POTTERSVILLE WATER DISTRICT STUDY

Preliminary Engineering Report

Town of Chester, NY

Prepared for:

Town of Chester

6307 State Route 9

P.O. Box 423

Chestertown, NY 12817

Project Number: 22-057

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EXECUTIVE SUMMARY

The Town of Chester owns and operates the Pottersville Water District System (PWSID No. NY5600110) which provides water for approximately 88 service connections to a population of around 240 people. The Town of Chester received a Community Development Block Grant ("CDBG") to complete this engineering study of the system. The original system was installed around 1946, with the majority of the system beyond its useful life. Much of the original antiquated infrastructure is still in service, including the original asbestos cement water mains. Frequency of emergency repairs of the system continue to increase and a long-term solution to resolve the system issues and deficiencies is critical. The Town has undertaken smaller capital projects to upgrade the system, but outside sources of funding are required to ensure the project is economical for the Water District and rate payers.

The existing system has either reported or observed the following system deficiencies:

- Source:
  - Wellhead security.
  - Alarm/monitoring capabilities.
  - Need of abandonment of an unused groundwater well (Well #1).
- Distribution:
  - Fire Flows not achieved at 20psi residual pressure (undersized water mains).
  - Inadequate frost depth cover on water mains reported.
- Storage:
  - Security recommendations.
  - Level control for overflow and low-level warnings.

The purpose of this report is to include a thorough assessment, cost estimates and financial strategy for completing major system improvements to ensure the long-term sustainability of the Water District. The total capital cost estimate of the proposed project is $5,000,000 (estimated in 2026 dollars). The recommended upgrades are as follows:

- Source & Treatment: Existing Source & Treatment Upgrades.
- Distribution System: Replacement of all existing asbestos cement water mains with upsized water mains and appurtenances.
- Storage: Water tank rehabilitation and installation of a pressure transducer to monitor and control tank levels.

1. PROJECT PLANNING

a.) Location & Site Information

The Pottersville Water District is located in the Hamlet of Pottersville in the Town of Chester, Warren County, New York. Pottersville is located in the Northeast corner of Warren County. See the location map attached as **Appendix A,** showing the water district boundary. See **Appendix B** for a topographic map of the service area.

Soil Classification

The majority of the project area is generally classified as sandy loam and loamy sand according to the USDA-NRCS Soil Mapping program. Please see **Appendix C** for a complete soils map and a full description of the soil types.

Depth to Bedrock

USGS classifications indicate that the depth to bedrock for these soil types ranges greater than 6.5 feet (200 cm). Please see **Appendix C** for a complete set of maps indicating depth to bedrock. However, ledge has been historically encountered during water main repairs, and soil bores should be obtained to give a more accurate representation of the depth to bedrock throughout the water district.

Depth to Water Table

USGS soil classifications indicate that the depth to water table for these soil types range from zero feet (existing surface level) to greater than 6.5 feet. There are some areas with frequent flooding and a high-water table. According to Warren County GIS, there are some flood zones located within the water district. FEMA data is very limited for this area. Please see **Appendix C** for a complete set of maps indicating depth to water table and **Appendix D1** & **D2** for a map of flood zones.

Other site considerations

It is recommended as funding is secured to progress the engineering design, that subsurface investigations be conducted to obtain a true representation of project subterranean conditions.

b.) Environmental Resources Present

Wetlands, Natural Communities and Rare Plants or Animals

The NYS DEC Environmental Resource Mapper was utilized to create a map attached in **Appendix E**. The project site only includes nearby waterbodies including rivers and streams. No rare plants or animals or significant natural communities were identified within the area of the water district. The USFWS Wetland Map is included as **Appendix F**, which details federal waterbodies and wetlands in the project area. The regulatory wetlands located within the Adirondack Park are also shown in **Appendix F**. As the project progresses into the engineering design phase after procurement of funding, it is recommended that the project site be flagged for any waterbodies and wetlands based upon actual field locations.

Floodplains

As shown in the flood plain map in **Appendix D1 & D2**, there is a portion of the project site within the 100-year flood zone.

Threatened or Endangered Species

The United States Department of the Interior Fish and Wildlife Service list of threatened and endangered species are attached in **Appendix G**. The Indiana Bat (*Myotis sodalis*) was listed as endangered for the mammals category, although the location was noted that it did not overlap the critical habitat. For insects, a candidate status was declared for the Monarch Butterfly (*Danaus plexippus*), and no critical habitat has been designated for the species. There were no critical habitats found within the project area under the USFWS jurisdiction. It is recommended that this list is updated during engineering design and prior to construction to ensure all threatened or endangered species are identified for the project.

Environmental Justice Area

The water district is not located in an environmental justice area as shown in the map in **Appendix H**.

c.) Population Trends

Based upon U.S. Census date for the hamlet of Pottersville the population projection is shown in Table 1. The Pottersville population from the 2020 census data was 359, just over a 1.53% decrease per year from the 2010 data. Assuming a constant decline of 1.53% per year, the 20-year projected population is 264 utilizing the population growth formula of $P_t = P_0 (1+k)^n$ (where P_t = population at time t, P_0 = population at time zero, k = growth rate, and n = number of periods). Although the projected population based upon census data shows a substantial decrease in population, no projected demand decrease will be accounted for the purposes of this engineering study.

Table 1: Pottersville Population Projection

Date	Population	% Change Per Year
2000 Census	Data Not Available	N/A
2010 Census	424	N/A
2020 Census	359	-1.53%
2040 Projected	264	-1.53%

Potential projected growth for the Pottersville Water District identified by the Town includes a conversion of the old schoolhouse to development of approximately 20-apartments. If the district evaluates any potential future water district expansion, this could also factor into the projected growth for the water district as the Word of Life Bible Institute is within connection distance to the existing water distribution system with water system extensions. Any system expansion would require a Map, Plan and Report and legal process to extend the district which is outside the scope of this report.

d.) Community Engagement

Public hearings were held to obtain community input for the proposed project for the planning process. The hearings were conducted to provide the water district users and general public with an understanding and need for the project, utility operational service levels required, funding and revenue strategies to meet these requirements, along with other miscellaneous considerations.

2. EXISTING FACILITIES

a.) Location Map

A map of the existing water district is included in **Appendix I** and includes facilities that are no longer in use or abandoned to the best of our knowledge with information provided by the Town. A schematic process layout of the existing facilities is shown in **Figure 1** below.

The Town of Pottersville Water District, Public Water Supply ID# 5600110, serves 240 people through approximately 88 service connections. A map showing locations for the existing infrastructure is shown below in **Figure 1**.

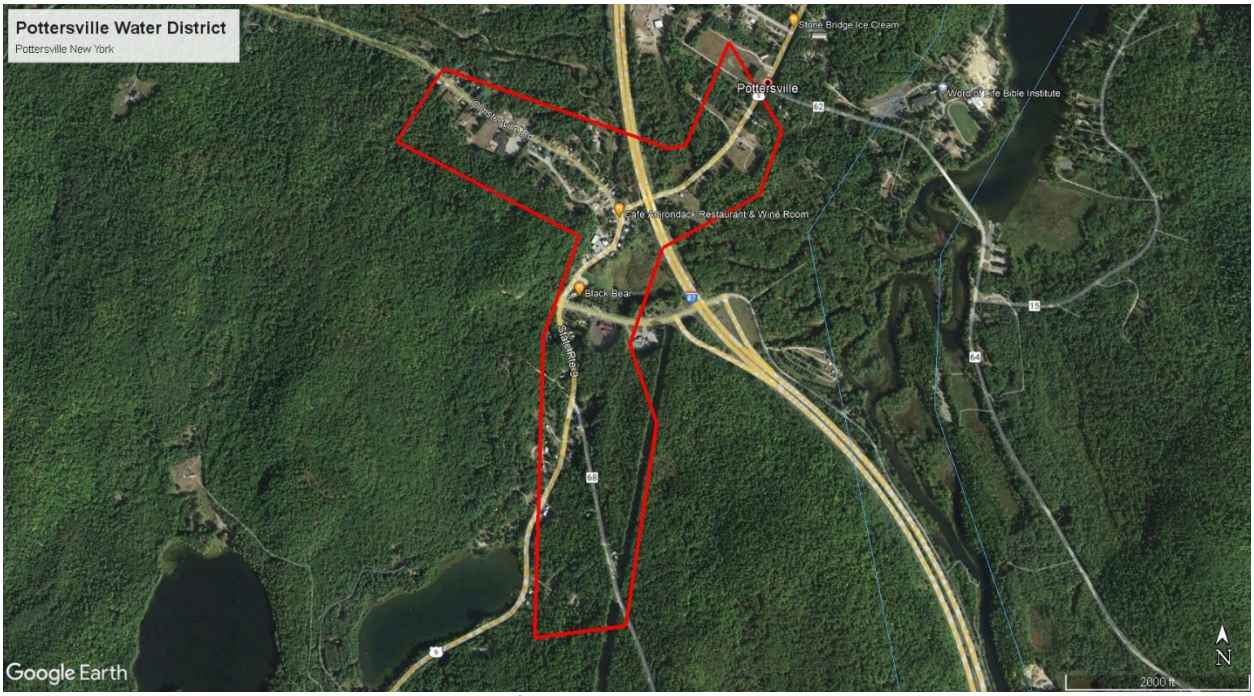


Figure 1: Map of existing water district.[1]

[1]Background imagery provided by Google Earth

b.) History

The approximate timeline of the major system components including constructed, renovated, expanded, or removed from service. Component failures and the cause for failure have been listed, if provided by the Town. A history of any applicable violations of regulatory requirements has also been included, and are shown below in **red text**.

- **1946** – System Installed.
- **1992** – New Landon Hill water storage tank installed.
- **2004** – Water main replacement along NYS Route 9 from Glendale Road (dead end) to around the Olmstedville Road intersection.
    - 6" asbestos cement main replaced with 10" cement lined ductile iron pipe per the April 2004 Frank D. Walter, Jr., P.E. Consulting Engineers as-built plans. The new 10" cement lined ductile iron pipe connects to the existing 6" ductile iron pipe located near the Trout Brook water main crossing.
    - It has also been reported from the Town that Valley Farm Road water main was installed around this time period (believed to be 6" ductile iron pipe to the dead end hydrant near the fire station).
- **2005 (June 13)** – Flooding at pump house from flash flood.
- **2011 (August 21)** – Flooding at pump house from hurricane Irene.
- **2012 (October 22)** – Flooding at pump house from hurricane Sandy.
- **2012 (Prior To This Date)** – Well #1 and well #2 Placed into service.
    - Well #1 only operated as an emergency backup and is not connected to the system (per the Annual Water Quality Report) due to unacceptable separation distance from an absorption field septic system.
- **2017 (December 28)** – Boil water order due to undetected water break. Backup water system was utilized.
- **2018** – Emergency action taken based upon the past reduced well yield from well #2 to install a redundant supply well.
    - Based upon camera inspection of the well, it was determined that the reduction of well yield was due to the plugging of the formation outside and adjacent to the casing and not due to fouling of the well screen.
- **2018 (May 8)** – Flooding at pump house.
- **2018 (July 5)** – Boil Water Order due to water main break.
- **2018 (September)** – Well #3 was drilled to provide mechanical redundancy to well #2.
- **2019 (September)** – 72-hour pumping test and Part 5 along with MPA analysis on well #3.
- **2019 (October)** – Well #2 was redeveloped to offset a noted decline in well yield.
- **2019 (November 1)** – Boil water order for flooding at the pumphouse.
- **2019 (Fall 2019 into Winter 2020)** – Construction of pump house replacement structure by Town.
- **2022** – Well house improvement updates and final construction of Well #3. Well #2 was brough above the pumphouse floor to remove the confined space entry previously required for maintenance.
- **2022 (January 26)** – NYS Department of Environmental Conservation Water Withdrawal permit obtained for Pottersville.

    - W.W. Permit was consolidated and included Chester Water District and Pottersville Water District systems.
- **2022 (November 30)** – Boil water order for chlorine pump malfunction.

c.) Ownership & Service Area

The water system is currently operated by Jason Monroe who holds the following licenses:

- IIB-GW or SW with Filtration Avoidance Plant
- C-Plant or Distribution System
- D-Distribution System

The Pottersville Water District provides water through 88 service connections to a population of approximately 240 people. The Water District operates two wells located off Gamble Beach Road (Well #2/PW2 and Well #3/PW3). Well #1/ PW1 is also located off Gamble Beach Road, but has no physical connection to the distribution system (per the Annual Water Quality Report included as **Appendix J**) and is in the process of being taken out of service and decommissioned. The Water District has recently obtained an updated Water Withdrawal Permit for both PW2 and PW3 to serve as public water supply wells. Treated water is pumped to a 200,000-gallon water storage tank located on Landon Hill Road to handle any peak hourly demands along with fire protection. Pottersville does not anticipate any significant changes to water demand in the future outside of the conversion of the existing school building into 20-apartments as previously discussed herein.

d.) Condition of Existing Facilities

The water district main existing facilities to be included within this report are broken out as follows:

Source:

The current system utilizes two groundwater wells, Well #2 and Well #3 to meet daily water demands. Wells #2 and #3 cannot be run together and only provide mechanical redundancy. Well #1 is around 40+ feet deep, has a 12" casing with an estimated yield of 100 gallons per minute (gpm) and is an emergency backup for the system. Well #1 is currently not physically connected to the system (per the Annual Water Quality Report). Well #1 is planned to be properly decommissioned due to its proximity to a neighboring sanitary sewer system. Well #2 is around approximately 50 feet deep with a 12" casing recently sleeved with an 8" casing and yields approximately 60-gpm with a screen depth of around 35 feet. An exact date for when Well #1 and #2 were placed in service is not known, but they were believed to be placed in service prior to 2012. Well #3 is 47 feet deep with an 8" casing and a screen depth of 42 feet. The well was drilled in September of 2018 and placed in service in late 2022 to provide mechanical redundancy for the system. Well #3 provides a yield of 60 gpm under normal rainfall conditions.

As the pump house had historical issues with flooding that penetrated the buried vault of well #2, the well casing was extended above the pump house floor and flood zone during the 2022 pump house construction upgrades.

Based upon the annual water quality report included in **Appendix J**, the NYS DOH determined the possible and actual threats to this drinking water source were elevated. The source water was identified to have an elevated susceptibility to microbials, nitrates, and industrial contaminants due primarily to the close proximity of a septic system to the well and commercial land use and related activities in the assessment area. The well is considered high-yielding and draws from an unconfined aquifer. The unconfined aquifer is a shallow aquifer that occurs immediately below the ground surface, and has no overlying impermeable layer for protection from potential contamination sources.

Treatment:
The two groundwater wells (Well #2 and #3) feed into the pump house (treatment building) where sodium hypochlorite (chlorine) is added for disinfection, caustic soda is added for pH adjustment, and orthophosphate is added for corrosion control. The well pumps feed through the pump house treatment piping and eventually through 24" nominal diameter ductile iron chlorine contact time piping outside the pump house and then into the distribution system and eventually into the atmospheric storage tank. The 24" nominal diameter ductile iron piping leaving the pump house provides the required chlorine contact time required for disinfection prior to the first user.

The action level for copper was exceeded during both the first and second half of 2020, although the treatment has switched the soda ash to caustic soda. Operational difficulties were had with the chemical feed pump with soda ash falling out of solution and clogging chemical feed pumps, feed lines and appurtenances that led to inconsistent dosing. There have not been any reported issues with pH adjustment chemical dosing after the switch to liquid caustic soda.

Distribution:
Existing distribution system consisting of 6" asbestos cement and 6"-10" ductile iron water mains and applicable appurtenances. Service connections are estimated to be mainly copper with some galvanized steel service lines in the system. No survey or log of system materials is known to exist.

It is believed that the majority of the distribution system is aged that of the original system installation around 1946, including the asbestos cement water mains. The only modern upgrades reported by the Town consist of minor repairs and the 2004 ductile iron water main replacement along NYS Route 9 from approximately the Olmstedville Road intersection to Glendale Road (system dead end), and the 6" dead end water main along Valley Farm Road that are believed to be ductile iron piping. It is also reported that a majority of breaks occur on Olmstedville Road due to the amount ledge rock in the area and the water main and services not being installed below frost depth.

Storage:
There is one atmospheric water storage tank for the water district located on Landon Hill Road that was construction around 1992. It is approximately a 200,000-gallon welded steel tank. The tank is roughly 40' in diameter and 24' tall. The water tanks last inspection was conducted on July 29, 2016 by Liquivision Technology Diving Services and the report is

included in **Attachment K**. The inspection detailed a visual tank inspection but did not give recommendations for repairs or improvements. The tanks conditions was described as follows:

- Exterior ladder – minor corrosion in good condition.
- Exterior base – slight minor cracking of concrete, appeared to be in good condition.
- Ground level 24" manway – good condition with minor corrosion.
- Ground level 32" manway – good condition with minor corrosion.
- Exterior wall – fair condition with minor corrosion.
- Exterior overflow – good condition with minor corrosion.
- Interior overflow – good condition with minor corrosion.
- Roof 24" entry hatch – fair condition with moderate amount of corrosion, no weather stripper observed.
- Roof – good condition with minor corrosion.
- Roof interior – fair condition with a minor amount of corrosion.
- Center exterior vent – fair condition with moderate amount of corrosion.
- Interior floor – unable to be evaluated due to sediment.
- Interior wall – fair condition with moderate amount of corrosion and heavy staining.
- Interior 24" manway – fair condition with moderate amount of corrosion.
- Interior 32" manway – fair condition with moderate amount of corrosion.
- Interior 12" Inlet/Outlet – fair condition with moderate amount of corrosion.

It is recommended that the Town have another tank inspection completed and the sediment cleaned out of the tank as soon as possible. Some additional questions remain if there is any cathodic protection within the tank for corrosion resistance, and condition of the tank floor. It may also be recommended to have a structural evaluation of the tank be completed to ensure the tank could be rehabilitated in the future to prolong its useful life. The overflow screen and vent screens should be evaluated that they are in good condition to ensure public safety. A gasket and new lock should also be installed on the roof access hatch.

Overall current energy consumption is outside the scope of this report, and no asset management plan has been provided or completed by the Town.

Additional recommended items were included in **Appendix L** from the NYS Department of Health January 6, 2023 sanitary survey letter. The majority of these items are being taken care of outside the scope of this report/project. A sanitary survey was conducted on December 22, 2022 and in a NYS DOH letter dated January 6, 2023 recommended:

1. Remaining items to be completed from the existing water treatment system upgrades:
    a. Master meter to be placed into operation.
    b. Variable frequency drives to be installed/connected to the pumps.
2. Minor deficiencies and recommendations:
    a. Phosphate levels must be measured daily and recorded on the operator's monthly report.

b. Currently, the well pumps are operated manually by the water operator. We recommend the well pumps be controlled by a storage tank water level sensor that will activate the well pumps. The "pump on" water level elevation must be determined such that 35 psi is maintained in the distribution system. The chemical pumps should be controlled by the flowrate through the master meter.
c. Secondary containment for the chemicals needs to be installed.
d. American Water Works Association recommends storage tank inspections take place on a 5-year frequency. Please submit the most recent storage tank inspection or schedule an inspection to be performed this year.
e. In December of 2021, the USEPA promulgated the revised Lead and Copper Rule (LCRR) which requires all community water systems to develop an inventory of all service line materials. The inventory is to be submitted to the NYSDOH by October 2024.

Site photos for each respective existing facility has been attached in **Appendix M** for reference.

e.) Existing System Demands

Water demands are discussed below from Town provided information and the available annual water quality reports for the Pottersville Water District. The 2021 Annual Water Quality report states the average daily demand (ADD) to be 24,000 gpd. The highest recorded Maximum Daily Demand (MDD) since 2016 occurred in 2016 with a value of 182,000 gpd. The highest recorded MDD in 2020 was 121,000 gpd. Although these are listed as maximum daily demands, they likely do not represent a true max daily demand due to the system being operated in hand and not off any level control setpoints from the storage tank. All daily demand values were obtained from monitoring the flows of the groundwater well that currently supplies the system with the existing flowmeter located in the pit of the water building. See **Appendix J** – 2021 Annual Water Quality Report for additional information on a system overview, flows observed, and water quality.

f.) Hydrant Testing & Hydraulic Analysis

Hydrant testing was conducted on May 8, 2023 with Cedarwood completing/observing the testing and the Town of Chester operating the valving and hydrants. The table below represents the summary of the testing and theoretical fire flow available. It should be noted that the majority of the system was found not able to provide the minimum fire flow required for the system per ISO recommendations of 500 gallons per minute at 20 psi residual system pressures. Based upon the elevation data and static pressure readings at the time the testing was conducted, the tank was believed to be filled to around 12.74 feet (approximately 119,753 gallons). The pump off level is around 22.5 feet above the finished flow elevation of the tank for comparison (approximately 211,492 gallons).

Table 2: Hydrant Testing Results

Project: Pottersvile Water District Study
Test Date: 5/8/2023

Test #	Time	Flow Hydrant #	Flow Hydrant Static Pressure		Orfice Coeficient	Orfice Diameter	Residual Hydrant #	R. Hydrant Static Pressure		R. Hydrant Residual Pressure		Flow (Pitot Gauge)				Theoretical Flow Available at 20 psi	
1	9:59 AM	10	49	psi	0.9	2.5	8	56	psi	38	psi	9	psi	201.35	gpm	292.76	gpm
2	10:38 AM	6	69	psi	0.9	2.5	3	71	psi	63	psi	17.5	psi	280.77	gpm	763.44	gpm
3	10:59 AM	2	71	psi	0.9	2.5	1	49	psi	26	psi	22.5	psi	318.37	gpm	360.82	gpm
4	11:50 AM	13	59	psi	0.9	2.5	12	59	psi	14	psi	14	psi	251.13	gpm	232.46	gpm

Notes:
Yellow highlighted cells represent fire flows below the ISO recommendations.

The hydrant location map is shown in Figure 2 below:

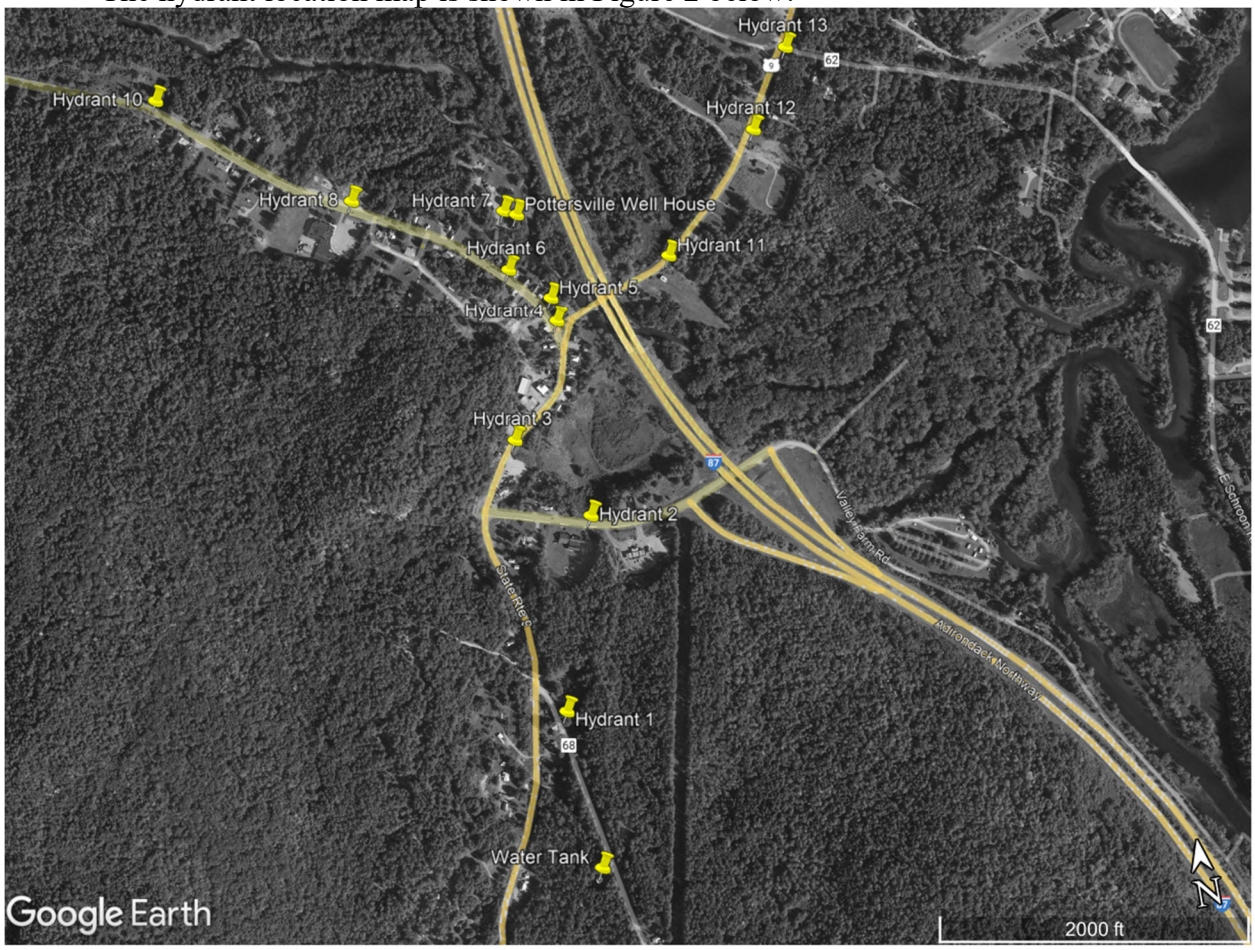


Figure 2: Hydrant Location Map[1]

[1]Background imagery provided by Google Earth

It is believed that test number 2 shown in the fire flow testing table did not cause a residual pressure drop of at least 10psi, and therefore, the results may not be relied upon for this specific test. Test 2 may represent a higher theoretical flow available that can be achieved by the existing system. Additional hydrant testing locations were attempted, but due to multiple issues with existing hydrants (gate valve isolated with debris in the valve box, hydrant caps unable to be removed, etc.), the additional testing could not be completed.

