E. Water Resources

1. Groundwater

a) Existing Conditions

A *Hydrogeologic Assessment* for the Site was prepared by Leggette, Brashears, & Graham, Inc. (LBG), dated September 2010. This report is included in DEIS Appendix D and is summarized below[1]. Water supply is also discussed in Chapter III.K, Utilities.

Groundwater Protection Overlay District

The Site is underlain by outwash sand and gravel and kame stratified drift glacial deposits (See Exhibit III.G-1, Overburden Geology) which are part of the Town of Somers Groundwater Protection Overlay District (GPOD). Stratified drift deposits are formed from glacial sediments that have been transported and sorted by the running melt water from retreating glaciers. Based on information from test borings and bedrock wells drilled on the Site, the overburden soil underlying the Site is indicated to be approximately 38 feet to 27 feet in thickness.

The Groundwater Protection Overlay District (Article IXA of Somers Town Code Chapter 170) was created by the Town to assist in the protection of groundwater resources. This overlay district is a defined as a "*primary recharge area for a stratified drift deposit known or believed to be an aquifer*" (Somers Code, 170-32.2.3.A). The overlay district boundary was presented in a report prepared for the Town by LBG dated December 1988 and is also shown on Exhibit III.E-1 in the vicinity of the Site.

Section 170-32.7 of the Somers Code describes a prohibition of certain uses within the Groundwater Protection Overlay District. One of these prohibited uses reads as follows:

> "H. The storage of hydrocarbon products except those necessary for residential use in homes and vehicles, provided that such products are stored in appropriate containers".

[1] Bibbo Associates, LLP has reviewed the 2010 LBG report and sections as prepared by LBG included for the Alexan Somers Woods project. Bibbo finds the analysis and text the same and/or comparable to the subject Somers Crossing project included herein as footnoted by Bibbo Associates, LLP. This statement is made in accordance with the State of New York Education Department. See also Project Engineer Acceptance Statement in front of Appendix D.

Groundwater Supply and Recharge

Groundwater in overburden and bedrock aquifers is recharged by precipitation which falls on a watershed. Of the precipitation which falls on a watershed, about half the amount is returned to the air through evaporation and transpiration processes; the remaining portion is available to become surface-water runoff and groundwater recharge. A water budget analysis was conducted to determine groundwater recharge. Groundwater recharge to the stratified drift deposits on the Site under existing conditions is estimated to be 38,700 gallons per day (gpd) under average precipitation conditions, and 26,100 gpd under one-year-in-thirty drought conditions.

Based on the **Ground-Water Supply Overview of the Town of Somers, New York** (LBG, 1988)[2], average precipitation in Somers is about 46 inches per year. For a one-year-in-ten period, the annual precipitation may exceed 54 inches and during a one-year-in-ten drought period, the precipitation total can be expected to be about 36 inches. During extreme drought periods, identified as a one-year-in-thirty event, the annual precipitation may decline to 31 inches (LBG, 1988).

Precipitation recharge rates to stratified drift aquifers, based on studies completed by the U.S. Geological Survey in the northeast, are estimated to average from 18 to 21 inches per year (LBG, 1988), or about 1,340 to 1,560 gpd/acre (gallons per day per acre). For this analysis, an intermediate recharge rate to the stratified drift aquifer of 19.5 inches annually (1,450 gpd/acre) was used.

Groundwater in the bedrock aquifer is recharged by precipitation which infiltrates down through the overburden soil material and into the bedrock. The average recharge rate for a bedrock aquifer underlying a stratified drift deposit is estimated to be between 12 to 15 inches annually. For this analysis an intermediate recharge rate to the bedrock aquifer of 13.5 inches annually (1,000 gpd/acre) was used. Therefore, recharge to the bedrock aquifer underlying the Site under average precipitation conditions is about 26,700 gpd and under extreme drought conditions is about 18,000 gpd.

Potential recharge areas include the entire 26-acre Site since it is currently vacant land. The total recharge area comprises 1.50% of the total Brown Brook Basin to the project Design Point.

[2] This LBG report has been reviewed and accepted as referenced throughout the DEIS, except as modified by the Project Engineer site specific to the Somers Crossing Project DEIS.

Site groundwater flow direction, rates, hydraulic capacity of the soils, interaction with surface waters, recharge quantity and percentage of total recharge area has been evaluated in LBG Hydrogeologic Assessment Report dated September 2010 for Somers Woods Project (Appendix D), as accepted by the Project Engineer.

Seasonal High and Low Groundwater Table

Water-level data from the November 1994 and November 2008 soil investigations completed on the Site indicate groundwater underlying the Site in the overburden material flows from topographically high areas toward low areas, with the majority of the property draining toward the wetland located on the western boundary. Based on water-level data collected from monitor well B-9 on the Site, as well as information from a nearby USGS well location with a continuous daily record of water-level data collection, seasonal groundwater level fluctuation is approximately 4.0-4.5 feet in the region. Cross section mapping the groundwater with available data are provided in the LBG report in Appendix D[3]. Monitoring data to develop the 2014 Geologic Site Cross Sections A and B is based on the Bibbo Associates, LLP 2009 deep test pit information. See also III.D, Geology and Soils for description of soils with high groundwater.

Relationship Between Surface Water and Groundwater

The Site is located in the Green Briar Brook sub-watershed[4]. Green Briar Brook flows generally south to the Muscoot Reservoir. Both the Green Briar Brook sub-watershed and the Muscoot Reservoir are part of the Croton River Basin. Surface water and groundwater are recharged by precipitation which falls on a watershed, and approximately half is available to become surface-water runoff and groundwater recharge.

Both surface water runoff and groundwater in the overburden aquifer typically flow from high topographic areas to low topographic areas. In this case, the majority of surface water and groundwater flow would be toward the wetland on the west side of the Site. The exception to this is the small area along the southwestern edge of the Site where surface water and groundwater likely flow south off the property, also following the topography.

[3] Certification of the LBG report is provided in Appendix D.
[4] According to the NYSDEC, "Green Briar Brook" is the official name of this watershed. Locally it may be referred to as the "Brown Brook" watershed.

In areas where the groundwater table in the overburden aquifer intersects the land surface, such as in a wetland or stream, groundwater baseflow can occur. If the groundwater elevation is higher than the surface-water level, groundwater will discharge into the surface-water feature, creating what is called an upward gradient. If, on the other hand, the groundwater elevation is lower than the surface-water level, water will infiltrate through the bottom of the surface-water feature and recharge groundwater, creating a downward gradient. In instances where groundwater level and surface-water level are at the same elevation, a neutral gradient exists. The gradient between groundwater and surface water is not always constant. The gradient direction may change, for example, seasonally as the groundwater table fluctuates or as the result of a large precipitation event.

Groundwater Levels

As described in the *Hydrogeological Assessment* by LBG (Appendix D), general information regarding depth to groundwater in the overburden soils underlying the Site was obtained from test boring records from November 1994 and November 2008 soil investigations. Depth to groundwater identified in the test borings completed during the November 1994 soil investigation ranged from 21 ft bg (feet below grade) to 8 ft bg; and from the November 2008 soil investigation, depth to groundwater ranged from 19 ft bg to 6.5 ft bg. Cross sections were created with the test boring data which depict the approximate groundwater elevation versus ground surface elevation from the November 1994 and 2008. The boring and cross section locations are shown on figure 5 in the LBG report in DEIS Appendix D and the cross sections on are shown on figures 6 and 7 in Appendix D. In both of the cross sections, the groundwater flow direction is indicated to be from east to west toward the wetlands on the Site.

Three piezometers were installed on the south/central portion of the Site. Three months (March 2009 through May 2009) of water-level measurements collected from these piezometers. Even though groundwater levels shown in the LBG report in Appendix D are closer to the surface elevations, Bibbo Associates LLP's September 24, 2009 test pit program showed that the groundwater levels are much lower than the 2009 LBG report data. The SWPPP designs (See SWPPP in DEIS Appendix E) follow the Bibbo Associates LLP's field testing results. Monitoring data used to develop the Site Cross Sections A and B included with the Engineering Plans (2014) is based on the Bibbo Associates, LLP 2009 deep test pit information.

Site groundwater flow direction, rates, hydraulic capacity of the soils, interaction with surface waters, recharge quantity, limits and percentage of total recharge

area has been evaluated in LBG Hydrogeologic Assessment Report dated September 2010 for Somers Woods Project (Appendix D), as certified by the project engineer.

Seasonal Water Level

Seasonal water level was estimated based on existing data compiled for the Site. Boring B-9 was completed as a 1-inch monitor well during the November 2008 soil investigation. Available water-level data from Boring B-9, shows a seasonal change of groundwater level of 5.1 feet (See Table 2 in appendix of LBG report in DEIS Appendix D for water level data). The highest water level occurred in June 2009 (15 ft bg) and the lowest water level in October 2009 (20.1 ft bg). Table 2 in the LBG report (DEIS Appendix D) provides depth to water data collected and recorded on-site on a daily basis from 5/11/2009 to 12/15/12009 (a period of over 6 months).

For comparison, data from a nearby USGS well located in Yorktown Heights, New York was reviewed. Data collected from November 2008 to November 2009 reported groundwater levels ranging from 14.25 ft bg in November 2008 to 9.79 ft bg in June 2009, a seasonal change of 4.5 feet. Copies of the water-level records for the USGS well located in Yorktown Heights are located in Appendix I of LBG report in DEIS Appendix D.

Public Water Supply: Heritage Hills Water Works Corporation

Based on information available from the Westchester County Water Agency, there are six water districts in the Town of Somers. These water districts include the Amawalk Shenorock, Lincoln Hall and Dykeer Water Co. located to the west of the Site; the Primrose County Water District located to the southwest; and the Heritage Hills Water District and Greenbriar Subdivision located to the north of the Site. Heritage Hills District (Water Works Corporation Service area) is located directly north of the Site on the north side of Route 202. A map of the water districts obtained from the Westchester County Water Agency is located on figure 9 in the *Hydrogeologic Assessment Report* in DEIS Appendix D.

The Heritage Hills Water Works Corporation is supplied by five wells completed in the sand and gravel stratified drift aquifer underlying the Town of Somers, north of the Site. The wells are permitted for an average daily taking of 600,000 gpd. The average daily water usage for the District in 2008 was about 363,500

gpd.[5] Based on this information, there is sufficient surplus water available from the Heritage Hills Water Works Corporation to meet the water demand requirements of the Proposed Action.

Connection policies will be as per regulatory agencies with jurisdiction over water supply. Westchester County Department of Health, NYS Department of Health and NYSDEC have separate approval processes after SEQRA is complete and local preliminary approvals are obtained.

Existing On-site Bedrock Wells

Two existing wells drilled in the bedrock aquifer are located on the Site. These wells were completed for a previously proposed development (drilled in 1986 by P.F. Beal & Sons, Inc.) and are identified as Well #1 (TW-1) and Well #2 (TW-2). (See Exhibit II-4, Site Survey and Exhibit II-6, Site Constraints, for well locations). A simultaneous 72-hour pumping test was completed on the wells in January 1997 which demonstrated wells TW-1 and TW-2 had a safe yield of 29 gpm (gallons per minute) and 28.5 gpm, respectively, for a total combined yield of 57.5 gpm. Copies of the well completion reports are located in the LBG report in DEIS Appendix D (reviewed and accepted by the Project Engineer). Since these wells will be abandoned, since the project proposes to connect to Heritage Hills for water supply.

The simultaneous 72-hour pumping test of TW-1 and TW-2 began on January 13, 1997. The static water level in TW-1 prior to the start of pumping was 7.41 ft btoc (feet below top of casing) and in TW-2, the static water-level was 4.53 ft btoc. Both TW-1 and TW-2 demonstrated 27 hours of stabilized yield and water-level drawdown during the pumping test. The final pumping water level prior to shut down of the pump in TW- 1 was 119 ft btoc, for a total water-level drawdown of 111.6 feet. The final pumping water level prior to shut down of the pump in TW-2 was 118 ft btoc, for a total water-level drawdown of 113.5 feet. The water levels in TW-1 and TW-2 were fully recovered to their pre-test static height 24 hours and 27 hours, respectively, following shut down of the well pumps. Hydrographs for TW-1 and TW-2 from the January 1997 pumping test are located in Appendix III of LBG report in DEIS Appendix D.

Also at this time in 1997, an off-site well monitoring program was completed

[5] 2008 Average and Total Consumption values provided by Heritage Hills of Westchester Water Operator, Robert Cox, in fax dated May 18, 2009.

during the 72-hour pumping test. Neighboring wells located on the IBM property, the NYS Police Station on Route 100 and the supply well on the Towne Centre property were monitored for potential water-level interference effects from the pumping of TW-1 and TW-2. No water-level drawdown was measured in the neighboring wells was attributed to the pumping of TW-1 and TW-2.

Water-quality samples were collected from both TW-1 and TW-2 near the end of the pumping test. The samples were analyzed for all parameters specified in the New York State Department of Health (NYSDOH) Part 5, Subpart 5-1. The water-quality results for TW-1 and TW-2 met all NYSDOH drinking water standards.

Off-site at the adjacent Towne Centre site, an existing well used by the shopping center is located at the southern property border of that parcel (see Exhibit II-4, Site Survey and Exhibit II-6, Site Constraints for well location). This well is reported to be 300 feet deep, with a yield of 25 gallons per minute (gpm).

With the current Proposed Action, the existing bedrock wells are proposed to be abandoned. The wells will be abandoned in accordance with NYSDOH Sanitary Code Part 5, Subpart 5-1 and Westchester County Department of Health (WCDOH) standards. Copies of the well abandonment requirements from the NYSDOH and WCDOH are located in Appendix IV of the LBG report in DEIS Appendix D.

Groundwater Quality

Groundwater samples were collected from TW-1 and TW-2 in September 1994. Groundwater quality has been analyzed in this report as per New York State Department of Health Part 5 Subpart 5-1 requirements. This report is accepted by the Project Engineer. The existing drilled wells are shown on the Site Utilities Plan, these wells will be abandoned and backfilled in accordance with Westchester County Health Department Regulations.

The samples were analyzed for volatile organic compounds (VOC) by EPA Methods 502.1 and 503.1. The results reported all VOCs as not detected with the exception of 2.0 ug/l (micrograms per liter) of hexachlorobutadiene and 1.0 ug/l 1,2,3-trichlorobenzene in TW-1. Both the detections were below the NYSDOH drinking water standards maximum concentration levels (MCL) of 5 ug/l for these compounds. The source of these detected compounds is unknown as the Somers Crossing site is undeveloped and these compounds are not associated with any uses on neighboring properties. Hexachlorobutadiene can be associated with the production of perchloroethylene and 1,2,3-trichlorobenzene can be associated

with septic tank and drain cleaner or with wood preservatives.

Additional water-quality samples were collected from wells TW-1 and TW-2 near the end of the 72-hour pumping test completed in January 1997. The water-quality results met all NYSDOH drinking water standards. A detection of 0.8 ug/l of toluene was reported in well TW-1 which was below the MCL of 5 ug/l. Trace concentrations of toluene are present in electrical tape adhesive and the coating of new electrical wiring, both of which were used during the installation of the temporary well pumps, and is likely the source of the trace toluene detection. The compounds hexachlorobutadiene and 1,2,3-trichlorobenzene detected in low concentrations in the 1994 samples were not detected in the 1997 samples collected. (Copies of the water-quality sampling reports for wells TW-1 and TW-2 for both sampling events are located in Appendix V in LBG report in DEIS Appendix D; reviewed and accepted by the Project Engineer).

There are no known sources of potential groundwater contamination on the Site with the exception of the stormwater detention pond which collects storm-water runoff from the parking area from Towne Centre. Runoff from the parking area has the potential to contain trace concentrations hydrocarbons, metallic ions, roads salts, and fertilizers.

Historic water quality data for the bedrock water supply well located on the southeast side of the Towne Centre from 1987 through 1994 reported detections of cis-1,2-dichloroethylene, tetrachloroethylene and trichloroethylene. The presence of these chemicals in the Towne Centre well was attributed to the release of wastewater from a dry cleaning business into the on-site septic system. However, the VOCs which were detected in the Towne Centre well were not detected in the groundwater samples collected from the bedrock wells on the Somers Crossing site detailed above.

b) Anticipated Impacts

Groundwater Protection Overlay District Review

The following describes a review of potential changes which may occur as a result of the build-out of the Proposed Action. This review is based on conclusions of LBG (accepted by Project Engineer) to address the DEIS Scoping document as well as the Town Code in relation to the Groundwater Protection Overlay District (GPOD). Included below is an assessment of changes in groundwater recharge due to the construction of impervious surfaces, changes in groundwater quality from the use of pesticides, fertilizers and de-icing chemicals on the parking areas and landscaped areas, and potential groundwater mounding which may result in

the vicinity of the proposed stormwater detention ponds. The purpose of the hydrogeologic analysis within the GPOD is "*to demonstrate whether the use shall result in any degradation or contamination of groundwater*" within the overlay district (Somers Code, 170-32.8.A).

The Somers Crossing development is proposing to connect to the Heritage Hills Sewer Works Corporation; therefore, an analysis of an increase in nitrogen and phosphorous concentrations in groundwater from the use of on-site septic systems is not a concern and has not been completed, and a Groundwater Protection Plan is not necessary in this case[6]. The off-site septic system on the adjacent Towne Centre site has been functioning for many years, has a valid permit, and has no violations against it.

Groundwater Recharge

Under the existing pre-development conditions at the Site, groundwater recharge to the stratified drift aquifer underlying the vacant portion of the Site is estimated to be approximately 38,700 gpd under average precipitation conditions and approximately 26,100 gpd under one-year-in-thirty drought conditions.

A portion of the groundwater recharge to the stratified drift aquifer infiltrates down through the overburden soil to recharge the bedrock aquifer. The groundwater recharge to the bedrock aquifer under existing pre-development conditions is estimated to be 26,700 gpd under average precipitation conditions and 18,000 gpd under one-year-in-thirty drought conditions.

Following build-out of the Site under the proposed development plan, approximately 7.28 acres[7] of new impervious surfaces including roadway, rooftops and parking areas will be constructed. Precipitation runoff from these impervious surfaces will be collected in an on-site storm-water collection system and discharged into on-site stormwater detention basins.

Assuming that all surface-water runoff from the new impervious surfaces is lost to groundwater recharge at the Site, the recharge rate to the stratified drift aquifer following build-out of the property would be about 28,800 gpd under normal precipitation conditions and 19,400 gpd under drought conditions. The

[6] Findings of the LBG Hydrogeologic Assessment have been reviewed and accepted by the Project Engineer as applicable to the proposed Project.
[7] 6.82 acres impervious on Somers Woods project was analyzed in LBG report in 2010. 7.28 acres of impervious with Somers Crossings project would yield substantially same result, according to the Project Engineer.

recharge rate to the bedrock aquifer following build-out would be about 19,900 gpd under normal conditions and 13,400 gpd under drought conditions.

However, not all of the surface water runoff from the impervious surface areas will be lost to groundwater recharge following build-out. Several stormwater management facilities are proposed to collect stormwater runoff on the property. With the exception of during storms of a magnitude greater than a two-year flood event when overflow from the basins will be discharged off-site to prevent flooding, the runoff collected in the retention and infiltration basins will continue to recharge groundwater at the Site. Therefore, it is likely that groundwater recharge following build-out of the Site will be greater than the conservative recharge values provided above.

Water Table Relative to Proposed Site Grading

Soil testing has been conducted in the field to determine water table as described in this DEIS. (See Chapter III.D, Geology and Soils for description of proposed grading and Exhibit III.D-3, Preliminary Grading Plan and Appendix D).

As per the groundwater levels that occur throughout the Site, project dewatering is not anticipated. If during construction, any localized areas require dewatering, it will be handled in accordance with the NYSDEC - New York Standards and Specifications for Erosion and Sediment Control.

Cross Sections A-A (generally east-west) and B-B (generally north-south) were prepared by the Project Engineer as part of the Engineering Plan set to illustrate the proposed disturbance in plan and profile views. Features on these plans and profiles include depth to bedrock, depth to groundwater, existing and proposed grades, elevations of proposed stormwater facilities, and existing soil classifications.

De-icing Chemical (Road Salt) Application

De-icing chemicals, i.e. road salt, would likely be applied to paved areas within the Site during the winter storm season. An analysis of the potential increase in sodium and chloride concentrations in groundwater underlying the Applicant's residential property has been completed[8], utilizing the following (conservative) assumptions:

[8] Shopping center site is not anticipated to change from existing to proposed conditions relative to treatment of winter pavement, so no new impact is anticipated.

- Road salt is applied in a ratio of 1:3 salt to sand (25% road salt to 75% sand);
- A conservative application rate of 37 tons/lane mile/year of de-icing agent (sand and salt mixture) is used, which is based on the application rate for two-lane Town, County and State roads (Wagner and Yaggi, 2001);
- The average saturated thickness of the overburden material across the Site is 15 feet;
- The proposed paved areas to which de-icing agent will be applied are equal to 1.3 miles;
- Road salt is comprised of 60% chloride and 40% sodium;
- 55% of road salt that is applied is contained in surface-water runoff and 45% infiltrates into groundwater; and
- The calculation assumes no dilution through precipitation recharge.

The results of the calculation indicate that concentrations of sodium and chloride in groundwater underlying the Site would increase by about 3.0 mg/l (sodium) and 4.6 mg/l (chloride) due to the application of road salt. However, as stated above, this calculation assumes that there is no dilution of the constituents from precipitation recharge. With the addition of dilution through precipitation, it is likely there will be no discernible increase in sodium and chloride concentrations in groundwater down gradient of the Site.

Fertilizers (Nitrogen and Phosphorous) and Pesticides

Some fertilizers and pesticides will likely be utilized to maintain landscaped areas in the proposed residential development. Phosphates from fertilizers which are properly applied bind to the soil and become available for uptake by plants. Similar to phosphorous, nitrogen from fertilizers which are properly applied will be absorbed by plant material and become bound up in the process of photosynthesis.

Agricultural chemicals from landscaped areas are mostly contained in “first-flush” runoff from the early part of a storm event. Proper application by a professional contractor of the fertilizers and pesticides will minimize the runoff impacts by limiting overspreading of the chemicals on landscaped areas. In addition, the proposed stormwater collection and detention system, as well as the existing wetland, have a large capacity to remove trace contaminants from the runoff. Water quality impacts from these constituents from stormwater runoff will likely be minimal and can be readily mitigated through the use of best management practices, both during construction and occupancy of the residential portion of the Site.

Other Pollutant Loading to Groundwater (pre and post development)

The pollution loading to groundwater occurs as result of pollutants (fertilizers, pesticides, road salt, oils and grease, etc.) entering groundwater through surface water infiltration. The pre-development pollutant loading for the Site would be none because it is not developed, i.e. no sources of pollution. The adjacent Towne Centre site contributes pollutants through its existing stormwater detention pond which is located on the Somers Crossing site.

Storage of Hydrocarbons

Regarding Section 170-32.7 of the Somers Code which describes a prohibition of certain uses within the Groundwater Protection Overlay District including the storage of hydrocarbon products (except for residential uses), the proposed heating and cooling for the neighborhood grocery store portion of the project will be provided by geothermal technologies, therefore, storage of prohibited products will not be necessary. The residential units will be heated/cooled using geothermal/electric technologies. No bulk storage of hydrocarbon products will occur, and therefore the potential adverse environmental impacts associated therewith need not be studied.

Water Demand

See Chapter III.K, Utilities for discussion of the project's water demand.

Based on ISO standards, it is determined that the fire demand for the proposed action is 1,000 gallons per minute, peak hour domestic demand is 50.68 gallons per minute and irrigation is 106.65 gpm totaling to 1,157 gpm. This number is rounded up to 1,200 gpm. ISO Standards review water systems based on a minimum residual pressure of 20 psi. As per the hydrant test performed by Camo Pollution and witnessed by Bibbo Associates on December 17, 2014, there is adequate residual pressures and required flows to service this development. Refer to Appendix I for more detailed evaluation.

The wells on the Site will be abandoned in accordance with all applicable laws and regulations after completion of the Proposed Action and connection of all project components to the Heritage Hills Water Works Corporation.

There are no other identified impacts anticipated from irrigation. Potential impacts from use of pesticides and herbicides as well as deicing agents was

described previously in this section.

c) Mitigation Measures

In order to avoid, minimize or mitigate potential impacts resulting from the Proposed Action to the maximum extent practicable to groundwater resources (including drinking water) the following is proposed:

- Water conservation techniques, including: low-flow toilets and shower heads; and irrigation time restrictions (such as evenings only or every other day).
- Deed restrictions on proposed open space, best management practices during construction, safe, protected salt storage areas on the Site that prevent spillage, etc. will serve as additional mitigation measures to prevent impacts to groundwater resources.
- To minimize or mitigate potential impacts to groundwater, the site layout has been designed with infiltrators as a "green" (low-impact development) practice. The proposed infiltrators have adequate capacity to exfiltrate the entire 1 year storm volume.
  The Site will be replanted following an approved landscape plan in all disturbed areas not proposed for impervious surfaces.

