

**Appendix 5:**  
**Land Use and Zoning Analysis**

## Swanzey NH 10 Land Use & Zoning Analysis

Traffic patterns, as well as transportation needs and infrastructure are driven by land use. A single-family home generates different traffic patterns than a supermarket, which in turn generates different traffic patterns when compared to a small-scale manufacturing plant. Therefore, land use regulations determined by municipalities directly influence land use, and the current and future traffic impacts that they place on local roads and regional highways. This section analyzes the existing land uses and the municipal regulations that Swanzey permits in the NH 10 Study Area including future land uses. Analysis in this section includes community planning efforts that may inform future land use regulations, as well as constraints that could shape the distribution of future development. Finally, this section provides an analysis of transportation impacts of both current and future land uses represented by estimated trip generation for different types of land use.

### Existing Conditions

#### Existing Land Uses

The Study Area, which includes parcels within ¼ mile radius of NH Route 10, contains 527 parcels in total, the majority of which are single-family homes, and commercial and industrial properties. Map 1 depicts parcel-level data based on existing land uses and provides a sense of the total land area each land use represents in the Study Area as well as land use patterns along the corridor. To simplify the visualization of land use information, some similar land use codes are grouped together. For example, there are numerous parcels of forest within the land use codes that have been grouped into managed and unmanaged forests. Land use codes are derived from GIS assessing data provided by the Town of Swanzey.

Land uses within the NH 10 Study Area are primarily low density. In the northern half of the Study Area land use is predominately forests managed by Yale University, but there are also a number of low density commercial and industrial properties, and low-density residential properties. Land uses within the southern half of the Study Area are more diverse, with a mix of both single family and multi-family residential, commercial properties, unmanaged forests, and farmland.

Table 1 lists land uses that appear within the Study Area, with land use codes combined in the same manner as Map 1. Single-family residential properties are the most prevalent land use by number of parcels (355 parcels) and acres (451) within the Study Area. In terms of acreage, commercial/industrial (386) and managed forest (341) lands make up the other two predominant forms of land use within the Study Area. Managed forest account for the largest parcels within the Study Area, with only 19 parcels accounting for 341 acres of land within the corridor. Much of this land is contained within the Yale-Toumey forest, which is protected through Yale University as part of their forestry program.

Map 1: Land Use Map

# Study Area Land Use

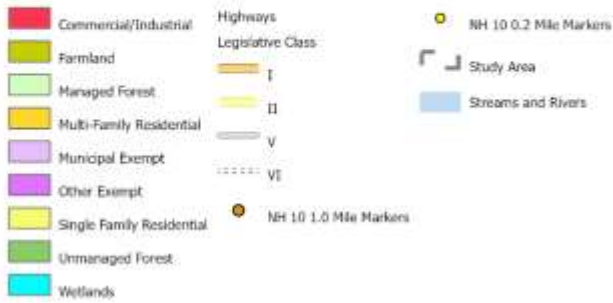
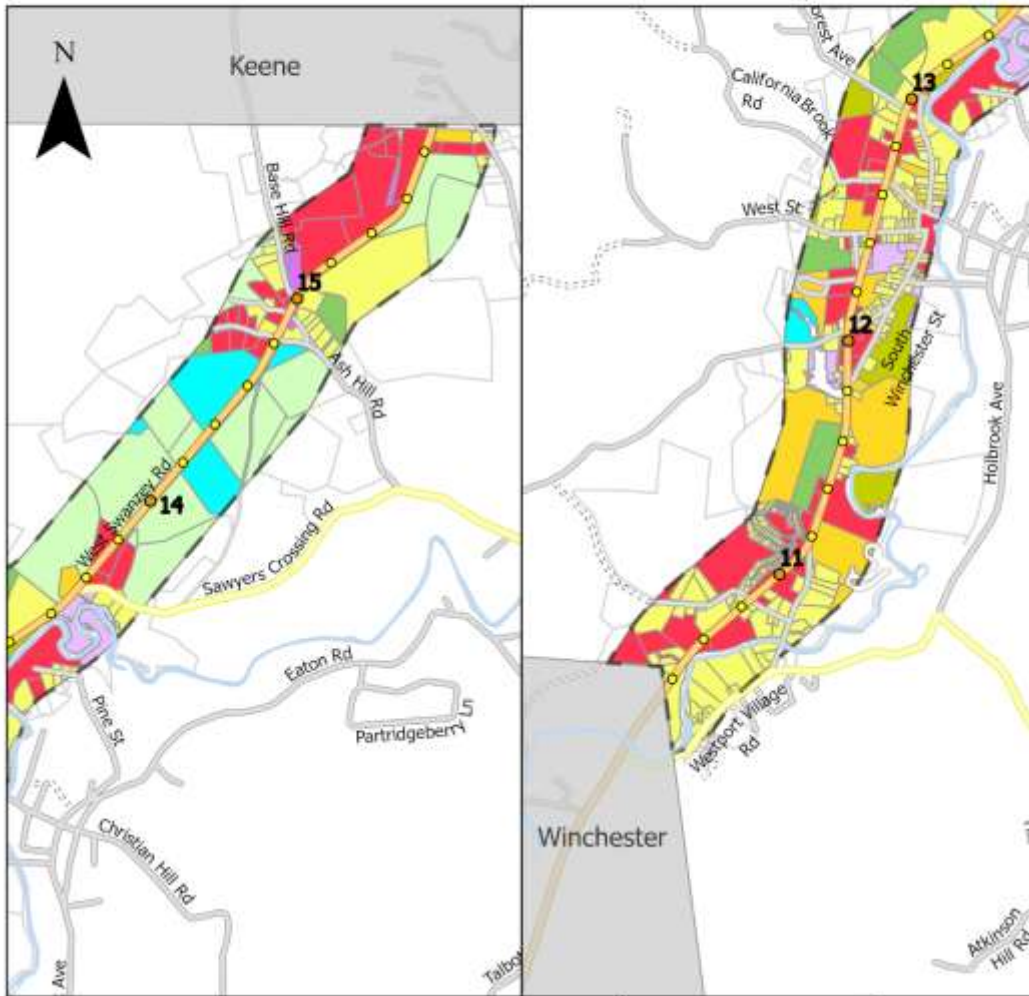


TABLE 1: Table of land uses by type, number of parcels and acreage<sup>1</sup>

Land Use Type	Parcels	Acres	Acreage as Percent of Total Study Area
Single Family Residential	355	451	27%
Multi-Family Residential	30	167	10%
Commercial/Industrial	77	386	23%
Municipal Exempt	19	42	1%
Other Exempt	4	11	4%
Farmland	5	58	4%
Managed Forest	19	341	21%
Unmanaged Forest	8	86	5%
Wetlands	10	90	5%
<b>Total</b>	<b>527</b>	<b>1,632</b>	<b>100%</b>

*Town of Swanzey Assessing Data*

## Zoning

Zoning in Swanzey is divided into seven districts, with four additional overlay zones. Five of these zones are present in the Study Area, which is defined here as land that is a quarter mile radius from NH 10. Zoning districts define the permitted uses for parcels within that zone along with other regulations such as parking requirements, setback requirements and maximum building heights. Overlay districts, as the name implies, overlays on parcels and mandates an additional set of land use regulations for parcels within that district. Overlay district requirements can include additional design or setback regulations or additional processes required to develop in that district, such as additional permitting rules required in floodplains. Three overlay districts apply to the Study Area, which are the Wetlands Conservation District, Shoreland Protection District and the Flood Plain District. The Wetlands Conservation District applies to scattered sites within the Study Area where wetlands are found, while the Shoreland Protection District applies to the Ashuelot River. Flood Plain District applies to those areas within the Study Area which lie within a FEMA designated flood hazard area, further described in “Future Land Uses” later in this document. In combination with subdivision and site plan regulations, zoning plays a major driving force in driving land use decisions over time.