The existing system was modeled using EPANet 2.2 and calibrated using the results of the hydrant testing conducted on May 8th 2023. The results of the hydraulic analysis were consistent with the field data and represent that the majority of the existing 6-inch asbestos cement water main should be upsized to provide the required fire flow to the system in accordance with design standards. This should be verified and updated during the design stage of the project once actual field survey data is available. The hydraulic analysis utilized aerial mapping to obtain approximate lengths of mains of the existing distribution system. Elevations were obtained through either available online information or with a field gps to obtain hydrant nozzle elevations. As the system was found to be deficient for available fire flows, no additional scenarios were run in the hydraulic model (no peak hourly flow scenario, etc.). The system was also modeled with the tank at full capacity, and the fire flows were still not achieved with 20psi residual pressures.

g.) Financial Status of any Existing Facilities

The Potterville Water District charges the following rates for the 2022-2023 calendar year:

- Base Rate: Metered Residential: $295
- Base Rate: Metered Business: $295
- Base Rate: Metered Outside of District: $470
- Base Rate: Unmetered Inside District: $400
- Base Rate: Unmetered Outside of District: $600
- Flat Rate: Unmetered Outside of District: $330
- Rate per 1,000 gallons for over 30,000 gallons: $3
- Swimming Pool Rate: $300
- Hydrant Rental (9 hydrants + 2 dry): $130
- Turn On/Turn Off: $20
- Connection Charge – Standard Install: $1,200
- Replace Water Meter: $170

The district charges their water users a base rate for the first 30,000 gallons of water with a $3 charge for every 1,000 gallons used thereafter. Residential and business rates are the same. Out of district rates are higher than inside the district rates. Charges are also included as a flat fee for swimming pools, hydrant rentals, water service curb stop turn on/off's, service connection charges and water meter replacements. Late fees and interest are charged on past due water bills not paid on time.

As of the date of this report, the Town has reported that the Pottersville Water District does not carry any debt.

The approved water budget for 2023 is shown below in Table 3. The approved expenditures and revenues for 2023 both are $58,670.

Table 3: Pottersville Water District 2023 Approved Budget

Item Code	Description	Adopted Budget 2023
sw2-8310.1	pers serv water supt	$ 8,540.00
sw2-8310.11	per serv asst supt	$ -
sw2-8310.2	equipment	$ 150.00
sw2-8310.4	contractual	$ 1,350.00
sw2-8320.2	equipment	$ 2,500.00
sw2-8320.22	water treatment equipment	$ -
sw2-8320.4	contractual	$ 8,190.00
sw2-8330.4	contractual	$ 14,000.00
sw2-8340.1	ps distrib/waterlines	$ 5,500.00
sw2-8340.2	equipment	$ 4,000.00
sw2-8340.4	contractual	$ 6,000.00
sw2-9010.8	NYS Retirement	$ 1,700.00
sw9030.8	Social Security and Medicare Taxes	$ 1,400.00
sw2-9055.8	NYS disability Insurance	$ 40.00
sw2-9060.8	health insurance	$ 5,300.00
	Total Expenditures	**$ 58,670.00**
sw2-1001	real property taxes	$ 20,000.00
sw2-2140	metered water sales	$ 30,000.00
sw2-2378	Hydrant Rental:Water Srvces-Other	$ 120.00
sw2-2142	unmetered water sale	$ -
sw2-2148	interest/penalties on water rates	$ -
sw2-2401	interest and earnings	$ 50.00
sw2-2770	well house project	$ -
SW2-5031	interfund transfer	$ -
	appropriated fund balance	$ 8,500.00
	Total Income	**$ 58,670.00**

h.) Water/Energy/Waste Audits

No water, energy or waste audits have been conducted for this project and is outside the scope of this report.

3. NEED FOR PROJECT

a.) Health, Sanitation, and Security

The existing wells for the system were rated as having an elevated susceptibility to contamination in accordance with the NYS DOH source water assessment system. Although this does not mean that the water is or will be contaminated, it is recommended that additional steps are made to protect the source waters in the future.

The majority of the existing distribution system is antiquated, beyond its useful life and is in need of replacement. Areas of the distribution system along Olmstedville Road are reportedly not buried to proper frost depth due to ledge rock, which has been the cause of breaks in the area. As the existing distribution system surpasses its useful life, the frequency of system breaks are expected to increase along with the risk of a catastrophic

failure of the asbestos cement water mains. System breaks that result in boil water orders leave the users with an elevated risk of potential contamination.

Due to the deteriorated conditions of much of the existing water system, the Operator has to spend additional time and resources maintaining and operating the system. Without pursuing the recommended alternatives, the expected O&M requirements of the existing system are expected to substantially increase.

Based upon the results of the fire flow analysis and hydrant testing, the existing system has been found to not be capable of providing the minimum fire flows of 500 gallons per minute at 20psi system residual pressures. This is a concern for the existing systems residential and commercial users and could limit future development within the district and limits the fire fighting capabilities.

b.) Aging Infrastructure

Without a modern control system for the water plant to turn on and off, the system does not operate in the most efficient manner and leads to unnecessary water loss for the system. The aging distribution system also accounts for a substantial amount of water loss for the system.

c.) Reasonable Growth

If the Water District evaluates potential district expansion, which is outside the scope of this report, it is assumed that the system would be extended from the existing dead-end hydrant located near the intersection of St. Rt. 9 and Glendale Road. If the system was extended towards the East down Glendale Road, potential service connections would include a few residential connections and the Word of Life Bible Institute. Expansion areas could be evaluated and should be accounted for during the design phase of the project to ensure the system is sized appropriately for future build out. As previously stated, the legal process and Map, Plan and Report to expand the district are outside the scope of this report.

d.) Capacity Development

The capacity development and smart growth forms have been attached to the end of the report Appendices.

e.) Known System Deficiencies

The known system deficiencies have been provided based upon the 2022 Edition of the Recommended Standards for Water Works (standard referenced and then the deficiency in the bullets below):

Source:

- 3.2.3.3 Wellhead protection
    - This standard states that a wellhead protection plan for continued protection of the wellhead from potential sources of contamination shall be provided as determined by the reviewing authority. Agreements with neighboring landowners are being completed due to proximity to nearby sanitary sewer septic system components, and a security fence for Well

#3 is proposed as part of this project (consistent with security features within the RSWW).

- 3.2.4.14 Well abandonment
  - Well #1 should be properly abandoned as it is not in use due to its proximity to a nearby sanitary sewer septic system.

Distribution System:

- 8.2.1 System design pressure
  - The system cannot maintain 20psi at ground level at all points in the distribution under all conditions of flow (fire flow scenarios @ 500gpm).
- 8.2.3 Fire protection
  - System does not meet requirements for fire protection set forth by the Insurance Services Office (ISO)
- 8.7.3 Cover
  - Reported issues of existing water mains not installed to proper frost depth due to ledge rock.

Storage:

- 7.1.4 Security
  - Locks on all access manways (valve vault and tank access manway) should be provided on the system.
- 7.4.3 Level Controls
  - Overflow and low-level warning or alarms should be located where they will be under responsible surveillance 24 hours a day which does not exist for the current system.

4. ALTERNATIVES CONSIDERED (SOURCE & TREATMENT)

a.) Description

Source & Treatment

Alternative 1.A. – No Action Alternative:

The no action alternative for source and treatment is not considered a viable option and is therefore not considered for the purposes of this report as the system has minimum deficiencies to resolve as recommended by the NYS Department of Health Sanitary Survey letter.

Alternative 2.A. – Existing Source & Treatment Upgrade Alternative:

The main deficiencies for the existing well field have been identified and taken care of with the latest upgrade completed near the end of the 2022 calendar year. The remaining items to be taken care of as previously discussed in the NYS DOH sanitary survey are:

1. Remaining items to be completed from the existing water treatment system upgrades:
   a. Master meter to be placed into operation.
      i. An electronic mag-meter is installed in the pump house, and needs to be wired/connected to the final power/control system.
   b. Variable frequency drives to be installed/connected to the pumps.
2. Minor deficiencies and recommendations:

a. Phosphate levels must be measured daily and recorded on the operator's monthly report.
    i. Not applicable to this report as this would be completed by the system Operator.
b. Currently, the well pumps are operated manually by the water operator. We recommend the well pumps be controlled by a storage tank water level sensor that will activate the well pumps. The "pump on" water level elevation must be determined such that 35 psi is maintained in the distribution system. The chemical pumps should be controlled by the flowrate through the master meter.
c. Secondary containment for the chemicals needs to be installed.

Additional items that should be taken care of moving forward are the abandonment and decommissioning of Well #1. No existing alarm system or autodialer is located at the pump house. It is recommended that this be installed to provide alarm capabilities to the let the operator and designated staff know of system issues outside of standard visits by the operator and complaints by the public. Alarming could identify conditions such as:

- Building low temperature
- Loss of power
- Loss of signal from tank/radio control
- Well pump failure (VFD failure)
- Magnetic flowmeter – loss of echo
- Water tank high level alarm
- Water tank low level alarm
- Possible future alarms:
    - SCADA/PLC Failure System Alarm
    - Chlorine Analyzer
        - Low and high chlorine residual
        - Loss of echo
    - Chemical Feed Pump Alarms
        - No/low flow alarm
        - Pump failure
    - Storage tank mixer failure
    - Spare alarms as requested or required.

As some items listed above were included with the prior upgrade project for the well house and well #3, they are not included in the cost estimates for the scope of this report. The items included in this alternative are as follows and are detailed in Table 4 below:

- Autodialer installation (system alarm capabilities).
- Chain link fencing for well protection.
- Abandonment of existing well #1.
- Lump sum allowance for miscellaneous items (minor items such as secondary containment, etc.).

Alternative 3.A. – Additional Water Source & Treatment Building:

A hydrogeological desktop study has been completed by Hydrosource Associates and is attached as **Appendix N**. Due to proximity to the existing distribution system, tax map I.D. 35.4-1-14 (a Group 1 Site) was selected for the purposes of this report. This option would require a minimum of 4-acres required for wellhead protection. The Town would be required to work out an Agreement to purchase the land prior to completing additional field work and drilling of test wells if this option is selected and advanced into the design stage. It is assumed that, at a minimum two wells would be required for the site although well yield testing would be completed to determine if the wells can produce viable yields for the system during the test well phase. A well house building would be required along with an access road. At a minimum, depending on water quality of the new source, it is believed that chlorine (sodium hypochlorite) would be required to disinfect the raw water prior to the first service connection. The required chlorine contact time would be calculated and it is assumed that plug flow piping would be utilized to achieve this prior to the first service connection. New distribution main would then be installed along Olmsteadville Road to connect from the new wells to the dead end of the existing system as shown in **Appendix P**. Estimated capital costs have been shown in Table 5 below.

b.) Design Criteria

Source & Treatment

For all source & treatment alternatives, design shall be completed in accordance with all applicable regulations and standards, including, but not necessarily limited to the latest revisions of:

- American Water Works Association – Applicable Standards.
- Recommended Standards for Water Works – 2022 Edition.
- Unofficial Compilation of Codes, Rules and Regulations of the State of NewYork Title 10. Department of Health Chapter I. State Sanitary Code Part 5. Drinking Water Supplies Subpart 5-1. Public Water Systems ("NYS DOH Part 5 Standards).
- NYS DEC Water Withdrawal Permit Requirements.

Per the Recommended Standards for Water Works, the source capacity shall meet or exceed the design maximum daily demand with the largest producing well or pump out of service.

c.) Map

Source & Treatment

Alternative 2.A. – Existing Source & Treatment Upgrade Alternative:

The existing source and treatment upgrade alternative would take place at the location of the existing pump house and well location. This is shown in **Appendix A** and is located off Olmstedville Road on Gambles Beach Road.

Alternative 3.A. – Additional Water Source & Treatment Building: **T.B.D.**

The proposed alternative well source location is shown in **Appendix O**.

d.) Cost Estimate

Source & Treatment

Alternative 2.A. – Existing Source & Treatment Upgrade Alternative:

Alternative 2.A. cost estimate is shown in the table below.

Table 4: Engineer's Opinion of Probable Cost for Existing Source & Treatment Upgrades

Description	Quantity	Unit	Unit Cost	Total Cost
Existing Source & Treatment Upgrades				
Autodialer (system alarm capabilities)	1	LS	$5,000	$5,000
Chain Link Fencing for Well Protection	1	LS	$10,000	$10,000
Abandonment of Existing Well #1	1	LS	$12,500	$12,500
Lump Sum Allowance for Miscellaneous Items	1	LS	$5,000	$5,000
			Construction Subtotal	$32,500
			Contingency (15%)	$4,875
			Total Construction w/Contingency	**$37,375**
			Engineering/Grant Admin./Legal Costs	$12,500
			Total with Contingency	**$49,875**
			Total with Contingency (2026 Dollars assuming 3% Inflation)	**$60,000**

Alternative 3.A. – Additional Water Source & Treatment Building:
The cost estimate for a new groundwater well source is detailed in Table 5 below.

Table 5: Engineer's Opinion of Probable Cost for New Well Source

Description	Quantity	Unit	Unit Cost	Total Cost
General Construction Items				
Mob./Demob., Bonds & Insurance	1	LS	$40,000	$40,000
Water Tank Replacement				
Land Acquisition (4-acres for wellhead protection)	1	LS	$150,000	$150,000
Well Installation	2	EA	$60,000	$120,000
Test Well Installation	2	EA	$15,000	$30,000
Well House Building	1	LS	$100,000	$100,000
Access Road	1	LS	$70,000	$70,000
VFD & Control Panel	1	LS	$75,000	$75,000
Electrical Service/Connection	1	LS	$60,000	$60,000
Security Fencing	1	LS	$20,000	$20,000
Plumbing Connections for Wells and Well House	1	LS	$50,000	$50,000
Main to Connect to Distribution System	1,650	LF	$185	$305,250
Rock Removal	400	CY	$200	$80,000
Hydrant Assembly	1	EA	$9,500	$9,500
Gate Valve w/Valve Boxes (spaced every 500LF)	3	EA	$3,500	$11,550
			Construction Subtotal	$1,121,300
			Contingency (15%)	$168,195
			Total Construction w/Contingency	**$1,289,495**
			Engineering/Grant Admin./Legal Costs	$230,000
			Total with Contingency	**$1,519,495**
			Total with Contingency (2026 Dollars assuming 3% Inflation)	**$1,670,000**

e.) Environmental Impacts

Source & Treatment

Alternative 2.A. – Existing Source & Treatment Upgrade Alternative:
As the Town already owns the lands of the existing source and treatment system and no significant construction is proposed, only minor environmental impacts would be anticipated.

Alternative 3.A. – Additional Water Source & Treatment Building:
This alternative would involve the installation of new water main to achieve chlorine contact time required for disinfection and to connect to the existing distribution system. Minor environmental impacts would be anticipated, although additional investigation would be required to determine all environmental impacts as design and test wells progress, if this alternative is selected.

f.) Land Requirements

Source & Treatment

Alternative 2.A. – Existing Source & Treatment Upgrade Alternative:

Not applicable as the Town already owns the lands of the existing source and treatment system.

Alternative 3.A. – Additional Water Source & Treatment Building:

The Town would be required to purchase land for this alternative. Due to the requirements for well head protection, a minimum of 4-acres would be required.

g.) Potential Construction Problems

Source & Treatment

Alternative 2.A. – Existing Source & Treatment Upgrade Alternative:

No major construction problems are anticipated for the proposed alternative.

Alternative 3.A. – Additional Water Source & Treatment Building:

Potential construction problems that could exist for the proposed alternative include the potential for rock removal and unknown subsurface conditions that would be identified during the design and investigation stages of the project. There is no guarantee that groundwater will be found of required yields with acceptable water quality until test wells are drilled at the proposed site. Yield tests and water quality sampling would be required to be conducted in accordance with NYS Department of Health regulations to determine viability.

h.) Non-Monetary Factors & Sustainability Considerations

Source & Treatment

Alternative 2.A. – Existing Source & Treatment Upgrade Alternative:

Non-monetary factors for this alternative include upgrades to increase operational efficiency and minimize the excess production of water with the proposed system control and alarming upgrades.

Alternative 3.A. – Additional Water Source & Treatment Building:

Non-monetary factors for this alternative are similar to those identified in alternative 2.A. along with potential aesthetic impacts due to the need for a building and an access road along with the 4-acres required for the proposed wells. Additional staffing requirements or responsibilities could also be required due to the additional operation and maintenance associated with this alternative.

i.) Water and Energy Efficiency

Source & Treatment

Alternative 2.A. – Existing Source & Treatment Upgrade Alternative:

The proposed alternative involves the installation of upgraded controls for the level sensor and radio control for well pump house operation. The Town will also be installing variable frequency drives on the existing well pumps and controls to minimize excessive run-times of the system.

Alternative 3.A. – Additional Water Source & Treatment Building:
This alternative would involve additional telemetry and controls for system operation and inclusion of variable frequency drives on the pumps for energy efficiency measures.

ii.) Green Infrastructure

As this project involves water infrastructure, this section is not applicable for this study and will not be discussed further. The only stormwater involved for the project would be during construction and would involve compliance with the NYS Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activity – GP-0-20-001 which would only completion of a stormwater pollution prevention plan to handle erosion and sediment controls during construction.

iii.) Other

Source & Treatment

Alternative 2.A. – Existing Source & Treatment Upgrade Alternative:
Not applicable.

Alternative 3.A. – Additional Water Source & Treatment Building:
Not applicable.

5. ALTERNATIVES CONSIDERED (DISTRIBUTION)

a.) Description

Distribution

Alternative 1.B. – No Action Alternative:
The no action alternative is not considered a viable alternative due to the age of the existing system and frequency of breaks of the existing asbestos cement mains and appurtenances. Therefore, this alternative will not be discussed further within this report.

Alternative 2.B. – Connection to Chestertown Water District System:
Connection to the nearest alternative water system would be the Chestertown Water District. The water main extension required would be well over 4-miles long southbound down Landon Hill Road to connect to the nearest portion of the Chestertown Water District distribution system. Due to the length of water main required for connection, this alternative has been deemed impractical and uneconomical and will not be discussed further within this report.

Alternative 3.B. – Replacement of Asbestos Cement Water Mains & Appurtenances:
The proposed replacement area involves all the water main and appurtenances other than the newer ductile iron water mains as shown in the map in **Appendix I**. The existing asbestos cement mains are beyond their expected useful life and are in need of replacement. It has been reported from the Town that portions of the existing system located on Olmstedville Road are not buried to sufficient frost depth due to ledge rock. These items

should be corrected in the proposed design. The system also has been found unable to provide the minimum required fire flow while maintaining 20psi residual pressures in the system. Due to this, the existing asbestos cement main would likely need to be upsized and evaluated during the design stage of the project.

As identified in the NYS DOH sanitary survey letter, the following will also be required (although has not been included in the scope of this report):

1. In December of 2021, the USEPA promulgated the revised Lead and Copper Rule (LCRR) which requires all community water systems to develop an inventory of all service line materials. The inventory is to be submitted to the NYSDOH by October 2024.

b.) Design Criteria

Distribution

Alternative 3.B. – Replacement of Asbestos Cement Water Mains & Appurtenances:

Proposed design shall be completed in accordance with all applicable regulations and standards, including, but not necessarily limited to the latest revisions of:

- American Water Works Association – Applicable Standards.
- Recommended Standards for Water Works – 2022 Edition.
- Unofficial Compilation of Codes, Rules and Regulations of the State of NewYork Title 10. Department of Health Chapter I. State Sanitary Code Part 5. Drinking Water Supplies Subpart 5-1. Public Water Systems ("NYS DOH Part 5 Standards).

c.) Map

Distribution

Alternative 3.B. – Replacement of Asbestos Cement Water Mains & Appurtenances:

The proposed replacement area involves all the water main and appurtenances other than the newer ductile iron water mains as shown in the map in **Appendix I**.

d.) Cost Estimate

Distribution

Alternative 3.B. – Replacement of Asbestos Cement Water Mains & Appurtenances:

The cost estimate is shown below in Table 6.

Table 6: Engineer's Opinion of Probable Cost for Water Main Replacement

Opinion of Probable Cost - Water Main Replacement

Description	Quantity	Unit	Unit Cost	Total Cost
General Construction Items				
Mob./Demob., Bonds & Insurance	1	LS	$150,000	$150,000
Maintenance & Protection of Traffic	1	LS	$100,000	$100,000
Erosion & Sediment Control	1	LS	$50,000	$50,000
1. Olmstedville Road Water Main Replacement Items				
Flowable Fill: 6" AC Water Main	3,150	FT	$18	$56,700
Water Main Replacement	3,424	FT	$185	$633,440
Gate Valves	15	EA	$3,500	$52,500
Service Connections: Near Side	19	EA	$5,500	$104,500
Service Connections: Far Side	20	EA	$7,500	$150,000
Connection to Existing Main	2	EA	$12,000	$24,000
Hydrant Assemblies	7	EA	$9,500	$66,500
Rock Removal	1000	CY	$200	$200,000
2. Route 9 Water Main Replacement Items				
Flowable Fill: 6" AC Water Main	2,350	FT	$18	$42,300
Water Main Replacement	2,450	FT	$185	$453,250
Gate Valves	7	EA	$3,500	$24,500
Service Connections: Near Side	10	EA	$5,500	$55,000
Service Connections: Far Side	9	EA	$7,500	$67,500
Connection to Existing Main	3	EA	$12,000	$36,000
Hydrant Assemblies	2	EA	$9,500	$19,000
3. Landon Hill Rd Water Main Replacement Items				
Flowable Fill: 6" AC Water Main	1,325	FT	$18	$23,850
Water Main Replacement	1,325	FT	$185	$245,125
Service Feed to ST. Rt. 9 Homes	490	FT	$150	$73,500
Gate Valves	7	EA	$3,500	$24,500
Service Connections: Near Side	6	EA	$5,500	$33,000
Service Connections: Far Side	2	EA	$7,500	$15,000
Connection to Existing Main	1	EA	$12,000	$12,000
Hydrant Assemblies	3	EA	$9,500	$28,500
			Construction Subtotal	$2,740,665
			Contingency (25%)	$685,166
			Total Construction w/Contingency	**$3,425,831**
			Engineering/Grant Admin./Legal Costs	$545,119
			Total with Contingency (2023 Dollars)	**$3,970,950**
			Total with Contingency (2026 Dollars assuming 3% Inflation)	**$4,340,000**

e.) Environmental Impacts

Distribution

Alternative 3.B. – Replacement of Asbestos Cement Water Mains & Appurtenances:

The only identified resources impacted are shown in **Appendix E**. During design, actual wetland and water resources should be identified during the survey stage to ensure all applicable permits are acquired prior to commencing construction.

f.) Land Requirements

Distribution

Alternative 3.B. – Replacement of Asbestos Cement Water Mains & Appurtenances:

The proposed replacement areas for the distribution system upgrade would be installed within the existing right-of-way with services replaced from the new main to the right-of-way boundary, unless a lead service line is encountered. If a lead service line is encountered, the entire service shall be replaced into the residence in accordance with all applicable laws and regulations in accordance with the Environmental Protection Agency and NYS Department of Health requirements.

g.) Potential Construction Problems

Distribution

Alternative 3.B. – Replacement of Asbestos Cement Water Mains & Appurtenances:

Subsurface investigations shall be completed as early as possible in the design phase to ensure ledge rock areas and high groundwater table zones are identified to minimize unforeseen costs during construction and to ensure the most effective installation method is chosen for installation (e.g.: trenchless installation versus open trenching methodologies).

h.) Non-Monetary Factors & Sustainability Considerations

Distribution

Alternative 3.B. – Replacement of Asbestos Cement Water Mains & Appurtenances:

Non-monetary factors included with this alternative include health and safety of the public to upgrade the mains to minimize system breaks that could pose contamination threats to the system.

i.) Water and Energy Efficiency

Not applicable for the proposed distribution system replacement.

ii.) Green Infrastructure

Not applicable.

iii.) Other

Distribution

Not applicable.