Groundwater Protection Overlay District

As described previously, the Applicant contends that a Groundwater Protection Plan is not necessary in this case, since the Somers Crossing development is proposing to connect to the Heritage Hills Water Works and Sewer Works Corporation service area, therefore, the use of on-site septic systems is not a concern as having a potential impact on groundwater. However, if it is required, a Groundwater Protection Plan (with reference to Town Code Section 170.32.8) would be prepared during the Site Plan approval process.

Groundwater Recharge

The runoff collected in the retention and infiltration basins will continue to recharge groundwater at the Site. Therefore, the runoff collected in the retention and infiltration basins will continue to recharge groundwater at the Site, and it is likely that groundwater recharge following build-out of the Somers Crossing site will be greater than the conservative recharge values provided, which means groundwater recharge will be maintained at a reasonably sustainable level (see LBG report in Appendix D, as reviewed and accepted by the Project Engineer).

De-Icing/Road Salt

The results of the LBG analysis indicate that concentrations of sodium and chloride in groundwater underlying the Site would increase by about 3.0 mg/l (sodium) and 4.6 mg/l (chloride) due to the application of road salt. However, as stated above, dilution of the sodium and chloride from precipitation recharge was not included in this analysis. With the addition of dilution through precipitation, it is likely there will be no discernible increase in sodium and chloride concentrations in groundwater at the Site.

Fertilizers (Nitrogen and Phosphorous) and Pesticides

As part of the proposed action, the new development is proposing to connect to the Heritage Hills Sewer Works Corporation; therefore, an increase in nitrogen and phosphorous concentrations in groundwater from the use of on-site septic systems is not a concern. Nitrogen and phosphorous are also contained in fertilizers. Fertilizers and pesticides will likely be used for landscape maintenance following build-out of the project. These chemicals should be applied by a licensed professional to prevent over-application. Water quality impacts from these constituents from stormwater runoff will likely be minimal and can be readily mitigated through the use of best management practices, both during construction and occupancy of the project.

Water Demand

The Applicant is proposing to connect the project to the Heritage Hills Water Works Corporation. The Heritage Hills Water Works Corporation is supplied by five wells completed in the sand and gravel stratified drift aquifer underlying the Town of Somers. The wells are permitted for an average daily taking of 600,000 gpd. The average daily water usage for Heritage Hills Water in 2008 was about 363,500 gpd. Based on this information, there is sufficient surplus water available from Heritage Hills to meet the water demand requirements of the Somers Crossing development.

Based on the groundwater levels that occur throughout the Site (which are indicated by site specific testing in the field), the Project Engineer does not anticipate that dewatering would be required. If during construction, any localized areas require dewatering, it will be handled in accordance with the NYSDEC - New York Standards and Specifications for Erosion and Sediment Control.

The existing wells on the Site will be abandoned in accordance with all applicable laws and regulations after completion of the Proposed Action and connection of all project components to the Heritage Hills Water Works Corporation.

2. Surface Water and Stormwater Management

a) Existing Conditions

Surface Water

Two wetlands, Wetland A and Wetland C, were identified on the Site. The stream that flows through Wetland A (off-site) is classified by the New York State Protection of Waters Program Regulations as C (t) and is regulated by the NYSDEC as a Protected Water under Article 15. However, this stream is located approximately 400' or more off-site and is therefore more than 50 feet from any proposed disturbances. See Chapter III.F.3. For further discussion of regulated watercourses and wetlands.

The floodplains for the 100 and 500-year storm events as well as the limits of floodplain, and regulated wetlands and buffers are shown in Exhibit II-4, Site Constraints. Wetlands are also indicated on Exhibit III.F-5, Existing Wetlands.

Description of Brown Brook

Brown Brook begins off-site, north of the Site. The main channel of Brown Brook does not flow through the subject property, but enters into a large wetland system (NYSDEC Freshwater Wetland F-1), of which a portion is located in the northern portion of the Site. This wetland system is exposed to periodic flooding from the brook. During baseline flow, the majority of moving surface water is confined to the main channel of the brook; however, groundwater discharge is present to support the hydrology of the adjacent wetlands as well as the baseflow of the brook. The area covered by surface water expands and deepens as flow volume increases during storm events. The floodplains for the 100 and 500-year storm events are shown in Exhibit II-4, Site Constraints. In the case of these larger storm events, the reach of the floodplain extends into areas that are dry under baseline conditions, and are likely dry during smaller storms. The 100 and 500-year floodplains extend onto part of the northern portion of the Site.

Water quality samples were taken on June 3, 2009 at four locations and on October 2, 2013 at six locations on and near the Site. See Exhibit III.E-4, Surface Water Sampling Locations. Two samples were taken from the stormwater basin,

one at the inlet (SWB-1-in) and one at the outlet (SWB-1-out). Note that on both sampling dates, there was no outflow from the stormwater basin to the wetland and the "out" sample was taken at the end of the last chamber of the stormwater basin. Two samples were taken from Brown Brook, one upstream from the property (Stream-In), just south of Route 202, and one downstream from the property (Stream-Out), just prior to the stream entering a culvert within the off-site portion of the wetland. Two additional samples were added during the 2013 sampling round, one sample was taken from an on-site, ponded portion of the wetland (Wetland), and a second was taken further downstream from previous sampling locations, just before (north of) the bridge to the Somers Office Park (Stream-Down). The water quality data is presented here as a baseline for comparison to future testing and monitoring.

The following analyses were performed, or subcontracted out, by Yorktown Medical Laboratories Environmental Services (YML), located in Yorktown Heights, New York: total suspended solids (TSS), fecal coliform, biochemical oxygen demand (BOD), chemical oxygen demand (COD), total Kjeldahl nitrogen (TKN), total phosphorus (TP), total petroleum hydrocarbons-oil and grease (TPH), deicing salt components (chloride, calcium, magnesium, sodium), and heavy metals (antimony, arsenic, cadmium, mercury, lead, copper, zinc). Metals analyses were chosen based on those metals that are most likely to cause harm to aquatic systems when found in elevated concentrations. pH, total dissolved solids (TDS), and temperature measurements were taken in the field by Evans Associates personnel in 2009 and 2013. TDS and pH meters were calibrated according to manufacturer's recommendations prior to use. Samples were collected in bottles that were prepared, cleaned, and preserved by the laboratory. Samples were kept on ice in a cooler until delivered to the laboratory, which occurred within approximately 3-5 hours (from first sample collected to arrival at the laboratory). Test results were reported in milligrams per liter (mg/l), colonies per 100 ml (#/100ml), parts per million (ppm), or degrees Fahrenheit (^{o}F). Results of all water quality analyses are shown below and the results are discussed in detail in the Biological Assessment Report prepared by Evans Associates (See Appendix F).

Table III.E-1
Water Quality Analysis Summary for Samples taken from Brown Brook and Associated Waterbodies

Analysis	Stream-In		Wetland	Stream-Out		Stream-Down	SWB-1-In		SWB-1-Out	
Date	06/03 2009	10/02 2013	10/02 2013	06/03 2009	10/02 2013	10/02 2013	06/03 2009	10/02 2013	06/03 2009	10/02 2013
TSS (ppm)	3	<2.0	22	12	2.0	6.4	5	<2.0	4	<2.0
Fecal coliform (#/100ml)	1	23	190	56	39	TNTC	120	TNTC	2	2
BOD (mg/l)	<2	<2.0	<2.0	4.5	<2.0	<2.0	<2	<2.0	2.5	3.1
COD (mg/l)	14.0	10	70	15.6	23	11	9.6	ND	13.4	14
TKN (mg/l)	<1	<1.0	<1.0	<1	<1.0	<1.0	<1	<1.0	<1	<1.0
TP (mg/l)	<0.1	<0.1	0.38	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TPH (mg/l)	<2	<5.00	<5.00	<2	<5.00	<5.00	<2	<5.00	<2	<5.00
Chloride (mg/l)	181	160	94	253	128	133	96.0	36	82.0	27
Calcium (ppm)	70.4	42	32	92.0	36	32	52.0	24	37.6	17
Magnesium (ppm)	5.76	24	9.9	13.0	15	14	2.4	8.5	12.0	6.3
Sodium (mg/l)	69.1	74.05	41.42	74.2	48.99	66.57	47.1	25.99	42.6	21.87
Antimony (mg/l)	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Arsenic (mg/l)	<2	2.3	2.7	<2	2.4	2.3	<2	1.4	<2	1.8
Cadmium (mg/l)	1.2	<0.0050	<0.0050	<1	<0.0050	<0.0050	<1	<0.0050	<1	<0.0050
Chromium (mg/l)	<0.010	<1.0	5.6	<0.010	1.0	<1.0	<0.010	2.9	<0.010	1.0
Mercury mg/l (mg/l)	<0.2	ND	ND	<0.2	ND	ND	<0.2	ND	<0.2	ND
Lead (mg/l)	<1	<1.0	<1.0	<1	<1.0	<1.0	<1	<1.0	1.2	<1.0
Copper (mg/l)	<0.050	0.06	0.05	<0.050	0.07	0.08	<0.050	<0.05	<0.050	0.06
Zinc (mg/l)	<0.050	<0.05	<0.05	<0.050	<0.05	<0.05	<0.050	<0.05	<0.050	<0.05
pH	7.35	7.55	6.62	8.21	6.84	7.10	7.99	7.43	7.77	9.46
TDS (ppm)	460	489	258	570	363	382	283	197	272	149
Temperature (°F)	62.5	62.5	58.0	64.0	60.0	68.0	56.0	62.0	70.0	73.5

Brown Brook is a Class C (t) stream, meaning that the NYSDEC has determined that the brook is capable of supporting trout populations, but not trout spawning. The brook begins off-site, over 2.5 miles north of the Site. The main channel of Brown Brook does not flow through the subject property, but a portion of its associated wetlands are located in the northern portion of the Site. (See Exhibit III.E-5) The capacity of the brook to support trout may be limited by the impacts to the stream from upland and upgradient sources. The main stem of Brown Brook is joined off-site by a small, Class C tributary from the west. Brown Brook appears to have been dammed in several places prior to reaching the Site. The brook is constricted by the East Hill Golf Course and Warren Street, which, in places, come right up to the edge of the brook. The brook flows past the Heritage Hills sewage treatment plant, then widens back out into a slower-flowing wetland area. Flow from this wetland passes through round, metal culverts beneath Warren Street and into a created, residential pond. Flow from the pond runs through a concrete box culvert beneath Route 202, alongside a soccer field and dirt parking lot (Fireman's Field), through a fire pond, and then into the wetland associated with the subject property.

Sources of point and not-point pollution occur along the brook. See Exhibit III.E-5, Point and Non-Point Pollution to Brown Brook. Runoff (sheet flow and storm drain flow) from Warren Street and Route 202 may enter Brown Brook and contribute contaminants such as salts, hydrocarbons, metals, and sediments. Runoff and infiltration to the groundwater from residential lawns and the golf course may contribute nutrients, fertilizers, pesticides and herbicides, along with bacteria (potentially fecal coliform). Geese were observed in the residential pond north of Route 202 as well as on the soccer field just south of Route 202 and east of Brown Brook. Geese can contribute pollution, such as nutrients and bacteria, through their waste. Evidence of erosion and sedimentation was observed in the parking lot next to the soccer field, south of Route 202 and upgradient of the wetland. Parking and lawn areas are also located at the schools that are located just south of Route 202 (west of Brown Brook). These areas may also be sources of erosion and sedimentation and contaminants similar to those for residential lawns and golf courses. Several septic systems are located in the area; septic systems can be sources of organic pollutants such as nutrients and bacteria, with potential for toxic pollutants in rare instances of improper disposal methods. Sewage treatments plants are located at Heritage Hills and at Somers Intermediate School. Treated effluent from the Heritage Hills sewage treatment plant is discharged directly into Brown Brook at the south end of the concrete box culvert beneath Route 202.

Potential sources of pollution from the Towne Centre shopping center include runoff from the parking lot, debris piles, and septic systems. Runoff from the parking lot is treated in underground oil separators and/or a stormwater detention basin (Wetland C) that is located on the Site. The Towne Centre shops are currently served by septic systems that are located along Route 100. Several fill and debris piles were observed in the northern portion of the Site. These piles contained various remains including concrete, metal, and asphalt, as well as organic materials such as grass clippings and tree branches. These piles may contribute pollutants to the property.

Site Drainage Patterns and Stormwater Calculations

A preliminary **Stormwater Pollution Prevention and Stormwater Management Plan** (SWPPP) was prepared for the Site by Bibbo Associates, LLP (dated April 23, 2014). This engineering report follows the guidelines set forth by the NYSDEC *Stormwater Management Design Manual Standards* and the New York City Department of Environmental Protection (NYCDEP) as outlined in the "*Applicant's Guide to Stormwater Pollution Prevention Plans and Crossing, Piping or Diversion Permits*" and "*New York State Department of Environmental Conservation SPDES General Permit for Construction Discharges (GP—0-10-001)*". The report is included in DEIS Appendix E and excerpted and summarized below.

Methodology:

Stormwater management computations are based upon the Soil Conservation Service (SCS) a.k.a. Natural Resource Conservation Service (NRCS), TR-20 methodologies and recommendations included in the NYSDEC *Stormwater Management Design Manual Standards and Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System General Permit # GP-0-10-001* requirements and the NYCDEP *Watershed Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and its Sources*.

Pre- and post-development rates of stormwater runoff have been computed for comparison for the 1, 2, 10, 25, 50 and 100 year storm events using Type III, 24-hour rainfall events. The computer software entitled "HydroCAD Version 8.50" by Applied Microcomputer Systems has been utilized to determine the peak runoff rates, plug flow extended detention times and high water elevations in the stormwater treatment facilities. The precipitation data for a 24-hour duration used for the hydrological modeling was based on the accepted practices by the NYCDEP and shown on the table below for the 1, 2, 10, 25, 50 and 100-year storm events. Alternate precipitation data were obtained from National Regional

Climate Center Maps for additional analysis. Refer to Appendix "K" of the Stormwater Management report (DEIS Appendix E) for the precipitation maps.

Table III.E-2
Precipitation Values Based on 24-hour Accumulation Period and Recurrence Interval

Storm Frequency	Precipitation (inches) – 24 hour
1-year	3.10
2-year	3.50
10-year	5.50
25-year	6.00
50-year	7.00
100-year	7.50

Table includes the NRCC precipitation data.

Table III.E-3
Precipitation Values Based on 24-hours Accumulation Period and Recurrence Interval (NRCC Values)

Storm Frequency	Precipitation (inches) – 24 hour
1-year	3.10
2-year	3.80
10-year	5.50
25-year	7.00
50-year	8.25
100-year	10.00

Existing Drainage Patterns

The Site (26.68 acres) is currently undeveloped, and is located within the Brown Brook and Muscoot Reservoir Drainage Basins. The soils are predominantly (Ff) Fluvaquents-Udifluvents complex, frequently flooded and (CrC) Charlton-Chatfield complex, rolling, very rocky. Westchester County Soil Survey has "B" hydrological classification for both (Ff) and (CrC) soils.[9]

A design point to evaluate the proposed development's hydrological impacts was selected on a point on the Brown Brook. The design point is located at the inlet side of the 13'-0" wide, 42" high bridge crossing of the old mining road located on the south side of the Site. The main stream of Brown Brook headwaters is

[9] Drainage analysis and Stormwater Management Plan use Westchester County Soil Survey information since hydrological classifications for regional soils needed to be used. This varies slightly from the site-specific soil classifications for the project described in Chapter III.D., Geology and Soils, since that is a site-specific survey based on soil testing and field investigations.

located approximately 2.64 miles north of the Site. The Brown Brook flows from north to south eventually joining to the Muscoot Reservoir. (See Off-Site Drainage Basin exhibit in Appendix I of SWPPP and DEIS Exhibit III.E-5, Pre-Development Drainage).

From the starting point near Cuddy Road in the Town of Carmel to confluence point with the Muscoot Reservoir, the main stream of Brown Brook has been measured to be approximately 4.07 miles long and classified by the NYSDEC as a Class C (T) stream. Brown Brook is mainly a trout stream with consistent flow throughout the year. Along the Brown Brook, there are various ponding and swampy areas which is why the time of concentration is determined to be very long.

There are two pre-development sub-basins to the design point, one of which (Sub OB-4) contains areas developed by IBM. Pre-development drainage basins and flow patterns are indicated in Exhibit III.E-2, Pre-Development Drainage. The larger, surrounding off-site drainage basin is described in Off-Site Drainage Basin Exhibit in the SWPPP.

Pre-Development Analysis: Peak Runoff Rates:

The pre-development sub-basin OB-4 data was obtained from approved drainage analysis entitled "*Stormwater Pollution Prevention Plan-Proposed Parking Expansion Program, Somers Associates Office Building Complex*".[10] The sub-basin has been routed through a detention basin (Pond 4) using the numerical data in that same report.

The table below summarizes the input variables utilized in the hydrologic modeling for the sub-basin and IBM detention pond. The sub-basin "Off-Site" is the remaining of the watershed of the Brown Brook in pre-development conditions for the design point and consists of approximately 1,778 acres.

Table III.E-4
Sub-basin Input Variables - Existing Conditions

Sub-catchment	Time of Concentration (Min)	Composite CN	Area of Coverage (acres)
Sub-basin "Off-Site"	481.0	69	1777.81
Sub-basin OB-4	21.0	81	35.54

[10] Ronald A. Freeman Associates, P. C. Environmental Engineering Consultants, Mt. Kisco, New York, dated (last revised) July 7, 1998.

The existing design point's sub-basin "Off-Site" was determined using an USGS Quadrangle Topographic Map and combined with the IBM properties' contribution including the Pond #4 routing in pre- and post-development hydrographs to the design point. The area of the sub-basin "Off-Site" was measured from the available mapping. The composite Curve Number (CN) for the sub-basin was estimated using aerial maps, Town Zoning Map and field inspections and calculated to be approximately 69.

The Flood Insurance Study by FEMA has studied the Brown Brook in Town of Somers and the cross section "I-I" location exactly matches the location of the design point. From the FEMA report it is estimated by areal interpolation that the 100-year flood peak flow at this location is approximately 753 cubic feet per second (cfs). The hydrologic computer model for the pre-development condition was calibrated to produce similar peak flow in the 100-year storm event, based on the rainfall precipitation data. Therefore, the total off-site watershed area was measured as 1,778 acres or 2.78 square miles and the composite CN was calculated to be 69.

Since the time of concentration (Tc) is influenced by multiple parameters such as flat and swampy areas, ponding and routing through a water body which is located at the middle portion of the watershed, the Tc has been back-calculated to arrive peak flow of approximately 753 cubic feet per second in the 100-year storm event on the design point. The time of concentration was calculated by trial and error method to be 481.0 minutes or 8.02 hours for the off-site sub-basin. Therefore, to be able to produce compatible 100-year storm peak flow to FEMA, the calculated CN and the area of the watershed was calculated, but the time of concentration was adjusted to produce approximately 8.02 cubic feet per second peak runoff at the inlet of the design point. (Note: this assumption is not very critical since the "Off-Site" sub-basin will produce the same flows in pre- and post-development condition and it is used only for comparison purposes.) (See Exhibit III.E-1, Pre-Development Drainage).

Pre-development peak runoff rates for the 1, 10, 25, 50-and 100-year storm events are provided in the table below.

Table III.E-5
Pre-development Peak Runoff Rates

Design Storm (yr.)	Pre-Development Peak Runoff Rate (cfs)
1	128.61
10	438.85
25	514.36
50	671.98
100	753.84

Pre-Development Pollutant Loading Analysis

A stormwater quality analysis was performed for the Site using the "Pollutant Loading Coefficient Method" using the on-site areas only. In order to coincide with the locations of each proposed stormwater treatment basin (SWTB), the same subcatchment boundaries were used in the quality analysis and quantity analysis. However, the off-site areas to the design point have not been evaluated. Pre-development were generated for Total Nitrogen (TN), Total Phosphorus (TP), Biological Oxygen Demand (BOD), Total Suspended Sediment (TSS) and Trace Metals such as Lead (Pb), Zinc (Zn) and Copper (Cu) at the design points/lines. After that the effects of the proposed stormwater management practices were analyzed utilizing both high and low removal rates determined by using "Reducing the Impacts of Stormwater Runoff from New Development – April 1992 Edition" and "National Pollutant Removal Database _ 9,2007_ and USEPA National Pollution Discharge Elimination System" (NPDES) and "NJASLA" 2011 Annual Meeting – 2/2011" to ensure acceptable post development pollutant loads at the design points/lines. Loading rates for Total Nitrogen (TN), Total Phosphorus (TP), Total Suspended Sediment (TSS), Lead (Pb), Zinc (Zn) and Copper (Cu) were obtained from the Terrene Institute, 1994. The loading rates for biological oxygen demand (BOD) were obtained from Wanielista & Yousef. For this analysis, the same on-site subcatchments contributing to the design point/line used in the drainage analysis were utilized and compared.

Estimates of pollutant loads for both the pre- and post-development scenarios were calculated utilizing the "Pollutant Loading Coefficient Method", as documented by the Metropolitan Washington Council of Governments publication **Controlling Urban Runoff a Practical Manual for Planning and Designing Urban BMP's**, July 1987. These methodologies have also been adopted by the NYSDEC in the publication **Reducing the Impacts of Stormwater Runoff from New Developments**, April 1992. As the Site is located within the Muscoot

Reservoir drainage basin, (a Phosphorus Restricted Reservoir), the post development Stormwater Treatment Basin and infiltration basin designs are based on the 1-year, 24-hour, Type III storm event.

Pollutant loading calculations are included in Appendix "C"; pre- and post-development pollutant loading subbasin maps are included in Appendix "S" and Appendix "T" of the Stormwater Pollution Prevention Plan in DEIS Appendix E. The following table summarizes the pollutant loading concentrations.

Table III.E-6
Pollutant Loading Concentrations (C)

	TN – Nitrogen	TP – Phosphorus	B.O.D.	T.S.S.	Pb	Zn	Cu
Forest	1.7800	0.0979	4.0 (*)	76.5400	0.0178	0.0178	0.0267
Meadow	3.7380	0.1157	10.0 (*)	305.27	0.0089	0.089	0.0267
Impervious	2.1360	0.9790	78.0 (*)	446.7800	0.6942	0.2759	0.0534
Lawn	3.7380	0.1157	8.00 (*)	307.94	0.0623	0.089	0.0267

Notes: All pollutant loading concentrations are average rates of (lbs/ac-yr) and obtained from Page 133 Table, Terrene Institute, 1994, unless otherwise specified.
(*) All B.O.D. pollutant loading concentrations are obtained from Wanielista, M.P., Yousef, Y.A., 1992. (lbs/ac-yr)

b) Anticipated Impacts

Wetland Disturbance

There are no direct impacts proposed to wetlands. Indirect disturbance to surface water and 100-foot buffer areas, as regulated by the Town of Somers, NYCDEP, NYSDEC and the U.S. Army Corps of Engineers is described in Chapter III.F.3, Wetlands.

Floodplain

No disturbance to FEMA 100-year floodplain is anticipated, therefore the volume of the flood storage shall remain the same when it is compared to pre-development condition.

Stormwater Quantity/Post-Development Drainage

Stormwater peak runoff rates following development will not exceed those in the existing condition. As proposed, stormwater runoff rates following development would have no adverse impacts on downstream properties or stormwater conveying systems. Similarly, considering the nature of the existing site

conditions and the level of stormwater treatment proposed in the post-development condition, it is predicted that this development will not represent a negative impact to stormwater quantity or degradation in the quality to any reservoir, stream, wetlands or watercourses.

The proposed development will include the construction of new impervious surfaces such as roofs, access roads, parking areas, walkways and driveways. The balance of the Site will be developed as landscaped lawn areas with integrated stormwater treatment facilities.

In the post-development condition, the watershed area has been divided into sub-basins which mainly contain a large off-site subarea that directly flows to the existing design point and the subareas that originated from the Somers Crossings Development and IBM. The design point evaluated within pre-development condition has been kept in the proposed condition to analyze the impacts at the same point. The off-site subarea directly flowing to the design point has the same CN number and the time of concentration as the pre-development condition, but the total area has been adjusted accordingly. Post Development Drainage is illustrated on Exhibit III.E-3.

Even though the post-development condition contains more impervious area than existing conditions, the proposed stormwater management facilities mitigate the stormwater quality as per the NYCDEP Watershed Rules and Regulations. Peak flow attenuation has not been proposed since the increased detention times from the development would worsen the downstream impacts. Within the development, all the proposed stormwater basins have been designed as the stormwater quality treatment areas (SWQTA) which are designed to obtain stormwater quality aspects for the 1-year storm only. The larger storms have been by-passed from the stormwater treatment basins to produce “Off-Line” basins. The design point evaluations based on the 1, 2, 10, 25, 50 and 100-year storm events showed that the peak flows occurring at the design point are less than or equal to the pre-development conditions.

The proposed development program will alter the existing land coverage on the Site. A comparison between the existing land use conditions and the proposed conditions is summarized in the table below.