Within the Study Area, the vast majority of land with direct frontage to NH 10 is zoned either Business or Commercial/Industrial. The parcels with direct frontage to NH 10 in the northern half of the corridor are primarily zoned Commercial/Industrial, while the primary zone in the southern half of the corridor is Business. Between Anthony Circle and Kempton Road on the west side of NH 10, there is a stretch of parcels that are zoned Residence. The most diverse mix of zoning within the study area is in West Swanzey Village, where there is a mix of parcels zoned Residence and Village Business I and Village Business II. Of particular note is the zoning of the former Homestead Mills site as Village Business II. Overall, the Town of Swanzey’s zoning regulations encourage low-density development, as the three most prominent zoning districts of Business, Commercial/Industrial and Residence require a minimum lot size of one acre. Often,

<sup>1</sup> Acreage is defined through calculations made through existing GIS data, and may differ from official assessing calculations.

lots larger than one acre are required in the case of properties within the Commercial/Industrial districts with direct frontage to NH 10 and multifamily properties not connected to public sewer.

TABLE 2: Zones and Dimensional Requirements<sup>2</sup>

Dimensional Requirements	Rural/Agricultural District	Residence District	Business District	Commercial/Industrial District	Village Business District I	Village Business District II
Minimum Lot Size	3 acres	1 acre	1 acre	3 acres (Route 10) 1 acre (Feeder Road)	0.5 acres	0.5 acres
Minimum Frontage	225 feet	150 feet	125 feet	400 feet (Route 10) 125 feet (Feeder Road)	100 feet	100 feet
Front Setback	30 feet	30 feet	75 feet	75 feet	30 feet	30 feet
Side Setback	20 feet	20 feet	20 feet	20 feet	20 feet	20 feet
Rear Setback	20 feet	20 feet	20 feet	20 feet	20 feet	20 feet

TABLE 3: Acreage by Zoning

Zoning District Name	Total Area (Acres)	Acres as Percent of Total Study Area
Rural/Agricultural	134	8.2%
Business	476	29.2%
Commercial/Industrial	834	51.1%
Residence	173	10.6%
Village Business I	10	0.6%
Village Business II	5	0.3%
<b>Total</b>	<b>1,632</b>	<b>100%</b>

### Traffic Impacts from Existing Land Uses

As noted above, the predominant land use in the Study Area today is the single family home. According to the Institute for Traffic Engineers, traffic generation for single family homes is on average about 10 trips per day on weekdays (5 trips leaving the home and 5 trips returning home) and slightly less on Saturdays and Sundays (7 and 6 trips respectively). Although single family homes have a.m. and p.m. peak hour traffic, this only accounts for about 2 of the 10 trips per day on average during the weekdays, so single family homes tend to generate 80% of their other traffic at other times of day. Among the 371 single family homes, they are estimated to generate about 3,550 trips per day within the corridor area per day on a typical weekday. Multifamily units, on average, generate less traffic than single family homes, averaging about 7 trips per day on all days of the week, Saturdays and Sundays included. Multifamily unit a.m. and p.m. peak hour traffic tends to be less than single family homes ranging from .5 to .6 trips per day respectively, again showing that the majority of residential traffic doesn't occur during the peak hour.

<sup>2</sup> Area and parcel calculations were accomplished using ESRI ArcGIS products and are for planning purposes only. Data presented in this analysis may differ from official assessing data.

The 273 multifamily units in the study area are estimated to generate almost than 1,800 trips per day on a typical weekday. Combined, housing on the corridor is expected to generate about 5,350 trips on the corridor.

Though sophisticated traffic modeling is beyond the scope of the study, the 5,350 trips per day is an insightful, though rough and imperfect metric for understanding the residential related traffic generation on the corridor. Though housing is distributed along the corridor (and much more housing using the NH 10 Corridor is outside the boundaries of the Study Area), one can apply a “back of the napkin” estimate to the AADT measured on the Corridor which ranges from 7,359 AADT in the southern part of the Corridor (NH 10 at the Winchester town line) to 14,443 in the northern part of the Corridor (NH 10 at the Keene town line). 5,350 trips are equivalent to approximately 76% of the net traffic between the two count sites (7,084 trips). Findings from later sections of the report, namely, 1) that most commuters gravitate towards Keene either to work there or go to pass through the Keene area to other destinations<sup>3</sup> and 2) the majority of housing in the study area is in West Swanzey, suggest that residential traffic from the Study Area is likely to contribute a great deal of traffic demand on the Corridor today. However, the capacity for the road to accommodate the traffic is far from congested. The standard reference for maximum saturation flow per lane is 1,900 vehicles per hour<sup>4</sup> and the area with the highest peak hour on the Corridor reaches about 1,470 vehicles for two opposing lanes combined.<sup>5</sup>

The next most common land use in the Study Area are commercial/industrial land uses. Traffic generation for commercial and industrial land uses can vary widely (see Table 4 below).

*TABLE 4: Common Land Uses Found in the Study Area Today and ADT Weekday Traffic*

Land Use	Unit of Measure	ADT Weekday
Single Family	Per Dwelling Unit	9.57
Multi-Family	Per Occupied Dwelling Unit	6.59
Grocery Store	1,000 sq. ft. gross floor area	102.24
Free-standing Discount Store	1,000 sq. ft. gross floor area	57.24
Restaurant: Sit-Down	1,000 sq. ft. gross floor area	127.15
Restaurant: Fast Food without Drive-Through	1,000 sq. ft. gross floor area	716.00
Business and Professional Office	1,000 sq. ft. gross floor area	11.01
Convenience Store with Gasoline Pumps	1,000 sq. ft. gross floor area	845.60
Gasoline, Car Wash, with Convenience Store	1,000 sq. ft. gross floor area	152.84
Coffee Shop with Drive-Through, no Seating	1,000 sq. ft. gross floor area	1,800.00
Auto Sales and Service	1,000 sq. ft. gross floor area	33.34
Manufacturing	1,000 sq. ft. gross floor area	3.82
Wholesale, Warehouse, Storage Facility	1,000 sq. ft. gross floor area	3.65
Recreational Facility	1,000 sq. ft. gross floor area	22.88

Source: *Institute for Traffic Engineers Trip Generation Manual, 8<sup>th</sup> Edition, 2008.*

<sup>3</sup> Keene is also an important shopping, medical and government services destination.

<sup>4</sup> Highway Capacity Manual, 6<sup>th</sup> edition, Transportation Research Board, 2015.