6. ALTERNATIVES CONSIDERED (STORAGE)

a.) Description

Storage

Alternative 1.C. – No Action Alternative:

The no action alternative would involve leaving the existing storage tank as-is for the foreseeable future. Additional maintenance costs would likely add up by not taking action and is not recommended due to the corrosion identified in the last inspection report from 2016. Therefore, the no action alternative will not be discussed further within this report.

Alternative 2.C. – Existing Tank Rehabilitation & Upgrades:

The existing tank rehabilitation and upgrade alternative would involve the following:

- Completion of an updated inspection of the water storage tank.
- Surface preparation and recoating of the interior and exterior of the tank to resolve identified corrosion.
- Installation of a cathodic protection system inside the tank to supplement the proposed coating with corrosion protection.
- Miscellaneous repairs/upgrades:
    - Installation of a level transducer for the tank to monitor tank level and upgrade, as required to send the level signal via radio control to the existing pump house to operate the well pumps.
    - Any additional items identified within a future inspection report.

As previously identified in the NYS DOH sanitary survey letter, the following should also be completed:

1. Currently, the well pumps are operated manually by the water operator. We recommend the well pumps be controlled by a storage tank water level sensor that will activate the well pumps. The "pump on" water level elevation must be determined such that 35 psi is maintained in the distribution system. The chemical pumps should be controlled by the flowrate through the master meter.
2. American Water Works Association recommends storage tank inspections take place on a 5-year frequency. Please submit the most recent storage tank inspection or schedule an inspection to be performed this year.

The existing water storage tank was installed around 1992. Steel water storage tanks are expected to have a useful life well over 30-years and based upon similar style steel tanks other similar water districts, 50-60+ year useful life is obtainable depending on the tanks existing condition and maintenance conducted.

Alternative 3.C. – Water Storage Tank Replacement:

This alternative would involve the replacement of the existing water storage tank and abandonment of the existing tank and valve vault. As it has been recommended that another tank inspection be completed, this information will be critical to make an informed decision on the chosen alternative for the storage for the system. It is currently believed that the existing tank being installed in 1992 has a substantial amount of useful life

remaining, although the existing structural integrity of the tank should be evaluated during the next inspection to verify existing conditions.

For this alternative it is assumed that a new tank would be installed on the same site as the existing tank, and the existing tank would be demolished after the new tank is online and operational.

b.) Design Criteria

Storage

For both alternatives for storage, design shall be completed in accordance with all applicable regulations and standards, including, but not necessarily limited to the latest revisions of:

- American Water Works Association – Applicable Standards.
- Recommended Standards for Water Works – 2022 Edition.
- Unofficial Compilation of Codes, Rules and Regulations of the State of NewYork Title 10. Department of Health Chapter I. State Sanitary Code Part 5. Drinking Water Supplies Subpart 5-1. Public Water Systems ("NYS DOH Part 5 Standards).

c.) Map

Storage

For both alternatives, the storage tank would be located at the site of the existing tank as shown in **Appendix I**.

d.) Cost Estimate

Storage

Alternative 2.C. – Existing Tank Rehabilitation & Upgrades:

The existing storage tank rehabilitation is shown below in Table 7.

Table 7: Engineer's Opinion of Probable Cost for Storage Tank Rehabilitation

Description	Quantity	Unit	Unit Cost	Total Cost
General Construction Items				
Mob./Demob., Bonds & Insurance	1	LS	$20,000	$20,000
Water Tank Replacement				
200,000 Gallon Water Tank Surface Preparation & Coating (Internal & External)	1	LS	$380,000	$380,000
Miscellaneous Repairs/Upgrades	1	LS	$10,000	$10,000
Cathodic Protection System Installation	1	LS	$10,000	$10,000
			Construction Subtotal	$420,000
			Contingency (15%)	$63,000
			Total Construction w/Contingency	**$483,000**
			Engineering/Grant Admin./Legal Costs	$60,000
			Total with Contingency	**$543,000**
			Total with Contingency (2026 Dollars assuming 3% Inflation)	**$600,000**

Alternative 3.C. – Water Storage Tank Replacement:
The cost estimate for storage tank replacement is shown below in Table 8.

Table 8: Engineer's Opinion of Probable Cost for Storage Tank Replacement

Description	Quantity	Unit	Unit Cost	Total Cost
General Construction Items				
Mob./Demob., Bonds & Insurance	1	LS	$40,000	$40,000
Maintenance & Protection of Traffic	1	LS	$20,000	$20,000
Erosion & Sediment Control	1	LS	$12,500	$12,500
Water Tank Replacement				
200,000 Gallon Water Tank Including Foundation & Sitework	1	LS	$580,000	$580,000
Storage Tank, Valve Vault & Appurtenances	1	LS	$115,000	$115,000
Demolition of Existing Tank & Valve Vault	1	LS	$65,000	$65,000
			Construction Subtotal	$832,500
			Contingency (25%)	$208,125
			Total Construction w/Contingency	**$1,040,625**
			Engineering/Grant Admin./Legal Costs	$159,375
			Total with Contingency	**$1,200,000**
			Total with Contingency (2026 Dollars assuming 3% Inflation)	**$1,320,000**

e.) Environmental Impacts

Storage

Alternative 2.C. – Existing Tank Rehabilitation & Upgrades:
As no physical disturbance to the proposed project site is anticipated for this alternative, the environmental impacts are expected to be minor in nature.

Alternative 3.C. – Water Storage Tank Replacement:
This proposed alternative would occur of the existing site and is owned by the Town. Minimal clearing would be required and therefore a minor environmental impact is anticipated.

f.) Land Requirements

As the Town already owns the land for the storage tank, no additional land requirements are anticipated for either alternative.

g.) Potential Construction Problems

Storage

Alternative 2.C. – Existing Tank Rehabilitation & Upgrades:
A potential construction problem for this alternative involves taking the existing tank out of commission during the coating procedure, which is best completed during or around summer due to environmental conditions. The highest water system demands also occur during the summer months. The existing wells would be required to run at maximum capacity and will need to keep up with any peak hourly demands during construction.

Pressure reducing valves would likely need to be installed on system hydrants to discharge when maximum pressures are achieved for the system. Temporary storage may need to be evaluated during the design stage of the project if the wells are unable to satisfy peak hourly demands. These items shall be evaluated and determined during the design stage of the project.

Alternative 3.C. – Water Storage Tank Replacement:
A subsurface investigation with geotechnical report should be completed by a licensed engineer for the proposed storage tank replacement. Depending on conditions, a foundation design can then be completed, and the final cost estimate updated. No other major construction problems are anticipated for this alternative.

h.) Non-Monetary Factors & Sustainability Considerations

Storage

Alternative 2.C. – Existing Tank Rehabilitation & Upgrades:
Not applicable.

Alternative 3.C. – Water Storage Tank Replacement:
Replacing the existing water storage tank too early in its useful life may not be considered a practical option and therefore, additional information shall be evaluated including the updated water storage tank inspection with structural evaluation. If a new storage tank is constructed adjacent to the existing, visual impacts should be evaluated and accounted for during the design and permitting stages of the project.

i.) Water and Energy Efficiency

Both options would improve water and energy efficiency with the installation of a pressure level transducer and updated radio control items within the water storage tank to optimize system run-times and operation.

ii.) Green Infrastructure

Not applicable.

iii.) Other

Not applicable.

7. SUMMARY & COMPARISON OF ALTERNATIVES

a.) Life Cycle Cost Analysis

Source & Treatment

The life cycle assessment with short lived assets are detailed below for the source & treatment alternatives.

Table 9: Existing Source & Treatment Upgrade Alternative LCA (Alt. 2A)

*Federal Disount Rate for Water Resources Planning (Interest Rate) I = 0.02

Number of Years for Life Cycle Analysis, n = 20 years

Short Lived Assets (Not Including Existing Infrastructure)						
Item	**Years of Life Expectancy**	**Number of Units**	**Unit**	**Replacement Cost Each**	**Replacement Cost Item**	**Funds to Set Aside Yearly**
Autodialer	15	1	EA	$5,000.00	$5,000.00	$333.33
					Short Lived Asset Annual Reserve	$333.33

Operation & Maintenance Costs (Additional)			
Item	**How Often (yrs)**	**Cost**	**Annual Cost**
Not Applicable (no additional cost to current operations)	N/A	N/A	$0.00
		Total O&M Costs	$0.00

Present Worth Calculation	
Description	**Cost**
Initial Capital Costs	$60,000.00
Present Worth of SLA**	$5,450.48
Present Worth of O&M**	$0.00
Total Present Worth* **	**$65,450.48**

Notes:

**Interest rate utilized from the OMB Circular A-94 shown for the 2023 calendar year.*

***PW of Annual Cost = Annual O&M * $[(1+i)^n -1]/[i(1+i)^n]$*

****Total Present Worth included initial capital costs + PW of SLA + PW of O&M.*

Salvage value has not been included for the evaluated options.

Short lived assets have not been included for items with a life expectancy greater than 15 years per USDA RD guidance.

A 20-year evaluation for the LCA was completed per USDA RD guidance.

Cost estimates are shown in 2023 dollars.

Table 10: New Source Alternative LCA (Alt. 3A)

*Federal Disount Rate for Water Resources Planning (Interest Rate) I = 0.02

Number of Years for Life Cycle Analysis, n = 20 years

Short Lived Assets						
Item	**Years of Life Expectancy**	**Number of Units**	**Unit**	**Replacement Cost Each**	**Replacement Cost Item**	**Funds to Set Aside Yearly**
Well Pumps & VFD's	10	2	EA	$15,000.00	$30,000.00	$3,000.00
Chem Pumps	5	2	EA	$4,000.00	$8,000.00	$1,600.00
Chem Pumps Rebuilt Kits	1	2	EA	$1,000.00	$2,000.00	$2,000.00
Lab Equipment	5	1	LS	$3,500.00	$3,500.00	$700.00
Flow Meter	15	2	EA	$6,000.00	$12,000.00	$800.00
Controls	15	1	LS	$20,000.00	$20,000.00	$1,333.33
					Short Lived Asset Annual Reserve	$9,433.33

Operation & Maintenance Costs (Additional)			
Item	**How Often (yrs)**	**Cost**	**Annual Cost**
Chlorine Cost	1	$1,000.00	$1,000.00
Labor	1	$18,250.00	$18,250.00
		Total O&M Costs	$19,250.00

Present Worth Calculation	
Description	**Cost**
Initial Capital Costs	$1,670,000.00
Present Worth of SLA**	$154,248.52
Present Worth of O&M**	$314,765.09
Total Present Worth* **	**$2,139,013.61**

Notes:

**Interest rate utilized from the OMB Circular A-94 shown for the 2023 calendar year.*

***PW of Annual Cost = Annual O&M * $[(1+i)^n -1]/[i(1+i)^n]$*

****Total Present Worth included initial capital costs + PW of SLA + PW of O&M.*

Salvage value has not been included for the evaluated options.

Short lived assets have not been included for items with a life expectancy greater than 15 years per USDA RD guidance.

A 20-year evaluation for the LCA was completed per USDA RD guidance.

Distribution

A traditional life cycle cost analysis does not apply to the distribution alternatives proposed within this report and therefore will not be discussed further.

Storage

Alternative 2.C. – Existing Tank Rehabilitation & Upgrades:

The existing tank rehabilitation and upgrade project life cycle assessment is shown below in Table 11. If completed in accordance with manufacturers specifications, a coating of the interior and exterior of the tank could provide a 30-year useful life. Cathodic protection installation should have a useful life of around 15 years, and the remaining upgrades should be evaluated after an inspection is completed.

Table 11: Tank Rehabilitation Life Cycle Assessment (2C)

*Federal Disount Rate for Water Resources Planning (Interest Rate) I = 0.02

Number of Years for Life Cycle Analysis, n = 20 years

Short Lived Assets						
Item	**Years of Life Expectancy**	**Number of Units**	**Unit**	**Replacement Cost Each**	**Replacement Cost Item**	**Funds to Set Aside Yearly**
Cathodic Protection (Anodes)	15	1	LS	$10,000.00	$10,000.00	$666.67
Level Transducer/Controls	10	1	LS	$10,000.00	$10,000.00	$1,000.00
					Short Lived Asset Annual Reserve	$1,666.67

Operation & Maintenance Costs (Additional)			
Item	**How Often (yrs)**	**Cost**	**Annual Cost**
Annual/Routine Inspections	5	$5,000.00	$1,000.00

Present Worth Calculation	
Description	**Cost**
Initial Capital Costs	$600,000.00
Present Worth of SLA**	$27,252.39
Present Worth of O&M**	$16,351.43
Total Present Worth* **	**$643,603.82**

Notes:

**Interest rate utilized from the OMB Circular A-94 shown for the 2023 calendar year.*

***PW of Annual Cost = Annual O&M * $[(1+i)^n -1]/[i(1+i)^n]$*

****Total Present Worth included initial capital costs + PW of SLA + PW of O&M.*

Salvage value has not been included for the evaluated options.

Short lived assets have not been included for items with a life expectancy greater than 15 years per USDA RD guidance.

A 20-year evaluation for the LCA was completed per USDA RD guidance.

Alternative 3.C. – Water Storage Tank Replacement:

The existing water storage tank replacement alternative is shown below in Table 12. The tank replacement would provide a useful life of 30+ years (actual anticipated 50-60+), and cathodic protection would need to be replaced every 15 years with the level transducer required to be replace around every 10 years.

Table 12: Tank Replacement Life Cycle Analysis (Alt. 3C)

*Federal Disount Rate for Water Resources Planning (Interest Rate) I = 0.02

Number of Years for Life Cycle Analysis, n = 20 years

Short Lived Assets						
Item	**Years of Life Expectancy**	**Number of Units**	**Unit**	**Replacement Cost Each**	**Replacement Cost Item**	**Funds to Set Aside Yearly**
Cathodic Protection (Anodes)	15	1	LS	$10,000.00	$10,000.00	$666.67
Level Transducer/Controls	10	1	LS	$10,000.00	$10,000.00	$1,000.00
					Short Lived Asset Annual Reserve	$1,666.67

Operation & Maintenance Costs (Additional)			
Item	**How Often (yrs)**	**Cost**	**Annual Cost**
Annual/Routine Inspections	5	$5,000.00	$1,000.00

Present Worth Calculation	
Description	**Cost**
Initial Capital Costs	$1,320,000.00
Present Worth of SLA**	$27,252.39
Present Worth of O&M**	$16,351.43
Total Present Worth* **	**$1,363,603.82**

Notes:

**Interest rate utilized from the OMB Circular A-94 shown for the 2023 calendar year.*

***PW of Annual Cost = Annual O&M * $[(1+i)^n -1]/[i(1+i)^n]$*

****Total Present Worth included initial capital costs + PW of SLA + PW of O&M.*

Salvage value has not been included for the evaluated options.

Short lived assets have not been included for items with a life expectancy greater than 15 years per USDA RD guidance.

A 20-year evaluation for the LCA was completed per USDA RD guidance.

8. RECOMMENDED ALTERNATIVE

a.) Preliminary Project Design

Water Supply & Treatment:

It is recommended that **Alternative 2A** is pursued – Existing Source & Treatment Alternative. Due to the excessive capital costs associated with providing a new well source and treatment, it is not economical to move forward with the other options. Alternative 2A includes upgrades that are minor in nature that will improve the operation, monitoring and safety of the system.

Distribution System:

It is recommended that the Town pursue **Alternative 3.B.** – Replacement of asbestos cement water mains and appurtenances for the proposed project site. Based upon information from the Town, although all existing asbestos cement mains are considered high priority, the highest priority is the Olmstedville Road replacement due to the known

ledge rock in the area where the existing system is reportedly not buried to sufficient frost depth.

Storage:
The recommended alternative is rehabilitation of the existing tank, **Alternative 2.C**. It shall be noted that Cedarwood recommends completion of a water tank inspection as previously noted to ensure that the tank has sufficient structural integrity to be rehabilitated due to visual internal corrosion of the tank.

b.) Project Schedule

It is assumed that the Town will utilize this report to pursue funding for the project. The scheduling discussed below shall be considered tentative and should be adjusted once funding is procured and as engineering design progresses.

- Procurement of Funding: 2024
- Engineering Design & Permitting Commences: January 2025
- Submission of Design Plans & Specifications to DOH: July 2025
- Anticipated DOH Approval: November 2025
- Bid Phase: January 2026
- Construction Commencement: April/May 2026
- Construction Completion: December 2028
    - Note, if the project is proposed to be phased, the above draft timelines should be updated.

c.) Permit Requirements

For the project to move forward into construction, the following permits would be required (more may be necessary depending on the final funding agencies involved):

- State Environmental Quality Review Act
    - Type I Action with coordinated review with involved agencies
- NYS Department of Health
    - NYS DOH Form 348 with Plans & Specifications
- NYS Department of Environmental Conservation
    - General Stormwater Permit (T.B.D.)
    - Article 15 – Freshwater Wetland Permit (T.B.D.)
- Adirondack Park Agency
    - Jurisdictional Inquiry Form (T.B.D.)
- NYS Department of Transportation
    - Perm. 32 – Utility Work Permit
- Town of Chester Town Board
- Town/Warren County Planning (T.B.D.)
- Warren County Building Code (T.B.D.)

Design criteria will be based upon, but is not necessarily limited to, the latest revisions of:

- Recommended Standards for Water Works;
- NYS Department of Health Sub-Part 5-1, Public Water Systems;

- NYS Building Code; Insurance Services Office (ISO);
- NYS Energy Code; AWWA and ANSI Standards;
- Americans with Disabilities Act (ADA);
- NYS DOT Standard Specifications and Sheets;
- Adirondack Park Agency Zoning and Land Use Policies and Regulations;
- NYS Department of Environmental Conservation Stormwater Design Manual (If applicable).

d.) Sustainability Considerations

i.) Water and Energy Efficiency

Any proposed improvements shall be evaluated during the design stage for water and energy efficiency. It is assumed if any pumps are required that the selection is sized for the best efficiency point on the pump curve and variable frequency drives will be incorporated into the design for energy conservancy.

ii.) Green Infrastructure

Not applicable.

iii.) Other

Not applicable.

e.) Total Project Cost Estimate (Engineer's Opinion of Probable Cost)

The total project cost estimate is shown below and discussed previously within this report:

- **Total Projected Capital Cost** (estimated in 2026 dollars assuming 3% annual inflation): **$5,000,000**
  - Water Source Alternative: $60,000
  - Distribution System Alternative: $4,340,000
  - Water Storage Alternative: $600,000

f.) Annual Operating Budget

i.) Income

The Pottersville Water District income has been previously shown and discussed in this report. If funding is procured and the project commences, it is recommended that the Town updates the estimates as design commences and evaluates their water rates to ensure the income is sufficient to handle the additional projected debt service.

ii.) Annual O&M Costs

The annual O&M costs for the district have been previously discussed within this report.

iii.) Debt Repayments

The Town has reported that the Pottersville Water District does not currently have any outstanding debts.

iv.) Reserves

At the time of this report, no reserves exist for the Pottersville Water District.

g.) Funding Options

Potential funding options for the proposed project include:

- NYS Environmental Facilities Corporation (EFC) Drinking Water State Revolving Fund (DWSRF) Loan and Water Infrastructure Improvement Act (WIIA) Grants:
  - Grants – Lesser of $3million or 60% of eligible project costs.
  - Loans – 0% hardship to low interest, 30-years.
- USDA Rural Development (USDA RD):
  - Grants (maximum of 45% of eligible project costs).
  - Loans (around 4% interest, 38-years).
  - Rolling application period.
- Empire State Development (ESD):
  - Grants only (up to 20% of eligible project costs).
- Community Development Block Grant (CDBG):
  - Grants only (up to $1million or $1.25million with co-funding)
  - Income survey required.
- Northern Border Regional Commission (NBRC):
  - Grants only ($1million maximum for eligible infrastructure projects).
- Open Market Borrowing:
  - Loans only at specified interest for listed term.

It is recommended that prior to accepting any grants, the overall plan of finance is reviewed and approved by the project team including grant administrator/fiscal coordinator, legal representative and project engineer to ensure the proposed plan of finance is optimized for the scope of the project. Although certain grants are listed above to fund up to a specific percentage, grants/loans may be adjusted by the funding agencies depending on the final plan of finance for the project.

According to information provided by the Town, household income surveys undertaken for the CDBG application demonstrated that 73 percent of Water District households reported incomes at 80 percent or less of the Area Median Income ("AMI") and 42 percent of those households had incomes less than 50 percent of AMI. Census CDP data indicates that 85 percent of persons within the area of the Water District were low and moderate income and 68 percent of the housing was built before 1960. Due to the information presented, it is anticipated that the proposed project would qualify for hardship or a low-interest rate loan, although this should be verified with the applicable funding agencies directly at the time of application.

h.) Debt Service Costs Per Rate User

Based upon the total project cost of $5,000,000 for the recommended alternatives, the following scenarios were calculated based upon a current user base of 88 rate payers for a 30-year period for the additional debt service cost per rate payer (on top of existing rates):

1. No Grant with Standard Interest Rate Loan (4.5%): $3,454.67/year per user
2. NYS EFC WIIA Grant (60%) w/SRF Hardship Loan (0%): $757.58/year per user

Due to the projected annual cost per rate payer, it is highly recommended that the project be implemented in a phased manner when obtaining funding for the project, as the projected rate increases are not economical for the small district user base. Due to the MHI for the water district, it is recommended that the Town considers applying for multiple rounds of the NYS Office of Community Renewal Community Development Block Grants or applying for various grants to lower the debt service for the existing districts user base. The water district could be eligible for grants up to $1,000,000 for public health projects. Utilizing multiple grants and loans for the project should be evaluated to determine the total impact and costs to the rate payers as the project progresses. If multiple grants are received, this can lower the eligible grant amounts from other specific funding agencies. Based upon the known system deficiency, the project priorities (listed in order), are:

1. Asbestos cement water main replacements.
2. Water storage tank rehabilitation (Town to hire qualified firm to inspect the water tank as recommended in this report along with evaluation of the tanks structural integrity to determine if Tank is a candidate for rehabilitation.)
3. Existing water source upgrades/improvements.

The estimates provided herein are conceptual level estimates based upon knowledge regarding the system provided by the Town and existing documentation. When the proposed project moves forward into the design phase it is recommended that the budgets and O&M/life-cycle cost be updated. Some minor items recommended within this report may be completed with in-kind services by the Town to help minimize expenditures where possible.