Table III.E-7
Land Use Comparison - Existing and Proposed

Land Use	Woods (Acres)	Meadow (Acres)	Lawn (Acres)	Impervious (Acres)
Existing Conditions	26.73	0	0.49	0.49
Proposed Conditions	12.25	2.14	5.44	7.88
Change	**- 14.48**	**+ 2.14**	**+ 4.95**	**+ 7.39**

The conversion of approximately 54% of the woods on the Site to other cover types, including over 7 acres of impervious cover, will change the recharge of groundwater and subsurface flow patterns of groundwater on the Site. Use of retention and infiltration practices in the stormwater management program will replace the recharge potential lost to impervious cover, while re-vegetation of the remaining 7+ acres of development as meadow and lawn area will allow infiltration of precipitation.

The proposed conditions' site coverages by sub-catchment to the design point are summarized on the following tables (sub-catchments are illustrated on Exhibit III.E-3, Post-Development Drainage).

Table III.E-8
Sub-catchment #1 - Proposed Conditions

Coverage Type	Area of Coverage -(acres)
Woods, Good, HSG B	0.566
Lawn, HSG B	0.580
Paved parking & roofs	1.209
Meadow, HSG B	0.247
Total	**2.602**

Table III.E-9
Sub-catchment #2 - Proposed Conditions

Coverage Type	Area of Coverage - (acres)
Lawn, HSG B	1.505
Paved parking & roofs	2.029
Woods, Good, HSG B	0.225
Meadow, HSG B	0.069
Total	**3.828**

Table III.E-10
Sub-catchment #3 - Proposed Conditions

Coverage Type	Area of Coverage-(acres)
Lawn, HSG B	0.755
Meadow, HSG B	0.568
Paved parking & roofs	0.836
Total	**2.159**

Table III.E-11
Sub-catchment #4 - Proposed Conditions

Coverage Type	Area of Coverage - (acres)
Lawn, HSG B	0.210
Paved parking & roofs	0.194
Meadow, HSG B	0.159
Total	**0.563**

Table III.E-12
Sub-catchment #5 - Proposed Conditions

Coverage Type	Area of Coverage - (acres)
Lawn, HSG B	0.114
Paved parking & roofs	0.396
Total	**0.510**

Table III.E-13
Sub-catchment #6 - Proposed Conditions

Coverage Type	Area of Coverage - (acres)
Lawn, HSG B	0.372
Paved parking & roofs	0.154
Total	**0.526**

Table III.E-14
Sub-catchment #7 - Proposed Conditions

Coverage Type	Area of Coverage - (acres)
Lawn, HSG B	0.177
Paved parking & roofs	0.480
Total	**0.657**

Table III.E-15
Sub-catchment #8 - Proposed Conditions

Coverage Type	Area of Coverage - (acres)
Lawn, HSG B	0.608
Paved parking & roofs	0.355
Meadow, HSG B	0.163
Total	**1.126**

Table III.E-16
Sub-catchment #9 - Proposed Conditions

Coverage Type	Area of Coverage - (acres)
Lawn, HSG B	0.245
Paved parking & roofs	1.827
Total	**2.072**

Table III.E-17
Sub-catchment #10 - Proposed Conditions

Coverage Type	Area of Coverage - (acres)
Lawn, HSG B	0.083
Paved parking & roofs	0.121
Continuous Water	0.096
Meadow, HSG B	0.754
Total	**1.054**

Table III.E-18
Sub-catchment #11 - Proposed Conditions

Coverage Type	Area of Coverage - (acres)
Lawn, HSG B	0.213
Paved parking & roofs	0.087
Meadow, HSG B	0.177
Total	**0.477**

Table III.E-19
Sub-catchment Off-Site - Proposed Conditions

Coverage Type	Area of Coverage- (acres)
1 acre lots, 20%imp, HSG B	357.070
1 acre lots, 20%imp, HSG C	33.290
1 acre lots, 20%imp, HSG D	4.595
2 acre lots, 12%imp, HSG B	26.730
1/8 acre lots, 65% imp, HSG B	216.948
1/8 acre lots, 65% imp, HSG C	149.796
1/8 acre lots, 65% imp, HSG D	7.006
Urban commercial, 85% imp, HSG B	47.700
Urban commercial, 85% imp, HSG C	1.195
Woods, Good, HSG B	624.494
Woods, Good, HSG C	42.914
Woods, Good, HSG D	123.340
>75% Grass cover, Good, HSG B	72.670
>75% Grass cover, Good, HSG C	6.160
>75% Grass cover, Good, HSG D	8.972
Brush, Good, HSG C	16.830
Brush, Good, HSG D	1.890
Water Surface	20.640
Total	**1762.240**

Proposed Stormwater Management Plan

Somers Town Code Chapter 93 – "Stormwater Management and Erosion and Sediment Control" has been used to design the stormwater on site.

Six Stormwater Treatment Basins (SWTB) have been proposed throughout the project and designed to attenuate the stormwater quality aspects of the development. The SWTBs have been located strategically on various locations to collect and detain most stormwater effectively from the development proposal. Four of the SWTBs have been designed as Infiltration Basins/Systems, one has been designed as Bioretention and the other one has been designed as Pocket Wetland. Each stormwater facility, except Pocket Wetland, has been utilized with an outlet control structure and diversion structure. The diversion structures have been designed to divert the storms larger than 1 year to downstream. In other words, all stormwater treatment basins have been designed "Off-Line". The proposed pocket wetland provides a continuous water volume which is equal to or more than the required 50% of the remaining WQv. The remaining 50% of the

WQv volume has been provided as extended detention which requires 1,440 minutes of detention time within the pocket wetland. The pocket wetland outlet control structure is a special precast concrete structure with a baffle with flow controlling holes with a specific diameter and inverts to accurately reduce the flows and/or provide the required detention time.

Tables 18 through 23 in the Stormwater Management Report in Appendix E provide summary information for each SWTB including: design storm event, peak inflow and outflow runoffs, outlet devices as proposed orifice holes and their inverts/diameters, high water elevations from the basin's bottom, and the required storage for the associated storm event. Outlet control structures have been designed for each basin such that the proposed lower orifice would control the smaller storms, since the larger orifice would allow the larger storm peaks to pass without exceeding the pre-development peak runoff levels.

Post-Development Peak Runoff Rates

Specifically, stormwater is directed overland or via a piping network to the stormwater treatment facilities. The outlet control and diversion structures have been designed to detain stormwater to mitigate the 1 year storm volumes within the facilities. Additionally, emergency overflow weirs have been provided over the 1 year, 24 hour storm high water elevation for each facility, to prevent uncontrolled spillage in case of clogging in the outlet control system. These devices are strictly an emergency provision and will not be activated within normal stormwater quality basin operations. Additionally, each stormwater facility has been sized such that peak rates at the design point of runoff generated from 1, 10, 25, 50 and 100 year, 24 hour Type III storm events are attenuated to such an extent that no adverse impact will result from the development of this project.

The proposed stormwater management system for this site will consist of four Infiltration Basins/Systems (NYSDEC Design 9), one Bioretention Basin and one Pocket Wetland/Extended Detention Basin (NYSDEC Design 3) all discharging to the NYSDEC Wetland F-1.

It was the intent of the design not to modify the existing drainage patterns at the Site. All stormwater treatment practices were sited at locations that can receive and treat the maximum amount of site areas.

All infiltration basins are designed to meet the requirements of 3' separation from seasonal high groundwater. The results of the field-testing can be found in the Appendix "L" of the SWPPP (DEIS Appendix E). Infiltration basin modeling includes the incorporation of the field-verified testing into the HydroCAD.

Percolation has been conservatively ignored and not used during HydroCad Hydrological modeling. This conservative approach is selected as the most sustainable long term rate.

Pretreatment for the infiltration basins and bioretention basin will consist of ConTech CDS pretreatment units, sumps in the catch basins, forebays and grass swales prior to entering the basins. Detailed calculations for the each of the stormwater treatment basins' required and provided; Water Quality Volume (WQv), Runoff Reduction Volume (RRv) and percent imperviousness as well as calculated volumes based on the contour areas and elevations are included in "Appendix "A" of the SWPPP (DEIS Appendix E).

Stormwater Rate of Runoff Analysis

Modeling of the rate of stormwater runoff has been performed for the pre- and post-development conditions, as shown in the table below for each of the 1, 10, 25, 50 and 100 year storm events. In post-development condition, the peak runoff discharges from the SWTB's have been combined with the overland subbasin flow to the design point and compared to the pre-development condition peak runoffs. Detailed hydrologic computations are provided in the report in Appendix E.

Table III.E-20
Peak Runoff Discharges to Design Point

Design Storm (yr)	Pre-Development Peak Runoff (cfs)	Post-Development Peak Runoff (cfs)
1	128.61	127.52
10	438.85	435.91
25	514.36	510.88
50	671.98	667.34
100	753.84	748.58

Water Quality Volume (WQv)

The required stormwater quality volume will be determined using "New York State Stormwater Management Design Manual – Phase III- Chapter 10-Enhanced Phosphorus Removal Standard" Unified Stormwater Sizing Criteria".

The "WQv" is the volume of runoff generated by a 90% rainfall event. In the area of the project location, the rainfall event associated with this volume is 1.20" of rainfall within a 24 hour period. As per NYSDEC design standards, each stormwater basin provided must be able to capture and store the "WQv" generated by its tributary area which relates to a 90% rainfall. However, the New

York City Department of Environmental Protection Watershed Rules and Regulations require 1-year storm runoff volume to be exfiltrated/retained. It must also provide a minimum filter area as determined by formulation outlined in the New York State Stormwater Management Design Manual.

Similarly, one Pocket Wetland (W-4) also designed in accordance with the "New York State Stormwater Management Design Manual – Phase III- Chapter 10- Enhanced Phosphorus Removal Standard" Unified Stormwater Sizing Criteria" provides extended detention time for the 1 year storm volume for at least 24 hours. Pocket Wetland also provides 50% of this stormwater quality volume (WQv) as permanent water and the remaining 50% as a volume providing a minimum of 24 hours of extended detention. Pocket Wetland (W-4) provides forebay at the pipe inlets and a permanent pool at the outlet. The forebays have been sized to hold a minimum of 10% of the required WQv volume. The permanent pool which consists of a sum of the forebays and the micropool has been sized to contain at least 50% of the same. HydroCad hydrologic model illustrates the required high water elevations and plug flow/center of mass extended detention times within facility for 1 year storm, as required. The stormwater treatment basins have been designed to comply with both NYSDEC and NYCDEP Standards and to comply with the "WQv" Chapter 10 criteria.

Post-Development Pollutant Loading Analysis

As described previously, a stormwater quality analysis was performed for the Site using the on-site areas only and using the same subcatchment boundaries used in the quality analysis and quantity analysis. Pre-development and post-development loadings were then generated for Total Nitrogen (TN), Total Phosphorus (TP), Biological Oxygen Demand (BOD), Total Suspended Sediment (TSS) and Trace Metals such as Lead (Pb), Zinc (Zn) and Copper (Cu) at the design points/lines. After that the effects of the proposed stormwater management practices were analyzed utilizing both high and low removal rates determined and accepted by NYCDEP to ensure acceptable post development pollutant loads at the design points. Loading rates for Total Nitrogen (TN), Total Phosphorus (TP), Total Suspended Sediment (TSS), Lead (Pb), Zinc (Zn) and Copper (Cu) were obtained from the Terrene Institute, 1994. The loading rates for biological oxygen demand (BOD) were obtained from Wanielista & Yousef. For this analysis, the same on-site subcatchments contributing to the design point used in the drainage analysis were utilized and compared. The pH values vary too much across the Site to predict post-development pH values, and therefore cannot be provided. There would not be expected a variation of pH levels from pre- post development conditions.

Estimates of pollutant loads were calculated utilizing the "Pollutant Loading Coefficient Method", as documented by the Metropolitan Washington Council of Governments publication **Controlling Urban Runoff a Practical Manual for Planning and Designing Urban BMP's**, July, 1987. These methodologies have also been adopted by the NYSDEC in the publication **Reducing the Impacts of Stormwater Runoff from New Developments**, April 1992. As the property is located within the Muscoot Reservoir drainage basin, (a Phosphorus Restricted Reservoir), the post-development Stormwater Treatment Basin and infiltration basin designs are based on the 1-year, 24-hour, Type III storm event. Within the Stormwater Report in DEIS Appendix E, pollutant loading calculations are included in Appendix "C", pre- and post-development pollutant loading subbasin maps are included in Appendix "S" and Appendix "T".

The pollutant loading concentrations utilized in the stormwater quality analysis were summarized previously in Table III.E-6. A pollutant loading concentrations summary is provided below.

Table III.E-21
Pollutant Loading Calculations Summary

	Pre-Development Conditions Annual Pollutant Loadings (lbs/yr)	**Post-Development Conditions Annual Pollutant Loadings (lbs/yr)**				
		No Treatment Option	Lower Removal Rates		Higher Removal Rates	
		Design Point	Design Point	INC+/DEC-%	Design Point	INC+/DEC-%
TSS	2,415.73	6,217.60	1,668.75	- 30.90	1,098.28	- 54.50
BOD	149.03	711.78	193.42	+ 29.80	57.54	- 61.40
TP	3.15	9.79	3.10	- 1.60	1.28	- 59.50
TN	50.46	66.96	37.14	- 26.30	28.44	- 43.60
Pb	0.85	6.05	1.08	+ 27.30	0.30	- 64.20
Zn	0.65	3.07	0.69	+ 6.00	0.28	- 57.00
Cu	0.75	0.95	0.44	- 41.60	0.33	- 56.70

Impacts to Brown Brook

The drainage area of the entire property occupies a very small part, less than 2%, of the Brown Brook watershed, which measures 1,778 acres (see Appendix E of the SWPPP). The 16.1 acres of proposed impacts represent just 0.9% of the watershed. Therefore, impacts or changes to Brown Brook from the proposed development are not expected. The Stormwater Pollution Prevention Plan

(SWPPP) prepared by Bibbo Associates, LLP addresses stormwater treatment to prevent or mitigate for the proposed changes to impervious surfaces. Pollutant loading calculations are summarized above for total suspended solids (TSS), biological oxygen demand (BOD), total phosphorus (TP), total nitrogen (TN), lead (Pb), zinc (Zn), and copper (Cu). Details of how these calculations were prepared, along with a summary table of the calculations (Table 25) are shown in the SWPPP (Appendix E of the DEIS).

The Stormwater Pollution Prevention Plan for Somers Crossings analyzed phosphorus in pre and post development conditions. Analysis assumed the low and high removal rates for the proposed stormwater treatment facilities. For both, low and high removal rates, the post development rates were less than the pre development rates. The pollutant loading analysis has been performed using the contaminant parameters and data available and accepted by the various regulatory agencies. There is no direct discharge from the Site to the Brown Brook. All stormwater conveying systems discharge to a green practice such as: Infiltration Practice, Bioretention and/or Pocket Wetland prior to discharge. Refer to Stormwater Pollution Prevention Plan for Somers Crossings for further details.

The proposed stormwater practices have been designed to minimize the surface water impacts. The proposed green practices provide infiltration reducing the runoff volume and proposed pocket wetland provide additional extended detention time and peak flow attenuation to reduce the impacts to design point which is located on the Brown Brook. All post development peak runoffs to the design point have been reduced below the pre development levels in 1, 10, 25, and 100 year storms. For additional detailed information refer to Stormwater Pollution Prevention Plan for Somers Crossings in Appendix E.

Other water quality discussions are presented in the Biological Assessment Report prepared by Evans Associates and in the Existing Conditions section (see DEIS Appendix F).

Impacts Due to Alteration of Plant Species

Untreated runoff from impervious surfaces has the potential to impact the water quality of wetlands. The SWPPP (Appendix E) is intended to mitigate for potential water quality impacts to the surface water of the wetlands on the Site. In addition, the stormwater basins will not discharge directly to the wetlands but rather will discharge treated stormwater runoff into the forested wetland buffers. The forested wetland buffer will provide additional treatment of the stormwater prior to entering the wetlands. Surface water leaving the developed areas of the

Site will have been treated and is therefore not expected to impact surface water quality.

c) Mitigation Measures

Stormwater peak runoff rates following development will not exceed those in the existing condition. As proposed, stormwater runoff rates following development would have no adverse impacts on downstream properties or stormwater conveying systems. Similarly, considering the nature of the existing site conditions and the level of stormwater treatment proposed in the post-development condition, it is anticipated that this development will not have a negative impact to stormwater quantity or degradation in the quality to any reservoir, stream, wetlands or watercourses.

The site layout has been planned to minimize impacts to existing surface water resources. But proposing stormwater facilities outside of wetlands and buffers, by providing facilities that comply with NYSDEC and local standards. This includes ensuring that all surface water runoff from the proposed project will be captured and treated in accordance with the details provided in the SWPPP (Appendix E). Six stormwater treatment basins have been proposed, including four infiltration systems, one bioretention system, and one pocket wetland. In addition, no direct impacts are proposed in wetlands, and impacts to the 100-foot NYSDEC wetland adjacent area have been minimized to the maximum extent practicable (See Chapter III.F.3, Wetlands).

See SWPPP for detailed description of SPDES General Permit.

No watercourses exist on-site, with the exception of the constructed stormwater basin and the associated discharge channel that drains to the NYSDEC wetland, which does meet the definition as a NYCDEP-regulated watercourse. This information was confirmed by NYCDEP personnel during an on-site visit on May 22, 2013. The stormwater basin itself does not provide trout habitat, although small minnows and sunfish have been observed in the basin. Changes to the water temperature in Brown Brook are not expected.

An Erosion Control Plan (see Exhibit III.D-5) has been prepared to depict and describe erosion and sedimentation control guidelines and measures to be followed during site construction. The wetlands on the Site will be surrounded by staked hay bales and silt fence, and drain inlets will be protected. Stockpiled soils will be at least 50' away from any wetlands, and wherever feasible, natural vegetation shall be retained and protected (by flagging or other effective means). Only the smallest practical area of land shall be exposed at any one time during construction and the period of exposure shall be kept to a minimum, installing

permanent and final vegetation, paving, structures, etc. at the earliest possible opportunity. On embankment fill slopes, a protective berm of topsoil shall be left in this area, running parallel to the contours for the purpose of restricting drainage runoff; the topsoil berm shall be seeded as required for stockpiles. Other erosion and siltation control measures may include slip trench silt traps and brush checkdams. All cut slopes and embankment fills are to be immediately laid back and stabilized in accordance with the erosion control guidelines listed on the plan.

The specific erosion and sediment controls to be employed during construction are intended to provide effective erosion control by minimizing land disturbance at one given time, containing sediment from disturbed areas, treating runoff where possible, and stabilizing disturbed soils as soon as possible. The directives specified on the plans and in the stormwater report serve as a minimum for erosion and sediment control. Further practices and measures may be required pursuant to on-site inspections in conformance with the requirements of the SPDES GP-0-10-001 permit. As per the SPDES permit, inspections are to be performed once a week and within 24 hours of ½" of rainfall. All erosion and sediment control practices specified for the Site will be in conformance with the **New York Standards & Specifications for Erosion & Sediment Control**. Preliminary Erosion and Sediment Control Plans are included as Exhibit III.D-5.

Temporary Erosion and Sediment Control Practices, Short Term Maintenance and Inspection Requirements

Listed below are the Temporary Erosion and Sediment Control Practices specified on the Erosion and Sediment Control Plan (see Exhibit III.D-5). All practices will be installed and maintained in conformance with the **New York Standards & Specifications for Erosion & Sediment Control**:

- Stabilized Construction Entrance
- Sediment Trap
- Silt Fence
- Temporary Swale
- Temporary Sediment Basin
- Diversion channels
- Water Bars

Stabilized construction entrances will be installed at the construction entrances to the Site. The construction entrance is designed to prevent outgoing trucks from tracking soil onto the public roads. Construction details specifying installation requirements can be found on the plan.

Inspections performed during construction should verify that all practices are functioning properly, are correctly maintained, and that accumulated sediment is removed from all control structures. The inspector must also examine the Site for any evidence of soil erosion, the potential for pollutants to enter the storm drain system, turbid discharge at all outfalls, and the potential for soil and mud to be transported on the public roadway at the Site entrance. In addition to these general guidelines, the project plans will provide more specific erosion control guidelines, as well as a construction sequence to guide the contractor through the construction process.

Discussed below are specific maintenance and inspection requirements for the temporary practices to be employed at the Site.

- During construction, the silt fence should be inspected to ensure correct installation. In addition, any accumulated sediment resulting in "bulges" in the silt fence should be removed and mixed with on-site soil. Any damaged or torn silt fence should be replaced. The silt fence for the Site will consist of a geotextile fabric installed at the toe of all disturbed slopes and parallel to the contours. The silt fence is intended to reduce runoff velocity and intercept sediment-laden runoff. Construction details specifying the proposed installation and type of permissible silt fence are on the plans.

- During construction, the construction entrances should be checked to ensure no sediment is being deposited onto the public roadway. Should sediment be observed, it should be removed from the street, and the stone in the construction entrance replaced.

- STWB's #1 and #3 are designed as micropool extended detention (ED) basins. These SWTB's will be used as temporary sediment basins during construction. The intent of the temporary sediment basin is to intercept sediment laden water and trap the sediment. Temporary sediment basin will be providing 3,600 cf of volume per acre of drainage area. (SWTB's #2, #4 and #5 are designed as infiltration basins and they will not be used as temporary silt basins during construction). Each sediment basin should be inspected to ensure that 50 percent of the original capacity is remaining. Should sediment accumulate to 50 percent of the original volume the sediment should be removed and mixed with on-site soils. Upon achievement of final stabilization the sediment traps can be removed and the stormwater quality basins constructed in their place.

- The temporary swales should be checked for erosion. Any observed erosion should be corrected immediately. In addition it should be verified that non-

erosive velocities are maintained at the outlet of the swale. If erosive velocities are observed, i.e. scouring or riling in down gradient areas, the design engineer should be contacted immediately and an outlet protection be designed and installed.

Once construction is completed and the site has been stabilized, a "Notice of Termination" shall be filed. At this point, limited maintenance requirements are anticipated.

Permanent Erosion and Sediment Control Practices, Long Term Maintenance and Inspection Requirements

Once final stabilization is achieved and construction complete, maintenance and inspections will be limited to the infiltration basins (x3) and the extended detention basins (x2). A copy of the Maintenance and Inspection Checklists from Appendix "J" of the **New York State Stormwater Management Design Manual** are included in the Appendix of the stormwater report to serve as a guide for maintaining and inspecting the infiltration and extended detention basins.

Inspections of the following items should be performed at a minimum annually and following significant rainstorm events.

Infiltration Basins

- Inspection of the infiltration basins to ensure accumulated water is infiltrating into the soil, and debris has not entered the infiltration basins. Any debris should be removed. Once debris is removed, if stormwater is still not infiltrating contact a professional engineer licensed in the State of New York to examine the system.
- Inspection of the outlet of the overflow pipe to ensure it is not plugged or clogged.
- Remove silt from forebays when the accumulated sediment is ½ of the design height.

Extended Detention Basins

- Clogging of Low Flow Orifice
- Debris collecting in or on the outlet structure
- The health and condition of the plantings within the facility. Healthy plants are essential to the practice functioning properly. Any dead or diseased vegetation should be removed immediately and replaced.

Rock Outlet Protection:

- Inspection of the rock pad to ensure no stones have become dislodged. Any missing stones should be replaced.

Catch Basins and Drain Manholes

- Inspect monthly and after heavy rain storms > ½" in 24 hours for sediment accumulation in sumps. Accumulated sediment should be removed immediately.

The intent of the permanent erosion and sediment control practices is to permanently stabilize the ground surface via vegetative and structural practices, while controlling and reducing runoff velocities.

Vegetation will be provided on all disturbed soils not covered by the proposed buildings, parking lots and driveways. Permanent vegetation will reduce runoff velocities, filter stormwater runoff, and minimize soil erosion. Optimum times for planting are the early spring and fall; however, plantings can be started in the summer provided adequate mulch and moisture is supplied. In addition to a permanent vegetative cover, the following permanent erosion and sediment, control practices are proposed for the Site: rock outlet protection and land grading.

Rock outlet protection is proposed at the outfalls of the infiltration basins and the extended detention basins as well as at all the end sections terminating the site drainage conveying system. The intent of the rock outlet protection is to reduce the depth, velocity, and energy of water to prevent downstream erosion. Designed in accordance with the **New York Standards & Specifications for Erosion & Sediment Control** details specifying dimensions of the rock outlet protection have been included on the plans.

Land grading is the reshaping of the existing land surface in accordance with the grading plan. Proper land grading is an essential component of the erosion control plan, as well as the stormwater pollution prevention plan. Given the relatively flat nature of this Site, arrows indicating the direction in which the land is to pitch were added to the plan to enhance the proposed grading. Proper grading will ensure the intended drainage areas are directed to the stormwater management practices.

Ownership and Maintenance

As described previously, the development would be privately owned, including all stormwater management facilities. Responsibility for maintenance of the

project infrastructure and improvements would be with the owner of the community and/or future homeowners association (HOA).

Measures Identified to Reduce Existing Phosphorus

As stated in the *Stormwater Pollution Prevention and Stormwater Management Plan* (methodology section, Chapter 10: Enhanced Phosphorus Removal Standards), *New York State Stormwater Management Design Manual* has been employed to develop hydrological model. Comprehensive hydrologic model and pollutant loading analysis included in Appendix E.