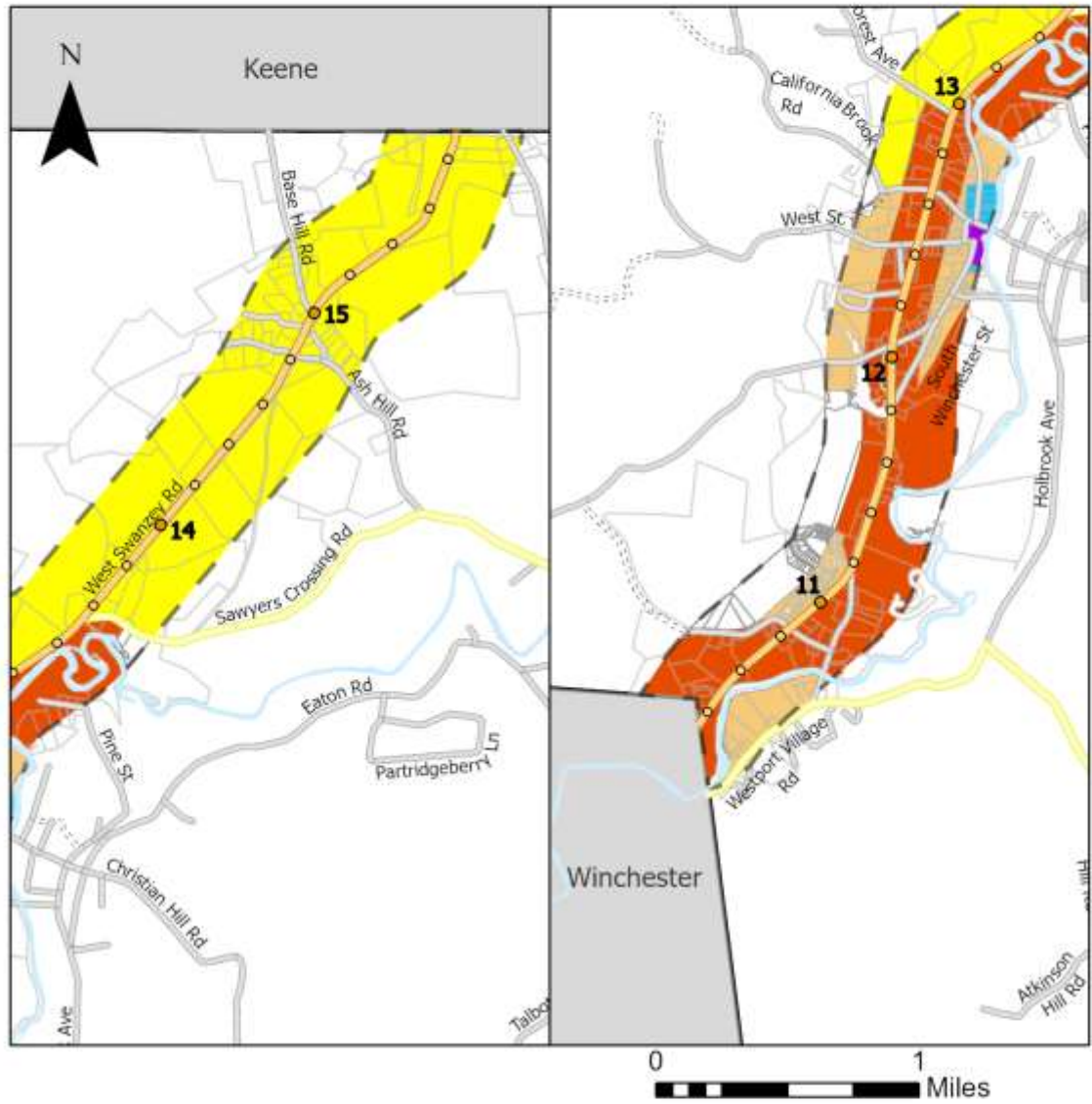
<sup>5</sup> SWRPC 2019 p.m. peak hour count at NH 10 at the Swanzey/Keene town line.

For reference, the Swanzey Market Basket has 97,397 square feet of gross floor area. As a Grocery Store trip generation could be as much as 9,957 trips per day with up to 1,150 vehicles per p.m. peak hour<sup>6</sup>. The Citgo Gas Station, which at 189 West Swanzey Road is 3,520 square feet could generate approximately 2,976 trips per day as a gas station alone with up to 220 vehicles in the p.m. peak hour. Applying only 1/5<sup>th</sup> of the gross floor area to the store's Coffee Shop/Drive-Through operation is equivalent to 1,267 vehicles per day and approximately 218 vehicles in the a.m. peak hour. A third example used for illustration purposes is the currently closed Nick's Seafood Restaurant, which is 4,624 square feet. If the restaurant opens again, it is likely to attract about 588 trips per day with about 85 vehicles during the p.m. peak hour. As a final example, traffic generation for the Dollar General at 786 West Swanzey Road, which is 9,100 square feet in area, is estimated to generate about 520 trips per day with about 51 trips generated in the p.m. peak hour.

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<sup>6</sup> The gross floor area is not entirely dedicated to Market Basket, but for simple illustration the Grocery Store land use code is used.

# Study Area Zoning



- |                                |                                   |                                    |
|--------------------------------|-----------------------------------|------------------------------------|
| <b>Zoning Districts</b>        | <b>Highways</b>                   | <b>NH 10 1.0 Mile Markers</b>      |
| Rural/Agricultural             | <b>Legislative Classification</b> | NH 10 1.0 Mile Markers             |
| Business District              | 0                                 | NH 10 0.2 Mile Markers             |
| Commercial/Industrial District | I                                 | Streams & Rivers                   |
| Residence District             | II                                | Study Area (.25 Mile NH 10 Buffer) |
| Village Business I District    | V                                 | Swanzey Town Boundary              |
| Village Business II District   | VI                                |                                    |



## Key Existing Zoning & Land Use Findings

Following is a list of key findings relative to land use and zoning:

- Every property along NH 10 north of Forest Avenue on the west side of the corridor and north of Sawyers Crossing Road on the east side of the corridor is zoned Commercial/Industrial. Commercial/Industrial is also exclusive to the NH 10 corridor within Swanzev and does not cover any parcels outside of the ¼ mile Study Area.
- The intent of the Commercial/Industrial district is to “minimize strip development and encourage off road development on portions of Route 10”. The district promotes this goal by requiring a 3-acre minimum lot size for properties utilizing access to NH 10 while only requiring a 1-acre minimum lot size for parcels using access to “feeder roads”.
- Reduced lot size and frontage requirements within the Commercial/Industrial District were used in the development of businesses along Whittemore Farm Road in the 1980’s, which currently is home to several commercial uses. The Town of Swanzev Planning and Economic Development Department is not aware of any other development proposals taking advantage of this zoning flexibility.
- Both the Residence and Business districts have a minimum lot size of one acre.
- West Swanzev Village is a diverse mix of Residence, Village Business I & II, and Commercial/Industrial zoning.
- For sections of the Study Area, particularly West Swanzev Village, current zoning dimensional requirements do not align with existing land use patterns. For example, in West Swanzev Village the majority of parcels are zoned either Residential or Commercial/Industrial, both of which have a minimum lot size of 1 acre. An analysis of parcel sizes in West Swanzev Village identified at least 73 parcels of just over 100 that are under 1 acre in size. In addition, 31 parcels are under half an acre, which is the minimum lot size requirement for the Village Business District I & II. This indicates that there is an existing pattern of development in West Swanzev Village that is not allowable under current zoning regulations.
- Village Business II is a zone almost exclusively applying to the Homestead Woolen Mills properties, while the Village Business I District applies to the properties directly north and south of the Mills.
- Multifamily housing is allowed only by special exception in the Business, Village Business I and Residence Districts but is allowed by-right within the Village Business II District.
- A minimum setback of 75 feet from the NH 10 right-of-way is required for parcels within the Business district.
- Both the Village Business District I & II have a minimum lot size of one-half acre, with the exception of a 1-acre requirement for multifamily properties within Village Business District I.
- There are a number of land uses within the corridor that are nonconforming with existing zoning regulations. For example, the vast majority of the northern half of the Study Area is zoned Commercial/Industrial which does not include any residential uses as a permitted use. However, there are several single-family and a few multi-family properties within the northern half of the Study Area. Single-family dwellings are also not permitted in the Business District, but several single-family properties are intermixed with commercial or industrial uses in that District.
- While 80% of the Study Area is comprised of just two zoning districts, Business and Commercial/Industrial, existing land use within the Study Area is extremely diverse. Existing land