9. CONCLUSIONS AND RECOMMENDATIONS

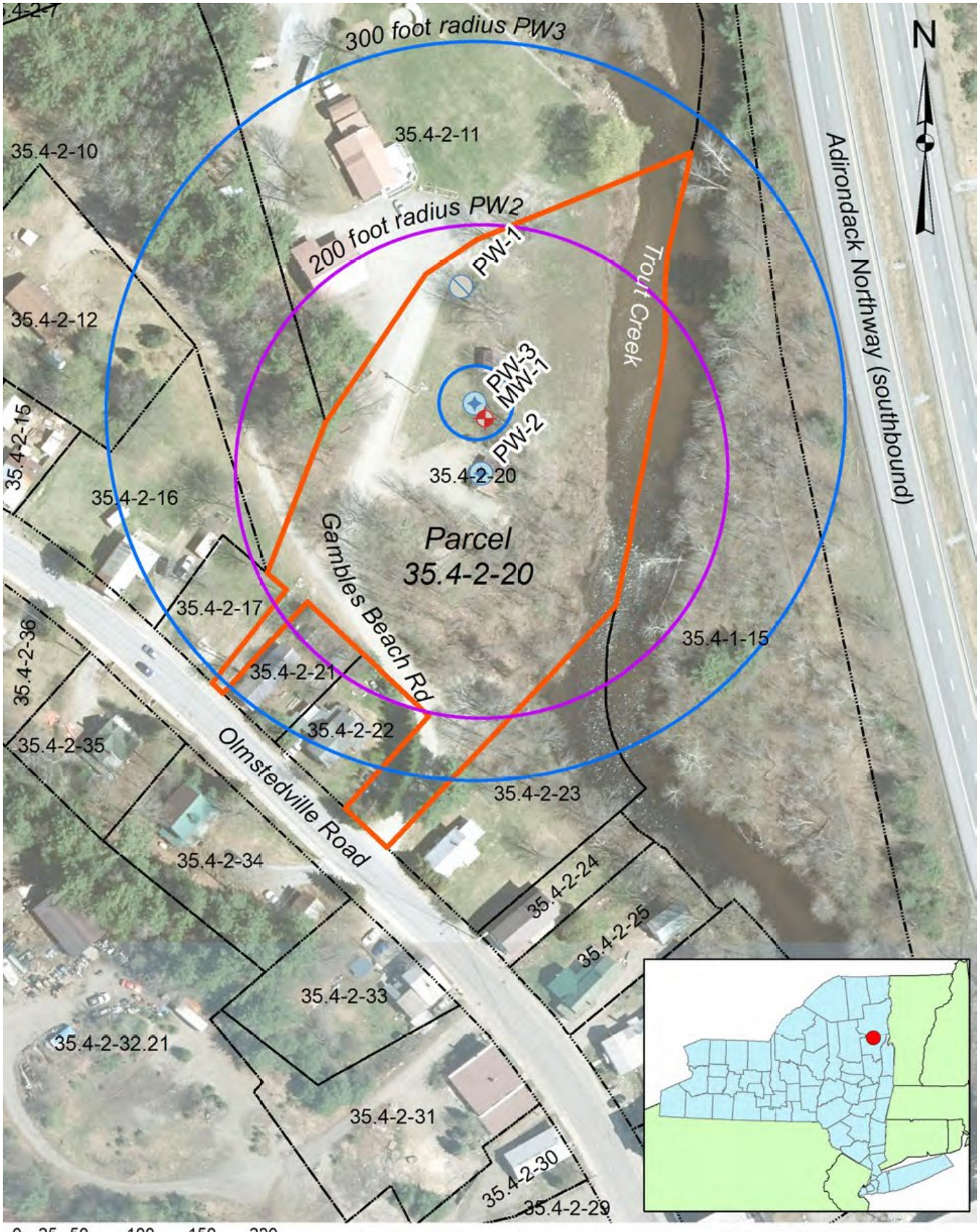
Additional recommendations that should be considered when moving forward with the project include:

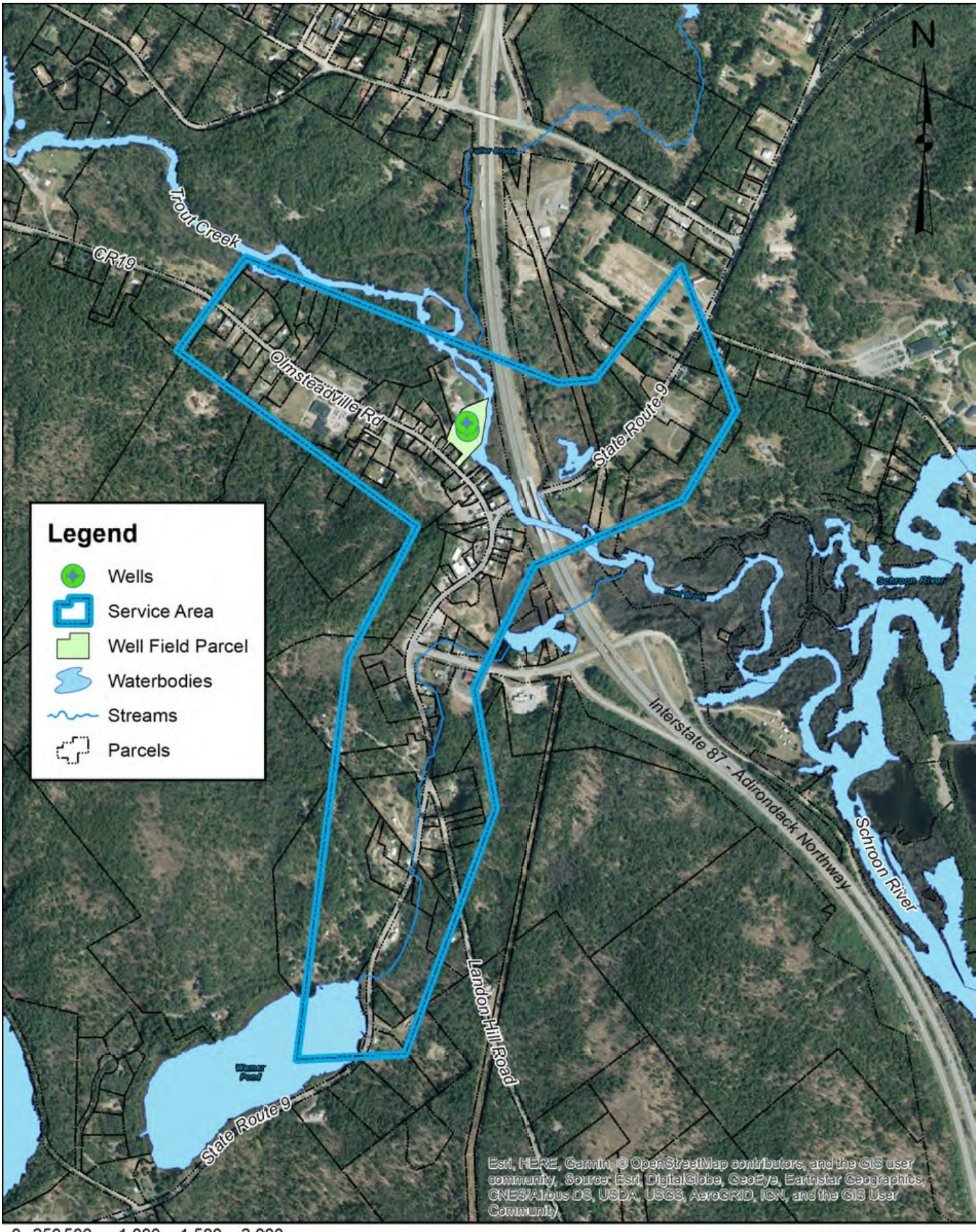
- Recommend that the water storage tank is inspected by a qualified firm in accordance with American Water Works Association.
    - The inspection shall include the removal of sediment buildup from the tank floor, visual inspections of the interior and exterior of the tank and include a structural inspection and evaluation of the tank. It is highly recommended that a structural evaluation be completed due to the prior inspection reports identification of corrosion on the interior of the tank.
- Completion of subsurface investigation as soon as possible for the proposed project area (areas of watermain replacement).

    - This will provide a more detailed evaluation of the subsurface conditions of the site so the estimate can be updated. Delineation of ledge rock and groundwater (if it exists at the site) can substantially impact the preliminary project cost estimates.
- Complete the Environmental Review (SEQRA & NEPA):
    - If the Town is considering applying for a NYS EFC WIIA grant, the environmental review shall be completed as required for submitting an application. This includes obtaining a State Historic Preservation Office sign-off letter and other items that may be deemed applicable as the environmental review process commences.
- Funding Options:
    - It is recommended that the Town utilize Warren County Planning, Lake Champlain-Lake George Regional Planning, and other available services to start the grant application process. Preliminary scoping calls/emails are recommended to be completed with respective funding agencies to determine the most economical path forward for the water district due to the small user base.

Appendix A – Existing Well Field and Service Area

(2- 8.5 X 11 pages)


300 foot radius PW3
200 foot radius PW2
N
Adirondack Northway (southbound)
Trout Creek
PW-1
PW-3
MW-1
PW-2
35.4-2-11
35.4-2-10
35.4-2-12
35.4-2-15
35.4-2-16
35.4-2-20
Parcel
35.4-2-20
Gambles Beach Rd
35.4-2-17
35.4-2-21
35.4-2-22
35.4-2-36
35.4-2-35
Olmstedville Road
35.4-2-23
35.4-1-15
35.4-2-34
35.4-2-24
35.4-2-25
35.4-2-33
35.4-2-32.21
35.4-2-31
35.4-2-30
35.4-2-29
0 25 50 100 150 200
1 inch = 100 feet
Pottersville Well Field
CEDARWOOD
ENGINEERING SERVICES PLLC



0 250 500 1,000 1,500 2,000

1 inch = 1,000 feet

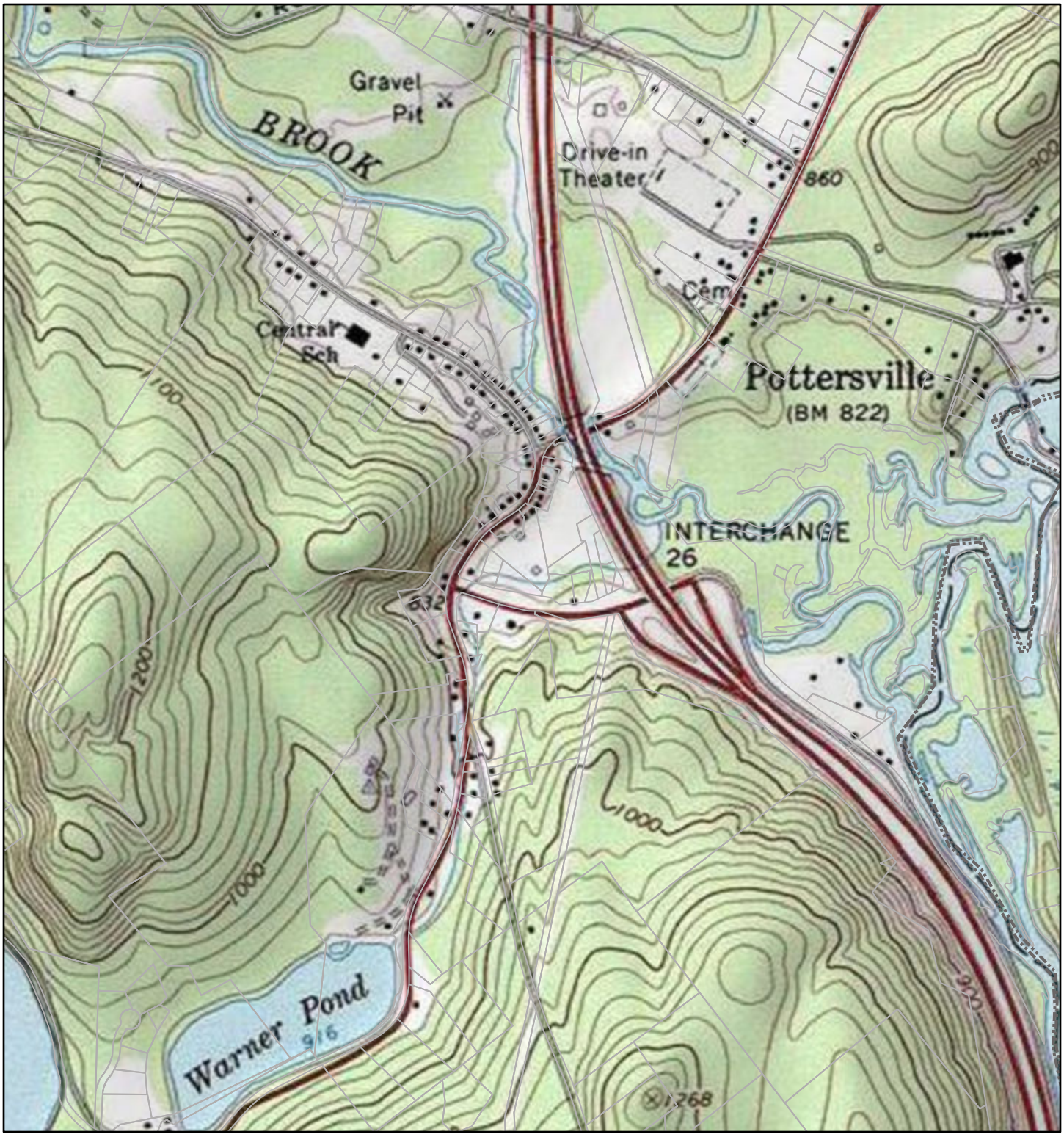
Pottersville Service Area

CEDARWOOD ENGINEERING SERVICES PLLC

Appendix B – Location Map

(1- 8.5 X 11 pages)

Pottersville Topo Map



3/2/2023, 3:14:00 PM

Town Boundaries

Parcels

1:18,056

0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

Appendix C – NRCS Soil Report

(44- 8.5 X 11 pages)

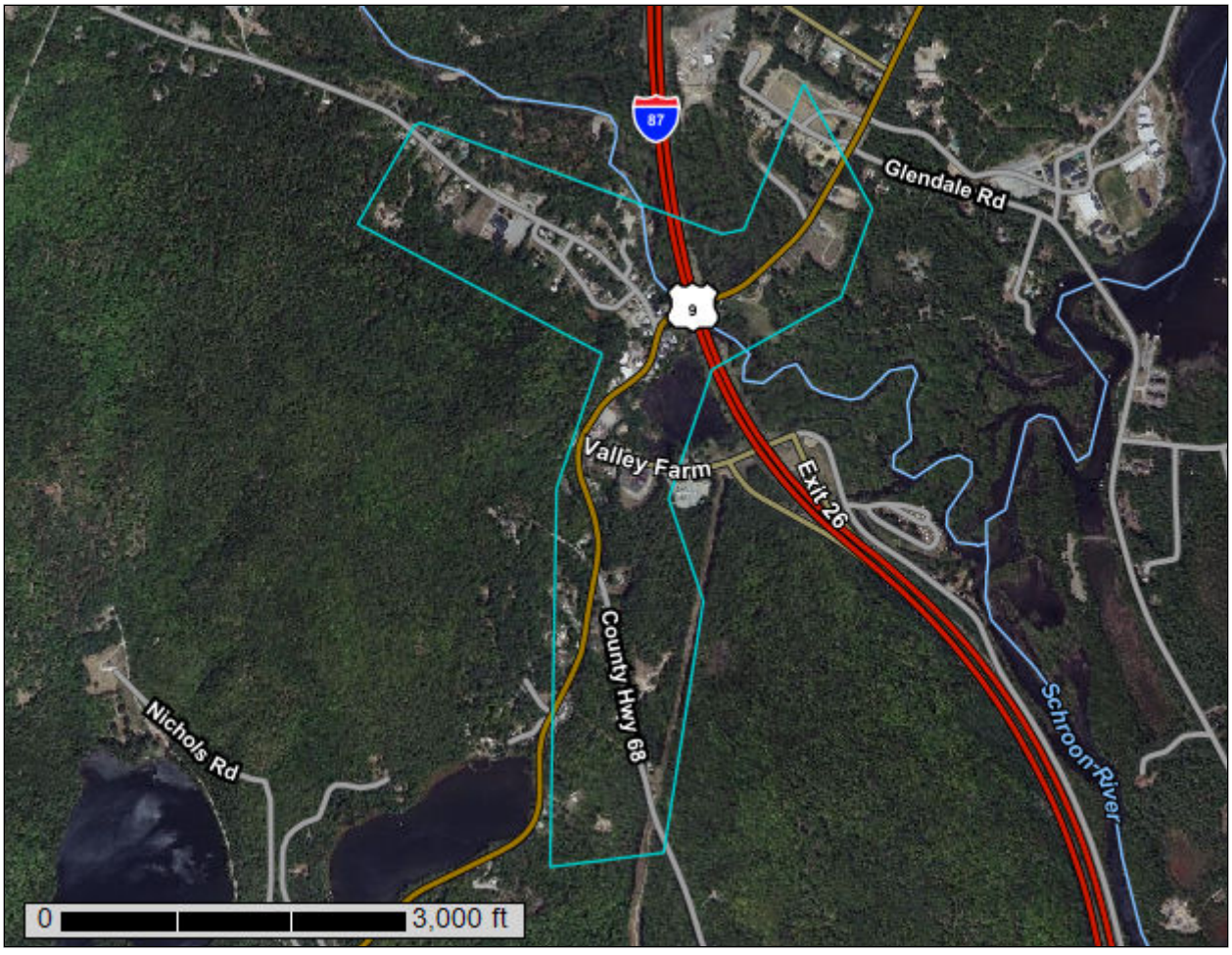
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Warren County, New York



December 18, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

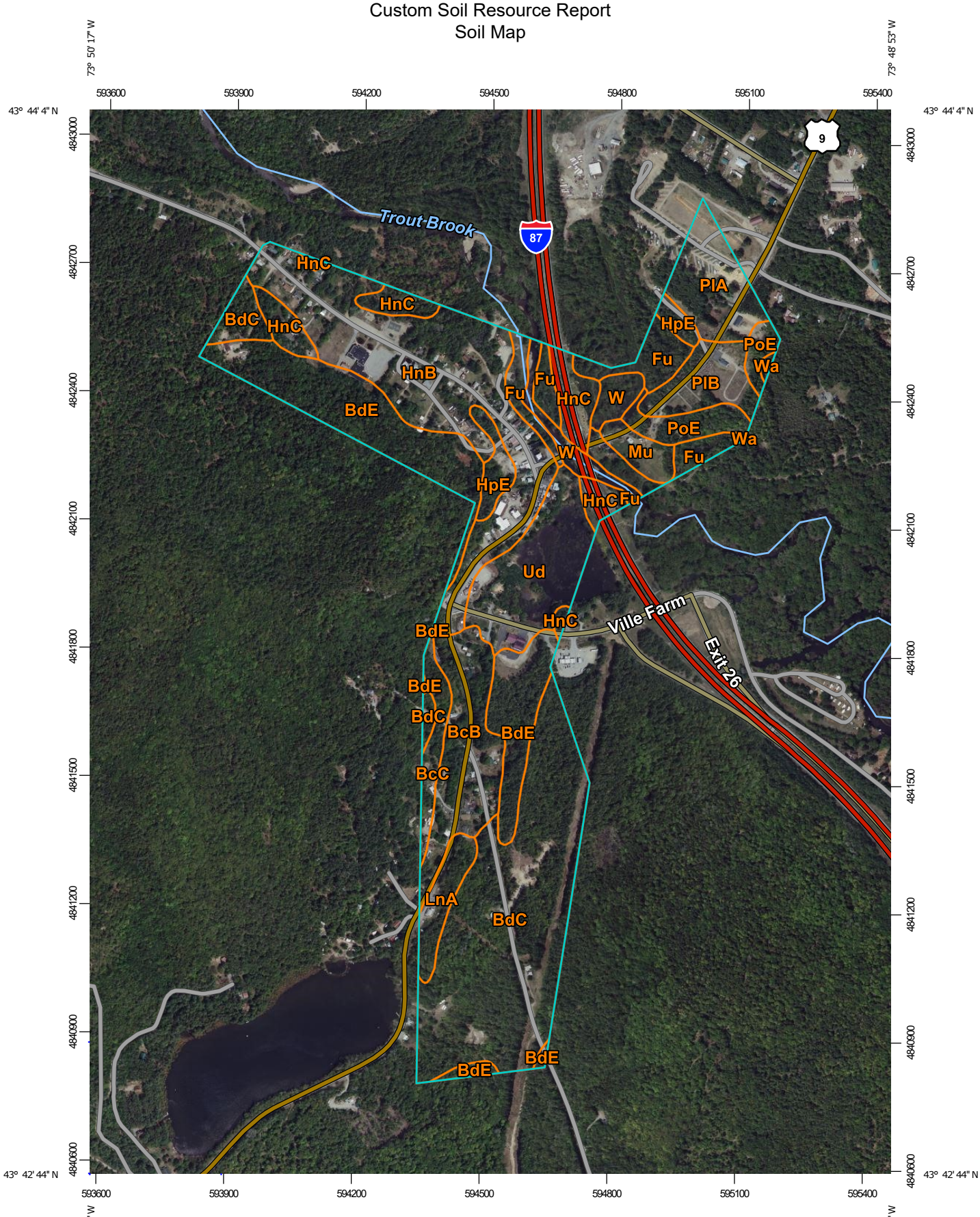
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:12,100 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Warren County, New York
Survey Area Data: Version 22, Sep 10, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 1, 2020—Oct 1, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BcB	Bice fine sandy loam, 3 to 8 percent slopes	16.4	7.0%
BcC	Bice fine sandy loam, 8 to 15 percent slopes	4.2	1.8%
BdC	Bice very bouldery fine sandy loam, sloping	53.6	22.7%
BdE	Bice very bouldery fine sandy loam, steep	31.2	13.2%
Fu	Fluvaquents-Udifluvents complex, frequently flooded	13.4	5.7%
HnB	Hinckley cobbly sandy loam, 3 to 8 percent slopes	43.6	18.5%
HnC	Hinckley cobbly sandy loam, 8 to 15 percent slopes	11.9	5.0%
HpE	Hinckley-Plainfield complex, steep	4.5	1.9%
LnA	Lyme fine sandy loam, 0 to 3 percent slopes	4.8	2.1%
Mu	Middlebury fine sandy loam	3.4	1.5%
PlA	Plainfield loamy sand, 0 to 3 percent slopes	10.6	4.5%
PlB	Plainfield loamy sand, 3 to 8 percent slopes	7.8	3.3%
PoE	Plainfield and Oakville soils, steep	6.5	2.8%
Ud	Udorthents, smoothed	17.3	7.3%
W	Water	6.0	2.5%
Wa	Wareham loamy sand	0.3	0.1%
Totals for Area of Interest		**235.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some

observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The

pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Warren County, New York

BcB—Bice fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9xvz
Elevation: 800 to 1,800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 100 to 130 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bice and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bice

Setting

Landform: Till plains, ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from granite and gneiss with variable components of sandstone and shale

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
H2 - 2 to 5 inches: fine sandy loam
H3 - 5 to 24 inches: fine sandy loam
H4 - 24 to 60 inches: fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F143XY501ME - Loamy Slope
Hydric soil rating: No

Minor Components

Lyme

Percent of map unit: 3 percent

Landform: Depressions
Hydric soil rating: Yes

BcC—Bice fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9xw0
Elevation: 800 to 1,800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 100 to 130 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bice and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bice

Setting

Landform: Ridges, till plains, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from granite and gneiss with variable components of sandstone and shale

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
H2 - 2 to 5 inches: fine sandy loam
H3 - 5 to 24 inches: fine sandy loam
H4 - 24 to 60 inches: fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F143XY501ME - Loamy Slope

Hydric soil rating: No

Minor Components

Lyme

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

BdC—Bice very bouldery fine sandy loam, sloping

Map Unit Setting

National map unit symbol: 9xw2
Elevation: 800 to 1,800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 100 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Bice and similar soils: 70 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bice

Setting

Landform: Till plains, ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from granite and gneiss with variable components of sandstone and shale