Implementation of Integrated Pest Management (IPM)

Given the potential impacts described herein, a specific long term monitoring program to detect impacts from pesticides and fertilizers for the project is not proposed. Measures to mitigate potential impacts to water quality as described herein will be incorporated as part of the project, therefore, a separated monitoring plan document is not warranted.

Thermal Environment

It is anticipated that the development of the Site will have no significant impact to the thermal environment of the watercourse at the design point, therefore mitigation on the property is limited to: maintenance of vegetation in the infiltration and stormwater management basins to limit insolation on water resident in the facilities, maintenance of the flow paths from the discharge points of the infiltration and stormwater management basins to the wetlands to ensure there is contact between runoff and vegetation. This would maximize the opportunity for infiltration, and also permit the temperature of the runoff to decrease from the time it exits the basin to the time it enters the watercourse at the design point. See also Chapter III.F.3.

Pollutants During Construction

The following pollutants could be present during construction and upon completion of construction. Their impact and mitigation measures are described below.

Sediments (Suspended Solids):

Sources of sediment include wash off particles that are deposited on impervious surfaces and erosion from streambanks and construction sites. The impacts of total suspended solids (TSS) have been evaluated in the Stormwater Management Report for pre- and post-development conditions and with the

Site's proposed stormwater treatment systems the post-development impacts have been reduced below the pre-development levels. Refer to Appendix E for numerical and comprehensive site analysis. During construction, the sediment and erosion control measure shall be enforced to control the sediment migration. Refer to Sediment and Erosion Control Plans and Construction Sequence for the additional information and methodology.

Nutrients:

Phosphorus and nitrogen have been evaluated under the NYCDEP Rules and Regulations and the comprehensive study is included within the Stormwater Management Report. The study evaluates pre- and post-development conditions and found that the proposed stormwater treatment systems shall reduce the impacts. During construction, some of the stormwater treatment basins shall be used as temporary basins and shall have a significant value providing extended detention time to reduce the phosphorus and nitrogen levels.

Organic Carbon:

Organic matter, washed from impervious surfaces during storms, can present a problem in slower moving downstream waters. Some sources include organic material blown onto the street surface, and attached to the sediment from stream banks, or from bare soil. In addition, organic carbon is formed indirectly from algal growth within systems with high nutrient loads. This pollutant shall also be handled with Sediment and Erosion Control measures during construction and utilizing the stormwater treatment systems after completion.

Bacteria:

The sources of this contaminant could include: pet waste, wildlife waste, sanitary and combined sewer overflows, wastewater and illicit connections to the storm drain system. Contamination in relation to sewer will not be applicable to the Site, since the project will be sewered and connected to the Heritage Hills of Westchester sewer collection system. Other sources such as pet and wildlife waste may be applicable.

HydroCarbons:

Project streets and parking areas, as well as leaking cars and grease, are the predominant source for this pollutant. During construction, hydrocarbons shall be controlled by the Sediment and Erosion Control measures. Heavy equipment will be refueled by daily deliveries to the Site. Gasoline and oil for small engine equipment will be stored in construction equipment storage sheds. Refueling will

take place at least 100 feet from the drainage swales to preclude any possible escape of spilled fuel to stormwater. In the event of any major spill, its capture and the removal of contaminated soil will be conducted under the NYSDEC regulations for spill remediation. After completion, even though there is no specific permanent structures proposed, it is anticipated that the hydrocarbon generation from the Site would be minimal or none.

Trace Metals:

Cadmium, copper, lead and zinc are the primary pollutants originated from automobiles. Lead, zinc and copper have been evaluated in the pollutant loading analysis located within the Stormwater Management Report and impacts have been mitigated using the Site's stormwater treatment systems.

Chlorides:

Salt applied to roads and parking lots in the winter months is the source of this pollutant. The Applicant will consider a low salt application consistent to that of the NYCDEP adjacent to reservoirs.

Thermal Impacts:

Runoff from impervious surfaces may increase temperature in receiving waters, adversely impacting aquatic organisms that require cold and cool water conditions. (See below for further discussion of thermal impacts).

Trash and Debris:

Construction debris, such as sheet metal and wood scrap, paper and insulation products, styrofoam cups and paper wrappers can become windblown litter over and off the Site if neglected. Suitable and ample refuse containers shall be provided on the Site and emptied when full. Any scattered debris shall be picked up and placed in containers on a continuous basis.

Snowmelt Concentrations:

After project completion, the snowmelt runoff and pollutants carried within the runoff will be flowing to the Site's stormwater treatment system and mitigated accordingly. The low impact alternative plan (Alternative C5 in Chapter IV) may best handle this condition with grassed and rip-rap swales to provide infiltration. However, all alternative shall have direct snowmelt from impervious surfaces directed to a Stormwater Treatment Practice.

Thermal Modification, Sediment Transport, Cumulative Impacts:

Runoff from the Site will be conveyed into both stormwater management basins and infiltration basins. Thermal impacts occur when runoff at an elevated temperature mixes with cooler water in the receiving waterbody, causing an increase in temperature of the water. In general, the maximum temperature for sensitive fish species ranges to about 78° F. Studies have shown that runoff from building roofs and paved parking areas can reach temperatures of about 110° F.

The temperature of runoff is dependent on several factors, including the land cover type, the ambient air temperature, which is dependent mostly on the season, the temperature of the surface of the land use, the depth of precipitation, and the time of day of the precipitation event. Thermal effects in this area are mostly limited to the summer months since, in bodies of water with temperature dependent species such as trout, warm water temperatures can be lethal.

Land cover types, such as asphalt pavements and roofs can exhibit very warm temperatures, given sufficient solar insolation to heat up. Temperatures at the surface of such land cover types between 105° to 120° F on sunny days during late summer mornings and afternoons are not uncommon.

There are many factors that can also impact the temperature of the runoff. The ambient air temperature will have an impact not only on the temperature of the land cover type which the rainfall strikes, but also the temperature of the rain. The depth of precipitation also impacts the temperature of the runoff. During a rainfall event, the runoff at the beginning of the event is the warmest, since as the rainfall event continues, the temperature of the pavement surface and building roofs will drop as heat is transferred to the runoff. The ambient air temperature may also drop during the rainfall event, sometimes significantly, as during a summer thunderstorm. This, in turn, will reduce the initial temperature of the precipitation impacting the pavement surface or building roof. Finally, the time of the day affects the temperature of the runoff. If the rain falls in the morning before or shortly after sunrise, the building roofs and roads have not been subjected to appreciable solar radiation. Their surface temperature is then typically equivalent to the ambient air temperature, which in summer mornings is usually about 65° F. If a rainfall event occurs in the afternoon as often occurs with summer thunderstorms, then the above noted impervious surfaces would have been subject to hours of solar insolation and may become much warmer than the ambient air temperature. It is this latter conservative analysis which was performed.

The temperature of the runoff from the Site would be attenuated within the stormwater management basin due to contact with vegetation, as well as when

it traverses wooded areas between the discharge points from the basins and the watercourse.

The calculation of the potential thermal impact to the watercourse was performed for the Water Quality Volume, since this would account for 90% of the storm events. In addition, as noted above, the temperature of the runoff drops during a storm event as heat is transferred from building roofs and pavement, and, as usually occurs, the ambient air temperature decreases during the precipitation event. Therefore, it is the smaller and more frequent storm events that potentially have the more significant impact on the temperature of the watercourse.

To determine the potential thermal impact of runoff, a mass balance is calculated using the temperature of the runoff and the temperature of the water in the watercourse at the design point. Runoff into drainage areas SUB4, SUB7, SUB8, and SUB9 will be conveyed to infiltration basins. As noted above, for storm events up to the 1 year storm, there is no runoff from these drainage areas. The runoff that enters these infiltration basins will therefore not directly enter the watercourse, and will be cooled to the ambient soil temperature as the runoff enters the soil. The runoff from drainage areas SUB1, SUB2, SUB3, SUB5 and SUB6 will be conveyed to stormwater management basins. Some of the runoff that enters these basins will be discharged to the watercourse via the outlet control structure.

Runoff from building roofs and pavement will be conveyed into the network of subsurface storm drainage pipes, or be conveyed by overland flow to the stormwater management basin. Within the stormwater management basin, which will be vegetated, there is an opportunity for some thermal attenuation, as the runoff encounters plant stems and shoots. Only a portion of the runoff in the stormwater management basin will actually be discharged to the watercourse, after flowing across the wetland buffer into the wetland.

In order to assess the thermal impact of the development of the Site, an analysis was done to determine the flow in the watercourse at the design point. The watercourse is not a gaged stream, and the flow in a watercourse will vary seasonally and as a result of individual storm events. To determine the flow in the watercourse, stream information was obtained for seven nearby gaged watercourses from USGS stream gages. For each stream, the drainage area, most recent flow, minimum, median, mean and maximum flows were obtained from the USGS StreamStats web site. The flows were then calibrated to a per square mile basis in order to derive a reasonable stream flow for the watercourse at the design point (see table below). The drainage area to the design point is calculated

by the project engineer (and by StreamStats) to be 2.83 square miles. To be conservative in the analysis, the minimum flow in the stream was used in the thermal impact calculations, since the minimum flow typically would occur in the summer months corresponding to the time of the year with the greatest potential for thermal impacts. Based on an average minimum flow of 0.22 cubic feet per second per square mile of drainage area, it was determined that the minimum flow in the watercourse would be about 0.62 cubic feet per second.

Table III.E-22
Watercourse Flow Rates Calculation

USGS Station	**01374701**	**01374505**	**01374901**	**01374531**	**01374781**	**0137462010**	**01374654**	**Not Gaged**
Location	**W Branch Croton River Near Croton Falls**	**East Branch Croton River at Brewster**	**Cross River at Katonah**	**East Branch Croton River Near Croton Falls**	**Titicus River Below June Road at Salem Center**	**West Branch Croton River Near Carmel**	**Middle Branch Croton River Near Carmel**	**Watercourse Design Point at Somers Crossings Site**
Drainage Area (sq miles)	80.4	81.2	29.9	86.4	12.9	42.9	13.7	**2.83**
Most Recent Flow (cfs)	224	50	9.7	50	0.64	33	0.08	**n.a.**
Minimum (cfs)	18	16	4	45	0.4	15	1.2	**0.62**
Median (cfs)	50	71	14	71	8.2	30	6.3	**1.85**
Mean (cfs)	75	85	26	82	15	32	14	**2.72**
Maximum (cfs)	346	205	66	159	37	44	53	**7.54**
On Drainage Area Per Square Mile Basis								
Most Recent Flow (cfs)	2.79	0.62	0.32	0.58	0.05	0.77	0.01	
Minimum (cfs)	0.22	0.20	0.13	0.52	0.03	0.35	0.09	**0.22**
Median (cfs)	0.62	0.87	0.47	0.82	0.64	0.70	0.46	**0.65**
Mean (cfs)	0.93	1.05	0.87	0.95	1.16	0.75	1.02	**0.96**
Maximum (cfs)	4.30	2.52	2.21	1.84	2.87	1.03	3.87	**2.66**

Data Source: USGS stream gages (http://waterwatch.usgs.gov/?m=real&w=gmap&regions=ny)

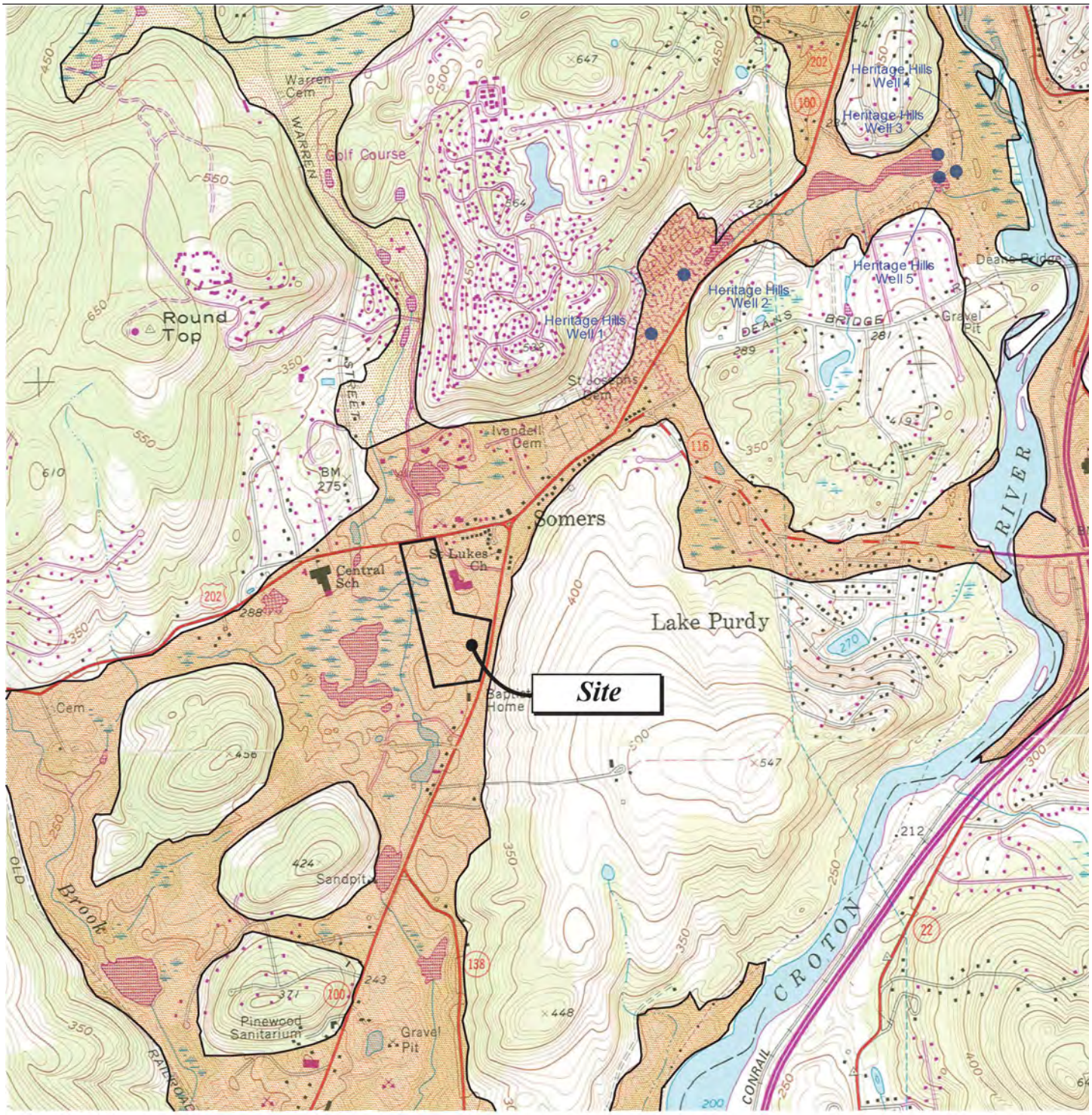
During the 1 year storm event (the water quality volume storm), approximately 4,496 cubic feet of flow would pass the design point during the 2 hour period when 50% of the runoff in the storm occurs. In addition to the runoff from the Site, there is also runoff contributed by the off-site watersheds, which in the stormwater management report are identified as IBM Pond and Off-Site which also flow to the design point. To model the runoff from all of these watersheds, the runoff volume in acre-feet was obtained from the stormwater management report for the 1 year storm and plugged into the mass balance calculations. The

temperature of the runoff from the IBM Pond was assumed to be 75° F; for the watercourse and the off-site watershed, the temperature of the runoff was assumed to be 65° F, whereas the entire volume of runoff from the Site that enters the watercourse is assumed to be at a temperature of 95° F.

PRE-DEV'T Drainage Area	Runoff Vol (acre-feet)	90% Rule Runoff Vol (cu feet)	90% Rule 50% Runoff Vol	Water Temp.	50% Runoff Vol x Temp
Watercourse			4,494	65.0	292,093
IBM POND	6.375	277,695	138,848	75.0	10,413,563
OFF-SITE	106.269	4,629,078	2,314,539	65.0	150,445,023
	Totals		2,457,880		161,150,679
		Calculated water temperature =			65.6

POST DEV'T Drainage Area	90% Rule Runoff Vol (acre-feet)	90% Rule Runoff Vol (cu feet)	50% Runoff Vol	Runoff Temp.	50% Runoff Vol x Temp
Watercourse			4,494	65.0	292,093
IBM POND	6.376	277,739	138,869	75.0	10,415,196
OFF-SITE	106.269	4,629,078	2,314,539	65.0	150,445,023
SWTB#1	0.853	37,157	18,578	95.0	1,764,942
SWTB#3	1.358	59,154	29,577	95.0	2,809,838
	Totals		2,506,057		165,727,093
		Calculated water temperature =			66.1

Based on the mass balance analysis, it shows that the development of the Site as a worst case (assuming that all of the runoff from the 1 year storm event is at 95° F for the entire storm duration) could result in an increase in the water temperature of the watercourse by about 0.5^{o} F. This increase is not a significant impact. The principal reason there is no significant impact is that the contributing off-site areas are far larger than the portion of the Site that will contribute runoff to the design point.



Town of Somers Groundwater Protection Overlay District

0 1000'

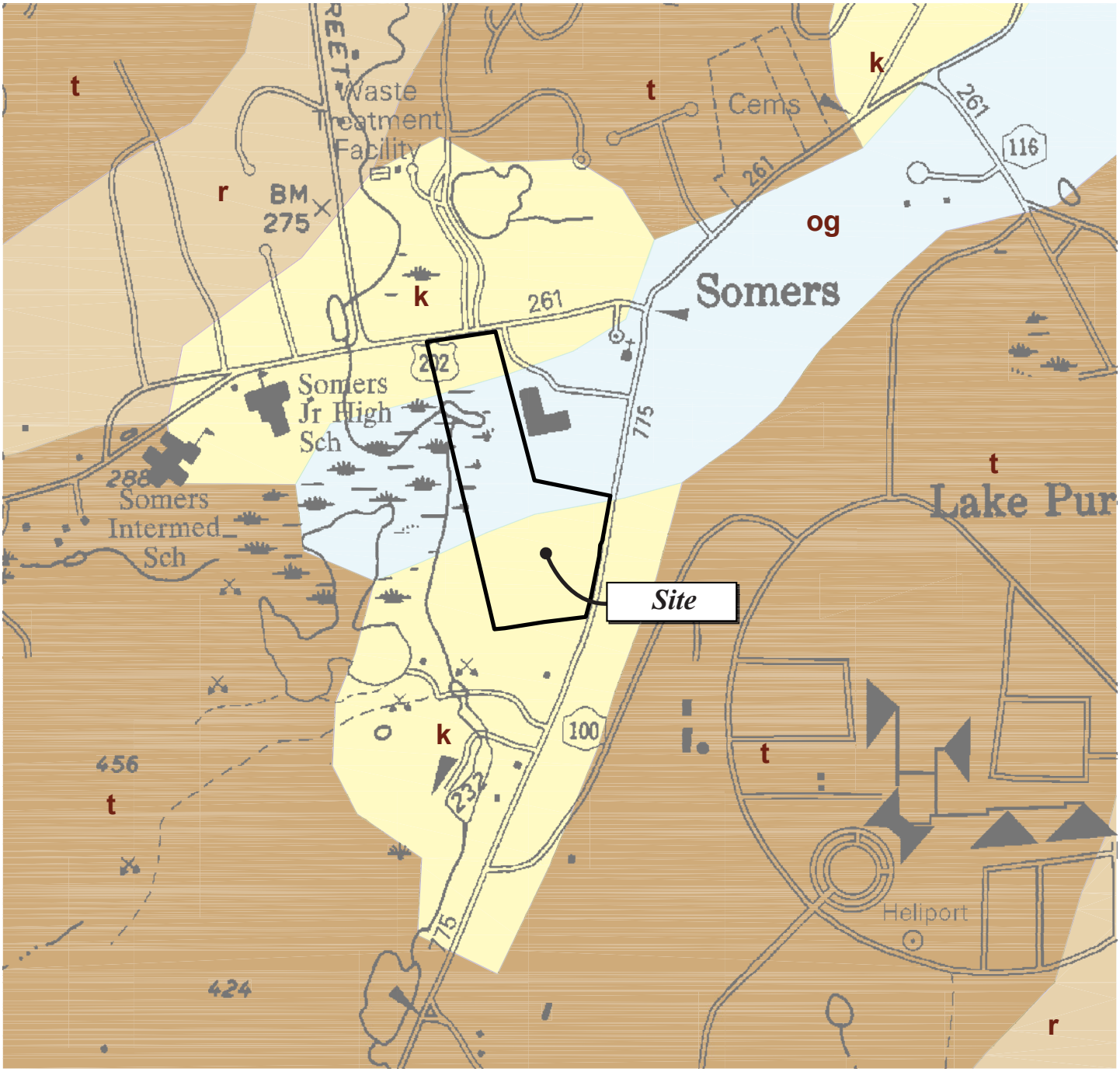
Source: Leggette, Brashears & Graham, Inc

SOMERS CROSSING
Somers, New York

Groundwater Protection Overlay District

Exhibit
III.E-1

VHB Engineering, Surveying and Landscape Architecture, P.C.



og Outwash Sand and Gravel
k Kame Deposits
r Bedrock - Exposed or within 3 Feet of Surface
t Till

0 500'

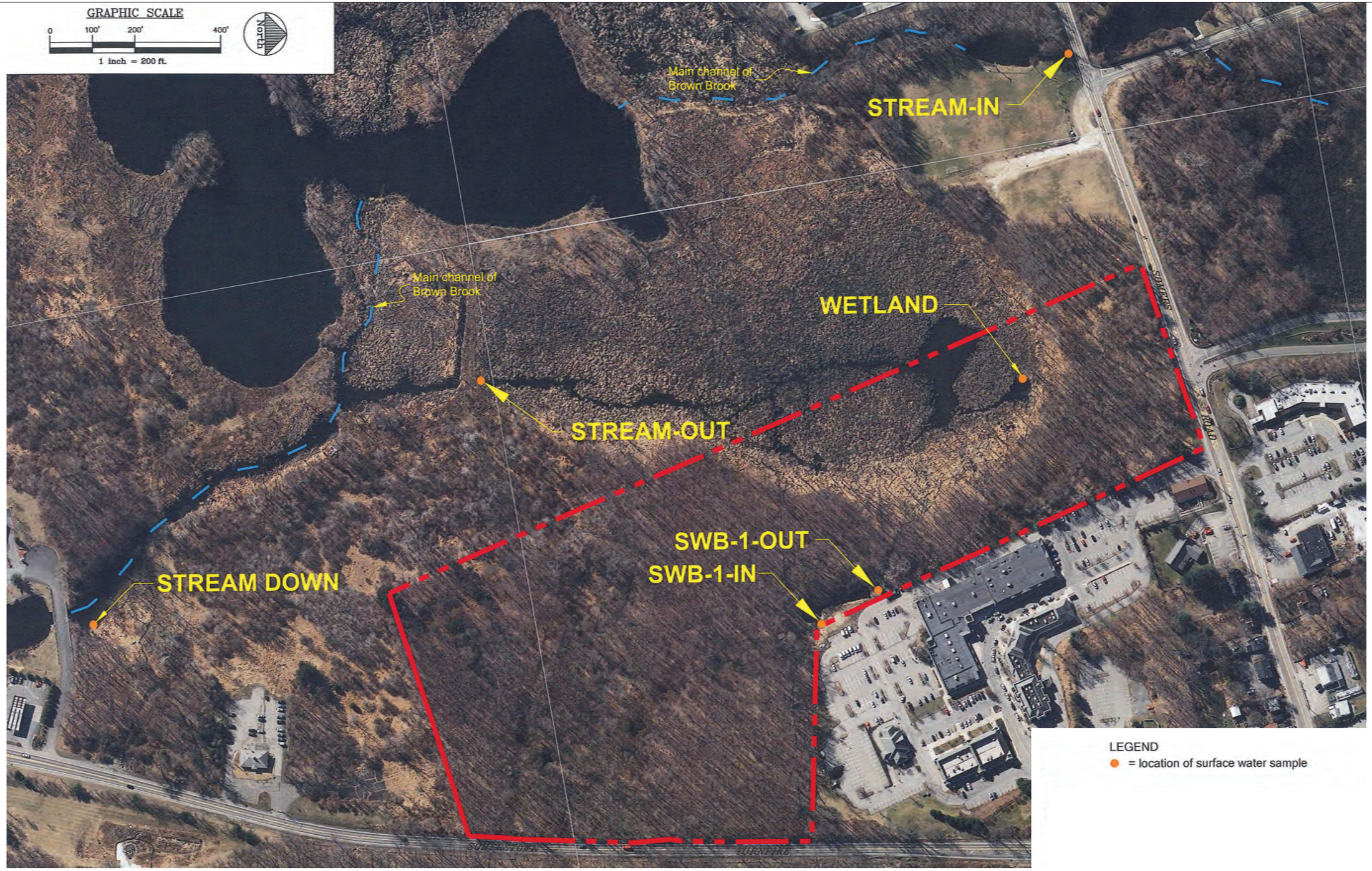
Source: New York State Geological Survey "Surficial Geology-Lower Hudson Sheet" 1997, New York State Museum Map and Chart Services Number 15.

