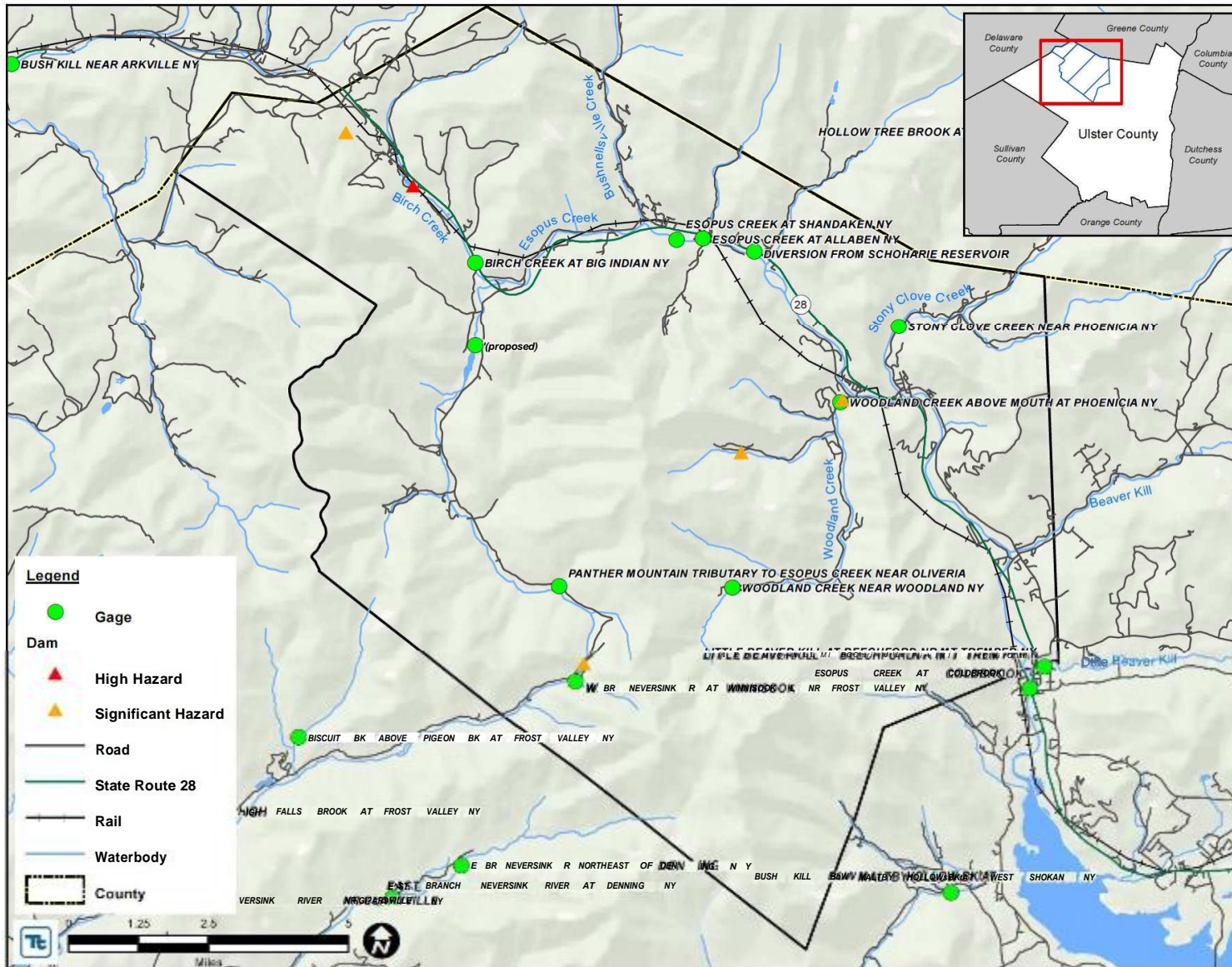
- ☐ Esopus Creek at Allaben Diversion from Schoharie Reservoir (DEP gage)
- ☐ Birch Creek at Big Indian, New York
- ☐ Stony Clove Creek near Phoenicia, New York
- ☐ Woodland Creek near Woodland Valley, New York
- ☐ Hollow Tree Brook in Lanesville (Town of Hunter)
- ☐ Bushnellsville Creek near Shandaken
- ☐ Esopus Creek at Coldbrook (Town of Olive)
- ☐ Little Beaverkill at Beechford