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
H2 - 2 to 5 inches: fine sandy loam
H3 - 5 to 24 inches: fine sandy loam
H4 - 24 to 60 inches: fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F143XY501ME - Loamy Slope
Hydric soil rating: No

Minor Components

Lyme

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

BdE—Bice very bouldery fine sandy loam, steep

Map Unit Setting

National map unit symbol: 9xw3
Elevation: 800 to 1,800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 100 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Bice and similar soils: 70 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bice

Setting

Landform: Till plains, ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from granite and gneiss with variable components of sandstone and shale

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
H2 - 2 to 5 inches: fine sandy loam
H3 - 5 to 24 inches: fine sandy loam
H4 - 24 to 60 inches: fine sandy loam

Properties and qualities

Slope: 25 to 35 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F143XY501ME - Loamy Slope
Hydric soil rating: No

Minor Components

Lyme

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Fu—Fluvaquents-Udifluvents complex, frequently flooded

Map Unit Setting

National map unit symbol: 9xwk
Elevation: 210 to 2,070 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquents and similar soils: 45 percent
Udifluvents and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquents

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium with highly variable texture

Typical profile

H1 - 0 to 10 inches: silt loam

H2 - 10 to 60 inches: gravelly silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: Frequent

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: F143XY120ME - Small Floodplain Riparian Complex, F143XY110ME - Broad Floodplain Riparian Complex, F142XB004VT - Wet Outwash Depression
Hydric soil rating: Yes

Description of Udifluvents

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium with a wide range of texture

Typical profile

H1 - 0 to 10 inches: gravelly fine sandy loam
H2 - 10 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C
Ecological site: F143XY120ME - Small Floodplain Riparian Complex, F142XA001NY - Low Floodplain Frigid, F143XY110ME - Broad Floodplain Riparian Complex
Hydric soil rating: No

Minor Components

Cathro

Percent of map unit: 5 percent

Landform: Swamps, marshes
Hydric soil rating: Yes

Greenwood
Percent of map unit: 5 percent
Landform: Marshes, swamps
Hydric soil rating: Yes

HnB—Hinckley cobbly sandy loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9xwv
Elevation: 0 to 1,000 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Hinckley and similar soils: 80 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting
Landform: Terraces, outwash plains, deltas
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glaciofluvial deposits derived principally from granite, gneiss, and schist

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
H2 - 1 to 5 inches: cobbly sandy loam
H3 - 5 to 28 inches: very gravelly loamy sand
H4 - 28 to 64 inches: stratified very gravelly sand

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F143XY601ME - Dry Sand, F142XB002VT - Dry Outwash
Hydric soil rating: No

Minor Components

Palms

Percent of map unit: 5 percent
Landform: Swamps, marshes
Hydric soil rating: Yes

Wareham

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

HnC—Hinckley cobbly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9xww
Elevation: 0 to 1,000 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 80 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Terraces, outwash plains, deltas
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glaciofluvial deposits derived principally from granite, gneiss, and schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H2 - 1 to 5 inches: cobbly sandy loam
H3 - 5 to 28 inches: very gravelly loamy sand
H4 - 28 to 64 inches: stratified very gravelly sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F143XY601ME - Dry Sand, F142XB002VT - Dry Outwash
Hydric soil rating: No

Minor Components

Wareham

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

HpE—Hinckley-Plainfield complex, steep

Map Unit Setting

National map unit symbol: 9xwz
Elevation: 0 to 1,150 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 45 percent
Plainfield and similar soils: 35 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Sandy and gravelly glaciofluvial deposits derived principally from granite, gneiss, and schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H2 - 1 to 5 inches: cobbly sandy loam
H3 - 5 to 28 inches: very gravelly loamy sand
H4 - 28 to 64 inches: stratified very gravelly sand

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F143XY601ME - Dry Sand, F142XB002VT - Dry Outwash
Hydric soil rating: No

Description of Plainfield

Setting

Landform: Terraces, outwash plains, deltas
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy glaciofluvial or deltaic deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 11 inches: loamy sand
H2 - 11 to 26 inches: sand
H3 - 26 to 60 inches: sand

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Ecological site: F143XY601ME - Dry Sand, F142XB002VT - Dry Outwash
Hydric soil rating: No

Minor Components

Wareham
Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

LnA—Lyme fine sandy loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 9xx4
Elevation: 330 to 1,380 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 100 to 130 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Lyme and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lyme

Setting
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy till derived mainly from crystalline rock

Typical profile
Oa - 0 to 2 inches: highly decomposed plant material
H2 - 2 to 10 inches: fine sandy loam
H3 - 10 to 27 inches: fine sandy loam
H4 - 27 to 60 inches: fine sandy loam

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F143XY304ME - Wet Flat
Hydric soil rating: Yes

Mu—Middlebury fine sandy loam

Map Unit Setting

National map unit symbol: 9xxb
Elevation: 210 to 1,620 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Middlebury and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Middlebury

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy alluvium predominantly from areas of shale and sandstone with some lime-bearing material

Typical profile

H1 - 0 to 10 inches: fine sandy loam
H2 - 10 to 40 inches: fine sandy loam
H3 - 40 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D

Ecological site: F143XY120ME - Small Floodplain Riparian Complex, F142XB003VT - Moist Outwash, F143XY110ME - Broad Floodplain Riparian Complex
Hydric soil rating: No

PlA—Plainfield loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9xxn
Elevation: 720 to 1,150 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Plainfield and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plainfield

Setting

Landform: Terraces, outwash plains, deltas
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy glaciofluvial or deltaic deposits

Typical profile

H1 - 0 to 10 inches: loamy sand
H2 - 10 to 25 inches: sand
H3 - 25 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F143XY601ME - Dry Sand, F142XB002VT - Dry Outwash
Hydric soil rating: No

PlB—Plainfield loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9xxp
Elevation: 720 to 1,150 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Plainfield and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plainfield

Setting

Landform: Terraces, outwash plains, deltas
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy glaciofluvial or deltaic deposits

Typical profile

H1 - 0 to 10 inches: loamy sand
H2 - 10 to 25 inches: sand
H3 - 25 to 60 inches: sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F143XY601ME - Dry Sand, F142XB002VT - Dry Outwash
Hydric soil rating: No

PoE—Plainfield and Oakville soils, steep

Map Unit Setting

National map unit symbol: 9xxr
Elevation: 600 to 1,200 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Plainfield and similar soils: 40 percent
Oakville and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plainfield

Setting

Landform: Terraces, outwash plains, deltas
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy glaciofluvial or deltaic deposits

Typical profile

H1 - 0 to 10 inches: loamy sand
H2 - 10 to 25 inches: sand
H3 - 25 to 60 inches: sand

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Description of Oakville

Setting

Landform: Terraces, outwash plains, deltas

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy eolian, beach ridge, or glaciofluvial deposits

Typical profile

H1 - 0 to 8 inches: loamy fine sand
H2 - 8 to 27 inches: sand
H3 - 27 to 60 inches: sand

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Ud—Udorthents, smoothed

Map Unit Setting

National map unit symbol: 9xy9
Elevation: 210 to 2,890 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 70 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Typical profile

H1 - 0 to 6 inches: loam
H2 - 6 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F143XY501ME - Loamy Slope
Hydric soil rating: No

Minor Components

Madalin

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

W—Water

Map Unit Setting

National map unit symbol: 9xyb
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Wa—Wareham loamy sand

Map Unit Setting

National map unit symbol: 9xyc
Elevation: 100 to 1,000 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Wareham, poorly drained, and similar soils: 50 percent
Wareham, somewhat poorly drained, and similar soils: 35 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wareham, Poorly Drained

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy glaciofluvial or deltaic deposits

Typical profile

H1 - 0 to 8 inches: loamy sand
H2 - 8 to 18 inches: loamy fine sand
H3 - 18 to 32 inches: loamy sand
H4 - 32 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F144AY028MA - Wet Outwash, F143XY602ME - Sandy Flat
Hydric soil rating: Yes

Description of Wareham, Somewhat Poorly Drained

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy glaciofluvial or deltaic deposits

Typical profile

H1 - 0 to 8 inches: loamy sand
H2 - 8 to 18 inches: loamy fine sand
H3 - 18 to 32 inches: loamy sand
H4 - 32 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F144AY028MA - Wet Outwash, F143XY602ME - Sandy Flat
Hydric soil rating: No

Minor Components

Raynham

Percent of map unit: 4 percent
Landform: Depressions
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Depth to Bedrock

The term bedrock in soil survey refers to a continuous root and water restrictive layer of rock that occurs within the soil profile.

There are many types of restrictions that can occur within the soil profile but this theme only includes the three restrictions that use the term bedrock. These are:

1) Lithic Bedrock

2) Paralithic Bedrock

3) Densic Bedrock

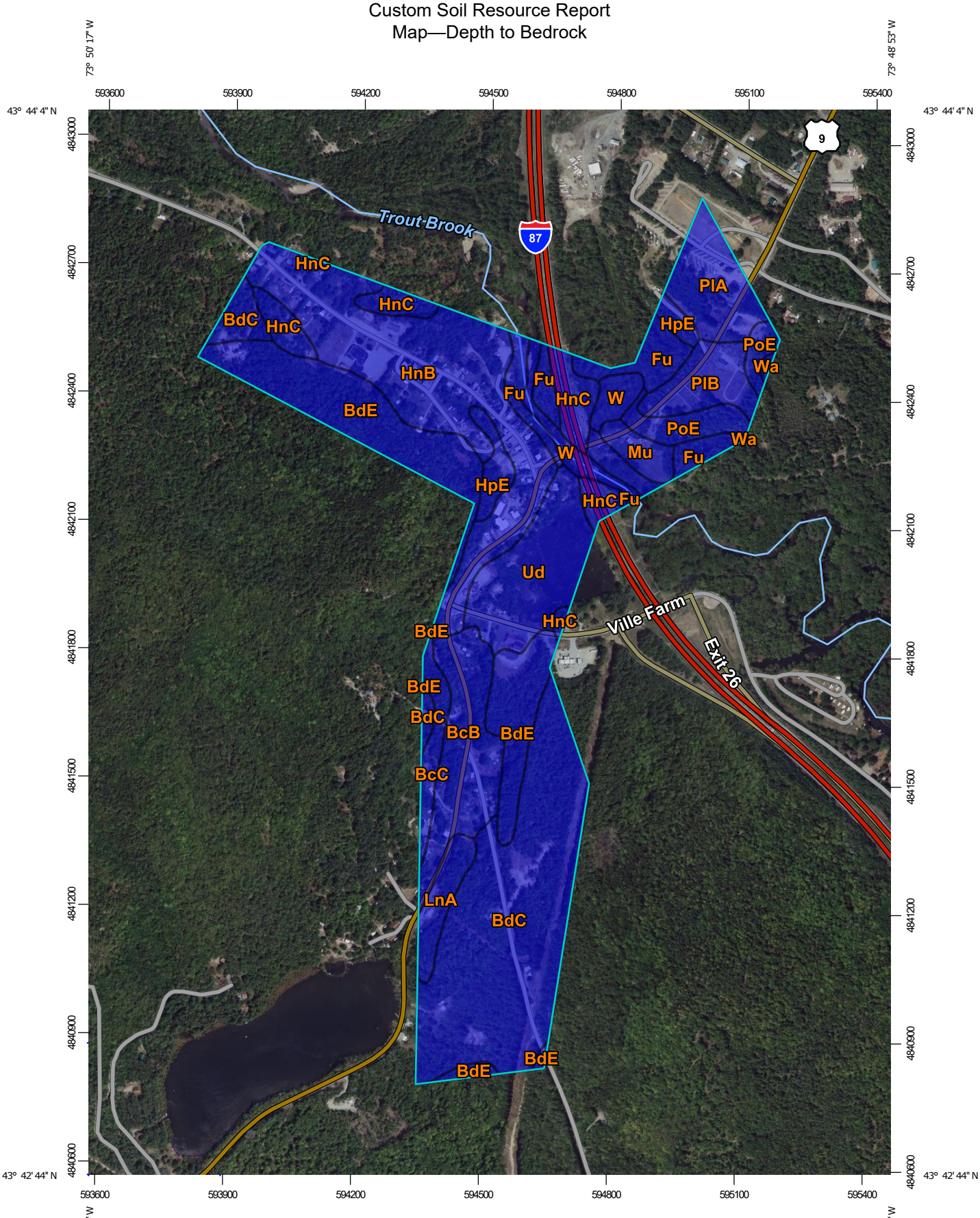
Lithic bedrock and paralithic bedrock are comprised of igneous, metamorphic, and sedimentary rocks, which are coherent and consolidated into rock through pressure, heat, cementation, or fusion. Lithic bedrock represents the hardest type of bedrock, with a hardness of strongly coherent to indurated. Paralithic bedrock has a hardness of extremely weakly coherent to moderately coherent. It can occur as a

thin layer of weathered bedrock above harder lithic bedrock. Paralithic bedrock can also be much thicker, extending well below the soil profile.

Densic bedrock represents a unique kind of bedrock recognized within the soil survey. It is non-coherent and consolidated, dense root restrictive material, formed by pressure, heat, and dewatering of earth materials or sediments. Densic bedrock differs from densic materials, which formed under the compaction of glaciers, mudflows, and or human-caused compaction.

If more than one type of bedrock is described for an individual soil type, the depth to the shallowest one is given. If no bedrock is described in a map unit, it is represented by the "greater than 200" depth class.

Depth to bedrock is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.



Map Scale: 1:12,100 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 150 300 600 900

Feet
0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Points

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Warren County, New York
Survey Area Data: Version 22, Sep 10, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 1, 2020—Oct 1, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Depth to Bedrock

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
BcB	Bice fine sandy loam, 3 to 8 percent slopes	>200	16.4	7.0%
BcC	Bice fine sandy loam, 8 to 15 percent slopes	>200	4.2	1.8%
BdC	Bice very bouldery fine sandy loam, sloping	>200	53.6	22.7%
BdE	Bice very bouldery fine sandy loam, steep	>200	31.2	13.2%
Fu	Fluvaquents-Udifluvents complex, frequently flooded	>200	13.4	5.7%
HnB	Hinckley cobbly sandy loam, 3 to 8 percent slopes	>200	43.6	18.5%
HnC	Hinckley cobbly sandy loam, 8 to 15 percent slopes	>200	11.9	5.0%
HpE	Hinckley-Plainfield complex, steep	>200	4.5	1.9%
LnA	Lyme fine sandy loam, 0 to 3 percent slopes	>200	4.8	2.1%
Mu	Middlebury fine sandy loam	>200	3.4	1.5%
PlA	Plainfield loamy sand, 0 to 3 percent slopes	>200	10.6	4.5%
PlB	Plainfield loamy sand, 3 to 8 percent slopes	>200	7.8	3.3%
PoE	Plainfield and Oakville soils, steep	>200	6.5	2.8%
Ud	Udorthents, smoothed	>200	17.3	7.3%
W	Water	>200	6.0	2.5%
Wa	Wareham loamy sand	>200	0.3	0.1%
Totals for Area of Interest			**235.6**	**100.0%**

Rating Options—Depth to Bedrock

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

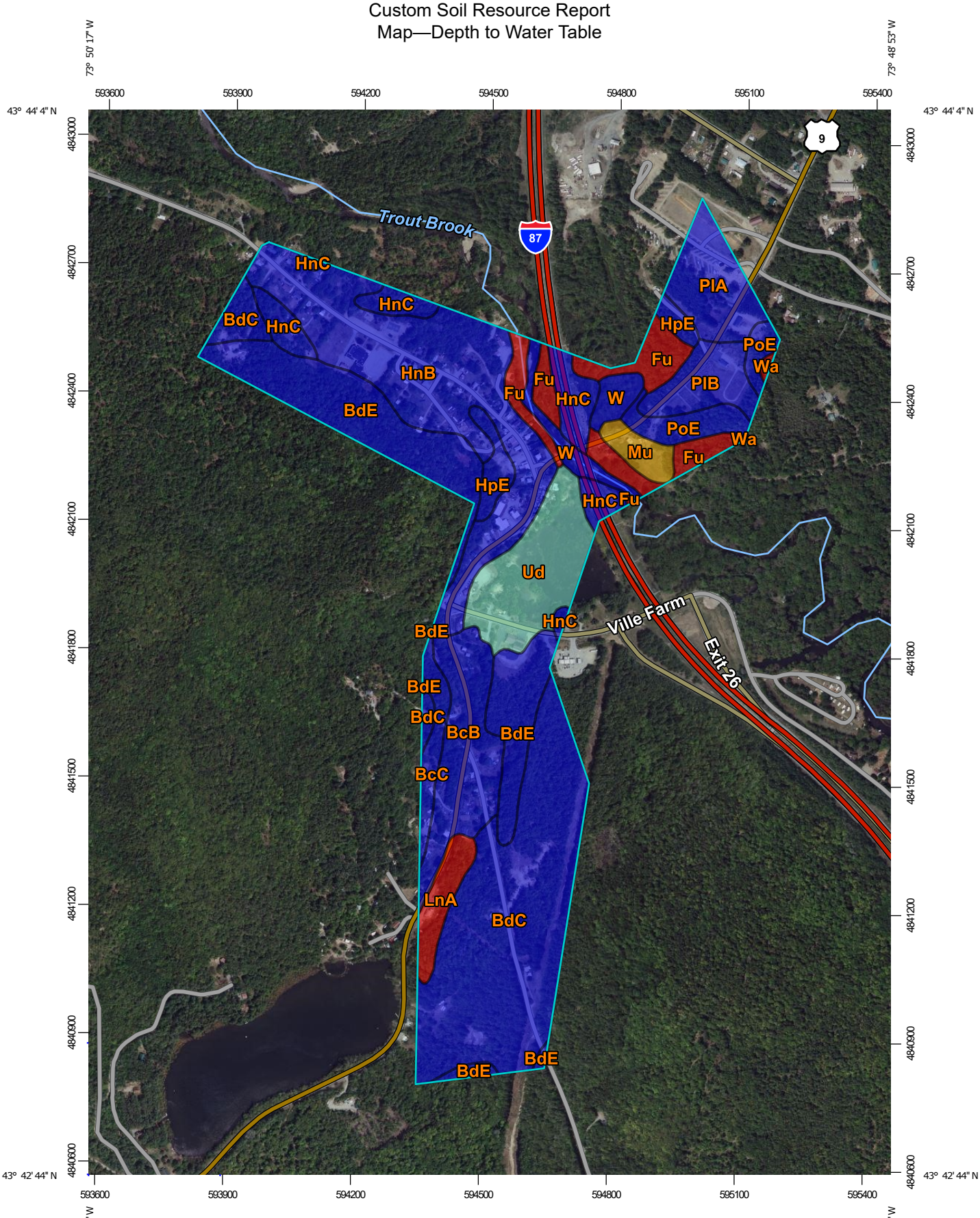
Water Features

Water Features include ponding frequency, flooding frequency, and depth to water table.

Depth to Water Table

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.


73° 50' 17" W
73° 48' 53" W
593600
593900
594200
594500
594800
595100
595400
43° 44' 4" N
43° 42' 44" N
4843000
4842700
4842400
4842100
4841800
4841500
4841200
4840900
4840600
Trout Brook
87
9
Ville Farm
Exit 26
HnC
BdC
HnB
BdE
HpE
Fu
W
PIA
PoE
Wa
PIB
Mu
Ud
LnA
BcB
BcC
Map Scale: 1:12,100 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 150 300 600 900
Feet
0 500 1000 2000 3000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

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150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

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Not rated or not available

Soil Rating Points

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Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Warren County, New York
Survey Area Data: Version 22, Sep 10, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 1, 2020—Oct 1, 2020

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Table—Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
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BdC	Bice very bouldery fine sandy loam, sloping	>200	53.6	22.7%
BdE	Bice very bouldery fine sandy loam, steep	>200	31.2	13.2%
Fu	Fluvaquents-Udifluvents complex, frequently flooded	0	13.4	5.7%
HnB	Hinckley cobbly sandy loam, 3 to 8 percent slopes	>200	43.6	18.5%
HnC	Hinckley cobbly sandy loam, 8 to 15 percent slopes	>200	11.9	5.0%
HpE	Hinckley-Plainfield complex, steep	>200	4.5	1.9%
LnA	Lyme fine sandy loam, 0 to 3 percent slopes	0	4.8	2.1%
Mu	Middlebury fine sandy loam	48	3.4	1.5%
PlA	Plainfield loamy sand, 0 to 3 percent slopes	>200	10.6	4.5%
PlB	Plainfield loamy sand, 3 to 8 percent slopes	>200	7.8	3.3%
PoE	Plainfield and Oakville soils, steep	>200	6.5	2.8%
Ud	Udorthents, smoothed	137	17.3	7.3%
W	Water	>200	6.0	2.5%
Wa	Wareham loamy sand	15	0.3	0.1%
Totals for Area of Interest			**235.6**	**100.0%**

Rating Options—Depth to Water Table

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

References

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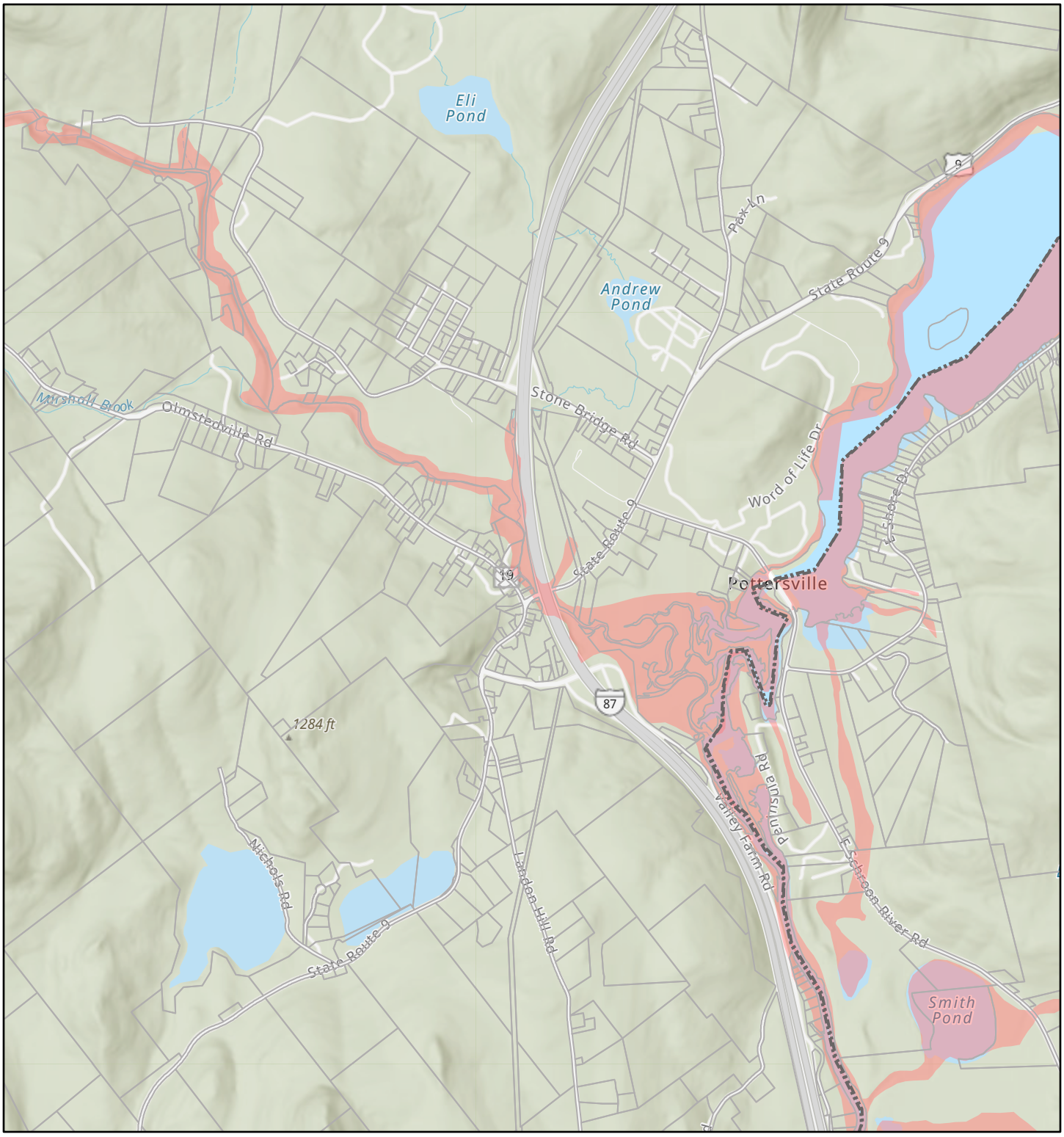
Appendix D1 – Flood Map