SOMERS CROSSING
Somers, New York

Overburden Geology

Exhibit
III.E-2

Engineering, Surveying and Landscape Architecture, P.C.



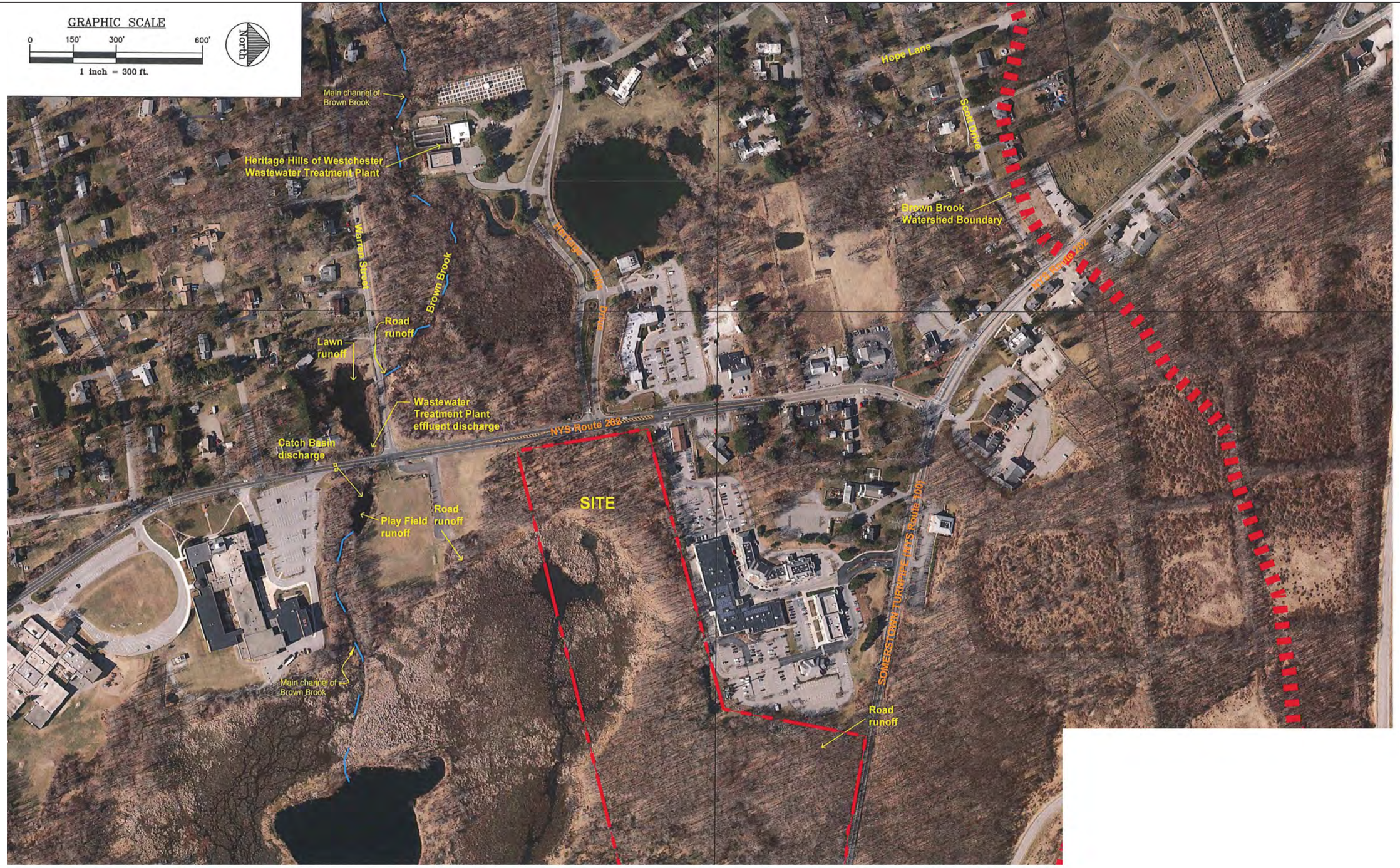
Source: Evans Associates Environmental Consulting , INC.

SOMERS CROSSING
Somers, New York

Surface Water Sample Locations

Exhibit
III.E-3

Engineering, Surveying and Landscape Architecture, P.C.



Source: Evans Associates Environmental Consulting , INC.

SOMERS CROSSING

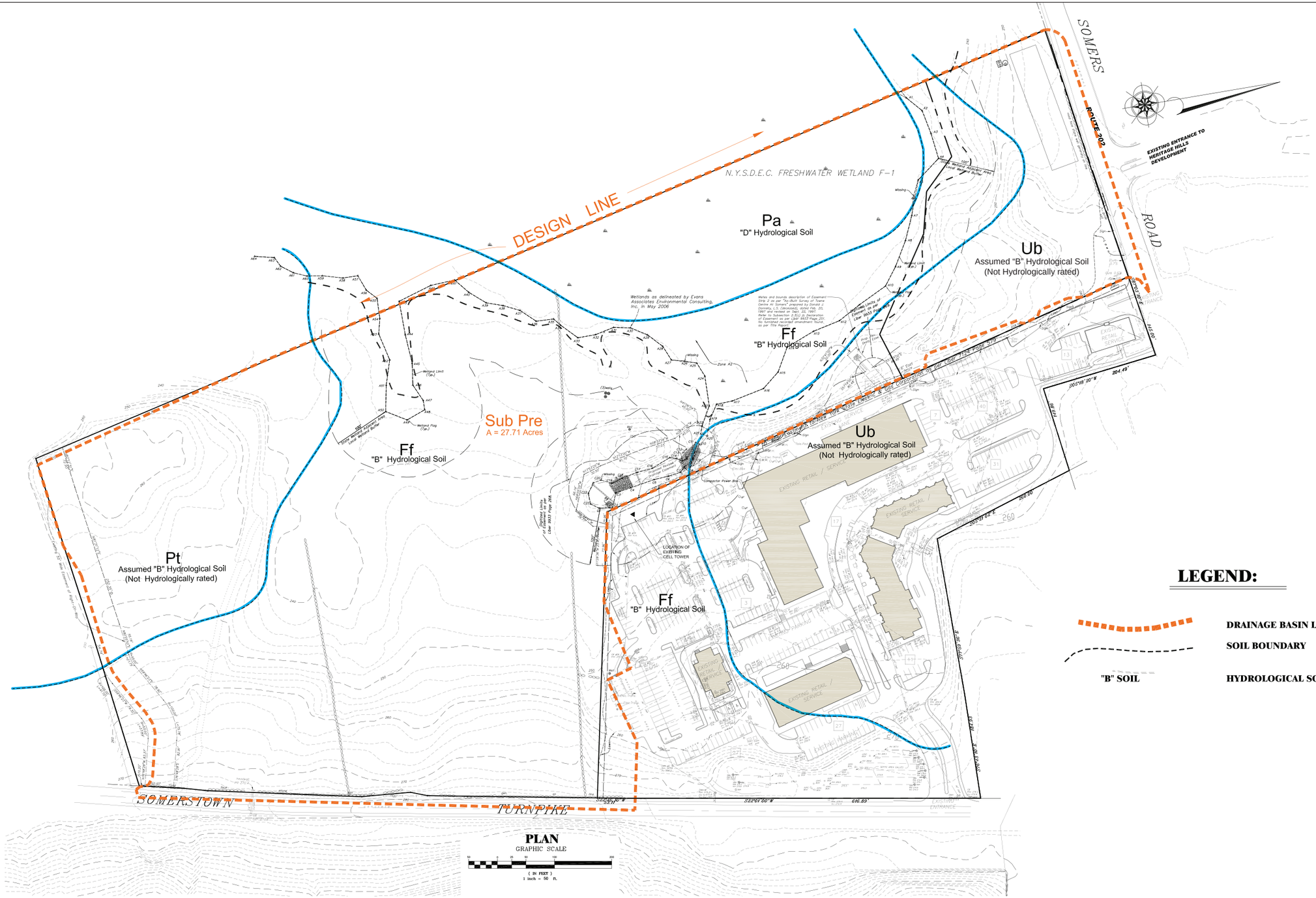
Somers, New York

Point & Non-Point Pollution to Brown Brook

Exhibit

III.E-4

Engineering, Surveying and Landscape Architecture, P.C.



Source: Bibbo Associates, LLP.

SOMERS CROSSING

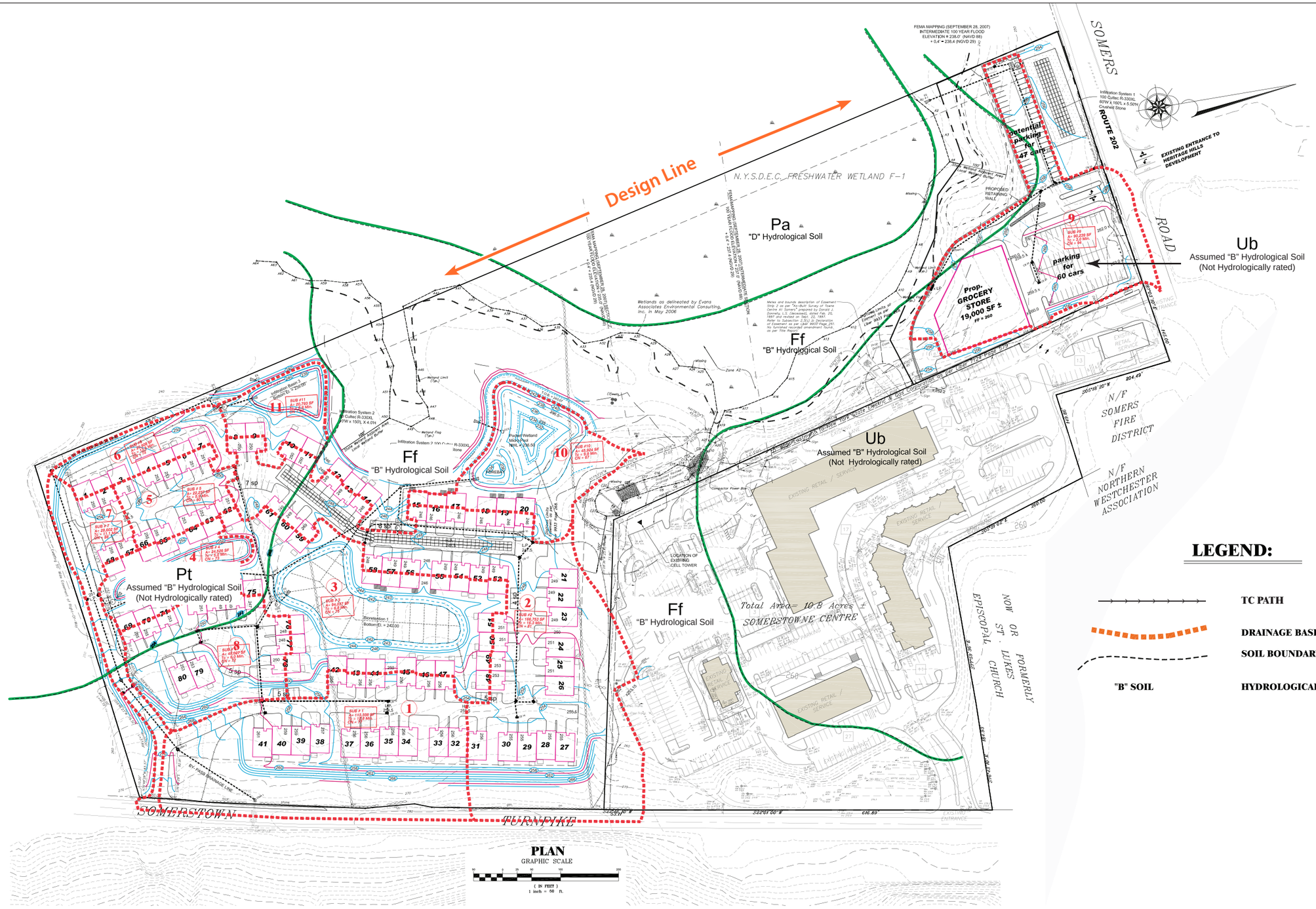
Somers, New York

Pre-Development Drainage

Exhibit

III.E-5

Engineering, Surveying and Landscape Architecture, P.C.



Source: Bibbo Associates, LLP.

SOMERS CROSSING

Somers, New York

Post-Development Drainage

Exhibit

III.E-6

VHB *Engineering, Surveying and Landscape Architecture, P.C.*

F. Terrestrial and Aquatic Ecology

1. Vegetation

a) Existing Conditions

The majority of the Site (21.40 acres) consists of successional southern hardwood forest, which is an upland vegetative community. Wetland communities are dominated by shallow emergent marsh (3.92 acres) and red maple swamp (1.15 acres). The Site also contains small areas of mowed lawn and a stormwater basin. Red maple (Acer rubrum) and white ash (Fraxinus americana) trees dominate the overstory, along with the invasive species tree-of-heaven (Ailanthus altissima). The understory is dominated in many areas by Japanese barberry (Berberis thunbergii) shrubs and Japanese stilt-grass (Microstegium vimineum), both invasive, non-native species. A detailed discussion of the ecological communities on the Site, including a description of survey methodologies, analysis of site and supporting documentation to reach conclusions is presented in the Biological Assessment Report prepared by Evans Associates in Appendix F. See also Exhibit III.F-1, Ecological Communities for locations.

<u>Tree Survey</u>

A tree survey was conducted by Donnelly Associates in accordance with Chapter 156 of the Code of the Town of Somers in August 2009. All trees on the Site (excluding the wetlands/areas not to be disturbed) with a diameter at breast height (DBH) of 12 inches or greater were marked with a numbered tag, measured for DBH and survey located. The trees were identified and assigned a health class of poor, fair or good. Trees considered in good health have no structural damage or disease, and show no signs of insect infestation. Trees in fair health may have been structurally damaged (for example by storms, lightening, or falling trees) or may show signs of insect infestation or disease. Trees in poor health show serious structural damage or disease, and are likely to die within a few years. In total, 1,418 trees were identified. A reduced version of the Tree Survey is included as Exhibit III.F-3.

The tree data are summarized by species in Table III.F-1, Summary of Tree Survey Data by Species. As indicated on this table, the most common tree species on the site is red maple which comprises about 60 percent of all the trees that were identified. Other common tree species include tree of heaven, white ash and black cherry.

The tree survey data are summarized by tree size in Table III.F-2, Summary of Tree Survey Data by Size. As can be seen in this table, most of the trees on the site are relatively small caliber. More than half (80 percent or 1,134 trees) of the trees have a DBH of 14 inches or less and approximately 50 percent (709 trees) have a DBH of 12 inches or less.

Table III.F-1
Summary of Tree Survey Data by Species

Common Name	Number
Maple	849
Catalpa	2
Elm	12
Hickory	17
Tulip	7
Walnut	2
Poplar	11
Spruce	1
Tree-of-heaven (Ailanthus)	191
Black birch	11
White ash	138
Red cedar	6
Sycamore	5
Black cherry	84
Oak	45
Apple	6
Locust	31
Totals	**1,418**

Source: Bibbo Associates, LLP

Table III.F-2
Summary of Tree Survey Data by Size

DBH	Number
12	709
14	425
16	176
18	47
20	20
22	9
24	19
26	3
28	1
30	4
36	4
40	1
	1,418

Source: Bibbo Associates, LLP

Protected Species

Protected species that could potentially occur on or in the vicinity of the Site were determined by the NYSDEC. A response letter, dated June 11, 2013 from NYSDEC, states that there are no records of sensitive resources identified by this review for state-listed species. In addition, the on-line NYSDEC Nature Explorer website, which references data from the New York Natural Heritage Program (NY NHP), was accessed on March 7, 2014 and the same results were found. The response letter and website information are shown in the attachments to the Biological Assessment Report in Appendix F. Of the six species of Federally protected plants known to occur in New York State, none occur in Westchester County. There are no local (County or Town) regulations concerning protected species. There is a "threatened species" list compiled by the Westchester County Department of Parks, but this list has no regulatory applicability beyond County park lands. As the site of the Proposed Action is private property, it is instead governed by the State designation of threatened and endangered species.

b) Anticipated Impacts

Impacts to the vegetative communities on the Site are shown on Exhibit III.F-2, Ecological Communities Impacts. The table below summarizes the proposed impacts by vegetative community.

Table III.F-3
Proposed Ecological Community Impacts

Community	Area Proposed to be Disturbed (acres)	Percent of Total Site
Successional Southern Hardwood Forest	15.95	59.78
Mowed lawn	0.09	0.34
Shallow Emergent Marsh	0	0
Red Maple Hardwood Swamp	0	0
Stormwater Basin	0.01	0.04
Total Site Area Disturbance	16.1	60.2 %

Approximately 16 acres or 60% of the vegetative communities on the Site will be altered by the proposed plan. The majority of the site development will take place in the Successional Southern Hardwood Forest community. As described in the Biological Assessment Report in Appendix F, this second growth forest community comprises over 80% of the Site, and typically occurs on sites that have been previously disturbed or cleared. The dominant tree species in this community are red maple (*Acer rubrum*) with black cherry (*Prunus serotina*), white ash (*Fraxinus americana*) and tree-of-heaven (*Ailanthus altissima*) also being relatively common. The shrub layer varies over the Site from being very sparsely vegetated to completely dominated by the non-native invasive species Japanese barberry (*Berberis thunbergii*). The herbaceous layer was poorly developed except for areas that are dominated by the non-native invasive species Japanese stilt grass (*Microstegium vimineum*). The forested upland portions of the Site have very little leaf litter (duff) or woody debris on the forest floor. Taken together, the relatively low species diversity in the Successional Southern Hardwood Forest community, the prevalence of invasive species, and the general lack of topsoil from past mining activities results in sub-optimal habitat for most wildlife species.

The trees and shrubs on-site can provide some nesting and perching areas for birds and limited habitat for other small animals, however, food sources are limited. Breeding birds were observed primarily within and near the edges of the wetlands; few birds were observed in the uplands on the Site. While deer likely occupy the Site at times, bedding sites were not observed in the wooded uplands and if they occur, they would likely be located closer to the wetlands in the denser vegetation. In contrast, as discussed in the Biological Assessment Report, the most valuable wildlife habitat is located in NYSDEC Freshwater Wetland F-1, the edge of which extends onto the Site. This wetland contains good aquatic habitat for wetland flora and fauna, as the emergent marsh habitat is fairly diverse and

densely vegetated in many areas. Impacts to this wetland habitat have been avoided in order to maintain the biodiversity of the area.

The quality of stormwater leaving the Site is not expected to be impacted by the proposed plan. See Chapter III.E.2 and the Stormwater Pollution Prevention Plan (SWPPP) in Appendix E. Impacts to site visual resources are discussed in Chapter III.M. As discussed in Chapter III.R., removal of existing vegetation from the Site will not cause more noise to travel from the Site to adjacent properties.

Tree Impacts

Tree removal is an unavoidable impact of the Proposed Action. The anticipated limit of disturbance line is superimposed on the tree survey on Exhibit III.F-4, Tree Impacts. As shown on Exhibit III.F-4, most of the trees within the proposed limit of disturbance are of smaller caliber (12-14" DBH or less). As shown on the exhibit, approximately 864 trees are estimated to be removed for the residential development on the southern portion of the Site and 203 trees are estimated to be removed for the grocery store on the north end of the Site, for a total of 1,067 trees to be removed. These trees are categorized by type and size on the table on the exhibit. A final Tree Removal Plan in accordance with the requirements of Chapter 156 of the Somers Town Code will be prepared when the plan is further refined, and submitted as part of the Tree Removal permit with the final Site Plans.

c) Mitigation Measures

Permits that will be required for the proposed disturbance of site vegetation include Site Plan Approval, a Wetland Permit, and a Tree Removal Permit from Town of Somers Planning Board, and a NYSDEC Wetland Permit (for minor encroachments into the 100' wetland adjacent area), which includes wetland mitigation requirements.

Tree removal regulations are found in Chapter 156, Tree Preservation, of the Somers Town Code. The Tree Preservation regulations in this chapter spell out in detail the provisions required for preparing an application for a tree removal permit to be submitted to the Town Engineer, who shall approve, approve with conditions, or deny the application.

Regarding disturbance of wetland adjacent areas, the NYSDEC states: "…activities that could have negative impact on wetlands are regulated. A local and state wetlands activity permit is required to conduct any regulated activity in a protected wetland or its adjacent (buffer) area. The permit standards in the regulations require that impacts to wetlands be avoided and minimized. If the

proposed activity will not seriously affect the wetland, a permit with various conditions is usually issued. If the proposed activity will affect the wetland, the benefits gained by allowing the action to occur must outweigh the wetland benefits lost, in order for a permit to be issued. Compensatory mitigation often is required for significant impacts to wetlands. This may include creating or restoring wetlands to replace the benefits lost by the proposed project." See Chapter III.F.3, Terrestrial and Aquatic Ecology for more information on the Site wetlands and wetland buffers (local and state).

To the extent possible, impacts have been avoided by the proposed plan layout. The wetlands on the Site provide the most valuable vegetation and wildlife habitats based on species diversity and specificity. There are no proposed impacts to wetlands; therefore, direct impacts have been avoided completely. Indirect impacts (such as impacts to hydrology or water quality) have been avoided and/or mitigated through the preparation of a SWPPP which includes sediment and erosion control and site maintenance and monitoring. Development has also been avoided in wetland buffers to the maximum extent practicable. The proposed development is located directly adjacent to the Towne Centre shopping plaza and will therefore not create areas of forest fragmentation or impact sensitive or rare ecological communities.

A Conceptual Landscape Plan (see Exhibits II-6A and II-6B) has been prepared to depict the landscaped and undisturbed natural vegetation areas of the Site. A detailed Landscape Plan will be prepared further along in the application process, and will incorporate any wetland buffer enhancement measures required to offset the unavoidable encroachments into the wetland buffer. At that time, the species of plants, sizes, quantities and growing habits will be discussed. Native, non-invasive species will be chosen in order to best represent natural wildlife habitat.

The wildlife that will inhabit the Site are development-tolerant species that will find habitat in the landscape plantings, the bioretention area, and the pocket wetland. In addition, any mitigation plantings in the wetland buffers will improve and encourage wildlife habitat in that area.

The majority of the wetland buffers will not be disturbed by the proposed project. A wetland buffer mitigation plan has been prepared to enhance areas of the wetland buffer that are currently compromised by past site disturbance and the overgrowth of invasive species. Mitigation plans will be prepared and reviewed by both local and State officials for review of those permits. Requirements of both agencies and comments received will be integrated into the mitigation plans for permits, as required.

The Conceptual Landscape Plan will provide screening of the Site along Route 100. The Plan was created to best retain the existing natural buffer as well as adding native plantings along Route 100 to maintain the visual appeal of the Site from the street.

Routine inspections are required as part of the SWPPP to insure that erosion and sediment control measures are maintained and that the limit of disturbance is protected throughout the construction process. All disturbed portions of the Site will be fully vegetated following construction, and only native species will be used in the landscape plan. These measures will help to protect the undisturbed portions of the Site where the more valuable wildlife habitat is found.

2. Fish, Shellfish, and Wildlife

a) Existing Conditions

The Biological Assessment Report prepared for this project and included in Appendix F. provides a site specific analysis and detailed wildlife assessment, including a map depicting the areas of ecological communities found on the Site. In summary, the young forest and the shallow emergent marsh provide habitat for a variety of species of animals. However, the ability of the Site to support less disturbance-tolerant species that require large blocks of undisturbed forest is somewhat diminished by the surroundings to the east, west and south which consist of roads, commercial buildings, and parking lots. The area to the north of the Site is currently privately owned undeveloped land which contains the majority of the NYSDEC Freshwater Wetland. The Biological Assessment Report provides a list of wildlife species documented on or potentially occurring on the Site (Table 5 of the Biological Assessment Report in Appendix F). All species that were documented on, or are anticipated to be present on, the Site are species that are common to central Westchester County.

The habitat areas on the Site are determined by their ecological communities; therefore the same map (Exhibit III.F-1 Ecological Communities) is referenced. The successional southern hardwood forest community, which comprises the majority of the uplands on the property, would host upland species, as well as those species that spend a portion of their life cycles in the uplands. The shallow emergent marsh and red maple swamp, the wetlands on and near the property, would support the wetland species. The stormwater basin, although small, contains limited habitat for fish, snakes, and turtles. As noted in the Biological Assessment Report in Appendix F, the emergent marsh and swamp contains good aquatic habitat for wetland fauna.

Several species of breeding birds were identified in and along the edges of the red maple-hardwood swamp and emergent marsh habitats. Off-site, Canada geese were observed nesting in the wetlands, and a rookery of great blue heron was noted off-site to the southwest, on the opposite side of Brown Brook. The emergent marsh habitat is fairly diverse and densely vegetated in many areas. The upland habitat on the Site is markedly less diverse in terms of vegetative species present, and has little in the way of structural diversity including standing dead wood and shrub layers. Based on the wildlife observed, and the disturbed wooded setting, there is limited wildlife habitat on the Site. Many areas are overgrown with invasive species such as Japanese barberry, which do not offer much as a food source, but do offer shelter to mice, which in turn increase the prevalence of ticks which can transmit Lyme disease. The trees and shrubs on-site can provide some nesting and perching areas for birds and limited habitat for other small animals, however food sources, such as mast bearing trees or fruiting shrubs, are extremely limited. Breeding birds were observed primarily within and near the edges of the wetlands; few birds were observed in the uplands on the Site. While deer likely occupy the site at times, bedding sites were not observed in the wooded uplands and if they occur, they would likely be located closer to the wetlands in the denser vegetation. Based on the field observations and records from the New York Natural Heritage Program, there is no high-quality wildlife habitat in the uplands on the Site.