Table 4-15. Dams in the Town of Shandaken

ID	Name	Owner	River	Nearest City	Distance (miles)	Year Completed	Dam Length	Dam Height	NID Hazard	NYSDEC Hazard	EAP
NY000280	SNOW MAKING POND DAM	BELLEAYRE SKI CENTER	CATHDRAL GLEN BROOK	PINE HILL	0	1975	325	36	Unknown	B	N
NY000281	PINE HILL LAKE DAM	NYS DEC	BIRCH CREEK	BIG INDIAN	2	1987	1,257	28	H	C	Y
NY000282	MUDDY BROOK POND DAM	CAMP WOODLAND INC	MUDDY BROOK	PHOENICIA	1	1946	0	6	S	B	N
NY000284	DAY POND DAM	RICK DAY	PANTHER KILL	PHOENICIA	2	1930	50	6	S	B	N
NY000285	WINNISOOK LAKE DAM	WINNISOOK INC	ESOPUS CREEK	OLIVEREA	4	0	344	42	S	B	NR

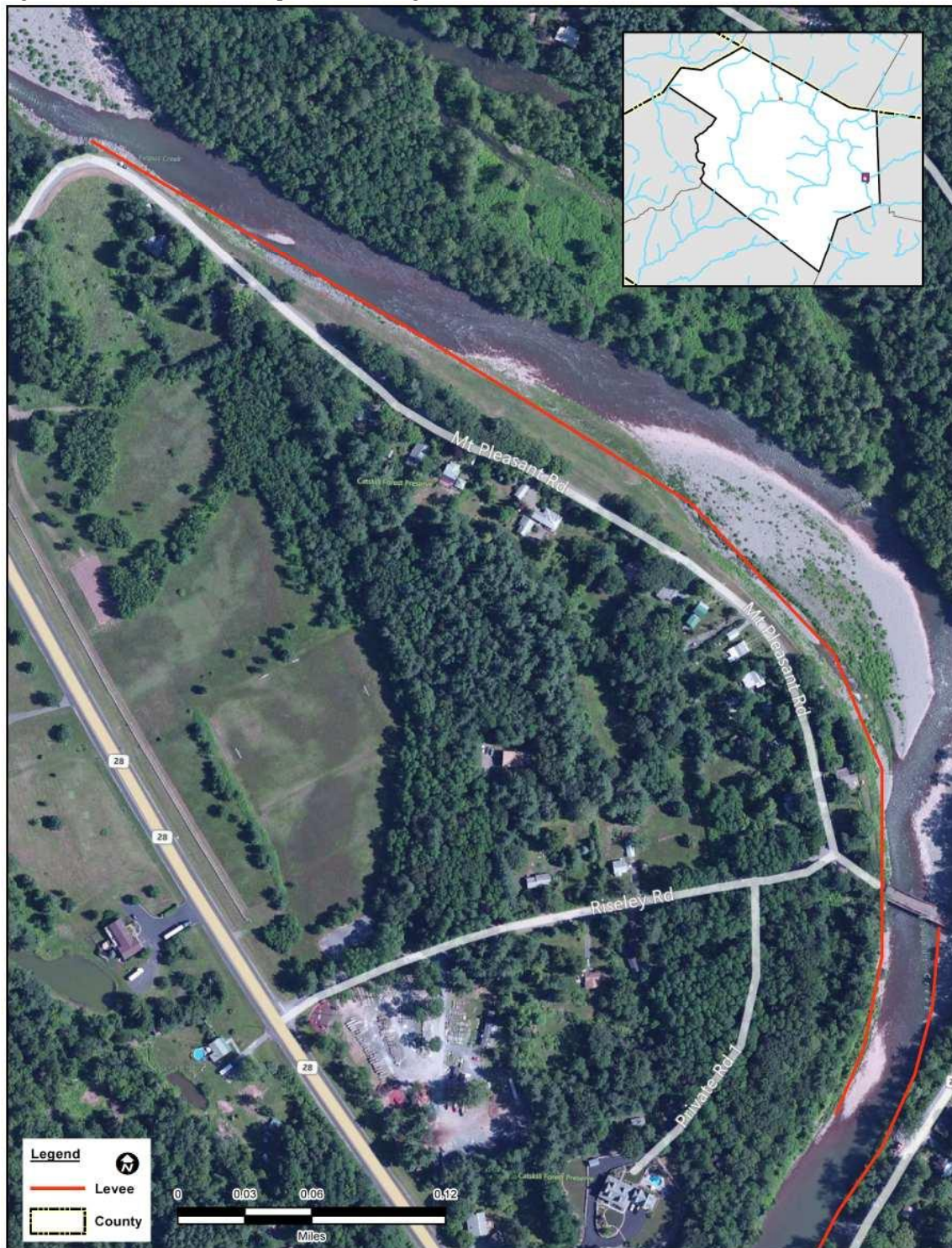
Source: NID, 2012

Figure 4-18. USGS Gages and Dams in the Town of Shandaken



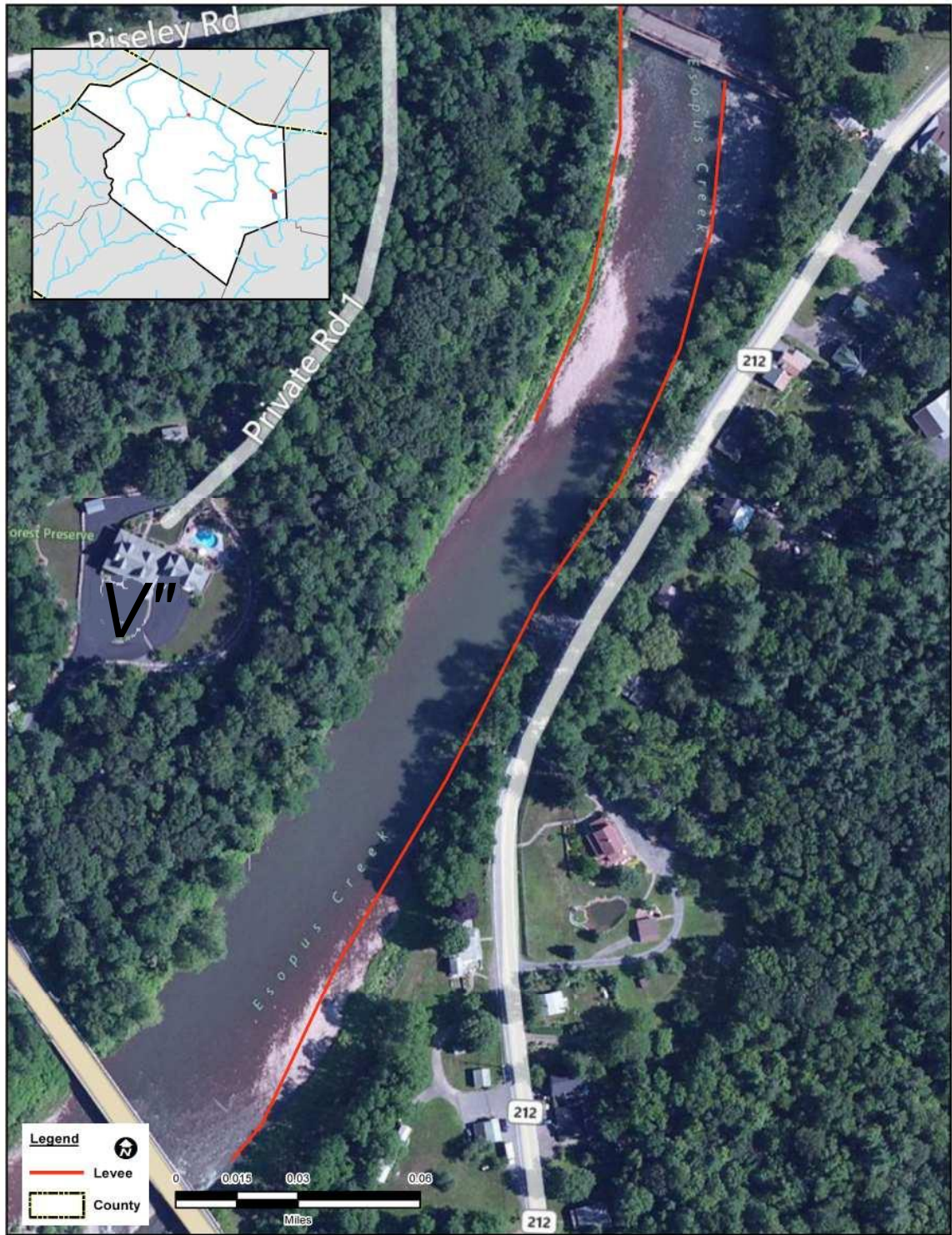
Source: NID, 2012; NYCDEP, 2012

Figure 4-19. Levee on the Esopus Creek along Mount Pleasant Road



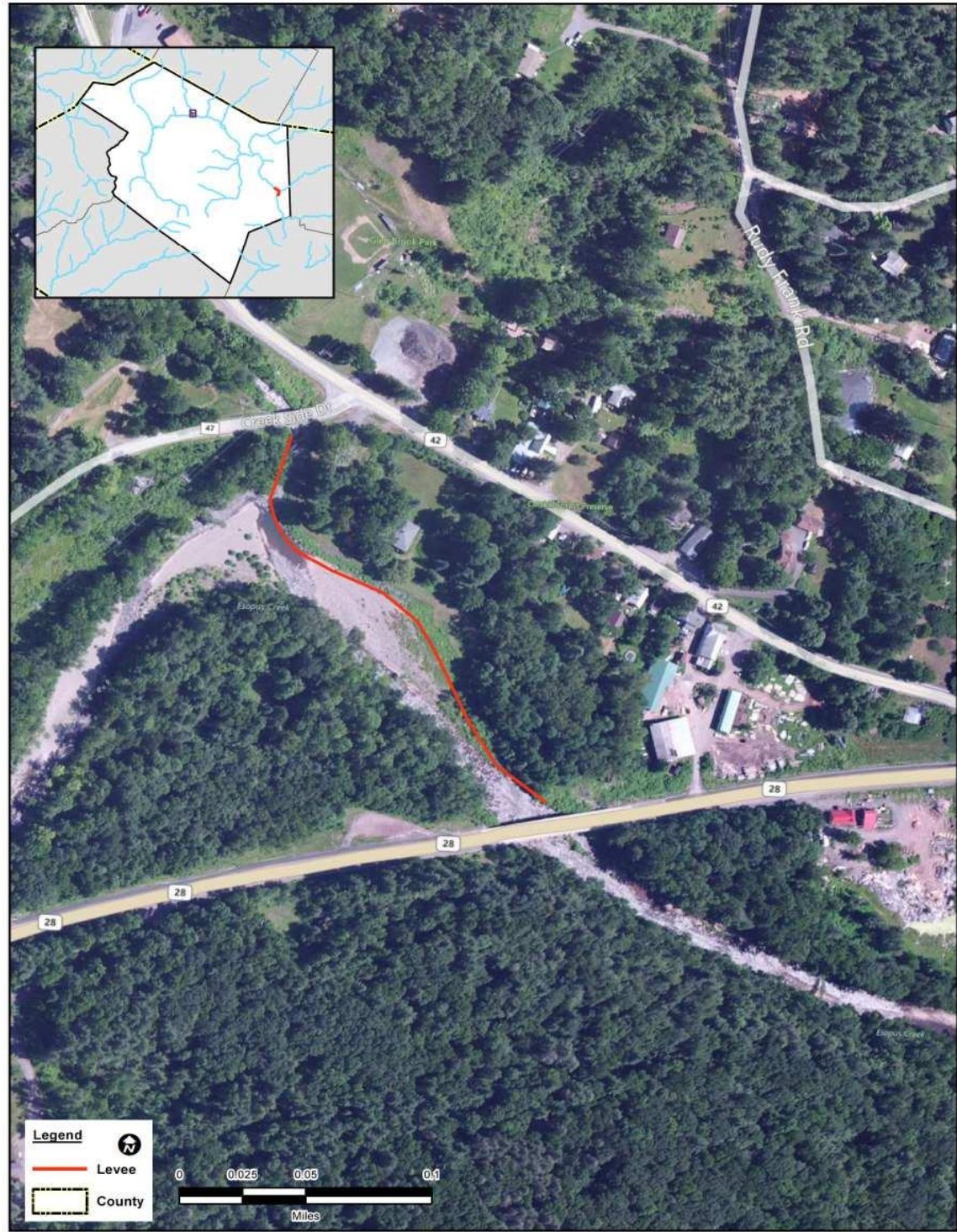
Source: Planning Committee, 2012

Figure 4-20. Levee on the Esopus Creek along Route 212



Source: Planning Committee, 2012

Figure 4-21. Levee on the Esopus Creek along Route 42



Source: Planning Committee, 2012

Other Facilities

The Planning Committee identified additional facilities (user-defined facilities) as critical. These facilities were included in the risk assessment conducted for the Town. Table 4-16 lists the other critical facilities identified by the Town of Shandaken.

Table 4-16. Public Buildings in the Town of Shandaken

Name	Municipality (Hamlet)	Building Type	Backup Power
Town Hall	Shandaken	Wood/Concrete	Yes (Battery back-up for phones/lights)
Town Highway Garage	Shandaken	Steel	Yes