(1- 8.5 X 11 pages)

Pottersville Flood Zone



3/2/2023, 2:59:32 PM

1:36,112

0 0.23 0.45 0.9 mi

0 0.35 0.7 1.4 km

Town Boundaries

Parcels

Flood Zones

Zone A, AE (100 year flood)

Zones C and X (minimal risk)

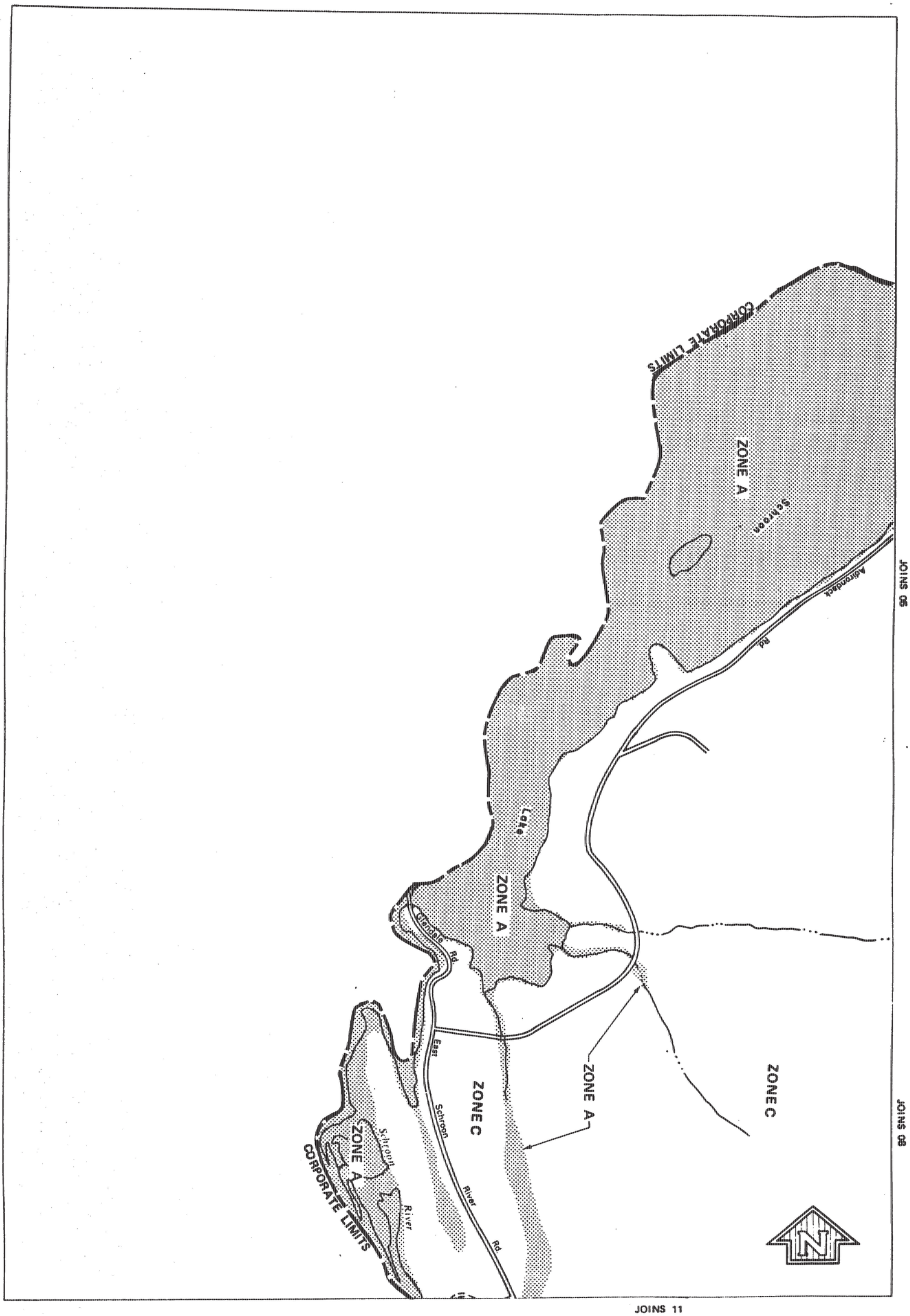
Esri, NASA, NGA, USGS, FEMA, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Warren County NY GIS

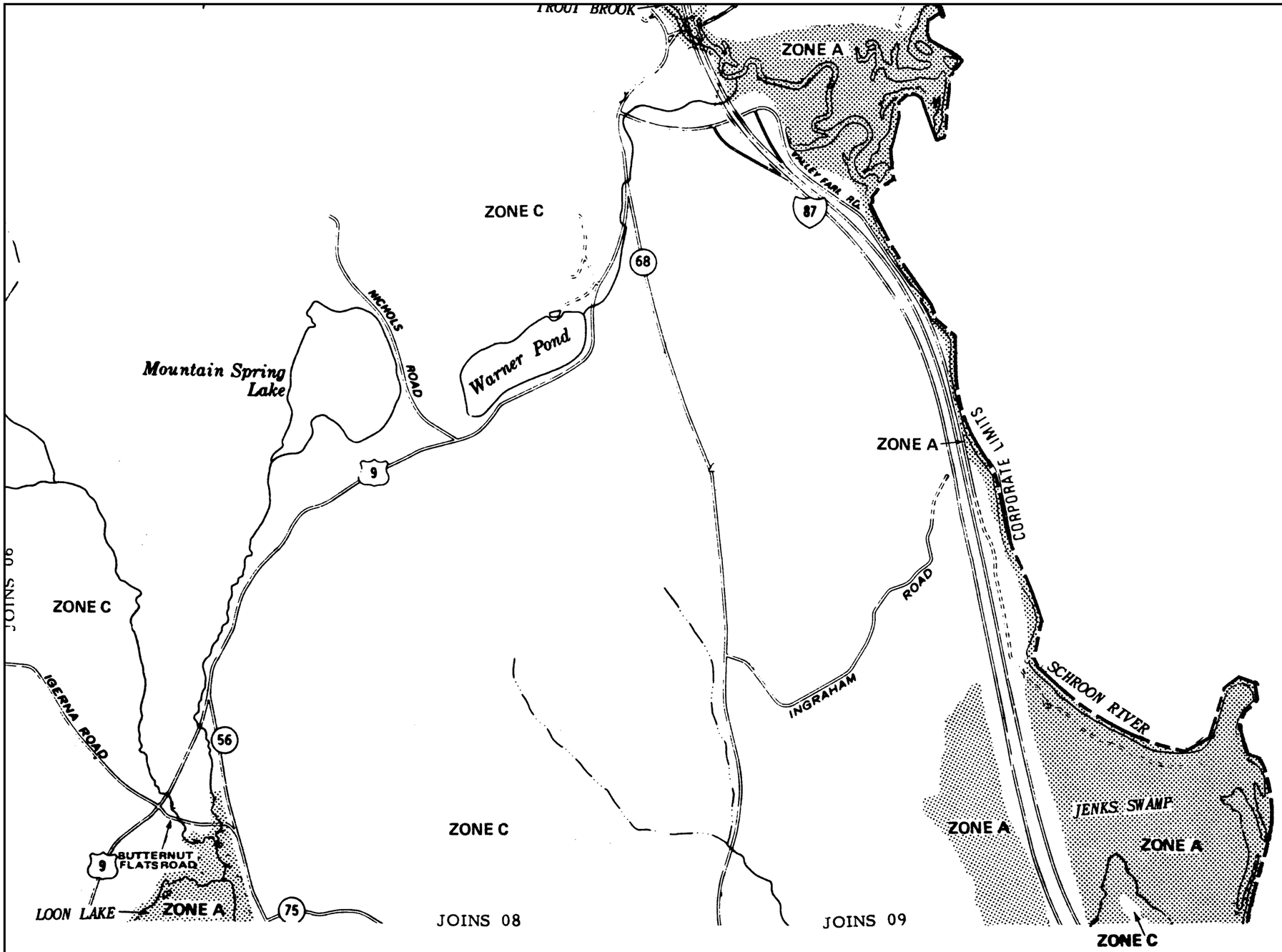
Esri, NASA, NGA, USGS, FEMA | Esri Community Maps Contributors, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA | DJ

Appendix D2 – FEMA Flood Plain Maps

(2-11 X 17 pages)



04	federal emergency management agency **TOWN OF HORICON, NY** WARREN COUNTY	APPROXIMATE SCALE 1000 0 1000 2000 3000 FEET FLOOD INSURANCE RATE MAP COMMUNITY NUMBER 360874 B	EFFECTIVE DATE FEBRUARY 15, 1985



This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

federal emergency management agency

TOWN OF CHESTER, NY
(WARREN CO.)

APPROXIMATE SCALE
1500 0 1500 3000 4500 FEET

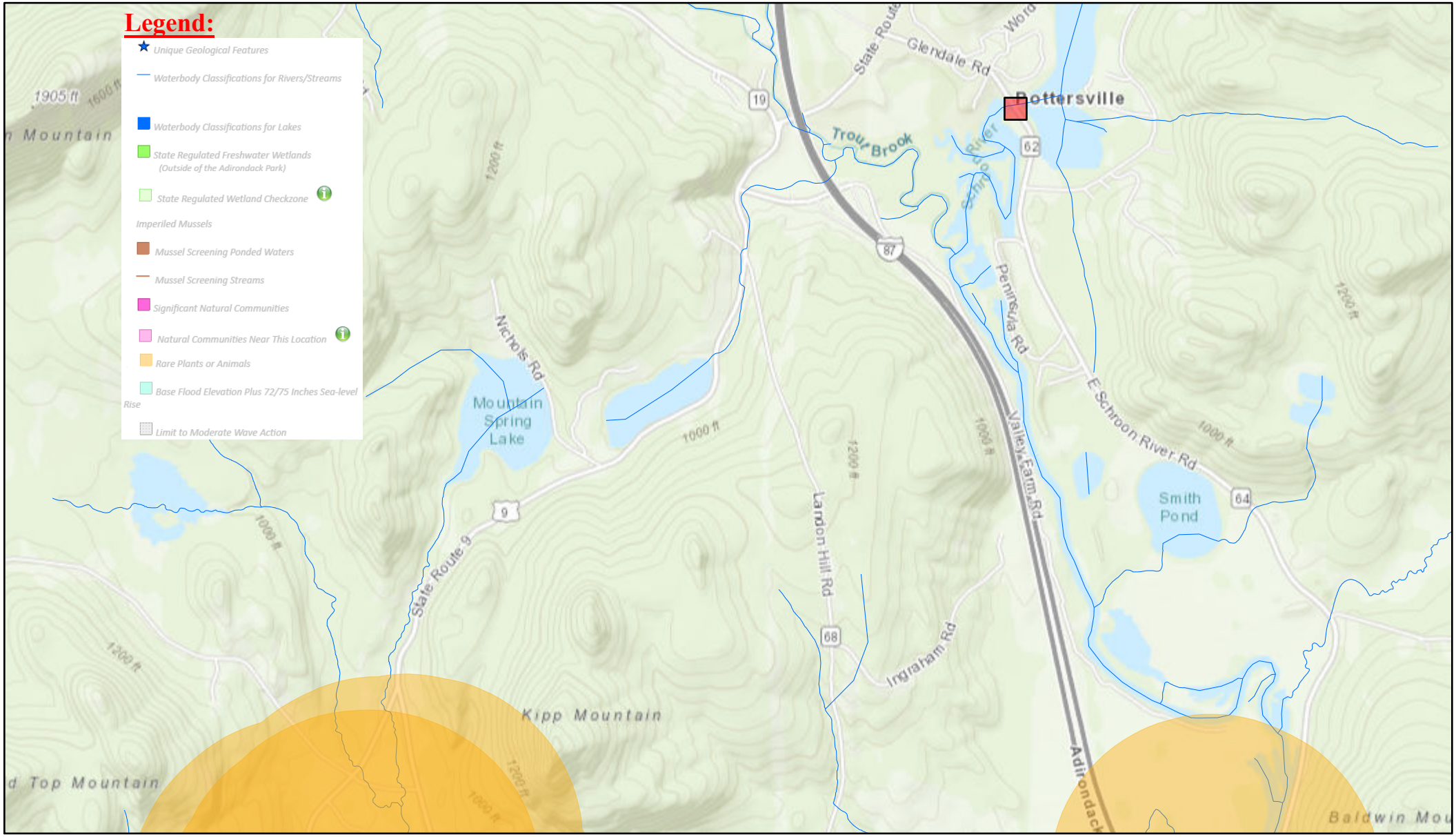
FLOOD INSURANCE RATE MAP
COMMUNITY NUMBER 360609 A

EFFECTIVE DATE
JUNE 5, 1985

Appendix E – Environmental Resource Mapper

(1- 11 X 17 pages)

POTTERSVILLE NYSDEC ENVIRONMENTAL RESOURCE MAP



December 18, 2022

1:36,112

0 0.23 0.45 0.9 mi

0 0.35 0.7 1.4 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

NYS Department of Environmental Conservation
Not a legal document

Appendix F – Wetland Maps

(2 -8.5 X 11 pages)

U.S. Fish and Wildlife Service
National Wetlands Inventory

USFWS Wetland map Pottersville

December 27, 2022

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Adirondack Park Regulatory Wetlands

Adirondack Park Boundary

Regulatory Wetlands in Promulgated Counties of the Adirondack Park

APA Regulatory Wetland Areas

APA Regulatory Mapping

Regulatory wetlands of the Adirondack Park.

0.4mi

New York State, Maxar | NYS Adirondack Park Agency | Esri, HERE, Garmin

Appendix G – IPaC Official Species List

(6 -8.5 X 11 pages)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
Phone: (607) 753-9334 Fax: (607) 753-9699
Email Address: fw5es_nyfo@fws.gov

In Reply Refer To: December 19, 2022
Project Code: 2023-0026396
Project Name: Pottersville water district study

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. **Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.**

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

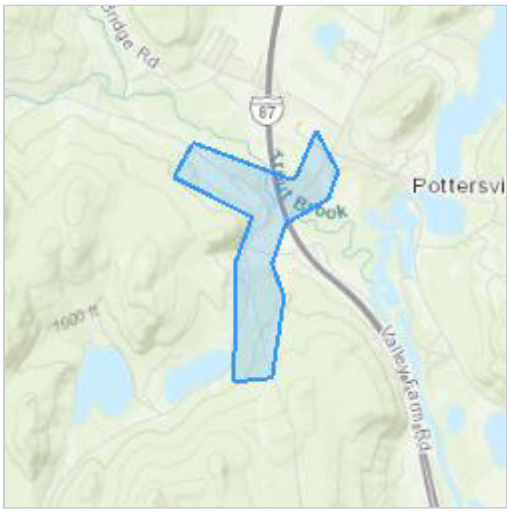
New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
(607) 753-9334

Project Summary

Project Code: 2023-0026396
Project Name: Pottersville water district study
Project Type: Water Supply Pipeline - New Constr - Below Ground
Project Description: Engineering Evaluation Study for the Pottersville Water District in the Town of Chester, Warren County, New York.The purpose of the Study is to present a
thorough analysis of the existing system, develop cost estimates and financial strategies for completing major system improvements for the long-term stability of the Water District.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.7234478,-73.82652090514534,14z



Counties: Warren County, New York

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: Chester town (Warren County, NY)
Name: Hanna Baldes
Address: 625 Maple Street Unit 2
City: Saratoga Springs
State: NY
Zip: 12866
Email hbaldes@cedarwoodengineering.com
Phone: 5186235500

Lead Agency Contact Information

Lead Agency: U.S. Fish and Wildlife Service

Appendix H – Environmental Justice Map

(1 -8.5 X 11 pages)

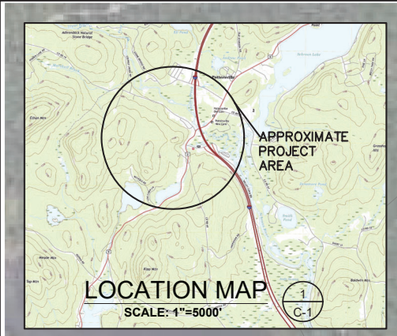
My Map

Potential_Environmental_Justice_Area__PEJA__Communities - Potential Environmental Justice Area (PEJA) Communities

Esri, NASA, NGA, USGS | Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA | Data collection: US Census Bureau Data analysis: David E. Witt, New York State Department of Environmental Conservation, Office of Environmental Justice (OEJ) Funding: NYS Taxpayers

Appendix I – Location Map

(1- 11 X 17 pages)



STATE RT. 9

LANDON HILL ROAD

WATER STORAGE TANK

VALLEY FARM RD

OLMSTEDVILLE RD

ASSUMED BEDROCK

6" ASBESTOS CEMENT PIPE

WELL HOUSE AND WELL #2 AND #3 LOCATIONS

INTERSTATE 87 SOUTH

INTERSTATE 87 NORTH

6" DUCTILE IRON PIPE

LEGEND

- ASBESTOS CEMENT PIPE
- DUCTILE IRON PIPE
- POTTERSVILLE WATER DISTRICT BOUNDARY
- WATER SERVICE CONNECTIONS
- 6" GATE VALVES
- HYDRANTS
- PARCELS WITH SERVICE CONNECTIONS

WATER DISTRICT MAP
SCALE: 1"=250'
1
C-1

GRAPHIC SCALE
0 125 250 500 750
1 INCH = 250 FEET

Issued for Planning Purposes Only

CEDARWOOD ENGINEERING SERVICES, PLLC
625 Maple Avenue, Saratoga Springs, NY 12866, (P) 518.623.5500
464 Main Street, PO Box 1360, Oneonta, NY 13820, (P) 607.441.3246

REVISIONS:

NO.	DATE:	DESCRIPTION:
1	1/28/21	ADDENDUM 1

ANY LICENSEE WHO ALTERS THIS DOCUMENT IS REQUIRED BY LAW TO AFFIX HIS OR HER SEAL, AND THE NOTATION "ALTERED BY" BY HIS OR HER SIGNATURE AND SPECIFIC DESCRIPTION OF THE ALTERATIONS.

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW

CLIENT NAME:
TOWN OF POTTERSVILLE
6307 US-9
CHESTERTOWN NEW YORK 12187

PROJECT NAME:
POTTERSVILLE WATER DISTRICT STUDY

SHEET NAME:
WATER DISTRICT MAP

PROJECT INFORMATION:
DATE: 1/17/2023
DESIGNED BY:
DRAWN BY: HGC
REVIEWED BY: JMS

PROJECT NUMBER:
22-057

DRAWING NUMBER:
C-1

PLOTTED BY: HANNA GIESNA
PLOT DATE: 3/3/2023 10:21 AM
FILE NAME: N:\Engineering-General\GIS_Jobs\2022\22-057 Pottersville Water District Study\GIS_DWGs\Base Drawings\POTTERSVILLE wsta district map.dwg

Appendix J – 2021 Annual Water Quality Report

(4- 8.5 X 11 pages)

Annual Drinking Water Quality Report for 2021

Pottersville Water District

Chester Town Hall, 6307 State Route 9, Chestertown, NY 12817

Public Water Supply Identification Number NY5600110

INTRODUCTION

To comply with State regulations, the Pottersville Water District, will be annually issuing a report describing the quality of your drinking water. The purpose of this report is to raise your understanding of drinking water and awareness of the need to protect our drinking water sources. We are very pleased to provide you with this year's Annual Water Quality Report. Last year, we conducted tests for over 80 contaminants. This report is an overview of last year's water quality. Included are details about where your water comes from, what it contains, and how it compares to New York State standards. Our constant goal is and always has been, to provide to you a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and to protect our water resources. If you have any questions concerning this report or concerning your drinking water please contact: *Mr. Jason Monroe, PO Box 423, Chestertown, NY 12817; Telephone (518) 494-5434.* We want our valued customers to be informed about their water utility. If you want to learn more, please attend any of our regularly scheduled meetings. They are held on the 2nd Tuesday of each month, 7:30 PM at the Town Hall, 6307 State Route 9; Telephone (518) 494-2711.

WHERE DOES OUR WATER COME FROM?

The Pottersville Water District draws its water from ground water sources. Groundwater or well water is stored below the surface of the earth in deep, porous rocks called "aquifers." Groundwater is purified naturally as it filters through layers of soil, clay, rock and sand. This process, known as percolation takes years to complete. As a result, groundwater requires less treatment than surface water. We pump this groundwater out through our wells. The Pottersville Water District draws its water from two wells located at Gamble Beach Road. Well #2, our main source of water, is a sixty-five-foot drilled well equipped with a 25-horsepower pump and a yield of 250 gallons per minute. Well #1 serves as an emergency back up with a yield of 100 gallons per minute. Each well has a pumphouse where chlorine is added for disinfection to protect against contamination from harmful bacteria and other organisms. We also add soda ash and phosphate to reduce lead and copper leaching from household water lines. After the water is treated, it is pumped to our 200,000-gallon water storage tank located on Landon Hill Road. Water storage helps us manage our distribution system effectively and is essential for fire protection. During 2017 the production capacity of well #2 decreased. We drilled a new well and are working to bring it on line in 2021. In addition we are changing from soda ash to caustic soda for pH control.

In general, the sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activities. Contaminants that may be present in source water include microbial contaminants; inorganic contaminants; pesticides and herbicides; organic chemical contaminants; and radioactive contaminants. In order to ensure that tap water is safe to drink, the State and EPA prescribe regulations which limit the amount of certain contaminants in water provided by public water systems. The State Health Department's and the FDA's regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

FACTS AND FIGURES

The Water District provides water through 88 service connections to a population of approximately 240 people. Our average daily demand is 35,000 gallons. Our single highest day was 135,000 gallons. The total water produced in 2021 was 12,700,000 gallons. The amount of water lost was 4,819,418 gallons. The average charge for water up to 18,000 gallons is $217.15. The rate per 1000 gallons over 18,000 gallons is $3.00 per 1000 gallons.

WHAT IS THE SOURCE WATER ASSESSMENT PROGRAM (SWAP)?

The NYS DOH has completed a source water assessment for this system, based on available information. Possible and actual threats to this drinking water source were evaluated. The state source water assessment includes a susceptibility rating based on the risk posed by each potential source of contamination and how easily contaminants can move through the subsurface to the wells. The susceptibility rating is an estimate of the potential for contamination of the source water, it does not mean that the water delivered to consumers is, or will become contaminated. See section "Are there contaminants in our drinking water?" for a list of the contaminants that have been detected, if any. The source water assessments provide resource managers with additional information for protecting source waters into the future.

The source water assessment has rated our water source as having an elevated susceptibility to microbials, nitrates, and industrial contaminants. These ratings are due primarily to close proximity of a septic system to the well and the

commercial land use and related activities in the assessment area. In addition, the well is a high yielding well, drawing from an unconfined aquifer, which is a shallow aquifer that occurs immediately below the ground surface and has no overlying protective layer for protection from potential sources of contamination. While the source water assessment rates our well(s) as being susceptible to microbials, please note that our water is disinfected to ensure that that the finished water delivered into your home meets New York State's drinking water standards for microbial contamination.

ARE THERE CONTAMINANTS IN OUR DRINKING WATER?

In accordance with State regulations, the Pottersville Water District routinely monitors your drinking water for numerous contaminants. We test your drinking water for inorganic contaminants, radiological contaminants, lead and copper, nitrate, volatile organic contaminants, and synthetic organic contaminants. In addition, we test 1 sample for coliform bacteria each month. The table presented below depicts which contaminants were detected in your drinking water. The state allows us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

It should be noted that all drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily pose a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791) or the New York State Department of Health Glens Falls District Office at (518) 793-3893.

WHAT DOES THIS INFORMATION MEAN?