Protected Species

Protected species that could potentially occur on or in the vicinity of the Site were determined by the NYSDEC. A response letter, dated June 11, 2013 from NYSDEC, states that there are no records of sensitive resources identified by this review for state-listed species. In addition, the on-line NYSDEC Nature Explorer website, which references data from the New York Natural Heritage Program (NYNHP), was accessed on March 7, 2014 and the same results were found. (See Appendix to Biological Assessment Report in DEIS Appendix F. for letter.)

The USFWS Endangered Species Program lists four species that should be considered in an effects analysis for the proposed project: Indiana Bat (Myotis sodalis), endangered; New England Cottontail (Sylvilagus transitionalis), candidate; Northern Long-eared Bat (Myotis septentrionalis), proposed endangered, and Bog Turtle (Glyptemys muhlenbergii), threatened. No critical habitats are listed by the USFWS. As discussed in the Biological Assessment Report (Appendix F.), none of these species would be expected to be found on the Site.

The *Croton-to-Highland Biodiversity Plan: Somers Addendum*[1] prepared a comprehensive list of all amphibian, reptile, and breeding bird species observed in the Somers study area. This Addendum was an expansion of the identification of biodiversity areas performed for the Town of Yorktown and the purpose was to identify sections within the Somers study area that are of high biodiversity value in order to see if these areas link up to those in Yorktown, thereby extending the Croton-to-Highlands Biodiversity Plan. The Somers study area that was evaluated is located in the southwest corner of the Town and is **not** located near or adjacent to the Site. Therefore, the Site is not part of the biodiversity corridor that is the subject of *The Croton-to-Highland Biodiversity Plan: Somers Addendum*.[1]

Of the species listed in The Croton-to-Highland Biodiversity Plan: Somers Addendum, the following had special status afforded by Federal, state, or county governments, or Audubon Society Watch List status (birds only): American Black Duck (Anas rubripes), Westchester County: Special Concern and Audubon Watch List: Declining; Willow Flycatcher (Empidonax traillii), Audubon Watch List: Declining; Worm-eating Warbler (Helmitheros vermivorum), Westchester County: Special Concern, Audubon Watch List: Declining; Blue-winged Warbler (Vermivora pinus), Audubon Watch List: Declining; Wood Thrush (Hylocichla mustelina), Westchester County: Special Concern, Audubon Watch List: Declining; Marbled Salamander (Ambystoma opacum), New York State: Special Concern; Spotted Turtle (Clemmys guttata), New York State: Special Concern, Westchester County: Threatened; Wood Turtle (Clemmys insculpta), New York State: Special Concern, Westchester County: Endangered; Eastern Box Turtle (Terrapene carolina), New York State: Special Concern, Westchester County: Threatened.

Of these species, the following have the potential to occur on the Site but were not documented on-site: Spotted Turtle (Clemmys guttata) and Eastern Box Turtle (Terrapene carolina). A Wood Thrush (Hylocichla mustelina) was documented on-site during the spring Breeding Bird Survey, but was not considered a probable or confirmed breeding bird for the Site.

[1] Reference: Miller, N. A. and M. W. Klemens. 2004. Croton-to-Highlands Biodiversity Plan: Balancing development and the environment in the Hudson River Estuary Catchment. MCA Technical Paper No. 7, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.

b) Anticipated Impacts

The habitat areas on the Site are determined by their ecological communities. See Exhibit III.F-2, Ecological Communities Impact Map. The impacts to wildlife habitat are discussed in Chapter III.F. Terrestrial and Aquatic Ecology, and are further discussed below.

Approximately 60 percent (16.1 acres) of the Site is within the proposed limit of disturbance line; approximately 14.5 wooded acres (about 54% of the forested acres on-site) are proposed to be permanently altered. The majority of the proposed development is within the successional second growth forest community. As discussed in above in Section III-F-1(b), this vegetative community does not provide habitat for any species that are considered development sensitive. The proposed project will result in an increase in edge habitat around the Site that is conducive to disturbance-tolerant bird species that utilize this type of habitat. In conjunction with the increased edge habitat created on the Site, the proposed project also has the potential for an increase in invasive species around the perimeter of development. However, the successional southern hardwood forest that is proposed to be disturbed is not part of a larger block (100 acres or greater) of unbroken forest that will be fragmented by the proposed project. Also, as discussed in the Biological Assessment Report (Appendix F.) breeding bird survey, species diversity and abundance were low in the successional southern hardwood forest community compared to the larger wetland communities on the west side of the Site.

The Biological Assessment Report also states that the only amphibians or reptiles that were found in the forest community that is proposed to be disturbed are the redback salamander, the gray tree frog, and the American toad. These species are very common and abundant in Westchester County as well as in New York State. No amphibian breeding habitats, such as vernal pools, are present in the successional southern hardwood forest community on site. No disturbance is proposed within the more valuable wetland communities and disturbance within 100 feet of the shallow emergent marsh and red maple swamp communities has been reduced to the maximum extent practicable. Populations of species in the wetlands will not be affected by the proposed project.

As discussed in the Biological Assessment Report, despite the permanent habitat removal where buildings and roads will replace existing habitat, most species documented on the Site are not development sensitive and will likely relocate to nearby areas during construction (despite temporary displacement); some may return after construction is completed. Some individuals of less-mobile upland species, such as redback salamanders and American toads that remain on-site

may perish during construction. However, these species are present in the surrounding areas, and therefore overall populations would not be in danger of significant decline.

Environmental quality impacts due to changes in water quality (TSS, nutrients, pollutant introduction) or site hydrology are not expected because a Stormwater Pollution Prevention Plan (SWPPP) has been prepared to address the potential impacts of untreated stormwater runoff from the proposed increase in impervious surfaces. See the SWPPP in Appendix E. for details. Other water quality discussions are presented in the Biological Assessment Report in Appendix F., as well as in Chapter III.E., Water Resources.

Anthropogenic activity (noise, light, movement) associated with the residential use of the property may impact the wildlife on and immediately adjacent to the Site. However, as discussed above, most of the species identified in the forested area are disturbance-tolerant species which will adapt to the activity.

No thermal impacts (change in water temperature) are expected from surface water runoff from the new impervious surfaces of the proposed project. (See also Chapter III.E.2.c for detail on thermal impacts). All surface water runoff from the proposed project will be captured and treated in accordance with the details provided in the SWPPP. Six stormwater treatment basins have been proposed, including four infiltration systems, one bioretention system, and one pocket wetland. If the temperature of stormwater runoff from the Site is different than the nearby groundwater or surface water temperatures, it would likely reach natural existing temperatures while flowing through or infiltrating the stormwater treatment systems and/or flowing through the wetland buffer. In addition, the areas proposed to be impervious surfaces and lawn total approximately 12 acres. Any outflow from current or proposed stormwater basins on the Site would be minute compared to the 1,778 acres that contribute to the watershed supplying Brown Brook. In addition, no direct impacts are proposed in wetlands, and impacts to the 100-foot NYSDEC wetland adjacent area have been minimized to the maximum extent practicable.

The NYSDEC has established strict criteria for regulating thermal impacts from stormwater runoff; the complete NYSDEC regulations are contained in Part 704: Criteria Governing Thermal Discharges (Statutory authority: Environmental Conservation Law §§15-0313, 17-0301).

Briefly, the NYSDEC thermal regulations for trout waters state:

(i) No discharge at a temperature over 70 degrees Fahrenheit shall be permitted at any time to streams classified for trout.

(ii) From June through September no discharge shall be permitted that will raise the temperature of the stream more than two Fahrenheit degrees over that which existed before the addition of heat of artificial origin.

(iii) From October through May no discharge shall be permitted that will raise the temperature of the stream more than five Fahrenheit degrees over that which existed before the addition of heat of artificial origin or to a maximum of 50 degrees Fahrenheit whichever is less.

(iv) From June through September no discharge shall be permitted that will lower the temperature of the stream more than two Fahrenheit degrees from that which existed immediately prior to such lowering.

Currently, outflow (when present) from the one existing on-site stormwater basin travels through a rip rap outlet, then into an eroded channel, prior to entering the NYSDEC wetland. This edge of the wetland is located approximately 1,000 feet from the main channel of the Brown Brook, which is likely the only portion of the wetland that would be deep enough with acceptable substrate to potentially support trout populations. Therefore, outflow from the stormwater basin, if different from the nearby groundwater or surface water temperatures, would likely reach natural existing temperatures while flowing through the shallow emergent marsh prior to reaching the brook (likely as groundwater).

The temperature of the water at the end of the existing stormwater basin was higher than the temperatures in the brook and the wetland during the sampling events in 2009 and 2012 (temperatures were 70 and 73.5^{o}F, respectively). However, these temperatures are still within the range tolerated by many trout species; also there was no outflow from the basin on either date, so although the surface water temperature was somewhat elevated, none of the water was leaving the basin. Future stormwater basins would be held to the regulatory standards of the NYSDEC. The NYSDEC has established strict criteria for regulating thermal impacts from stormwater runoff; the complete NYSDEC regulations are contained in Part 704: Criteria Governing Thermal Discharges (Statutory authority: Environmental Conservation Law §§15-0313, 17-0301).

c) Mitigation Measures

No permits are required related to existing fish, shellfish, and wildlife populations.

As discussed in the Biological Assessment Report in Appendix F, the likelihood of any rare, threatened, or endangered species to be present on-site is highly unlikely and there are not records of such. However, the wetlands and most of

the wetland buffers will be preserved, thus protecting the most valuable habitat on the property.

The wetlands on the property are not proposed to be disturbed, therefore there will be no disturbance to fish and shellfish, or their habitats. Direct disturbance (adverse impacts) to the higher-quality habitat (the wetlands) has been avoided, and disturbance to the surrounding wetland buffer has been reduced to the maximum extent practicable. To avoid indirect impacts to areas outside the line of disturbance during and after the proposed construction, a Stormwater Pollution Prevention Plan (SWPPP) and an Erosion and Sediment Control Plan has been prepared.

Most of the species that currently occupy the Site are not development sensitive and will continue to flourish on and near the developed site. Within the landscaped areas, habitat will be provided by the proposed plantings (see Conceptual Landscape Plan, Exhibits II-6A and II-6B). Habitat will be provided in the proposed tree, shrub, and grass plantings in the uplands, within the bioretention basin, and within the created pocket wetland. In addition, a wetland buffer mitigation plan has been prepared to enhance areas of the wetland buffer that are currently compromised by past site disturbance and the overgrowth of invasive species.

Monitoring and maintenance of the stormwater treatment systems, as well as of the proposed planted areas will be conducted following the completion of construction. The monitoring and maintenance protocols are detailed in the SWPPP (see Appendix E).

3. Wetlands

a) Existing Conditions

Town, State, and Federal regulatory jurisdiction of the on-site wetland boundaries are discussed below. The Town wetland delineation boundary varies slightly from that of the ACOE and NYSDEC. The locations of the wetlands and regulated buffers on the site are depicted on Exhibit III.F-5, Existing Wetlands and Exhibit III.F-6, Surrounding Surface Water Resources.

<u>Local Wetlands</u>

The Town of Somers regulates wetlands that are greater than 5,000 square feet in area primarily based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology as defined in Chapter 167, Wetlands and Watercourse Protection, in the Code of the Town of Somers. In addition to regulating the

wetland, the Town also regulates a wetland buffer of 100 feet, but the buffer may be increased to greater than 100 feet where designated by the approval authority. Wetland adjacent areas/buffer areas are shown on Exhibit II-4, Site Constraints, and III.F-5, Existing Wetlands, and described further below.

Both of the wetlands on the Site are regulated by the Town. Evans Associates staff conducted a site walk with the Town wetlands consultant (F.P. Clark Associates) and Town Engineer on July 11, 2008. During the site walk a very minor modification was made to the Town regulated wetlands boundary. Therefore, the Town wetland delineation boundary varies slightly from that of the ACOE and New York State Department of Environmental Conservation (NYSDEC). The most-recent review of the wetlands by the Town occurred on October 1, 2013, when Evans Associates staff conducted a site walk with a member of the current Town wetland consultants (Woodard & Curran). The wetlands boundaries for Wetland A and Wetland C were confirmed by the Town. Further information was requested by Woodard & Curran for a small wetland area located in the south-central portion of the Site, and is summarized below.

In the south-central portion of the Site there is a depressional area (shallow basin) where hydric soils are present. This depressional area was previously studied in 1994 for a former property owner by Roy Shook, Jr., a Certified Professional Soil Scientist from Environmental Resource Associates. In a report dated February 6, 1995, Mr. Shook described this area as a wetland occupying "*a low lying depression within a glacial outwash landscape. The hydrology that supports the wetland appears to be runoff from the adjacent uplands to the east. There is a watercourse that originates at the outlet of a culvert under NY-Route 100. This actively eroding watercourse carries storm water and sediment into the wetland. The outlet of the wetland is a narrow man-dug watercourse. This watercourse is partially blocked by sediments and forest litter. Flows out of the wetland through this watercourse are intermittent and likely only occur during and after major storm events. There is no sustained base waterflow. The watertable in the wetland is believed to fluctuate widely. Test boring done on November 8, 1994 showed the ground watertable to be at a depth of three feet or more*."

In the twenty years since Mr. Shook observed this area, the culvert under Route 100 has been disconnected and no stormwater currently discharges to the Site through the eroded channel. At the request of the Town, a piezometer was installed in 2009 in the central portion of the depressional area to monitor the groundwater level during the early growing season (March through July). The groundwater was measured eight times between March and July, and, as Mr. Shook observed in 1994, there was wide fluctuation in groundwater level, ranging from just below the soil surface in early May to more than 30 inches below the

surface in early June. During this same period, the eroded watercourse between the culvert under Route 100 and the basin was completely dry, and there was never any outflow observed, as the outflow channel has filled in sufficiently that it no longer serves to drain the depressional area. As a result of the unusually high precipitation in the winter and spring of 2011, and the intense rains brought by Hurricane Irene in August 2011, water was observed to pond at the surface in the depressional area and remain for several weeks. This periodic ponding has resulted in sparse vegetation dominated by facultative (FAC) species associated with disturbance - Japanese stilt-grass (*Microstegium vimineum*) and Oriental Lady's Thumb (*Polygonum cespitosum* or *Persicaria longiseta*). The perimeter of the ponded area is densely vegetated with barberry shrubs (*Berberis thunbergii*), which is an upland species. Based on these observations, the area of the ponded portion of the depressional basin was measured, and found to have an area of 3,230 square feet, which is well below the minimum area of 5,000 square feet for a Town-regulated wetland.

Photo of depressional area taken September 10, 2014, facing east

NYSDEC Wetlands

The NYSDEC regulates wetlands in accordance with the New York State Freshwater Wetlands Act (Article 24 of the New York State Environmental Conservation Law). The NYSDEC regulates wetlands that are 12.4 acres or greater, primarily based on the presence of hydrophytic vegetation, and are shown on the New York State Freshwater Wetlands Maps. The NYSDEC may also regulate smaller wetlands that are near (within 50 meters), are vegetatively connected to, and function together with, larger NYSDEC-mapped wetlands. The boundaries of the wetlands shown on the New York State Freshwater Wetlands Maps are only used for reference and need to be field delineated and then confirmed by NYSDEC staff. In addition to the wetlands, the NYSDEC also regulates a 100-foot adjacent area around the wetlands.

A site walk to confirm the wetland boundaries was conducted with Ms. Heather Gierloff of the NYSDEC on October 18, 2007 for the former owner of the property. The wetland boundaries were found to be accurately delineated and most of Wetland A is regulated by the NYSDEC as part of NYSDEC Freshwater Wetland F-1. During the site walk, Ms. Gierloff determined that the constructed stormwater basin (Wetland C) and the constructed outlet stream for the basin (part of Wetland A) were not part of NYSDEC Freshwater Wetland F-1. A map depicting the extent of NYSDEC-regulated wetlands on the Site was validated by Ms. Gierloff on October 24, 2007. The wetlands boundary is valid for 10 years from the time of the signature.

Federal Wetlands

The Army Corps of Engineers (ACOE) is the Federal agency that regulates wetlands under the Clean Water Act. They regulate wetlands based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology as defined in the 1987 ACOE Wetland Delineation Manual (TR-Y-87-1). The ACOE regulates wetlands that are associated with hydrologic features that are connected to interstate waters (e.g., connected to streams that ultimately drain to the Hudson River). There is no wetland buffer regulated under Federal jurisdiction. A Jurisdictional Determination (JD) was approved on November, 17, 2008, (NAN-2008-00957-EJE) and was valid for 5 years. Both wetland A and Wetland C were regulated by the ACOE. On October 8, 2014 a site inspection was performed with Ms. Amanda Switzer and Mr. Steve Ryba from the ACOE to reconfirm the wetland boundary (NAN-2013-01565-ESW) pursuant to a request by Evans Associates on November 5, 2013. F During the October 8, 2014 site inspection all portions of the site were evaluated, including the isolated depressional area in the south-central portion of the site described above. Based

on the recent review of the wetland boundaries by the ACOE, the jurisdictional status of the wetlands on the site were confirmed, and correspondence from ACOE was received (December 2014) and is included in Appendix F.

NYSDEC Watercourses

In addition to wetlands, the NYSDEC also regulates certain watercourses or waterbodies in accordance with the New York State Protection of Waters Program regulations (Article 15 of the New York State Environmental Conservation Law). Watercourses that are regulated are those classified as "Protected Streams" or "Protected Waters" based on the existing or expected best usage of these waters. Watercourses and waterbodies that are classified "AA", "A", "B" and "C(t) or C(ts)" are protected, and an Article 15 permit is required to disturb the bed or banks of such streams (up to 50 feet from the stream). The stream that flows through Wetland A (off-site) is classified by the New York State Protection of Waters Program Regulations as C(t). The C(t) designation means that the stream is capable of supporting trout. Therefore, this stream is regulated by the NYSDEC as a Protected Water under Article 15. However, this stream is located approximately 400' or more off-site and is therefore more than 50 feet from any proposed disturbances.

NYCDEP

The Site is within the New York City Watershed as part of the Croton River Basin and is therefore subject to the New York City Department of Environmental Protection (NYCDEP) watershed regulations. The NYCDEP regulates activities within and adjacent to NYSDEC regulated wetlands as well as intermittent and perennial streams. The wetlands that are regulated by the NYSDEC would therefore also be regulated by the NYCDEP. Representatives from the NYCDEP meet with Evans Associates staff on the site on July 7, 2009 to determine the presence of any NYCDEP-regulated watercourses. The constructed stormwater basin that drains to the NYSDEC wetland meets the definition as a NYCDEP regulated watercourse and will therefore be regulated by the NYCDEP.

The Site is within the watershed of the Upper New Croton/Muscoot Reservoir, which is classified by NYS DEC as an Impaired Waterbody subject to a total maximum daily load (TMDL), with the pollutant of concern (POC) being phosphorus. Water quality on and immediately adjacent to the Site is discussed in the Biological Assessment Report (see Appendix F) and in the SWPPP (see Appendix E).

A permit application will need to be submitted to the NYCDEP because the property is within the New York City Watershed. A permit application will also

need to be submitted to the NYSDEC for Freshwater Wetlands (Article 24) and the Town of Somers due to the proposed wetland adjacent area impacts. In addition, the NYSDEC will need to issue a permit for 401 Water Quality Certification for installation of stormwater basins. There are no direct wetland impacts proposed, so a permit will not be needed from the ACOE.

Wetland/Buffer Description

Two wetlands, Wetland A and Wetland C[2], were identified on the Site. The locations of the wetlands and regulated buffers on the Site are depicted on Exhibit III.F-5, Existing Wetlands. Both wetlands are described below, as well as in the Biological Assessment Report prepared by Evans Associates. In total, wetlands comprise 5.2 acres, or approximately 19.5% of the Site. Town-regulated 100-foot wetland buffers comprise 6.0 acres, or approximately 22% of the Site. DEC-regulated 100-foot adjacent areas, which are included in the Town-regulated buffer above, comprise 4.6 acres, or approximately 17% of the Site. The wetland buffers are primarily on the undeveloped portions of the Site, but portions (not included in area calculations) do encroach onto paved areas on the off-site shopping center property. Although regulated as wetland buffers, these off-site areas of the shopping center are disturbed in their existing condition.

Wetland A is a mainly emergent wetland (marsh), with some areas of forested, scrub/shrub, and open water habitat. The majority of this wetland is located off-site to the west. The on-site portion of Wetland A is best classified hydrogeomorphically as a slope wetland. Off-site portions (the much larger portion of this NYSDEC wetland) contain depressional and riverine classification types. Wetland A encompasses the majority of the northern portion of the Site. Wetland A receives hydrologic input from groundwater, stream flow, and stormwater runoff, from the adjacent shopping center parking lot and intermittent discharges from the stormwater basin. The on-site portion of Wetland A measures 5.08 acres and comprises approximately 19% of the Site. Wetland A is regulated by the Town of Somers, the NYSDEC, and the ACOE.

Much of the woody vegetation in Wetland A consists of dead standing trees and shrubs. A change in hydrology appears to have caused a considerable die-back of woody vegetation in the wetland within the last 10 to 20 years, resulting in a wetland that is now predominantly colonized by herbaceous vegetation. Live woody vegetation around the perimeter of this wetland includes red maple (Acer rubrum), cottonwood (Populus deltoides), American elm (Ulmus americana), swamp white oak (Quercus bicolor), pin oak (Quercus palustris), and sycamore

[2] Numbering carried over from previous investigations, there is no "Wetland B."

(Platanus occidentalis) trees and saplings along with spicebush (Lindera benzoin), silky dogwood (Cornus amomum), arrow-wood (Viburnum dentatum), winterberry (Ilex verticillata) and high-bush blueberry (Vaccinium corymbosum) shrubs. Herbaceous species include arrow-leaf tearthumb (Polygonum sagittatum), purple loosestrife (Lythrum salicaria), sensitive fern (Onoclea sensibilis), jewelweed (Impatiens capensis), soft rush (Juncus effusus), cinnamon fern (Osmunda cinnamomea), royal fern (Osmunda regalis), tussock sedge (Carex stricta), Japanese stilt-grass (Microstegium vimineum), skunk cabbage (Symplocarpus foetidus), broad-leaf cattails (Typha latifolia), lurid sedge (Carex lurida), wool-grass (Scirpus cyperinus), common reed (Phragmites australis), arrowhead (Sagittaria latifolia), and duck weed (Lemna sp.).

The soils in Wetland A include very poorly drained Palms muck in the central, more level, portions of the wetland (mainly off-site), with Fluvaquents and Udorthents, wet substratum located in other areas of the wetland (some also off-site). Palms muck is very poorly drained, nearly level to level, very deep to bedrock, and is found in depressions between hills and adjacent to streams. It consists of 16 to 51 inches of organic material over loamy mineral soil. Fluvaquents are soils that have formed in recent alluvial deposits. These soils are frequently flooded. Fluvaquents are associated with the stream that flows through the off-site portion of the wetland. Udorthents, wet substratum are poorly drained to very poorly drained soils that have been altered in the past, mainly by cutting and filling. Wetland A is primarily sustained by interception of the seasonally-high groundwater table with some runoff from upgradient areas, including Wetland C. Evidence of wetland hydrology includes seeps, flowing and ponded water, saturated soils, water-stained leaves, and water marks on trees.

Wetland C consists of a created stormwater basin containing mainly open water habitat. The hydrogeomorphic classification of Wetland C is depressional wetland. This wetland receives hydrologic input from stormwater runoff, mainly from the adjacent shopping center, as well as direct precipitation. Wetland C measures 0.12 acres and comprises approximately 0.4% of the Site. This wetland is regulated by the Town of Somers, the ACOE, and the NYCDEP. Wetland C is a stormwater detention basin which was ponded at the time of the site visits. Vegetation that was present around the perimeter of the basin during the 2006 field work included cottonwood saplings and silky dogwood and multiflora rose (Rosa multiflora) shrubs. Site visits conducted since 2008 have shown the vegetation in and around basin had been removed. The disturbed areas around the perimeter of the basin were seeded with a grass seed mix, and currently consist of grasses and smartweed (Polygonum sp.).

The soils in Wetland C are mainly Udorthents, wet substratum. Udorthents, wet substratum are poorly drained to very poorly drained soils that have been altered in the past, by cutting and filling. Wetland C also contains open water. The hydrology in Wetland C is primarily sustained by runoff from the parking lots and buildings, as well as by interception of the seasonally-high groundwater table. There appears to be some base flow from the pipe that enters the stormwater basin. Evidence of wetland hydrology includes flowing and ponded water, and saturated soils.