uses in the Study area generate different types of traffic during peak hours and over the course of the day. Existing housing in the study area is expected to generate up to 5,350 trips per day on NH 10. The land use with the greatest single contribution of trips in the Study Area is the likely to be the Market Basket store.

- The capacity for the road to accommodate more traffic is far from congested. The standard reference for maximum saturation flow per lane is 1,900 vehicles per hour<sup>7</sup> and the area with the highest peak hour on the Corridor reaches about 1,470 vehicles for two opposing lanes combined.

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<sup>7</sup> Highway Capacity Manual, 6<sup>th</sup> edition, Transportation Research Board, 2015.

## Future Land Uses

Similar to how existing land use shapes the current transportation needs within the Study Area, future development patterns will influence the transportation needs of the corridor and subsequent changes to NH 10. Future land uses are analyzed from both a regulatory and physical perspective, particularly natural resource constraints. The following sections discuss elements that influence the development of future land use including community planning efforts, economic development incentives, infrastructure, and environmental constraints.

## Traffic Impacts from Future Land Uses

There are a several types of land uses allowed on the Corridor that can potentially represent noticeable traffic impacts on the Corridor, however, the impacts are likely to have more of a local impact than a regional impact due to available vehicle capacity on NH 10 currently. Some land uses that currently do not appear on the Corridor today, but are allowed uses are show in the table below. Many of these would have their largest peak hour traffic on weekends.

TABLE 5: Select Land Uses Allowed in the Study Area and ADT Weekday and Highest Peak Hour Traffic

Land Use	Unit of Measure	ADT Weekday	Highest Peak Hour
Religious Institution	1,000 sq. ft. gross floor area	9.11	11.76, Sunday
Nursery	1,000 sq. ft. gross floor area	36.08	11.00, Saturday
Daycare	1,000 sq. ft. gross floor area	79.26	13.91, Weekday p.m.
Motel	Per Guest Room	9.11	0.76, Saturday
Hotel	Per Guest Room	8.17	0.72, Saturday
Bank with Drive-Through	1,000 sq. ft. gross floor area	148.15	31.90, Sunday

Source: Institute for Traffic Engineers Trip Generation Manual, 8<sup>th</sup> Edition, 2008.

Drive-through restaurants, coffee shops and banks are among the land uses that tend to have the highest local traffic impacts. In the existing Zoning Ordinance, there is no reference to drive-through uses, but Swanzey does have at least two drive through establishments in Town (both Dunkin Donuts drive throughs). Some of the types of allowed land uses that tend to include drive-through provisions are not included in the definitions section of the Swanzey Zoning Ordinance including Coffee Shops, Restaurants and Banks. The lack of definition may result in a situation in which a court interprets drive-throughs as an allowed land use if there is a conflict in interpretation between the Town of Swanzey and a land owner or developer.

## Community Planning

Similar to how zoning and other regulations shape the existing land use conditions of the Study Area, community planning efforts can shape future land use conditions. The preeminent community planning document that guides future zoning, and subsequently future land use, is the community's Master Plan.

As established in NH RSA 674:18 and 674:2, a municipality must adopt a Master Plan prior to adopting a zoning ordinance, and Master Plans must “set down as clearly and practically as possible the best and most appropriate future development of the area under the jurisdiction of the planning board”. The Town of Swanzev last adopted an update to their Master Plan in 2003, and as of writing is in the process of updating the Plan. However, the results of that update process are not finalized and are not included in this analysis.

In the 2003 update of Swanzev’s Master Plan, NH 10 is prominently featured in the land use chapter. A specific goal cited for future land use within the Plan is to encourage commercial and retail growth along NH 10. In addition, the land use chapter includes a specific recommendation to encourage higher density development in West Swanzev Village and North Swanzev, both within the Study Area. The land use chapter and recommends “discourag[ing] new residential development in the existing Commercial/Industrial and Business Zoning Districts.” The vast majority of the Study Area is zoned Commercial/Industrial or Business, which discourages housing development. Provisions for housing are made outside of the Study Area, with parcels fronting West Street, Forest Avenue, Main Street, and Westport Village Road primarily zoned Residence. For parcels not directly fronting those streets, the vast majority of land immediately outside of the Study Area is zoned Rural/Agricultural.

Finally, listed below are specific strategies outlined by the 2003 Master Plan that directly speak to land use in the study area:

- Recognizing that water frontage along the South Branch and Ashuelot Rivers will become more valuable, determine what steps will best protect the public’s aesthetic and recreational access to these areas.
- Future development of Yale Forest lands may be detrimental to the underlying high yield aquifer. Determine how to protect the Town’s interest in this area, including consideration of an aquifer protection district. This aquifer protection district has not yet been established.
- Promote the installation of sewer lines for the Wilson Pond area and North Swanzev. Promote upgrading of the roads and drainage system and water system in this area as part of the sewer line installation. This has occurred since the 2003 update.

While the transportation chapter is critical to understanding the future goals for NH 10, the route is not directly mentioned in the goals and objectives of the chapter. The overall goal for Swanzev’s transportation system is to “provide for a safe, efficient and diversified transportation system that is sensitive to the Town’s rural character”. The transportation chapter of the Plan also outlines a strong emphasis on access management in coordination with NHDOT, as well as continual assessment of the impact of land use development on the transportation system and the coordination of land use and transportation decisions.

The Plan also contains a chapter on utilities, which can have a significant impact on land use within the Study Area. A major goal of the utilities chapter is the continued expansion of sewage treatment facilities in West Swanzev Village and North Swanzev. As of writing, the recommendations made for improvement of sewer infrastructure in West Swanzev Village and North Swanzev were implemented, which has expanded capacity in North Swanzev and ensured continued operation of the system in West Swanzev Village. However, the major goal in the utilities chapter of the Plan, to combine all community water

services into one Town Water Department, has not yet occurred, which is a major limitation to the effective coordination and potential expansion of water infrastructure within the Study Area.