As you can see by the table, we exceeded the Action Level for copper during both the first 6 months of 2021 and are required to furnish the following information:

Copper is an essential nutrient, but some people who drink water containing copper in excess of the Action Level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's disease should consult their personal doctor.

IS OUR WATER SYSTEM MEETING OTHER RULES THAT GOVERN OPERATIONS?

Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During 2021, we did not complete all monitoring and therefore cannot be certain of your water quality with respect to the contaminants listed during the time period noted. We did not sample for lead and copper in the 2nd six months of 2021 and were issued a violation. Additionally, we were issued a monitoring violation for not collecting the 1,4 Dioxane and PFOA/PFOS samples for the 2nd quarter compliance period April 1-June 30, 2021. A sample was collected on 4/29/21 for those analytes and sent to the contract laboratory. After checking for the results it was discovered the sample was lost but we were into the 3rd quarter already. We did collect additional samples in July, August, November and December 2021.

IS OUR WATER SAFE FOR EVERYONE?

Some people may be more vulnerable to disease causing microorganisms or pathogens in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice from their health care provider about their drinking water. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium, Giardia and other microbiological pathogens are available from the Safe Drinking Water Hotline (800-426-4791).

INFORMATION ON LEAD

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Pottersville WD is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at *http://www.epa.gov/safewater/lead*

WATER CONSERVATION TIPS

The Pottersville Water District encourages water conservation. There are a lot of things you can do to conserve water in your own home. Conservation tips include:

- Only run the dishwasher and clothes washer when there is a full load.
- Use water saving showerheads.
- Water gardens and lawn for only a couple of hours after sunset.
- Check faucets, pipes and toilets for leaks and repair all leaks promptly.
- Take shorter showers.

CAPITAL IMPROVEMENTS

There were no major capital improvements in 2021.

CLOSING

Thank you for allowing us to continue providing your family with clean, quality water this year. In order to maintain a safe and dependable water supply we sometimes need to make improvements that will benefit our customers. We ask that all our customers help us protect our water sources, which are the heart of our community, our way of life and our children's future. Please call our office if you have questions.

POTTERSVILLE WATER DISTRICT TEST RESULTS Public Water Supply identification Number NY5600110						
Contaminant	Violation Y/N	Level Detected	Unit Measurement	MCLG	MCL	Likely Source of Contamination
Inorganic Contaminants (samples from 2/4/20 unless otherwise noted)						
Chloride	N	90.3	ppm	N/A	250	Naturally occurring
Copper (samples 6/23/21-6/24/21)	**Y**	2.18[1] 0.042-3.18				
Lead (samples from (samples 6/23/21-6/24/21)	N	4.7[2] ND-11.2	ppb	0	AL=15	Corrosion of household plumbing systems
Nitrate (as Nitrogen) from 8/26/21	N	2.32	ppm	10	10	Runoff from fertilizer use; leaching from septic tanks,
Odor	N	1	units	N/A	3	Natural sources
Sodium[3] (from 8/26/21)	N	52.7	ppm	N/A	N/A	Naturally occurring; Road salt;
Zinc	N	37.0	ppb	N/A	5000	Corrosion inhibitor
Synthetic Organic Chemicals						
Well#2 PFOS (from 1/25/21)	N	2.50	ppt	N/A	10	Released into the environment from widespread use in commercial and industrial applications.
Well#2 PFOS (from 7/19/21)		2.78				
Well#2 PFOA (from 8/26/21)		2.7				
Well#2 PFOS (from 11/20/21)		2.49				
Disinfection Byproducts (sample from 7/17/19)						
Haloacetic Acids [HAA5]	N	5.2	ppb	N/A	60	By-product of drinking water chlorination
Total Trihalomethanes [TTHM]	N	12.2	ppb	0	80	By-product of drinking water chlorination
Chlorine (based on daily readings) average range of values for 2021	N	0.7 0.6-0.9	ppm	MRDLG N/A	MRDL 4	Used in the treatment and disinfection of drinking water

NOTES-

1. The level presented represents the 90th percentile of the sites tested along with the range of results. The action level for copper was exceeded at 5 of the 10 sites during June of 2021.
2. The level presented represents the 90th percentile of the sites tested along with the range of results. The action level for lead was not exceeded at any of the 10 sites tested in June of 2021.
3. Water containing more than 20 mg/l should not be consumed by persons on severely restricted sodium diets. Water containing more than 270 mg/l of sodium should not be used for drinking by people on moderately restricted sodium diets.

Non-Detects (ND) - laboratory analysis indicates that the constituent is not present.
Parts per million (ppm) or Milligrams per liter (mg/l) - one part per million corresponds to one minute in two years or a single penny in $10,000.
Parts per billion (ppb) or Micrograms per liter - one part per billion corresponds to one minute in 2,000 years, or a single penny in $10,000,000.
Parts per trillion (ppt) or Nanograms per liter (nanograms/l) - one part per trillion corresponds to one minute in 2,000,000 years, or a single penny in $10,000,000,000.
90th Percentile Value- The values reported for lead and copper represent the 90th percentile. A percentile is a value on a scale of 100 that indicates the percent of a distribution that is equal to or below it. The 90th percentile is equal to or greater than 90% of the lead and copper values detected at your water system.
Action Level - the concentration of a contaminant, which, if exceeded, triggers treatment, or other requirements, which a water system must follow.
Maximum Contaminant Level - The "Maximum Allowed" (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
Maximum Contaminant Level Goal The "Goal" (MCLG) is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.
N/A-Not applicable

Appendix K – Inspection Report

(23- 8.5 X 11 pages)

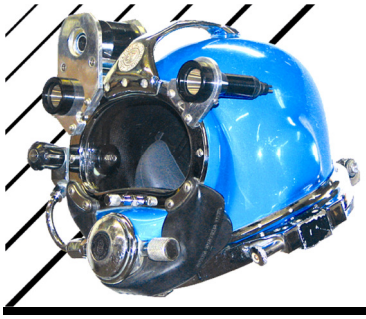
Pottersville Tank

Cedarwood Engineering

Report of Findings
From the
Diving Operations
Conducted on

July 29, 2016

by



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LiquiVision Technology
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711 Market Street
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Western Operations
835 Market Street
Klamath Falls, OR 97601
Toll Free: (800) 229-6959
Phone: (541) 883-6473
Fax: (541) 883-1361
www.divingservices.com
liquivision@divingservices.com

Underwater Inspection of Pottersville Tank

July 29, 2016

Gabriella Rossi
Cedarwood Engineering
PO Box 203
North Creek, NY 12853

Following is the report of findings during the underwater work conducted on your storage tank.

It will focus on issues of concern or areas that need attention. In order to see a complete and detailed inspection, please view each video.

Color images of all plumbing fixtures, components and areas of concern were taken via underwater digital camera. The images should give you a clear view of the conditions described. The video may give you another view and a clearer understanding of any area that you may wish to look at more closely.

METHODOLOGY:

Disinfection of All Equipment With 200ppm+ Chlorine Solution Immediately Prior to Entering System: This process prevents contamination of the water supply. All LVT equipment was properly disinfected prior to entering the potable water system.

Full-Time Voice Communication between surface and Diver: The system allowed for constant communication between the diver, and all surface personnel. In addition, customers were able to communicate with the diver at any time. For purposes of a more efficient inspection, cleaning, and repair program, that enabled the diver to immediately discuss any observations he made inside the storage tank.

Full-Time Live High Resolution Color Video: Allowed for constant viewing of the diver's work and observations. This also enabled the district personnel to view what the diver in the storage tank was witnessing.

Pottersville Tank

TERMINOLOGY:

When describing the features or areas of interest inside the storage tank, an image number is placed next to the description that corresponds with the inspection findings. The diagram is shown in a view looking from the top down. The entry hatch is referred to as the 12:00 o'clock position.

Following the diagram are pictures of the pertinent areas of the storage tank and the locations where the pictures were taken. Each picture is descript and numbered.

The standards used to evaluate the condition of the storage tank include: Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces – SSPC-Vis 2-82 & ASTM D 610-85 NACE Standard RP0196-96 & RP0388-2001 or Condition of Concrete In-service – ACI 201.1R-92.

Pottersville Tank

OVERVIEW OF STORAGE TANK INSPECTED:

Customer Name:	Cedarwood Engineering	**Tank Name:**	Pottersville Reservoir
Manager:	Gabriella Rossi	Construction:	OG Welded
Job Number:	NY2047215R1T3	Capacity (gal.):	200,000
Date of Inspection:	July 29, 2016	Diameter or L x W:	31'
Report Writer:	Eric Reitemeyer	Height:	35'
Diver:	Chris Kipp	Floor Square FT:	754.7
Tender:	Ken Kincaid	Date Built:	Unknown

N/A –not applicable **Excellent** (Ex.) –like new condition, no repairs needed. **Good** – Cosmetic only problems, repairs if wanted. **Fair**-Minor problems, repairs needed, not immediate. **Poor** –Major problems, structural or like, immediate repairs needed.

1. Rust Grades

Grades	% of Surface Rusted	Description
10	0% - 0.01%	No rusting or less than 0.01% of surface rusted
9	0.01% - 0.03%	Minute rusting, less than 0.03% of surface rusted
8	0.03% - 0.1%	Few isolated rust spots, less than 0.1% of surface rusted
7	0.1%- 0.3%	Less than 0.3% of surface rusted
6	0.3% - 1%	Extensive rust spots, but less than 1% of surface rusted
5	1% - 3%	Rusting to the extent of 3% of surface rusted
4	3% - 10%	Rusting to the extent of 10% of surface rusted
3	10% - 16%	Approximately one sixth of the surface rusted (16%)
2	16% - 33%	Approximately one third of the surface rusted (33%)
1	33% - 50%	Approximately one half of the surface rusted (50%)
0	50% - 100%	Approximately 100% of the surface rusted

2. Concrete Deformities

Unable to Evaluate	Good Condition	Cracks	Blistering	Chalking	De-Lamination	Pitting	Popouts	Scaling	Spalling	Warping
UE	GC	CK	BL	CH	DL	PT	PO	SC	SP	WA

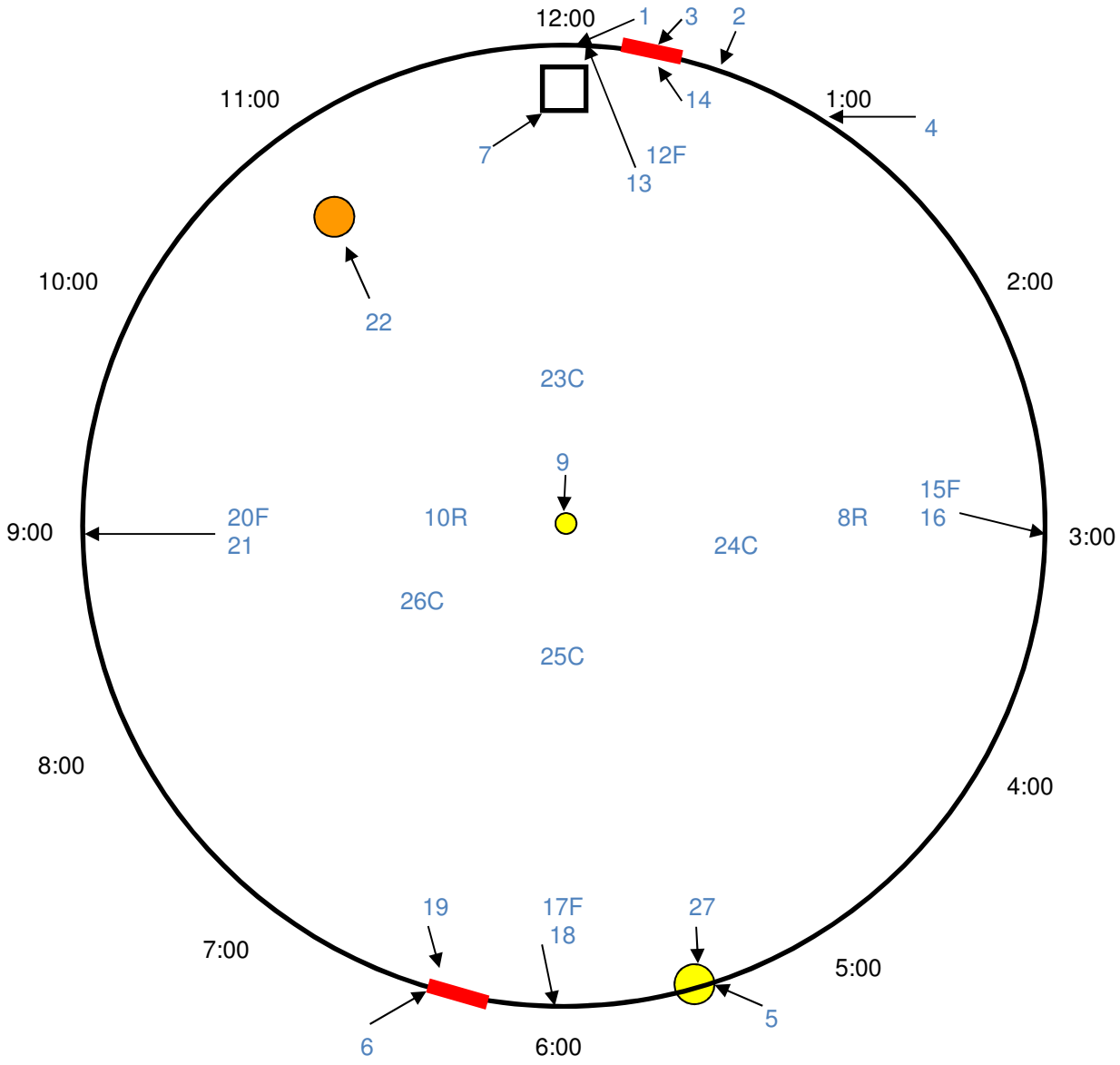
Pottersville Tank

RECOMMENDATIONS:

Recommendation	Estimated Time - Hrs.
Install weather stripping on entry hatch to limit the risk of bugs and other matter from entering the storage tank.	1.0
Perform a regular cleaning, inspection and repair cycle every 2-3 years in order to ensure superior water quality and proper maintenance of coating condition and appurtenances is performed.	Please contact our sales office for an estimate.

Pottersville Tank

Tank Diagram



Drawing Not To Scale

	Entry Hatch		Overflow		Air Vent
	Common Inlet/Outlet		Man Entry		

Pottersville Tank

Image #**1** *Exterior Ladder 12:00* **Condition:** Rust Grade[1] **8.** **Description:** Exterior Ladder appeared to be in good condition with a minor amount of corrosion.	
Image #**2** *Exterior Base 12:30* **Condition:** Concrete Deform[3] **CK**. **Description:** Exterior Base appeared to be in good condition with a minor amount of cracking.	

Pottersville Tank

Image #**3** *Man Way 12:05* **Condition:** Rust Grade[1] **7.** **Description:** 24" Man Way appeared to be in good condition with a minor amount of corrosion.	
Image #**4** *Exterior Wall 1:00* **Condition:** Rust Grade[1] **7.** **Description:** Exterior Wall appeared to be in fair condition with a minor amount of corrosion.	

Pottersville Tank

Image #**5** *Overflow 5:30* **Condition:** Rust Grade[1] **8.** **Description:** 8" Overflow appeared to be in good condition with a minor amount of corrosion.	
Image #**6** *Man Way 6:05* **Condition:** Rust Grade[1] **7.** **Description:** 32" Man Way appeared to be in good condition with a minor amount of corrosion	

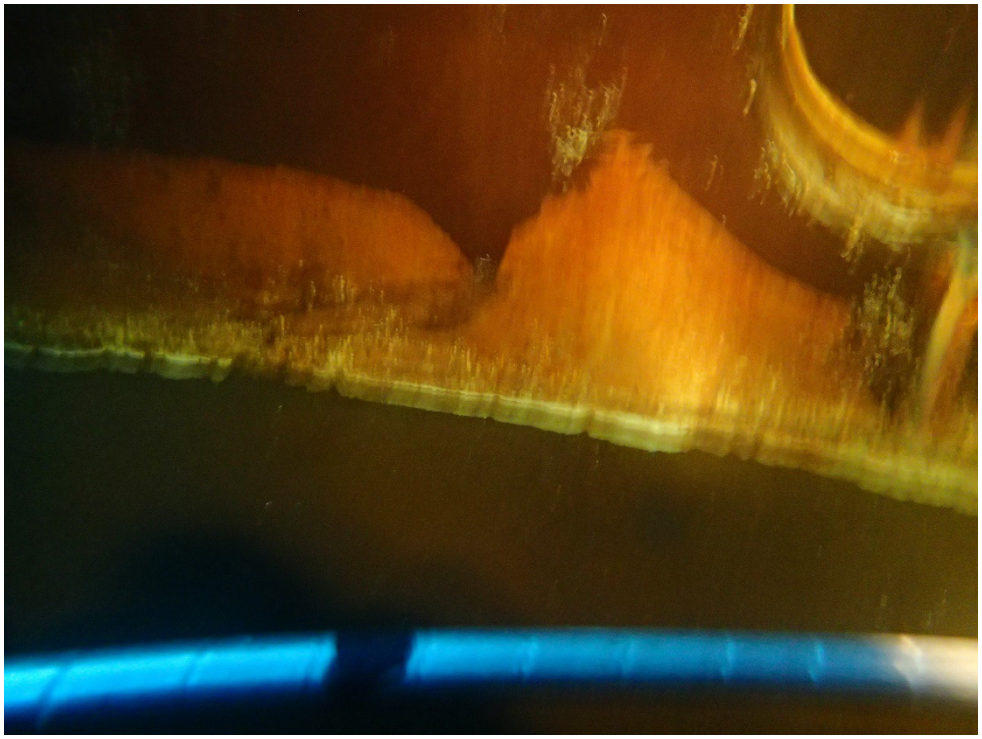
Pottersville Tank

Image #**7** *Entry Hatch 12:00* **Condition:** Rust Grade[1] **5.** **Description:** 24" Entry Hatch appeared to be in fair condition with a moderate amount of corrosion. No weather stripping was observed.	
Image #**8** *Roof 3:00* **Condition:** Rust Grade[1] **8.** **Description:** Roof appeared to be in good condition with a minor amount of corrosion.	

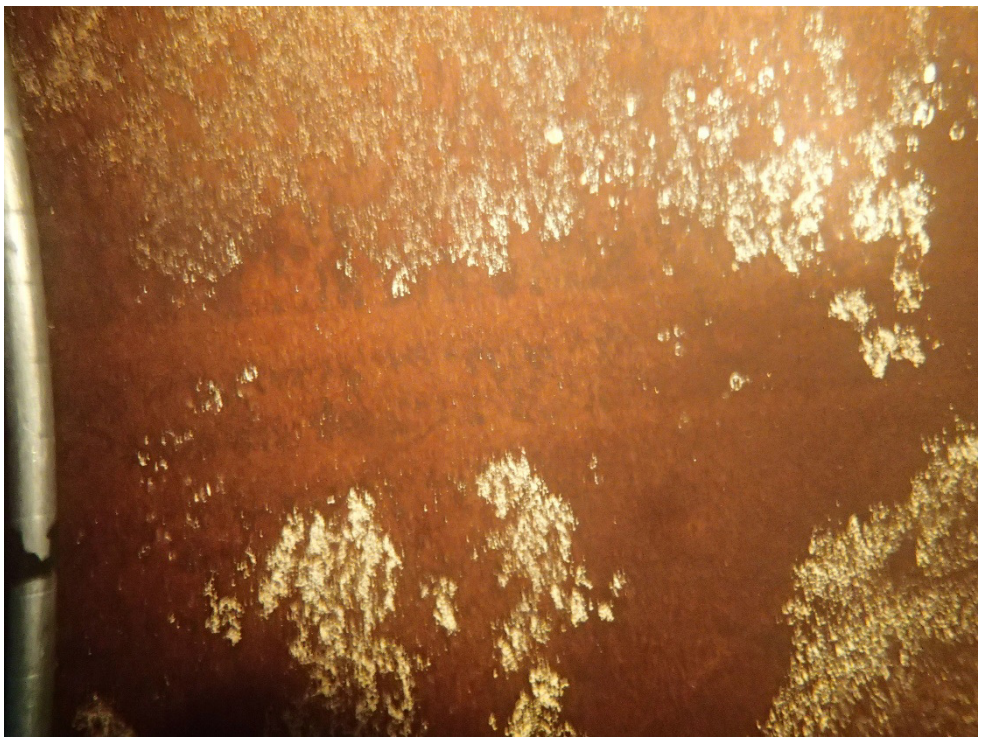
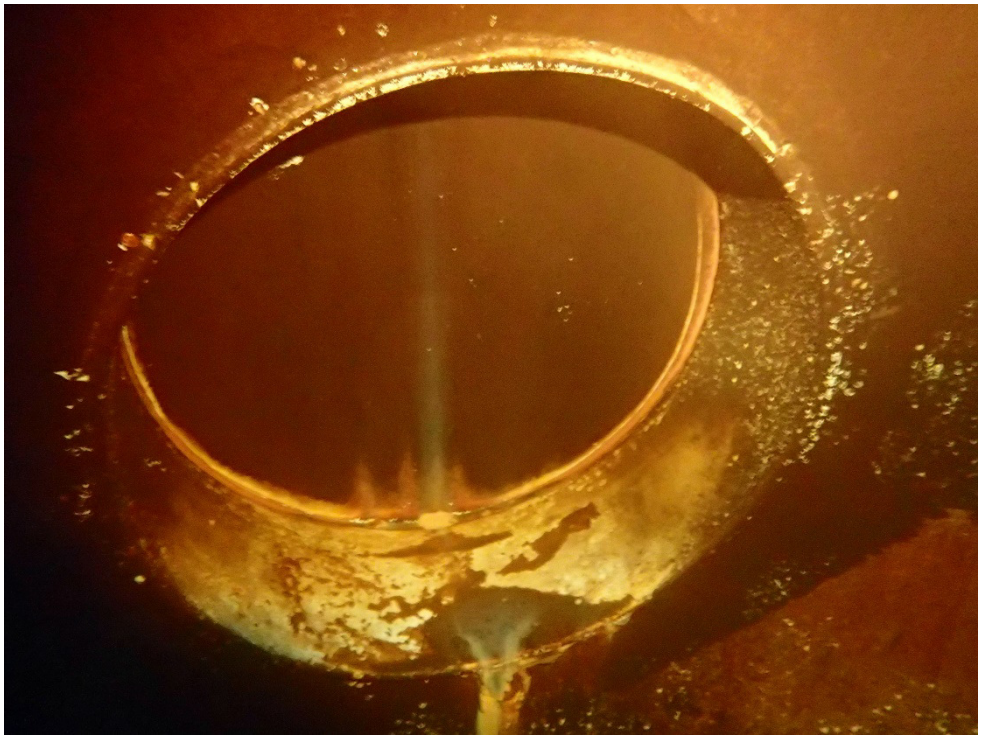
Pottersville Tank

Image #**9** *Vent Center* **Condition:** Rust Grade[1] **4.** **Description:** 20" Vent appeared to be in fair condition with a moderate amount of corrosion.	
Image #**10** *Roof 9:00* **Condition:** Rust Grade[1] **8.** **Description:** Roof appeared to be in good condition with a minor amount of corrosion.	