Site Hydrology

Site hydrology is discussed in Chapter III. E. Water Resources. The only major hydrologic change that impacted previous wetland delineations involves a depressional area in the south-central portion of the Site. A 1995 report by Environmental Resource Associates Soil & Environmental Consultants discusses a wetland in this area that they delineated and flagged and which was verified by a Town of Somers wetland consultant. According to the report "The hydrology that supports the wetland appears to be runoff from the adjacent uplands to the east. There is a watercourse that originates at the outlet of a culvert under NY-Route 100. This actively eroding watercourse carries storm water and sediment into the wetland…. there is no apparent source of water recharge other than the storm water runoff or snow melt…"

Since this 1995 report was prepared, the runoff that originated off-site to the east has been controlled or re-directed and no longer flows onto the subject property (apparently due to the stormwater management systems installed at the upgradient IBM property). Therefore, the former wetland in this area is currently a sediment-laden depression exhibiting relic hydric soil properties. Because much of the deposited sediment is very fine and deep (up to three feet of sediment are found in some portions of the basin) it has formed a discontinuity within the soil profile, allowing precipitation to pond in this area following heavy rain events. However, because of its hydrologic limitations (only fed by precipitation), this area does not remain ponded for long enough periods of time to support wetland vegetation The majority of the vegetation in the area is the non-native, invasive species Japanese stilt grass, along with smartweeds typical of disturbed areas. Even when ponded, this area is not hydrologically connected to NYSDEC-regulated Wetland F-1.

The current forested buffer on the Site contributes little runoff or pollution to the wetlands. Trees utilize a significant amount of water during the growing season, thereby lowering the groundwater table during that time. During the winter, groundwater and stream levels are higher. However, the majority of runoff

discharging to the wetlands occurs from impervious surfaces. Therefore, although the forested buffer does have a significant impact on the hydrology of the property, it does not have much of an impact on the pollution levels associated with current runoff sources.

Water quality is discussed in the Biological Assessment Report (see Appendix F.), and pollutant loading calculations in the SWPPP (see Appendix E.). The phosphorus TMDL was not calculated for the 1,778-acre watershed of which the Site is part. However, potential surface water impacts to the portion of the Brown Brook located upstream of the Site are discussed in Chapter III.E. Point and non-point sources of pollution on the Site are also discussed in Chapter III.E.

Wetland Functional Capacity

"A Rapid Procedure for Assessing Wetland Functional Capacity based on Hydrogeomorphic (HGM) Classification" (Magee and Hollands, 1998) was used in the functional assessments of the wetlands on the property (Wetland A and Wetland C). The functions and relative values of freshwater wetlands are determined by biological and physical characteristics, including the position of the wetland in the landscape, the geology and hydrology of the Site, and the substrate and vegetation comprising the wetland. Inventory data of the wetlands were collected during the field visits.

Wetland A is capable of performing many wetland functions, and when considered in conjunction with the off-site NYSDEC Wetland F-1 (of which it is a part), its functional capabilities are even greater. Wetland A provides an area of groundwater discharge, it can store floodwaters, and it can sometimes improve the quality of the water in the wetland. Wetland A is well vegetated, however the variable hydrology of the wetland encourages the development of plant communities that are more suited to a variety of moisture conditions rather than characteristic wetland species. This discourages the development of faunal communities that are suited to characteristic wetland habitats. However, the off-site areas of the wetlands, especially near the stream, will be better able than the on-site portion to support wetland-dependent flora and fauna. Wetland C functions as a stormwater basin. Its main function is to capture and treat stormwater runoff. In addition, because it always remains ponded, it can provide a consistent hydrology for wetland dependent plants and animals that are tolerant of conditions within a stormwater basin. The Wetlands Functional Evaluation, prepared by Evans Associates on January 2009 (revised May 8, 2014), can be found in Appendix G.

b. Anticipated Impacts

No direct wetland impacts are proposed. Encroachment into the NYSDEC-regulated 100-foot adjacent area has been minimized to the maximum extent practicable. Therefore, the majority of the natural buffers around the wetlands will remain intact. The wetland adjacent areas in the northern portion of the Site are more disturbed and impacted by the existing surrounding developments (the shopping center and Route 202), while the southern areas are less affected by development. Much of the wetland buffers contain invasive species, with Japanese barberry dominating the north, and Japanese stilt grass dominating the south. These invasive species may be impacted, but their survival and spread will be discouraged in the mitigation plans.

The main channel of Brown Brook, a Class C(t) stream, is located approximately 400' or more off-site. The portion of the Brown Brook watershed that contains the Site is 1,778 acres in size and contains undeveloped and developed areas. Sources of point and not-point pollution occur along the brook, as discussed in Chapter III.E. Water Resources. The northern-most portion of the watershed consists mainly of single-family residential development with small roads, and some forested, undeveloped areas. Progressing downstream, the watershed becomes more developed with residences (including condominium complexes), a golf course, and a sewage treatment plant. Commercial development is also present, along with Town offices and schools, mainly concentrated at the southern portion of the watershed, near the Site. Routes 202 and 100 are also located near or adjacent to the Site. The watershed is not listed on the NYSDEC Impaired Waterbodies List.

Hydrologic alterations to the wetland will be avoided through the use of stormwater treatment systems that will infiltrate stormwater runoff from impervious surfaces back into the ground. The Stormwater Pollution Prevention Plan (SWPPP) (see Appendix E.) provides detailed stormwater analysis for the proposed stormwater treatment system. Currently, stormwater runoff from the neighboring shopping center site is treated in a single stormwater basin located on the Project Site. Flow, when present, from this basin enters NYSDEC-regulated Wetland F-1. In addition, some stormwater runoff, when present, from the shopping center parking lot, flows into an oil/water separator and then into NYSDEC Freshwater Wetland F-1 on the Project Site.

Proposed impacts to wetlands and wetland buffers are summarized in below and are shown on Exhibit III.F-8, Wetland Disturbance Areas.

Table III.F-4
Proposed Wetland and Wetland Buffer Impacts

Regulatory Jurisdiction	Existing Area (acres)	Proposed Impacts (acres)
Town Wetland	5.19	0.01
Town 100' Buffer	5.43	1.10
NYSDEC 100' Adjacent Area	4.55	0.68

A clearing and grading limit line has been established and is shown on several of the site plans. No construction activities will be permitted outside of this limit during construction; silt fencing will be installed. After construction, use of these areas will be limited to recreational uses (e.g. walking paths) only. The wetland buffers are currently located near development and/or are already disturbed or impacted by anthropogenic activities (as discussed in Chapter III.E. Water Resources), and invasive species. The wetland buffer in the northern portion of the Site is currently the most disturbed. The undeveloped portion of this wetland buffer will be protected by a retaining wall around the proposed grocery store. This will prevent anthropogenic encroachment beyond the wall.

The proposed impact to wetlands is 0.01 acres along the edge of the stormwater basin (Wetland C). This disturbance will be temporary, and the area will be restored to existing conditions after utility installation. Proposed impacts to the Town-regulated 100-foot wetlands buffer total 1.1 acres. Of this total, 0.27 acres is in association with the grocery store; the remaining 0.83 acres is in association with grading for stormwater treatment systems and a parking lot, and drainage and utilities installation. Almost 40% (0.42 acres) of the Town-regulated 100-foot wetland buffer that is proposed to be disturbed is the buffer associated with the constructed stormwater basin (Wetland C) and not the large NYSDEC-regulated wetland (Wetland A). Proposed impacts to the NYSDEC-regulated 100-foot wetland adjacent area is 0.68 acres. Approximately 80% of the Town wetland buffer, and 85% of the NYSDEC adjacent area, will remain undisturbed. Therefore, the functions that are provided by the wetlands will not be significantly impacted by the proposed project.

Direct and indirect impacts to wetland hydrology will be avoided or mitigated through the implementation of the SWPPP (see Appendix E.). A sediment and erosion control plan has also been prepared to prevent direct and indirect impacts to wetlands during construction (see Exhibit III.D-5, Erosion Control Plan).

The proposed project will not impact adjacent wetlands, flow paths or Brown Brook. Increased areas of impervious surfaces and the associated removal of trees in the uplands will cause an increase in surface water runoff, reduced infiltration into the soil, and reduced soil-water uptake by trees. The SWPPP is intended to mitigate for potential water quality and quantity impacts to surface water and groundwater. In addition, the stormwater basins will not discharge directly to the wetlands but rather will discharge treated stormwater runoff into the forested wetland buffers. The forested wetland buffer will provide additional treatment of the stormwater prior to entering the wetlands.

c) Mitigation Measures

Direct wetland impacts were avoided, and impacts to the Town-regulated 100' wetland buffer and the NYSDEC-regulated 100' adjacent area have been minimized. In total, 4.32 acres (80%) of the Town-regulated 100-foot wetland buffer on the Site, and 4.47 acres (85%) of the NYSDEC-regulated 100-foot wetland adjacent area on the Site, will remain undisturbed.

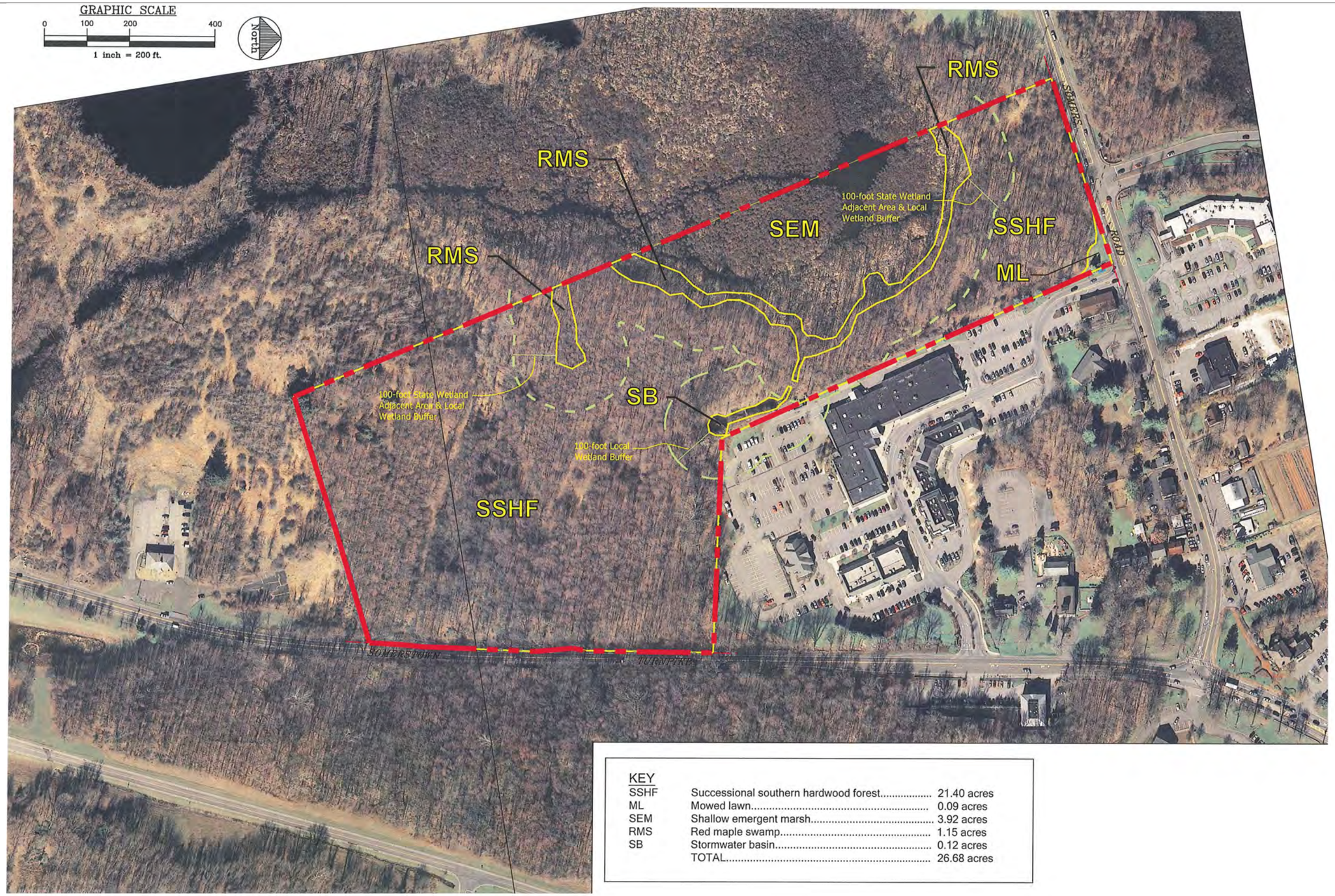
Anthropogenic encroachment could potentially impact preserved and undeveloped areas. Encroachment in bioretention, wetland, and mitigation areas could negatively impact the functions of these systems and lessen the efficacy of invasive species removal and mitigation plantings.

The Conceptual Landscape Plan (Exhibits II-6A and II-6B) depicts the proposed planting plan. Plantings in the stormwater treatment areas (bioretention area, infiltration basins, and pocket wetland) will be native and will perform the functions of plants in natural wetland areas, such as increased infiltration, nutrient uptake, sediment reduction, and water storage. Upland plants will also be native and will improve on-site infiltration and water uptake. Trees will provide shade to cool impervious surfaces and reduce the temperature of surface water runoff. Impacts to the Brown Brook watershed will be negligible due to the size of the watershed compared to the Site, along with the proposed mitigation features (stormwater treatment systems). No integrated pest management (IPM) is proposed or is deemed necessary to mitigate impacts at this site. According to the Applicant's experts, the use of IPM would only incrementally (if at all) reduce potential impacts to wetlands and water resources.

Potential thermal impacts of the project are discussed in Chapter III.F. Terrestrial and Aquatic Ecology. All surface water runoff from the proposed project will be captured and treated in accordance with the details provided in the SWPPP. Six stormwater treatment basins have been proposed, including four infiltration systems, one bioretention system, and one pocket wetland. The stormwater

treatment system was developed to avoid and/or mitigate for potential impacts, including thermal changes, to downstream waters.

Increasing the wetland buffers would increase the forested areas in the southern portion of the Site, between the stormwater basin and the "finger" of wetland that extends onto the Site. The increased buffer would also extend into the developed areas (the existing shopping center) off-site to the east, and into the disturbed wooded areas in the northern portion of the Site. As described in the Biological Assessment Report, see Appendix F, the most valuable wildlife habitat on the Site is the larger emergent wetland and the wetland edge with dead standing trees. The increased wetland buffers do not include these habitats. In addition, much of the increased buffer nearest to the wetlands in the southern portion of the property is proposed to become a created wetland pocket, an infiltration basin, and a mitigation area. The existing hydrology and proposed site hydrology with a 100-foot wetlands buffer are described in detail in Chapter III.E. Water Resources and in the SWPPP. Stormwater management measures similar to those for the proposed project would also be required if there were increased wetland buffers. Location of potential larger wetland buffers relative to the proposed plan are illustrated on Exhibit III.F-9. Wetlands buffers can vary in width, and according to the Applicant's experts, increasing buffers would have only an incremental positive effect on water quality and/or wildlife habitat, but that effect is difficult to quantify.



KEY

SSHF	Successional southern hardwood forest	21.40 acres
ML	Mowed lawn	0.09 acres
SEM	Shallow emergent marsh	3.92 acres
RMS	Red maple swamp	1.15 acres
SB	Stormwater basin	0.12 acres
	TOTAL	26.68 acres

Source: Evans Associates Environmental Consulting , INC.

SOMERS CROSSING
Somers, New York

Ecological Communities

Exhibit
III.F-1

VHB *Engineering, Surveying and Landscape Architecture, P.C.*

KEY	ECOLOGICAL COMMUNITY TYPE	EXISTING	IMPACTED	REMAINING
SSHF	Successional southern hardwood forest	21.40 acres	15.95 acres	5.45 acres
ML	Mowed lawn	0.09 acres	0.09 acres	0 acres
SEM	Shallow emergent marsh	3.92 acres	0	3.92 acres
RMS	Red maple swamp	1.15 acres	0	1.15 acres
SB	Stormwater basin	0.12 acres	0.01 acres	0.11 acres
	TOTAL	26.68 acres	16.05 acres	

AREA OF DISTURBANCE

** Disturbance line depicted on this drawing obtained from Bibbo Associates.*

Source: Evans Associates Environmental Consulting , INC.

SOMERS CROSSING
Somers, New York

VHB Engineering, Surveying and Landscape Architecture, P.C.

Ecological Communities Impacts

Exhibit
III.F-2

SURVEY NOTES:

1. SURVEYED PROPERTY SHOWN HEREON AS PARCEL I IS BASED ON DEED FROM JEROME L. BILLINGSLEY, ROBERT L. BILLINGSLEY AND FRANCIS L. BILLINGSLEY TO PINNACLE RETIREMENT SERVICES CORPORATION, DATED DEC. 12, 1994 AND RECORDED ON FEB. 9, 1995 IN LIBER 11084 PAGE 9. SAID RECORD DESCRIPTION FAILS TO FORM A MATHEMATICALLY CLOSED FIGURE AND IS CORRECTED HEREON.

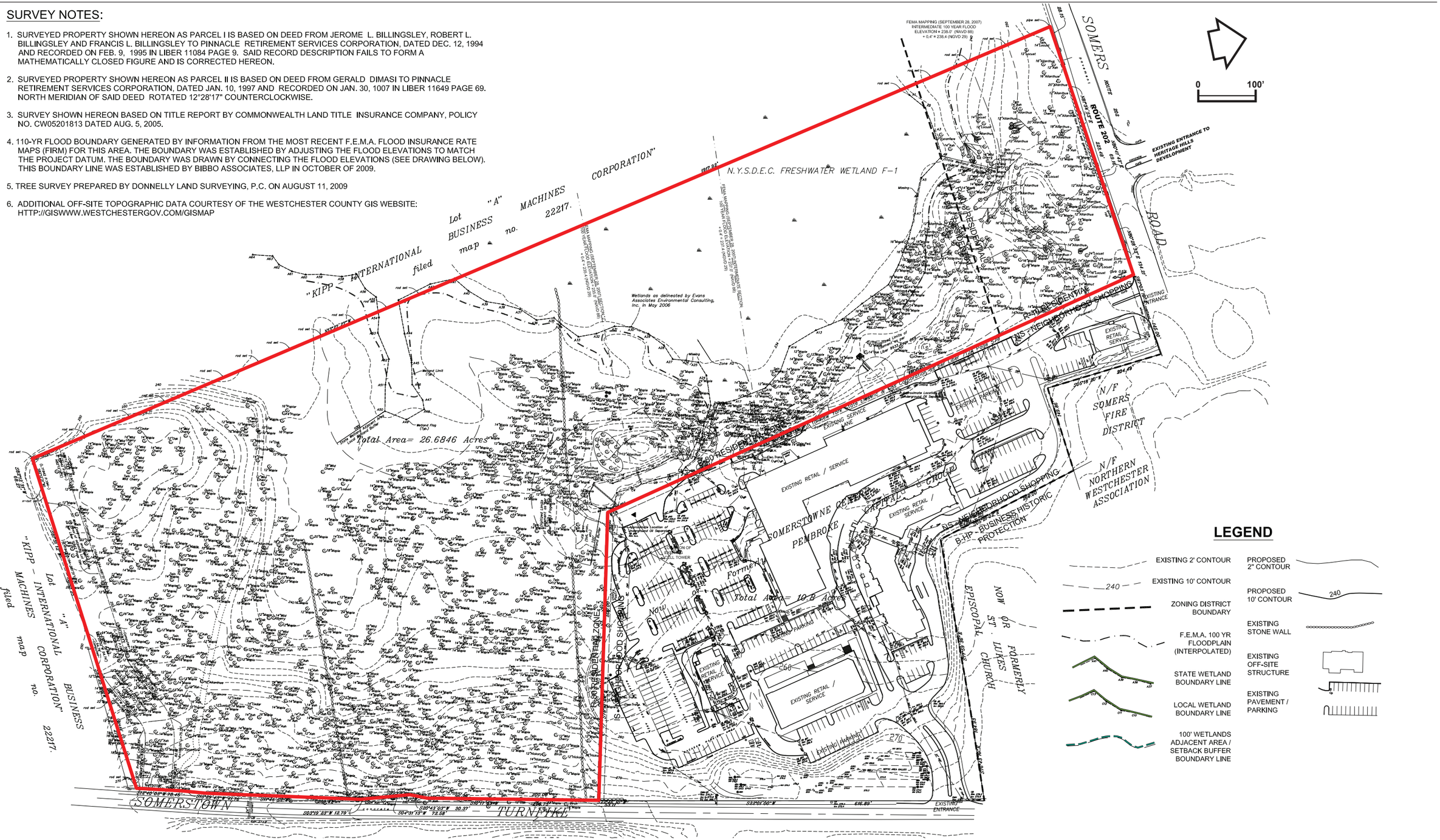
2. SURVEYED PROPERTY SHOWN HEREON AS PARCEL II IS BASED ON DEED FROM GERALD DIMASI TO PINNACLE RETIREMENT SERVICES CORPORATION, DATED JAN. 10, 1997 AND RECORDED ON JAN. 30, 1007 IN LIBER 11649 PAGE 69. NORTH MERIDIAN OF SAID DEED ROTATED 12°28'17" COUNTERCLOCKWISE.

3. SURVEY SHOWN HEREON BASED ON TITLE REPORT BY COMMONWEALTH LAND TITLE INSURANCE COMPANY, POLICY NO. CW05201813 DATED AUG. 5, 2005.

4. 110-YR FLOOD BOUNDARY GENERATED BY INFORMATION FROM THE MOST RECENT F.E.M.A. FLOOD INSURANCE RATE MAPS (FIRM) FOR THIS AREA. THE BOUNDARY WAS ESTABLISHED BY ADJUSTING THE FLOOD ELEVATIONS TO MATCH THE PROJECT DATUM. THE BOUNDARY WAS DRAWN BY CONNECTING THE FLOOD ELEVATIONS (SEE DRAWING BELOW). THIS BOUNDARY LINE WAS ESTABLISHED BY BIBBO ASSOCIATES, LLP IN OCTOBER OF 2009.