While not a document with regulatory authority, a *West Swanzey Charrette* report was produced by Plan New Hampshire documenting a design charette with local stakeholders on land use within West Swanzey Village. The charette took place in November of 2012, and envisioned potential future outcomes for West Swanzey Village. Through two listening sessions, a desired outcome was the redevelopment of Homestead Woolen Mills and the establishment of a more vibrant, walkable village with the growth of commercial uses along Main Street in West Swanzey Village. The report also specifically recommends the expansion of the Village Business I and II Districts as well as expanding the uses allowed in Village Business I & II Districts. In addition, the listening sessions indicated a desire to improve the connection between NH 10 and West Swanzey Village center. Specifically, four “gateways” were proposed along NH 10 to create a visual connection to the Village and provide additional wayfinding. Since the publication of the report, the recommendation to allow multifamily housing as an accessory use has been incorporated into Swanzey’s zoning code. While the *West Swanzey Charette* report is produced by a third-party entity and does not hold regulatory authority, it indicates a community desire for a major change in the character of the land use within West Swanzey Village. Any significant land use change in West Swanzey Village would change the relationship between NH 10 and the Village, as well as the transportation needs of the corridor.

### Economic Revitalization Zone

Detailed by NH RSA 162-N:6, the Economic Revitalization Zone (ERZ) is a short-term business tax credit program established to stimulate economic redevelopment, expand the commercial and industrial base, create new jobs, reduce sprawl, and increase tax revenues. The State of New Hampshire allocates approximately \$850,000 annually in tax credits through the ERZ program. Eligible areas for ERZs are unused or underutilized industrial parks as well as vacant land or structures previously used for industrial, commercial, or retail purposes that represent a contiguous area. A community can apply for the establishment of an ERZ to the NH Department of Business and Economic Affairs. When established, businesses can apply for tax credits based on the creation of jobs within the ERZ. Currently, Swanzey has three established ERZs. Within the study area, Swanzey has one ERZ, the Homestead Woolen Mills District established in 2010, which covers the Homestead Woolen Mills property as well as parcels directly north on both sides of North Winchester Street as well as several parcels extending east along Main Street. Currently, there have not been any businesses that have taken advantage of the job creation tax credits offered by the Homestead Woolen Mills ERZ.

### Development Constraints

As much as community planning shapes the regulatory landscape, natural conditions and the availability of water and sewer infrastructure play a key role in future land use development along the corridor. This study provides an analysis of water and sewer availability and natural resource constraints including

conservation and protected lands, problematic and sensitive soils and Federal Emergency Management Agency (FEMA) designated flood zones.

### Water and Sewer Availability

Within the Study Area, water and sewer availability is almost entirely limited to the West Swanzey Village area. North Winchester Street and Main Street east of the West Swanzey Street intersection are provided sewer by the Town of Swanzey and water by a series of public wells. Town sewer service extends to much of West Swanzey Village just outside of the Study Area across the Ashuelot River. South Winchester Street and West Street from South Winchester Street to approximately Aylward Avenue is provided both water by the West Swanzey Water Company and sewer from the Town of Swanzey. West Street and part of California Brook Road west of NH 10 is also served water by the West Swanzey Water Company. Sewer is provided partially along NH 10 by the Town of Swanzey from West Street to Perry Lane. The Pine Grove Mobile Home Park Cooperative operates a water system which serves their community. In the very northern section of the Study Area adjacent to the Keene town line, North Water and Fire Precinct provides water service along Matthews Road.

Access to public sewer is critical for achieving density for residential development. In the Residence, Business and Village Business I Districts, two-family and multifamily properties have reduced lot size requirements for parcels connected to public sewer. In the Residence District, multifamily buildings have a minimum lot size of one acre if connected to public sewer, as opposed to one acre for the first unit and one-half acre for each additional unit. In addition, in Village Business Districts II and I, two-family and multi-family properties are subject to one-half acre and one acre minimum lot sizes, respectively, as opposed to one and one-half acre for a two-family residence without public sewer access and one acre plus one-half acre for each unit in a multifamily property without sewer access.

### Natural Resource Constraints

The following sections outline the role of natural resource constraints on future land use within the Study Area. Constraints identified include conservation and protected lands, problematic and sensitive soils, FEMA flood zones and stratified drift aquifers.

#### *Conservation and Protected Lands*

Conserved and protected land serves as an important control on development, deflecting development pressure away from certain parcels within the Study Area. Data from NH GRANIT representing natural areas in the State of New Hampshire over two acres show that approximately 582 acres of natural land lie within the Study Area (36%). Conservation land is distributed among 37 properties, all of which except one are protected through fee ownership, which means that protection is secured through direct ownership by an organization with the mission of conservation. The majority of conservation lands in fee

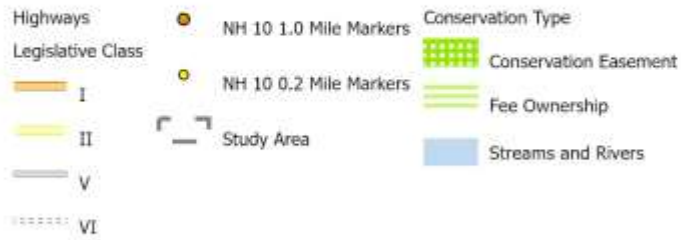
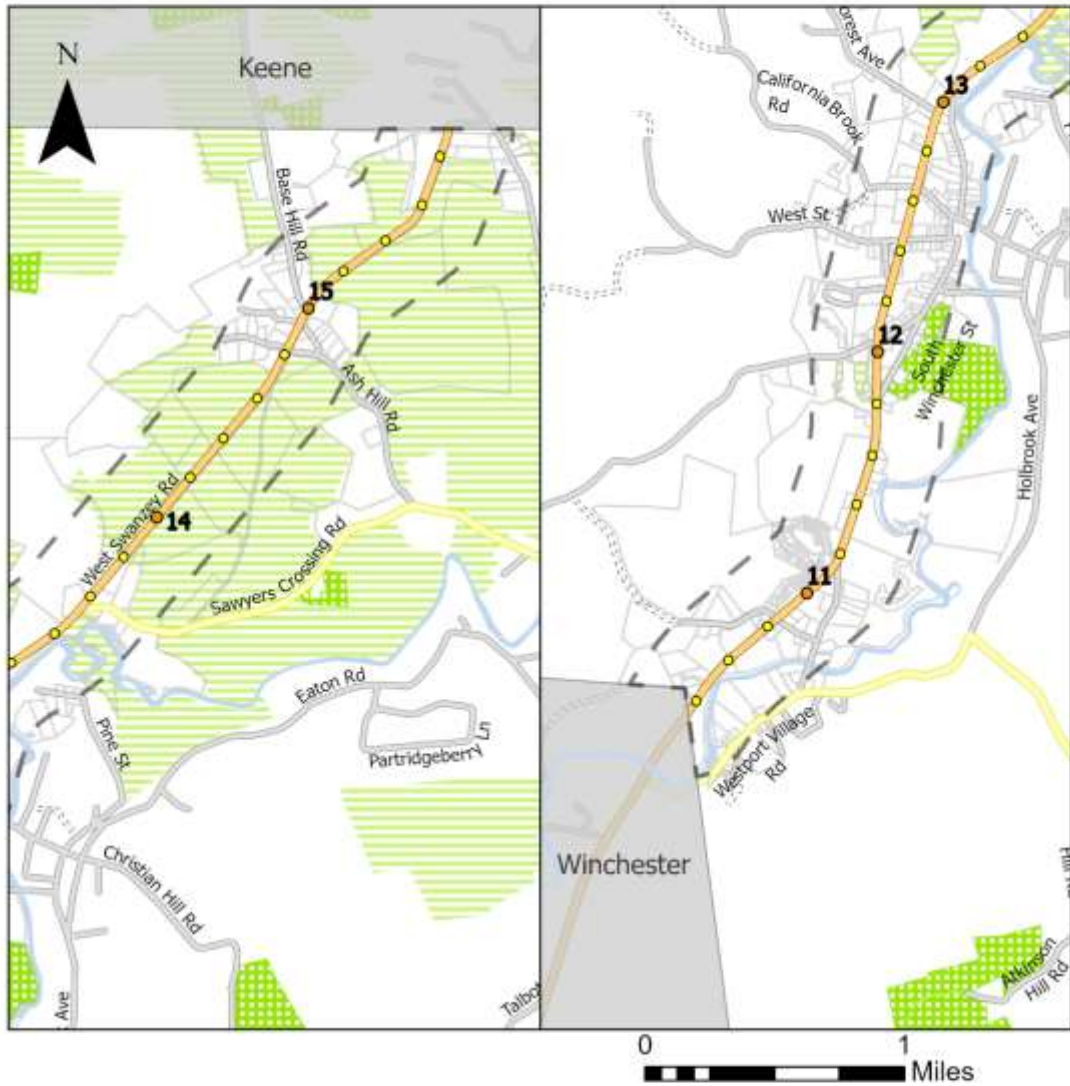
ownership (26 out of 35) are owned by Yale University as part of the Yale-Toumey forest. The Forest also comprises 505 of the 587 acres of conservation land in the Study Area. The Yale-Toumey Forest is used for the University's Forestry program and is the site of active educational and research activities, including collaboration with institutes of higher education within the Monadnock Region. However, Yale-Toumey Forest is protected through fee ownership, and does not have a deed restriction or conservation easement on the lands within the Study Area. The rest of the properties under fee ownership are either owned by the Town of Swanzey or the Monadnock Humane Society with the exception of one property owned by an entity identified as "Robjohn LLC". Only one property, which does not have a street address but is located off of the southern end of Winchester Street, is protected through a conservation easement on the property, (tax ID of 72-43) which is used as farmland by Windyhurst Farm.