5. TREE SURVEY PREPARED BY DONNELLY LAND SURVEYING, P.C. ON AUGUST 11, 2009

6. ADDITIONAL OFF-SITE TOPOGRAPHIC DATA COURTESY OF THE WESTCHESTER COUNTY GIS WEBSITE: HTTP://GISWWW.WESTCHESTERGOV.COM/GISMAP



Source: Bibbo Associates, LLP

SOMERS CROSSING

Somers, New York

Tree Survey

Exhibit

III.F-3

VHB *Engineering, Surveying and Landscape Architecture, P.C.*

TREES TO BE REMOVED WITHIN RESIDENTIAL AREA																
SIZE	MAPLE	ASH	OAK	TULIP	HICKORY	POPLAR	WALNUT	ELM	BLACK BIRCH	WILD CHERRY	SYCAMORE	LOCUST	CEDAR	SPRUCE	AILANTHUS	APPLE
12"	328	47	11	2	6	6	-	1	2	24	-	10	1	-	1	2
14"	210	22	11	1	4	1	-	2	2	20	-	-	4	1	2	
16"	54	12	4	-	1	3	-	2	2	13	1	-	-	-	-	
18"	13	3	4	-	-	-	-	-	-	4	-	-	-	-	-	
20"	3	1	4	-	-	-	-	-	-	-	1	-	-	-	-	
22"	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	
24"	3	-	1	-	-	-	1	-	-	1	-	-	-	-	-	
26"	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
28"	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
30"	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	
36"	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	
40"	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
TOTAL = 864	617	89	37	3	12	10	1	5	6	61	2	10	5	1	3	2

TREES TO BE REMOVED FROM AREAS ASSOCIATED WITH PROPOSED GROCERY STORE												
SIZE	MAPLE	LOCUST	AILANTHUS	ASH	BLACK BIRCH	OAK	WILD CHERRY	ELM	WALNUT	SYCAMORE	TULIP
12"	26	3	74	2	2	1	-	1	-	-	-
14"	13	2	27	3	-	-	2	4	1	-	-
16"	9	2	12	-	-	-	2	-	-	-	-
18"	3	1	3	-	-	-	-	-	-	-	-
20"	2	-	1	-	-	-	-	-	-	-	-
22"	2	-	1	-	-	-	-	-	-	-	-
24"	-	1	-	-	-	-	-	-	-	1	-
30"	-	-	-	-	-	-	-	-	-	-	1
TOTAL = 203	56	9	118	5	2	1	4	5	1	1	1

RESIDENTIAL: 864 TREES TO BE REMOVED
GROCERY: 203 TREES TO BE REMOVED
1067 TOTAL

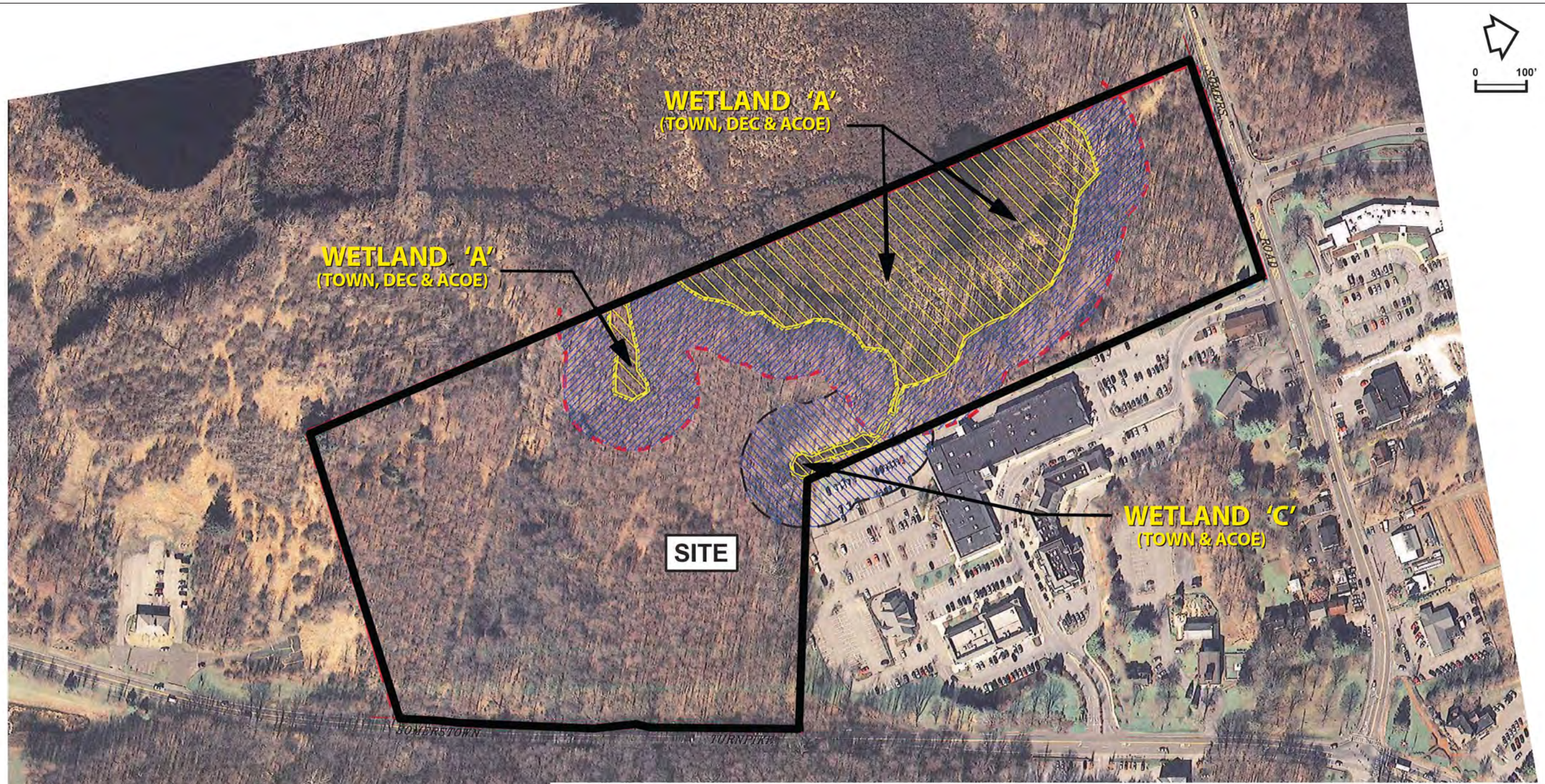
Source: Bibbo Associates, LLP

SOMERS CROSSING
Somers, New York

VHB *Engineering, Surveying and Landscape Architecture, P.C.*

Tree Impacts

Exhibit
III.F-4



EXISTING WETLAND INVENTORY:REGULATORY JURISDICTION:

Wetland	Type	Town	DEC	ACOE
A	Emergent and Forested	5.07	5.07	5.07
C	Stormwater Basin	0.12	----	0.12

WETLAND BUFFER INVENTORY:

Size	Type
4.54 Ac.	NYSDEC 100' Adjacent Area (On-Site)
5.42 Ac.	Town 100' Wetland Buffer (On-Site)
1.84 Ac.	NYCDEP Limiting Distance

Wetland (See Table for Jurisdiction)

DEC and Town Wetland Buffer

Town Only Wetland Buffer

NYSDEC & Town 100' Wetland Buffer

Town Only 100' Wetland Buffer

Source: Evans Associates Environmental Consulting , INC.

SOMERS CROSSING

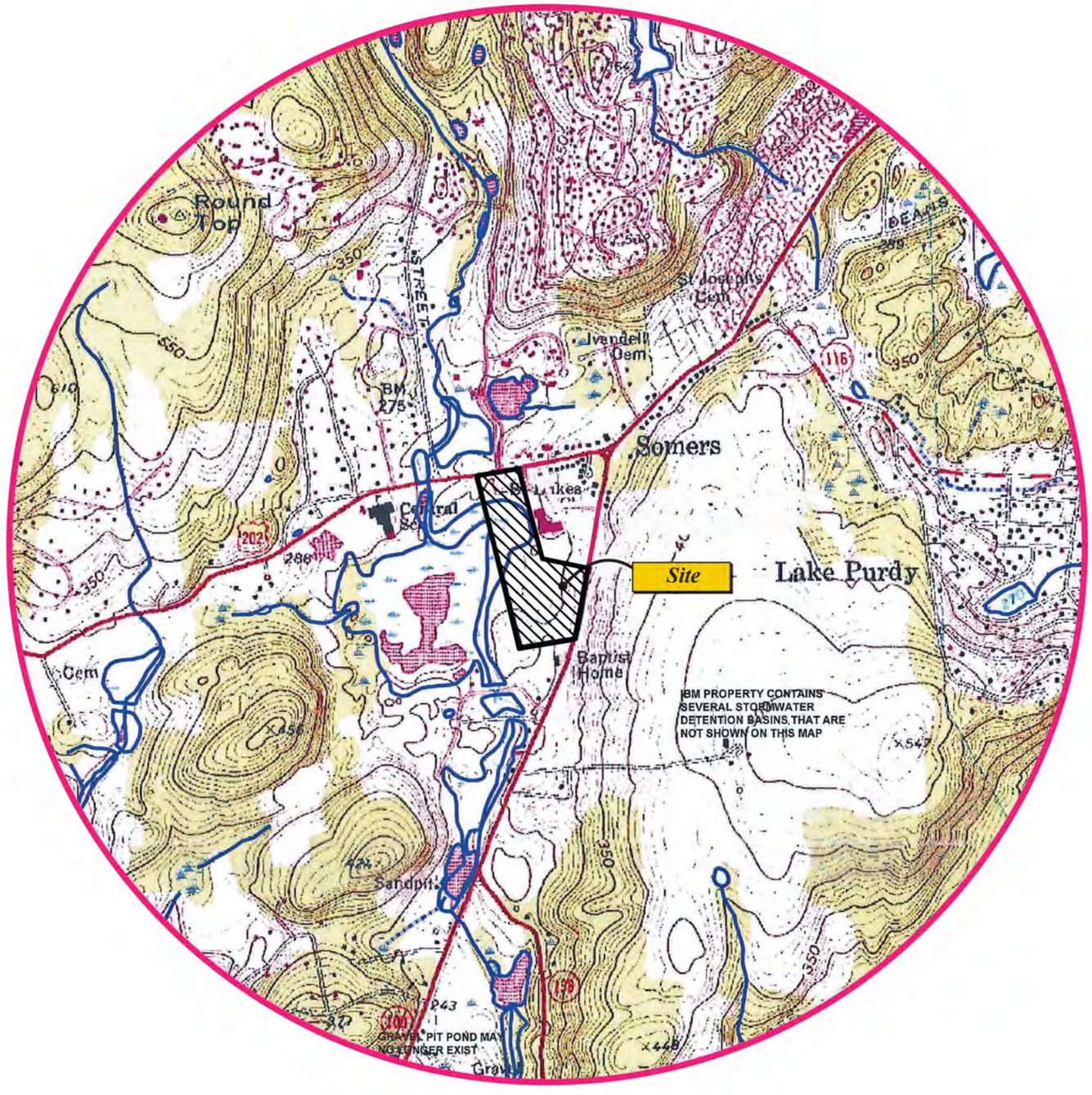
Somers, New York

Existing Wetlands

Exhibit

III.F-5

VHB *Engineering, Surveying and Landscape Architecture, P.C.*



LEGEND

Wetlands
-as estimated from DEC Freshwater Wetlands Map, USGS Topographic Map, National Wetland Inventory Map, and/or aerial photos on Bing.com

Wetlands
-as estimated from DEC Freshwater Wetlands Map, USGS Topographic Map, National Wetland Inventory Map, and/or aerial photos on Bing.com

Watercourses
-as estimated from DEC Freshwater Wetlands Map, USGS Topographic Map, National Wetland Inventory Map, and/or aerial photos on Bing.com
-watercourses may be permanent or intermittent

NOTE:
WETLAND AND WATERCOURSE AREAS APPROXIMATED FROM NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION FRESHWATER WETLANDS MAP, CROTON FALLS USGS TOPOGRAPHIC MAP (PORTION SHOWN), NATIONAL WETLANDS INVENTORY MAPS, AND AERIAL PHOTOGRAPHS FROM BING.COM

Source: Evans Associates Environmental Consulting, Inc.

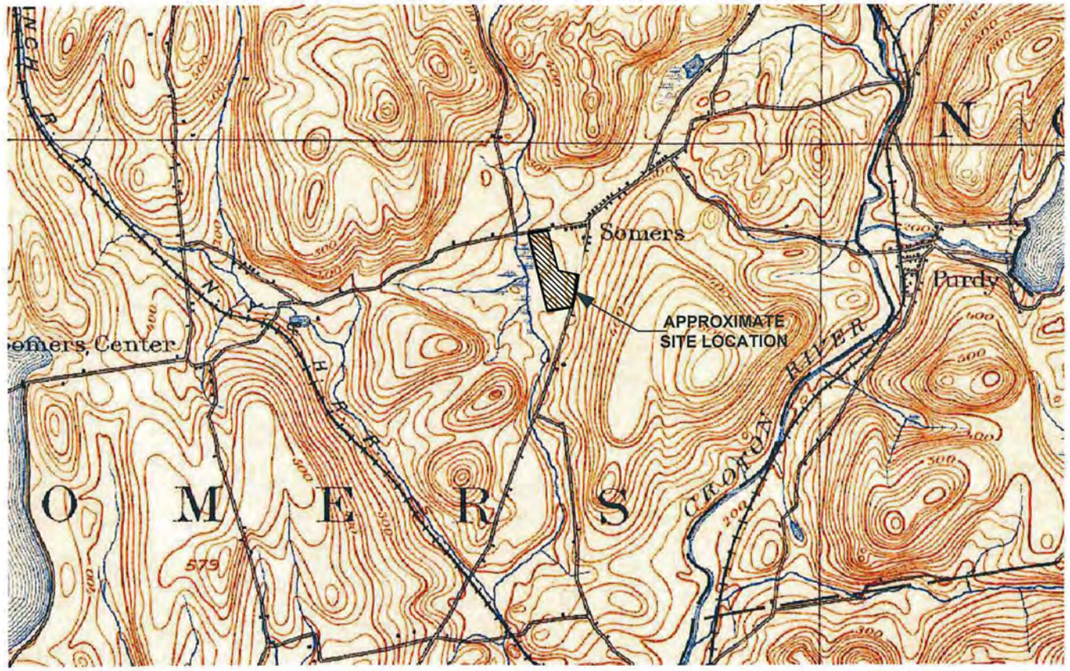
SOMERS CROSSING
Somers, New York

Surrounding Surface Water Resources

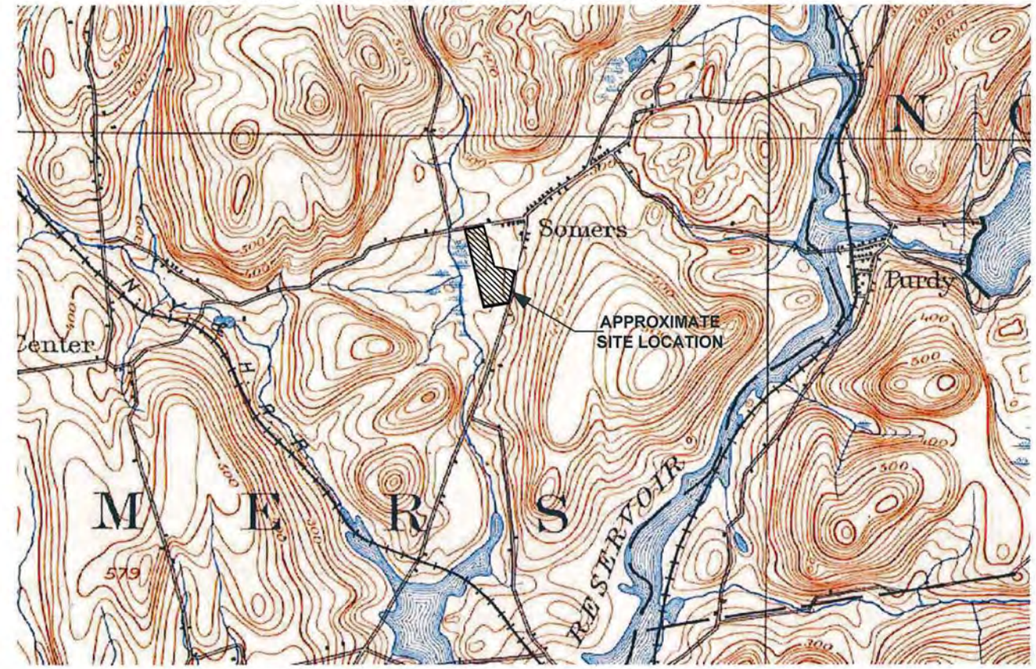
Exhibit
III.F-6

VHB Engineering, Surveying and Landscape Architecture, P.C.

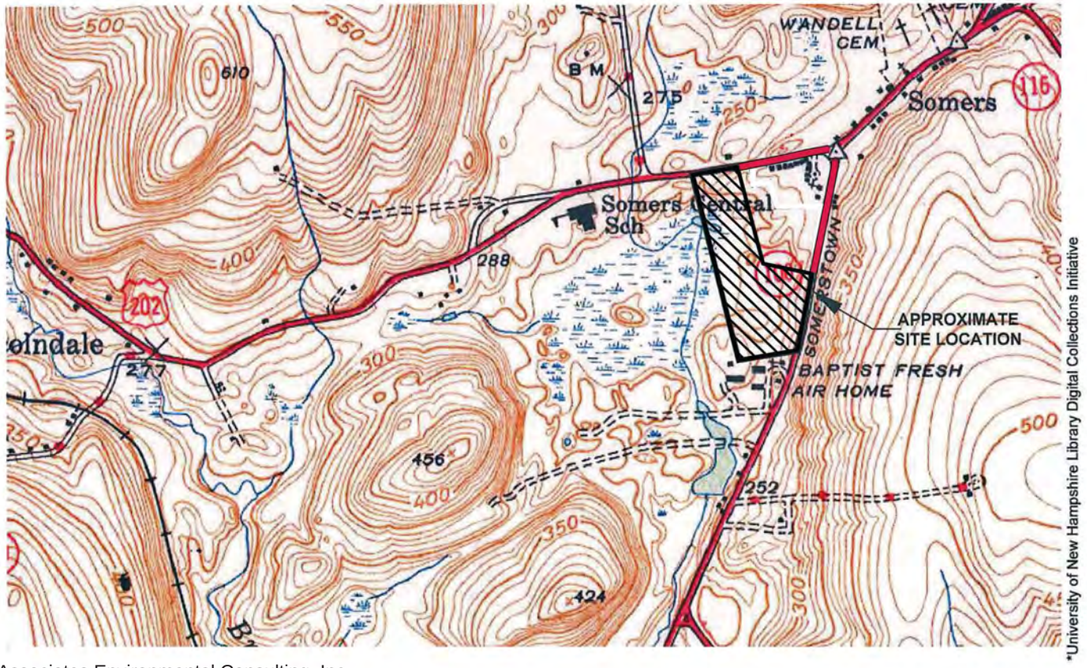
PORTION TAKEN FROM CARMEL USGS TOPOGRAPHIC MAP DATED 1894*



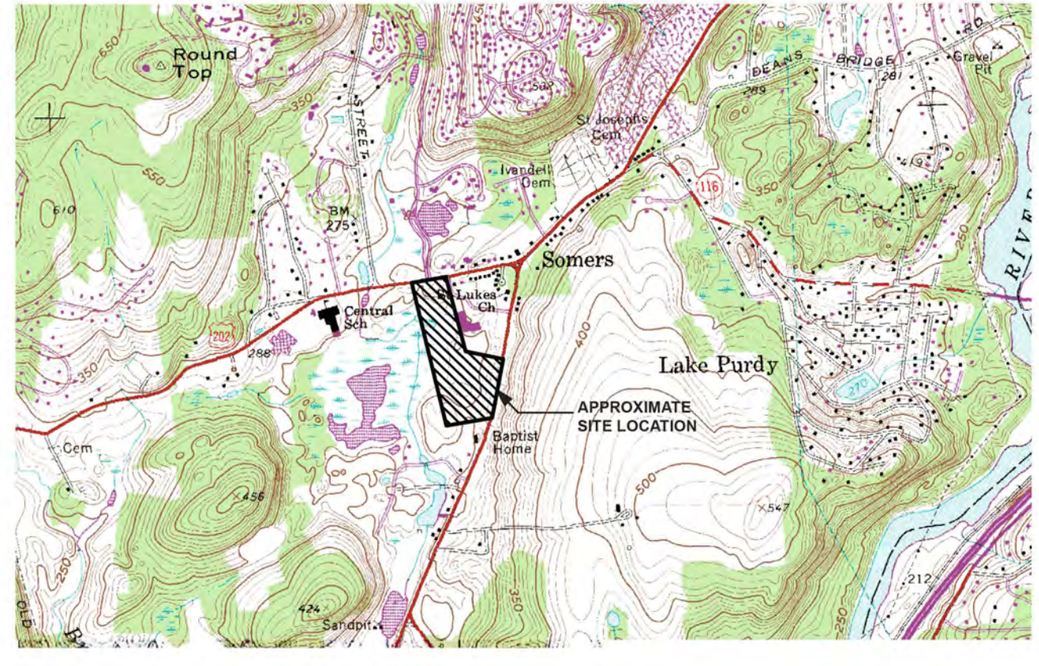
PORTION TAKEN FROM CARMEL USGS TOPOGRAPHIC MAP DATED 1928*



PORTION TAKEN FROM CARMEL USGS TOPOGRAPHIC MAP DATED 1944*



PORTION TAKEN FROM CROTON FALLS USGS TOPOGRAPHIC MAP DATED 1986



*University of New Hampshire Library Digital Collections Initiative

Source: Evans Associates Environmental Consulting, Inc.

SOMERS CROSSING

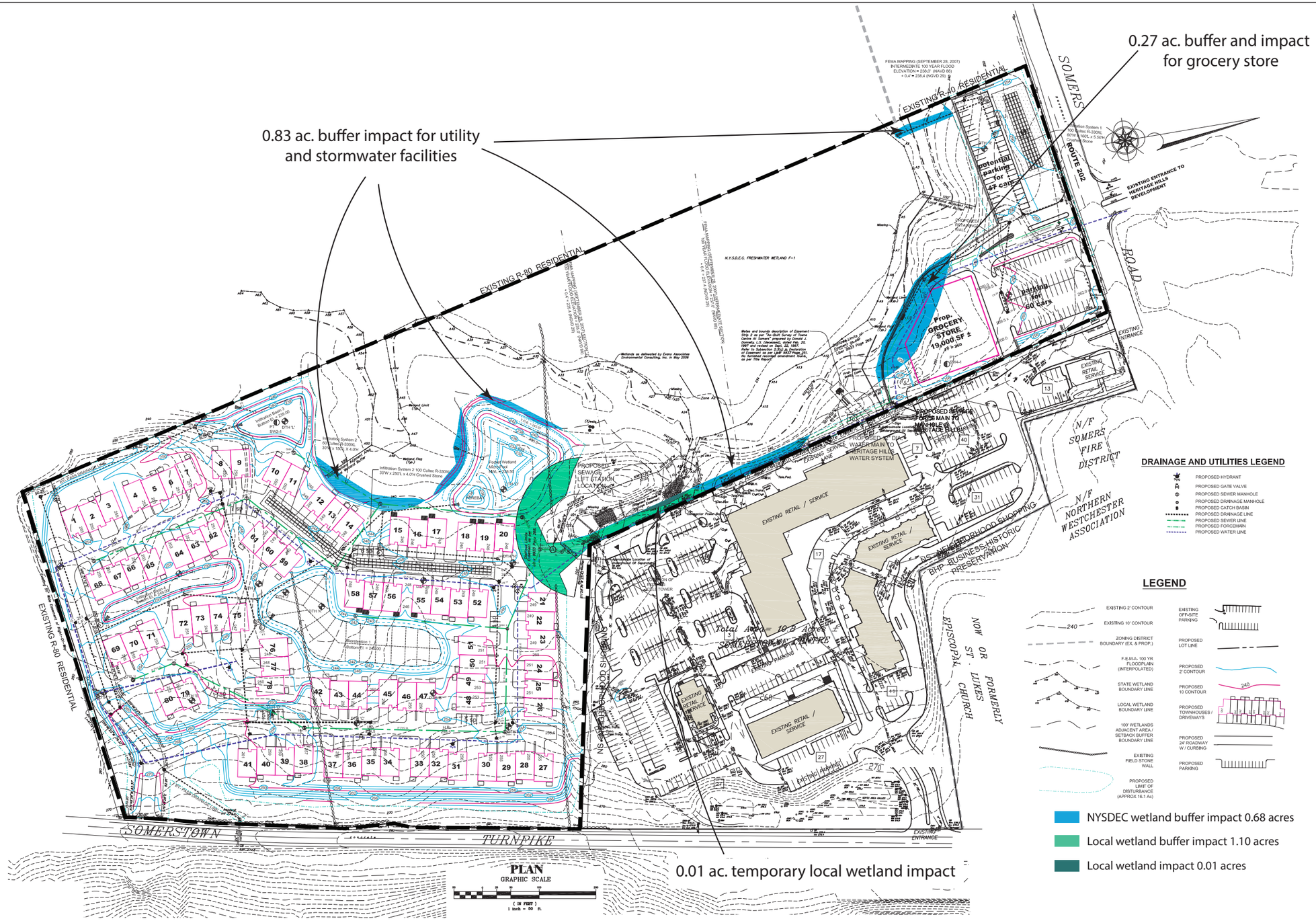
Somers, New York

Historical Topographic Maps

Exhibit

III.F-7

VHB Engineering, Surveying and Landscape Architecture, P.C.



Source: Bibbo Associates, LLP

SOMERS CROSSING

Somers, New York

VHB *Engineering, Surveying and Landscape Architecture, P.C.*

Wetland Disturbance Areas

Exhibit

III.F-8

CALCULATION OF BASE LOT AREA (W/ 0R W/O GROCREY STORE)			
	GROSS AREA	DEDUCTION %	NET AREA
SITE AREA	26.68	--	26.68
STATE WETLANDS / 100 YR FLOOD PLAINS	6.08	75%	-4.55
LOCAL WETLANDS	0.12	75%	-0.09
VERY STEEP SLOPES (>25%)	0.0	75%	-0.0
BASE LOT AREA			22.04 *

* NO DEDUCTION IS MADE FOR THE GROCERY STORE PARCEL, AS THE DEVELOPER BELIEVES THAT PROVIDING A GROCERY STORE IS A BENEFIT TO THE TOWN FOR WHICH HE REQUESTS RELIEF FROM THE 15% AFFORDABLE HOUSING REQUIREMENT.

CALCULATION OF MAXIMUM # OF UNITS	
2 DENSITY UNITS X BASE LOT AREA	44.08
# UNIT TYPES PER DENSITY UNIT (D.U.) :	
2 2-BR UNITS	
1.5 3-BR UNITS	
X = NUMBER OF 2-BR UNITS	
Y = NUMBER OF 3-BR UNITS	
PROPOSED RATIO OF 2-BR UNITS TO 3-BR UNITS: X = $\frac{5}{3}$ Y	
THEREFORE:	
$\frac{2}{1}$ X + $\frac{2}{1}$ Y = 44.08	
$\frac{5}{3}$ ($\frac{2}{1}$) Y + $\frac{2}{1}$ Y = 44.08.	
$\frac{10}{3}$ Y + $\frac{6}{3}$ Y = $\frac{6}{3}$ Y = 44.08	
NUMBER OF 3-BR UNITS: Y = 30 .....(ROUNDED)	30
AND, # OF 2-BR UNITS: X = $\frac{5}{3}$ Y = 50.....(ROUNDED)	50
MAX. # OF UNITS.	80

TOTAL NEW IMPERVIOUS AREA = 7.28
OVERALL SITE % IMPERVIOUSNESS= 7.28/26.68 = 27.29%

Base Map Source: Bibbo Associates, LLP.

SOMERS CROSSING
Somers, New York

Increased Wetland Buffers

Exhibit
III.F-9

VHB *Engineering, Surveying and Landscape Architecture, P.C.*