TABLE 4: Conserved and protected lands within the Study Area by parcel and type of conservation or protection method.

Parcel Tax Map ID	Street	Owner	Protection Type
71-17	COBBLE HILL RD	SWANZEY, TOWN OF	Fee Ownership
71-17	COBBLE HILL RD	SWANZEY, TOWN OF	Fee Ownership
72-43	WINCHESTER ST	WINDYHURST FARM PARTNERSHIP	Conservation Easement
56-4	SAWYERS CROSSING RD	SWANZEY, TOWN OF	Fee Ownership
57-124	PINE ST	SWANZEY, TOWN OF	Fee Ownership
56-4	SAWYERS CROSSING RD	SWANZEY, TOWN OF	Fee Ownership
56-4	SAWYERS CROSSING RD	SWANZEY, TOWN OF	Fee Ownership
50-4	SAWYERS CROSSING RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
50-14	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
50-13	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
50-3	SAWYERS CROSSING RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
50-12	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
54-2	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
50-11	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
54-1	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
54-3	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
51-13	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
55-7	FOREST AVE	HUMANE SOCIETY OF THE US	Fee Ownership
51-12	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
50-6	SAWYERS CROSSING RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
50-5	SAWYERS CROSSING RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
54-4	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
51-9	ASH HILL RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
51-1	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
51-9	ASH HILL RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
51-11	ASH HILL RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
51-11	ASH HILL RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
51-11	ASH HILL RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
51-7	ASH HILL RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
51-1-8	WHITTEMORE FARM RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
38-5	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
52-26	WEST SWANZEY RD	ROBJOHN LLC	Fee Ownership
38-8	MATTHEWS RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
38-4	WEST SWANZEY RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership
52-27	WEST SWANZEY RD	MONADNOCK HUMANE SOCIETY	Fee Ownership
38-22	MATTHEWS RD	SWANZEY, TOWN OF	Fee Ownership
52-9	BASE HILL RD	YALE UNIVERSITY FORESTRY SCHL	Fee Ownership



# Study Area Conservation Lands



### Shallow Depth to Bedrock

Bedrock near the soil surface can pose construction difficulties. Pouring foundations, excavating basements, or installing utilities can be complicated or rendered prohibitively expensive. For the purpose of this analysis, soils with less than 100 centimeters depth from surface to bedrock were considered a natural constraint. It should be noted that the highest resolution data available for bedrock depth, sourced from the USDA Soil Survey Geographic Database (SSURGO), may fail to capture localized ledges or outcroppings with exposed or shallow bedrock.

Within the Study Area, there are two clusters of soils with shallow depth to bedrock which affect a total of 60 parcels. The first cluster is located roughly between Sawyers Crossing Road and Ash Hill Road and does not affect properties with direct frontage to NH 10. The second cluster affects several properties near the northern Westport Village Road and affect properties with frontage to Westport Village Road and NH 10. The parcels lie within the Business and Residence Districts.

### Poorly Drained Soils

Poorly drained soils can constrain development because they can raise site work costs and/or risk of flooding during extreme precipitation events. They also frequently coincide with designated wetlands, presenting regulatory hurdles.

Poorly drained soils impact a total of 121 parcels within the Study Area across a number of scattered locations throughout the corridor. Several parcels between Sawyers Crossing Road and Ash Hill Road are affected, as well as several parcels north of Base Hill Road, all of which are zoned Business. Much of the current land use in these areas is undeveloped forest. SWRPC observed a handful of already developed commercial and industrial properties fronting Whittemore Farm Road consist of poorly drained soils. Areas with poorly drained soils north of Base Hill Road are entirely undeveloped forest.

Another significant cluster of poorly drained soils is located between Forest Avenue and West Street which affects a number of parcels fronting NH 10 on both sides of the road. Primarily, affected parcels are zoned Commercial/Industrial. Many of these parcels are already developed with existing commercial land uses. There are several smaller scattered areas of poorly drained soil south of West Street to the Winchester town line, including at the intersection of South Winchester Street and NH 10 and Westport Village Road and NH 10.

Additional details on poorly drained soils can be found on Map 4 below.

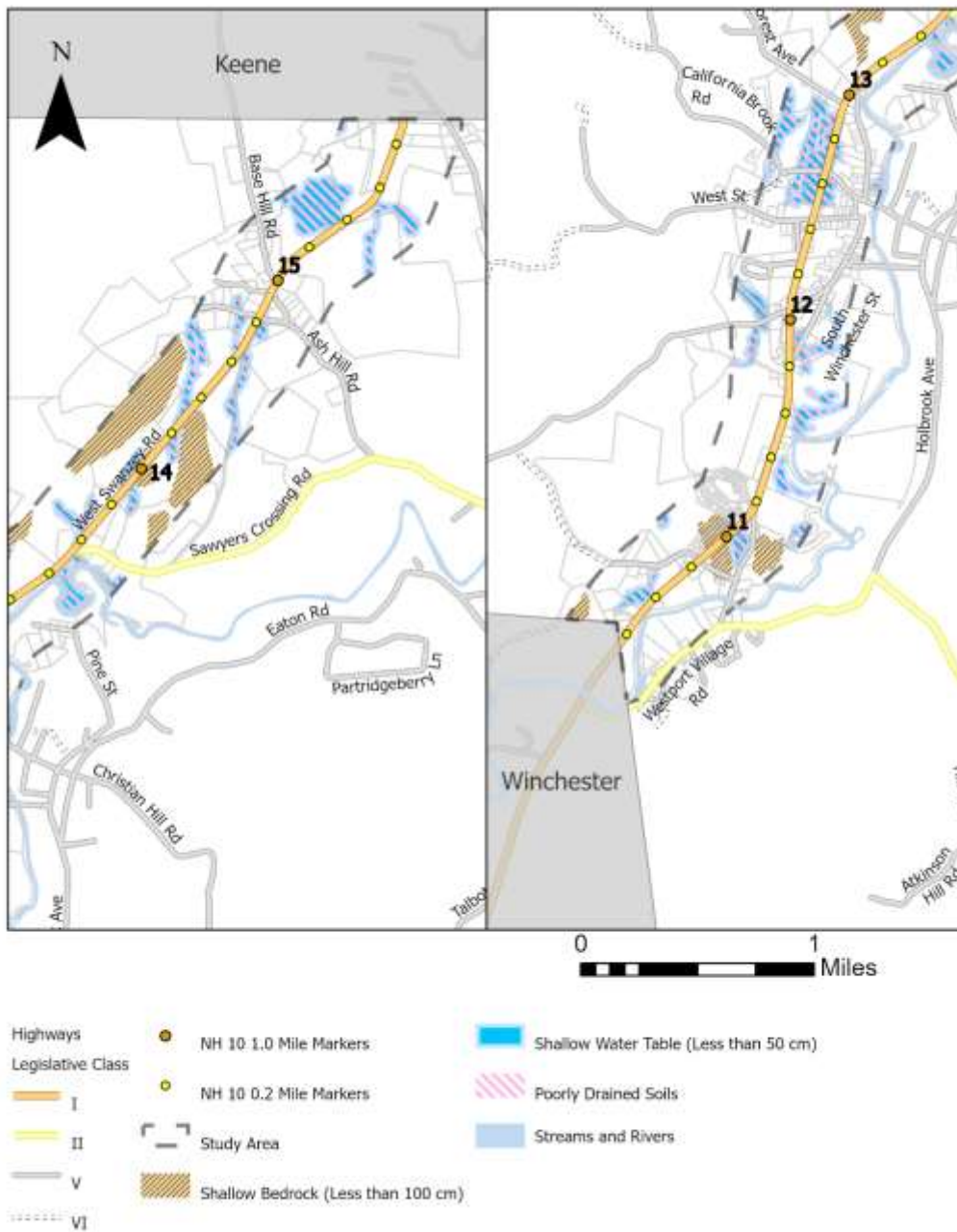
### Shallow Water Tables

Shallow water tables often coincide with poorly drained soils and pose similar development challenges. For the purpose of this analysis, shallow water tables are defined as water tables being 50 centimeters or closer to the surface. Within the Study Area, shallow water tables are present in all areas with poorly

drained soils, affecting 121 parcels. Additional details on the geographic distribution of shallow water tables can be found on Map 4.

MAP 4: Problematic Soils

## Study Area Problematic Soils

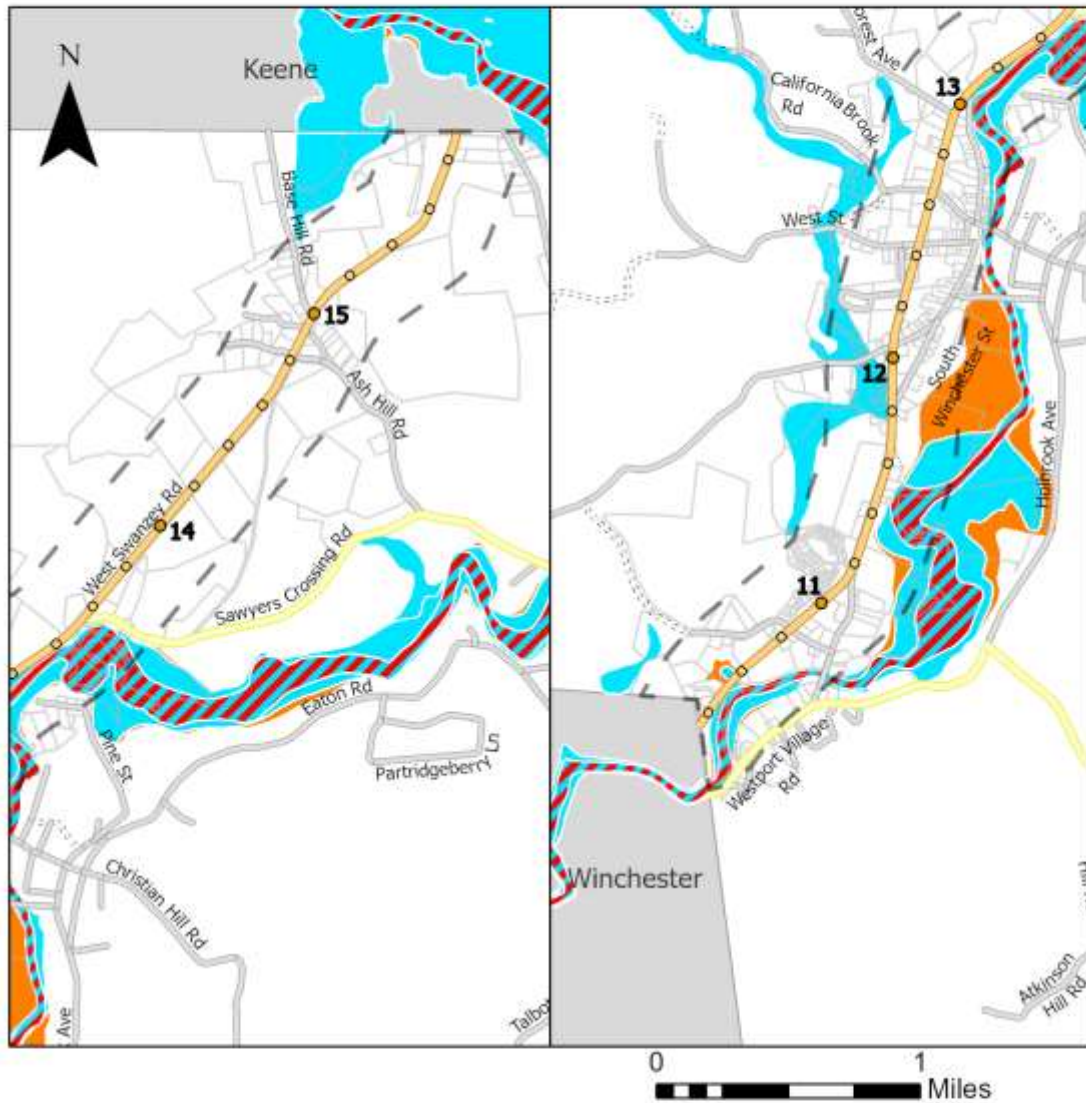


### *FEMA Designated Flood Zones*

The Federal Emergency Management Agency (FEMA) maps areas susceptible to flooding, including regulatory floodways, 100-year and 500-year floodplains. Regulatory floodways are streams, channels and adjacent land areas that must be reserved in order to discharge floodwaters without flood water elevations exceeding a certain height. Development in regulatory floodways is subject to a review process meant to determine whether new development would obstruct floodwaters. Regulatory floodways are included in the 100-year floodplain, the area of land where there is a one percent annual chance of a flood event occurring each year. Property owners in the 100-year floodplain are required to buy flood insurance if they acquired a mortgage through a program that is federally assisted or insured. The 500-year floodplain is the area of land where there is a 0.2 percent annual chance of a flood event occurring each year. Properties in the 500-year floodplain are not subject to flood insurance requirements, but given the rising probability of intense rainfall events, properties in the 500-year floodplain may be subject to increased risk of experiencing flood events.

Within the Study Area, flood zones designated by the FEMA can be found along the California Brook and the Ashuelot River. Flood zones within the California Brook system represent 100-year floodplains. Properties on the western edge of Perry Lane and directly south of the Cobble Hill Road and NH 10 intersection are impacted by the California Brook floodplain. The Ashuelot River floodplain includes 100 - year floodplains and regulatory floodways, which typically carry more prohibitive development regulations. The Ashuelot River floodplains primarily impact properties on the east side of NH 10 between Sawyer's Crossing Road and North Winchester Street, and impacts some residential properties along North Winchester Street. The area directly south of West Swanzey Village bordered roughly by Holbrook Avenue, NH 10 and Westport Village Road contains both 500-year and 100-year floodplains as well as regulatory floodways. A more detailed overview of the location and distribution of FEMA designated flood zones within the Study Area can be found on the Map 5.

# Study Area Flood Zones





## Stratified Drift Aquifers

According to the United State Geological Survey (USGS), a stratified drift aquifer is “a coarse-grained sand or sand and gravel deposit that contains a usable supply of water.” Stratified drift aquifers are an important source of drinking water for public wells in the Town of Swanzey. Stratified drift aquifers are an important natural resource and development constraint to consider because certain types of development might jeopardize water quality. According to the *Town of Swanzey’s Phase I Natural Resources Inventory Report* prepared in December of 2018, West Swanzey Village lies on a productive Stratified Drift Aquifer, as does much of the southern half of the NH 10 corridor south of North Sawyers Crossing Road.

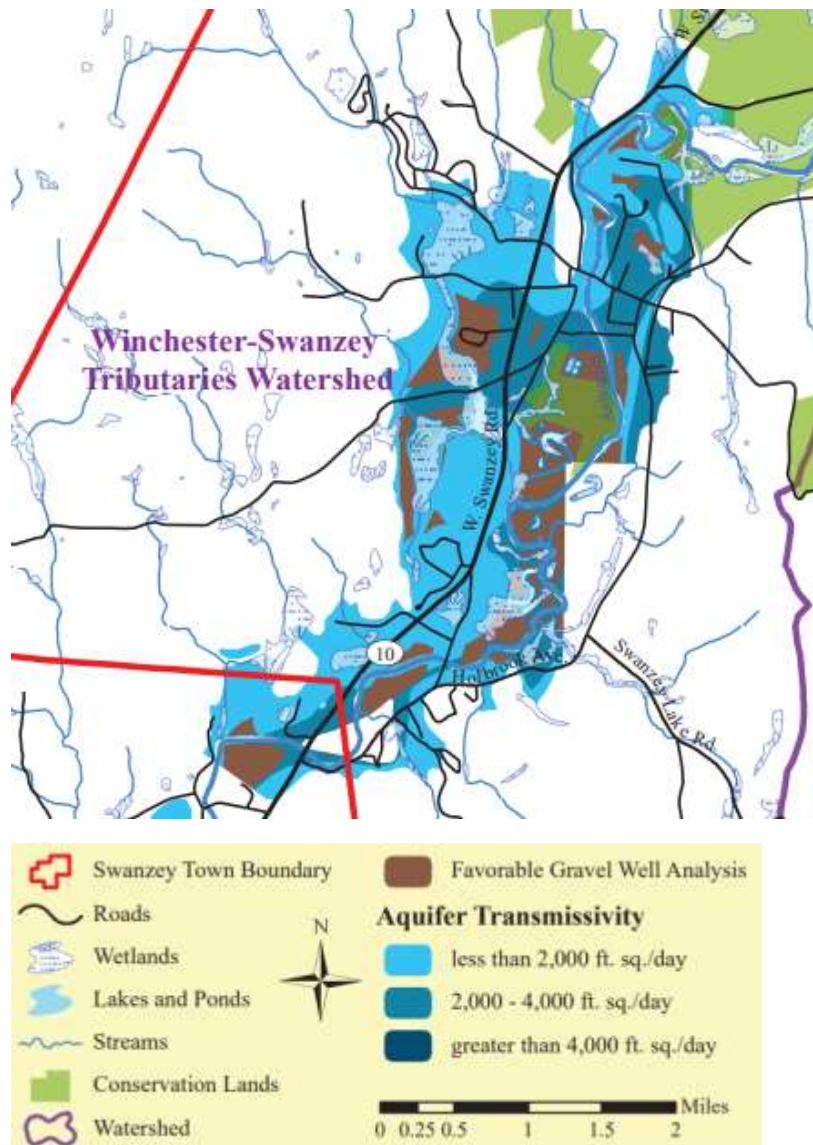


Figure 1: Productive Aquifers within the NH 10 Study Area and the corresponding legend. Source: Town of Swanzey Phase I Natural Resources Inventory Report, page 21.

## Key Future Land Use Findings

Following is a list of key findings relative to future land use.

- While much of the northern half of the Study Area is currently protected as conservation land, very few parcels are protected through easements or other legal restrictions on the use of the property. Yale-Toumey Forest is the preeminent source of conservation land in the Study Area and is managed as conservation land entirely through fee ownership by Yale University.
- The Ashuelot River floodplain represents a significant natural and regulatory barrier to development within the Study Area. However, there are relatively few parcels that fall within the floodplain, and most are concentrated along North Winchester Street, NH 10 between North Winchester Street and Sawyers Crossing Road, and parcels directly south of West Swanzey Village.
- Water and sewer availability is almost exclusively concentrated within West Swanzey Village, which heavily influences the potential for future residential and commercial development within the Study Area due to the Town of Swanzey's zoning regulations. However, a large portion of the Study Area south of the Forest Avenue and NH 10 intersection falls within some form of aquifer, which presents some opportunity for the development of wells.
- Soils that are poorly drained with shallow water tables represent another significant natural barrier to development and affect multiple parcels north of Base Hill Road and Sawyers Crossing Road, as well as several parcels between Forest Avenue and West Street.
- The intersection of Westport Village Road and NH 10 overlies of a number of problematic soils that would pose a barrier to development. In addition, the area bounded between NH 10 and Westport Village Road is crossed by the Ashuelot River and contains considerable floodplain areas that restrict development.
- Many of the Town of Swanzey's community planning efforts support additional commercial and mixed-use development in West Swanzey Village. This includes the Town of Swanzey's most recent Master Plan update (currently underway), planning efforts undertaken by Plan NH to gauge citizen input on West Swanzey Village, as well as the establishment of an Economic Revitalization Zone on the Homestead Woolen Mills property.
- The Town of Swanzey's current Master Plan discourages the development of housing in the Business and Commercial/Industrial Districts, which comprise in total over 80% of the Study Area. The existing regulatory framework points primarily to West Swanzey Village as the location most suitable for future residential development within the Study Area.