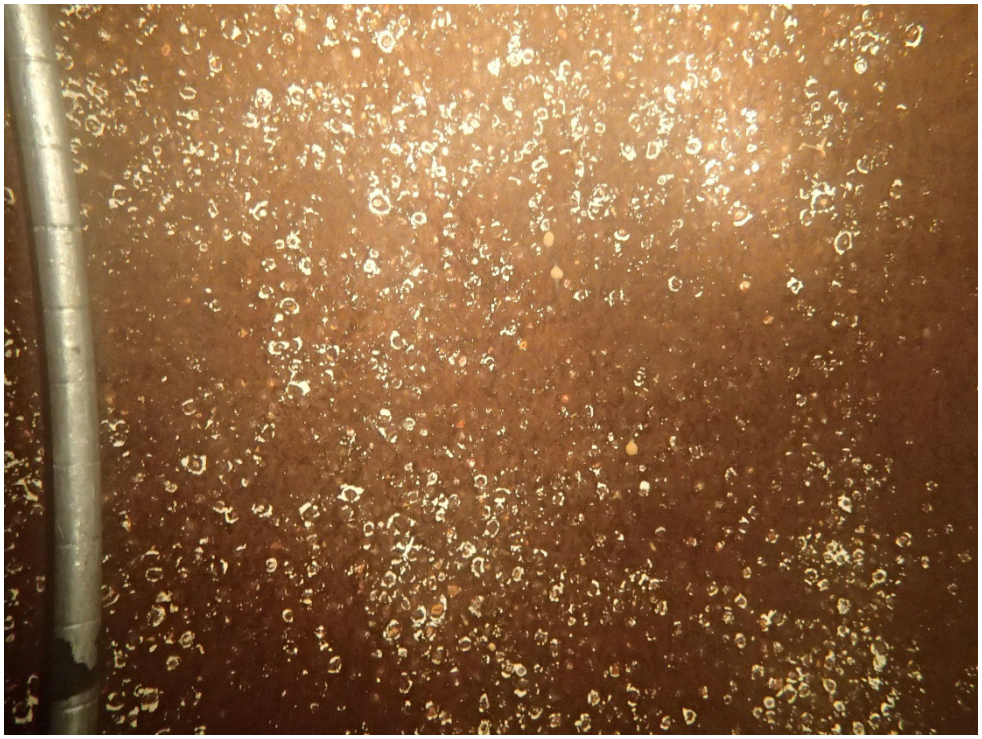
Pottersville Tank

Image #**11** *Diver*	
Image #**12** *Floor 12:00* **Condition:** Rust Grade[1] **UE.** **Description:** Floor was unable to properly evaluate due to sediment.	

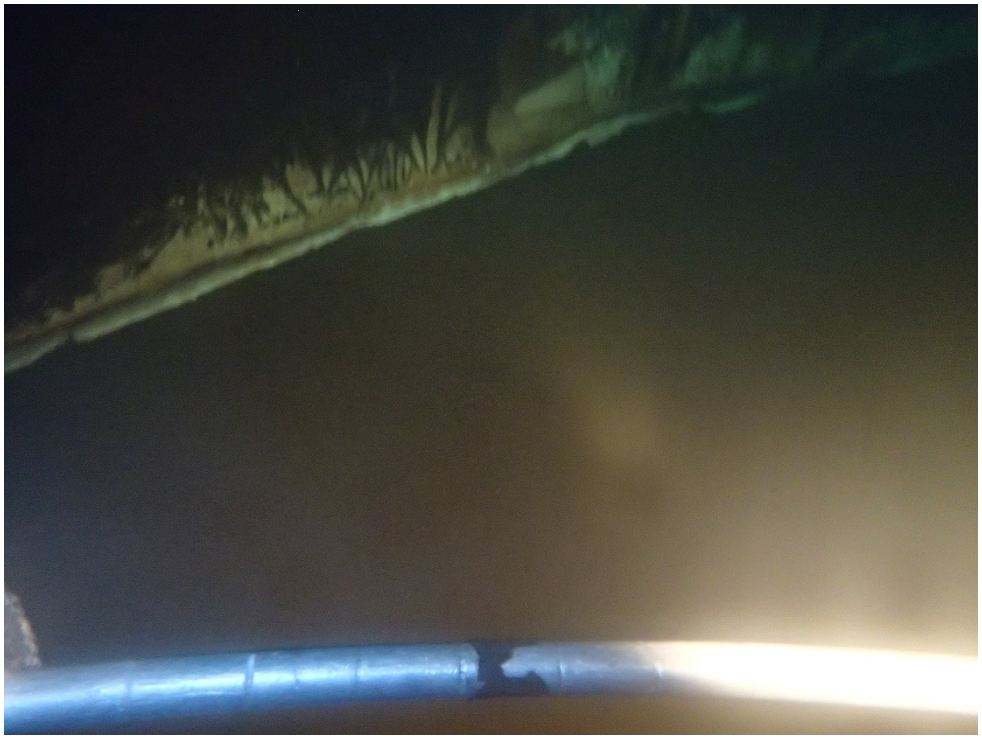
Pottersville Tank

Image #**13** *Wall 12:00* **Condition:** Rust Grade[1] **5.** **Description:** Wall appeared to be in fair condition with a moderate amount of corrosion and heavy staining observed.	
Image #**14** *Man Way 12:05* **Condition:** Rust Grade[1] **6.** **Description:** 24" Man Way appeared to be in fair condition with a moderate amount of corrosion.	

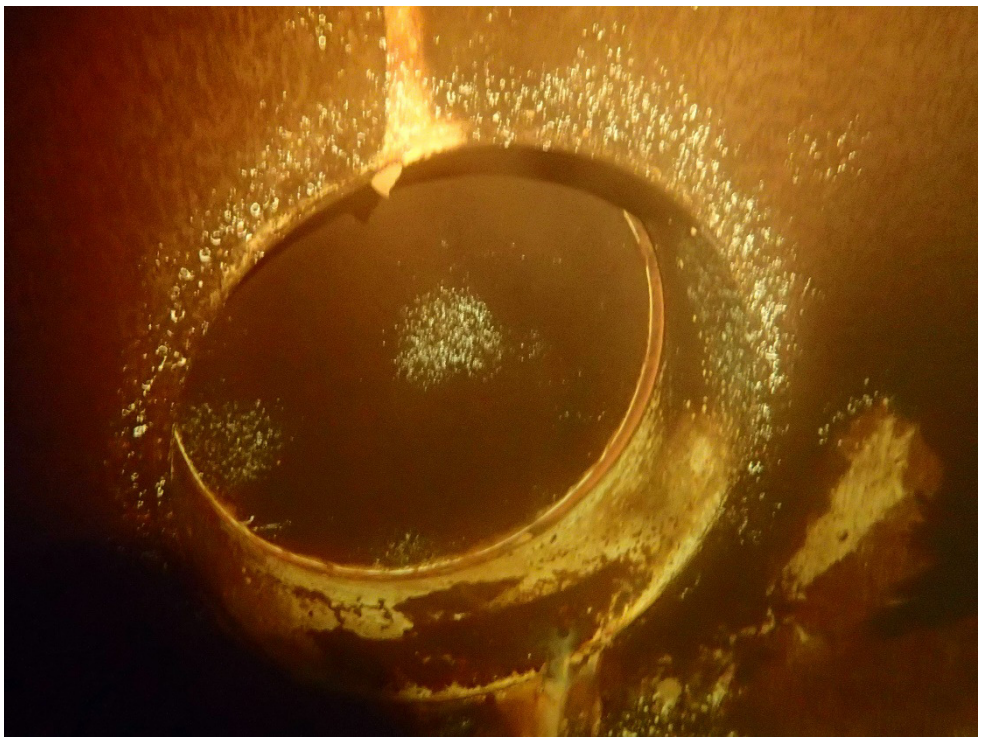
Pottersville Tank

Image #**15** *Floor 3:00* **Condition:** Rust Grade[1] **UE.** **Description:** Floor was unable to properly evaluate due to sediment.	
Image #**16** *Wall 3:00* **Condition:** Rust Grade[1] **5.** **Description:** Wall appeared to be in fair condition with a moderate amount of corrosion and heavy staining observed.	

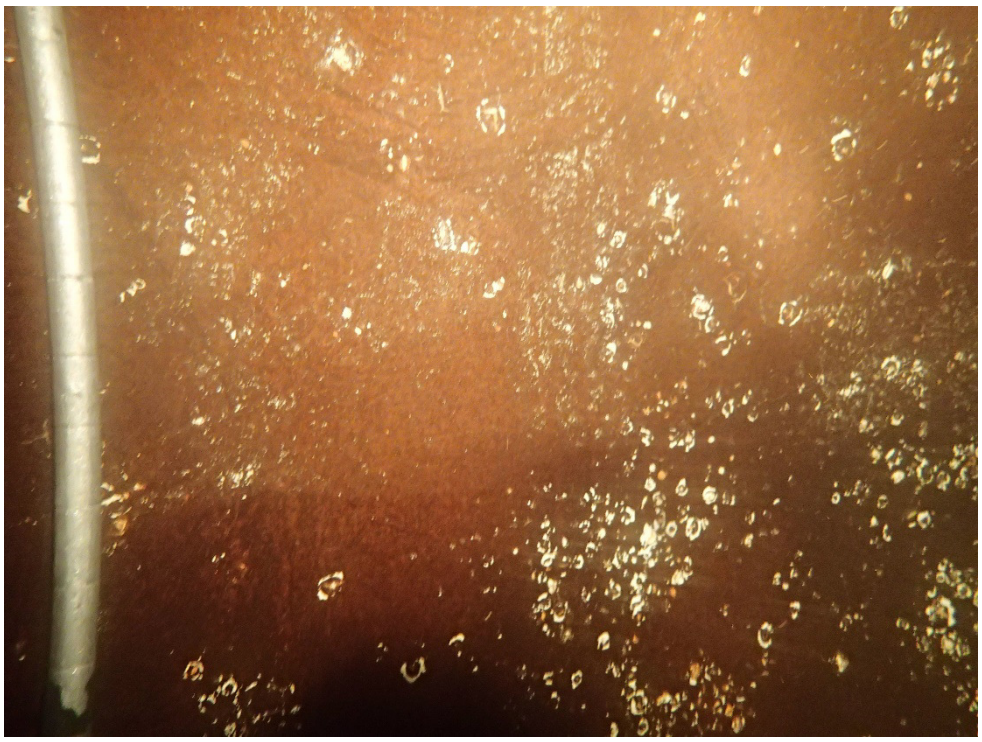
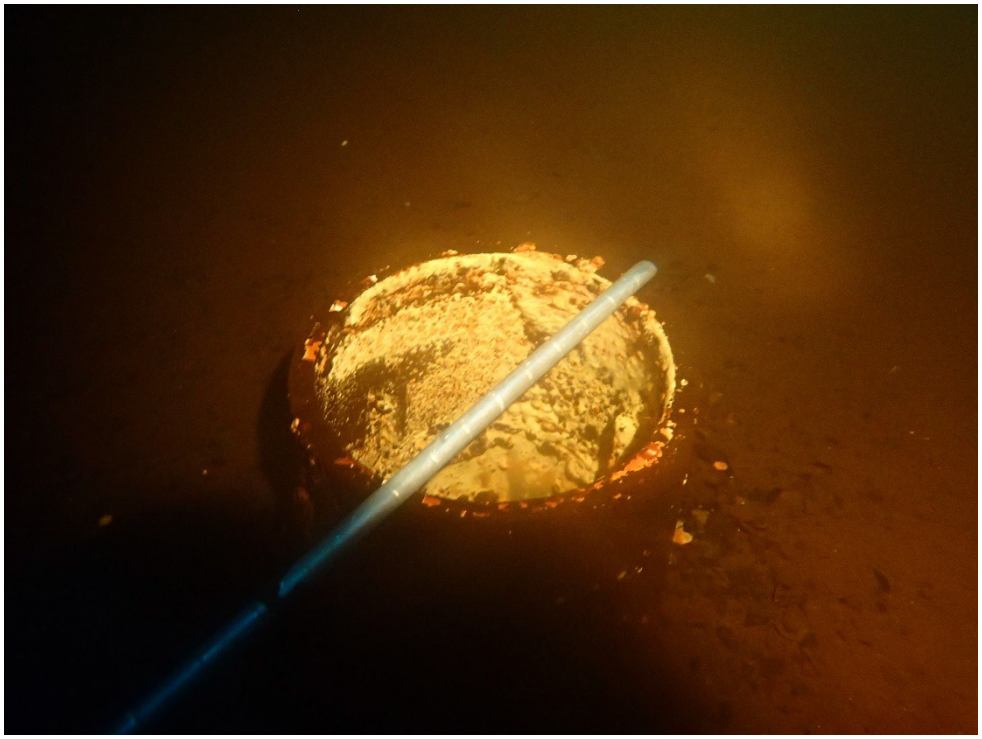
Pottersville Tank

Image #**17** *Floor 6:00* **Condition:** Rust Grade[1] **UE.** **Description:** Floor was unable to properly evaluate due to sediment.	
Image #**18** *Wall 6:00* **Condition:** Rust Grade[1] **5.** **Description:** Wall appeared to be in fair condition with a moderate amount of corrosion and heavy staining observed.	

Pottersville Tank

Image #**19** *Man Way 6:05* **Condition:** Rust Grade[1] **6.** **Description:** 32" Man Way appeared to be in fair condition with a moderate amount of corrosion.	
Image #**20** *Floor 9:00* **Condition:** Rust Grade[1] **UE.** **Description:** Floor was unable to properly evaluate due to sediment.	

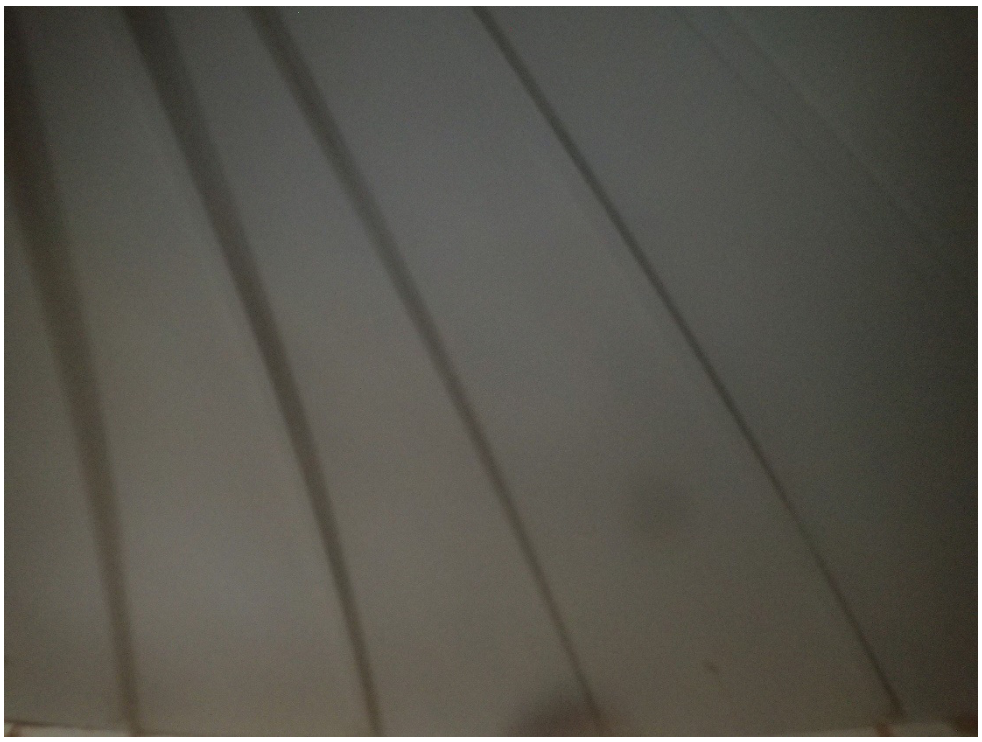
Pottersville Tank

Image #**21** *Wall 9:00* **Condition:** Rust Grade[1] **5.** **Description:** Wall appeared to be in fair condition with a moderate amount of corrosion and heavy staining observed.	
Image #**22** *Inlet / Outlet 11:00* **Condition:** Rust Grade[1] **4.** **Description:** 12" Inlet / Outlet appeared to be in fair condition with a moderate amount of corrosion.	

Pottersville Tank

Image #**23** *Ceiling 12:00* **Condition:** Rust Grade[1] **7.** **Description:** Ceiling appeared to be in fair condition with a minor amount of corrosion.	
Image #**24** *Ceiling 3:00* **Condition:** Rust Grade[1] **7.** **Description:** Ceiling appeared to be in fair condition with a minor amount of corrosion.	

Pottersville Tank

Image #**25** *Ceiling 6:00* **Condition:** Rust Grade[1] **7.** **Description:** Ceiling appeared to be in fair condition with a minor amount of corrosion.	
Image #**26** *Ceiling 9:00* **Condition:** Rust Grade[1] **7.** **Description:** Ceiling appeared to be in fair condition with a minor amount of corrosion.	

Pottersville Tank

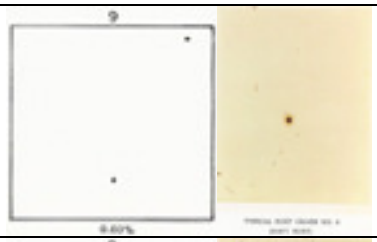
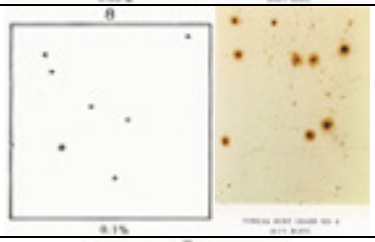
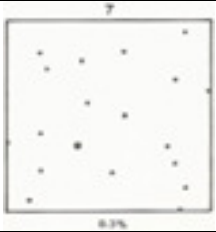
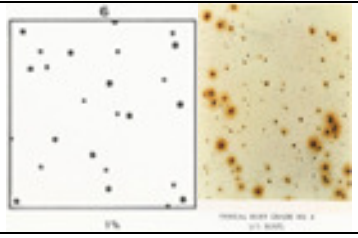
Image #**27** *Overflow 5:30* **Condition:** Rust Grade[1] **8.** **Description:** 24"x5" Overflow appeared to be in good condition with a minor amount of corrosion.	

REFERENCES:

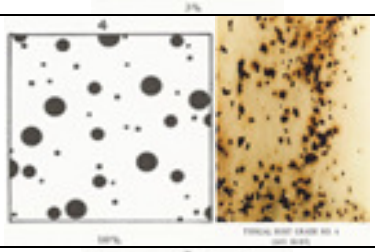
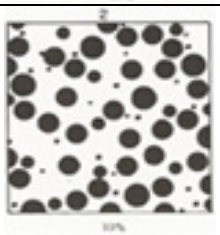
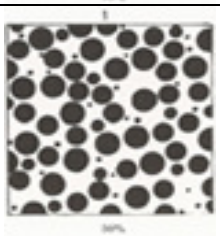
Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces – SSPC-Vis 2-82 & ASTM D 610-85 (1989)

The graphical representations show examples of area percentages, which may be helpful in rust grading. The use of photographical reference standards requires the following precautions:

1. Some finishes are stained by rust. This staining must not be confused with the actual rusting involved.
2. Accumulated dirt or other material may make accurate determination of the degree of rusting difficult.
3. Certain types of deposited dirt that contain iron or iron compounds may cause surface discoloration that should not be mistaken for corrosion.
4. It must be realized that failure may vary over a given area and discretion must therefore be used in applying these reference standards.
5. In evaluating surfaces, consideration shall be given to the color of the finish coating, since failures will be more apparent on a finish that shows color contrast with rust, such as white, than on a similar color, such as iron oxide finish.
6. The photographic reference standards are not required for use of the rust-grade scale since the scale is based upon the percent of the area rusted and any method of assessing area rusted may be used to determine the rust grade.

Rust Grades	Description	Graphical Representation
10	No rusting or less than 0.01% of surface rusted	Unnecessary
9	Minute rusting, less than 0.03% of surface rusted	
8	Few isolated rust spots, less than 0.1% of surface rusted	
7	Less than 0.3% of surface rusted	
6	Extensive rust spots, but less than 1% of surface rusted	

Pottersville Tank

5	Rusting to the extent of 3% of surface rusted	
4	Rusting to the extent of 10% of surface rusted	
3	Approximately one sixth of the surface rusted (16%)	
2	Approximately one third of the surface rusted (33%)	
1	Approximately one half of the surface rusted (50%)	
0	Approximately 100% of the surface rusted	Unnecessary

Appendix L –NYS DOH Sanitary Survey Letter

(2 -8.5 X 11 pages)

NEW YORK STATE OF OPPORTUNITY. Department of Health

KATHY HOCHUL
Governor

JAMES V. McDONALD, M.D., M.P.H.
Acting Commissioner

MEGAN E. BALDWIN
Acting Executive Deputy Commissioner

January 6, 2023

Supervisor Craig Leggett and Town of Chester Board
P.O. Box 423
Chestertown, NY 12817

Re: Pottersville Water District, PWS ID# NY5600110
Sanitary Survey 2022

Dear Mr. Leggett and Town Board Members,

On December 22, 2022, a sanitary survey of the Pottersville Water District was conducted by Dan MacElrath, and myself, with the assistance of Jason Monroe, Water and Highway Superintendent and Jeffery Schaefer. We thank them for their time and assistance during the survey. A summary of required or recommended actions are presented below and are intended to maintain or achieve compliance with Title 10, New York Codes, Rules and Regulations (NYCRR), Part 5.

Engineered Plans for upgrades to the existing water treatment system were recently approved in May 2022. Although construction of the approved upgrades has started it was not yet completed at the time of our survey. Some of the remaining items are as follows:

- The master meter needs to be operational
- The VFDs need to be installed/connected to the pumps

Minor Deficiencies and Recommendations:

1. Currently the phosphate levels are not monitored daily. Phosphate levels must be measured daily and recorded on the operator's monthly report.

2. Wells #2 and #3 operate independently with chemical injection pump after wells are combined. Currently, well pumps are operated manually by the water operator. We recommend the well pumps be controlled by a storage tank water level sensor that will activate the well pumps. The "pump on" water level elevation must be determined such that 35 psi is maintained in the distribution system. The chemical pumps should be controlled by the flowrate through the master meter.

3. Secondary containment for the chemicals needs to be installed.

4. American Water Works Association recommends storage tank inspections take place on a 5-year frequency. Please submit the most recent storage tank inspection or schedule an inspection to be performed this year.

5. In December of 2021, the USEPA promulgated the Revised Lead and Copper Rule (LCRR) which requires all community water systems to develop an inventory of all service line materials. The inventory is to be submitted to the NYSDOH by October 2024. Due to the significant workload this presents on water systems our office recommends beginning the inventory as soon as possible. An electronic template for completing the inventory is attached. We are available if you have any questions on this new requirement.

Sincerely,

Zachary Monroe
Assistant Engineer

c: Jason Monroe, Town of Chester
Rebecca Bussert, Director GFDO
Dan MacElrath, GFDO

Appendix M – Existing Site Photographs
13 - 8.5 x 11 pages

PUMP HOUSE


SURCHLOR+

WELL 1

WELL 2

WELL 3

WATER STORAGE TANK

Appendix N – Hydrosource Associates Report
29 - 8.5 x 11 pages

HIGH-YIELD WELL SITING HYDROGEOLOGIC EVALUATION
POTTERSVILLE WATER DISTRICT
TOWN OF CHESTER, NEW YORK

March 27, 2023

Introduction

The Hamlet of Pottersville, in Chester, New York, has a water system with 93 service connections and serves about 270 people. Maximum daily demand is approximately 86,400 gallons per day (gpd), or 60 gallons per minute (gpm). The system's water source is a wellfield off Gambles Beach Road consisting of three screened wells in sand and gravel deposits. The District is searching for a new well site where it can construct a well that is capable of meeting system demand and also satisfies State of New York regulatory requirements with respect to well location and setbacks.

HydroSource Associates (HSA) was retained to search for promising locations for a new well. This report documents its efforts. The work described here was carried out as described in HSA's proposal dated February 22, 2023. HSA is coordinating on this project with Cedarwood Engineering, the District's engineer.

Existing System

Figure 1 shows the location of the existing wellfield, the distribution system, and the District's main storage tank. The map also shows a half-mile buffer surrounding the distribution system. The buffer was intended to encompass the general area considered close enough to the distribution system to be practical for potential well sites.

Figure 2 shows the wells in the existing wellfield. According to the District's 2021 annual drinking water quality report, Well PW-1 is capable of producing 100 gpm, but we have no other information on it. It is currently used as an emergency backup, but it is slated for abandonment. Well PW-2 is a 12-inch-diameter screened well, and the 2021 report says it is 65 feet deep. The well may have yielded as much as 250 gpm when it was drilled, but we understand that it currently can produce about 60 gpm. Well PW-3 is an eight-inch-diameter screened well that was drilled in September 2019 and put in service at the end of 2022. It is 47 feet deep, is screened from 42 feet to 47 feet, and has a reported yield of approximately 60 gpm.

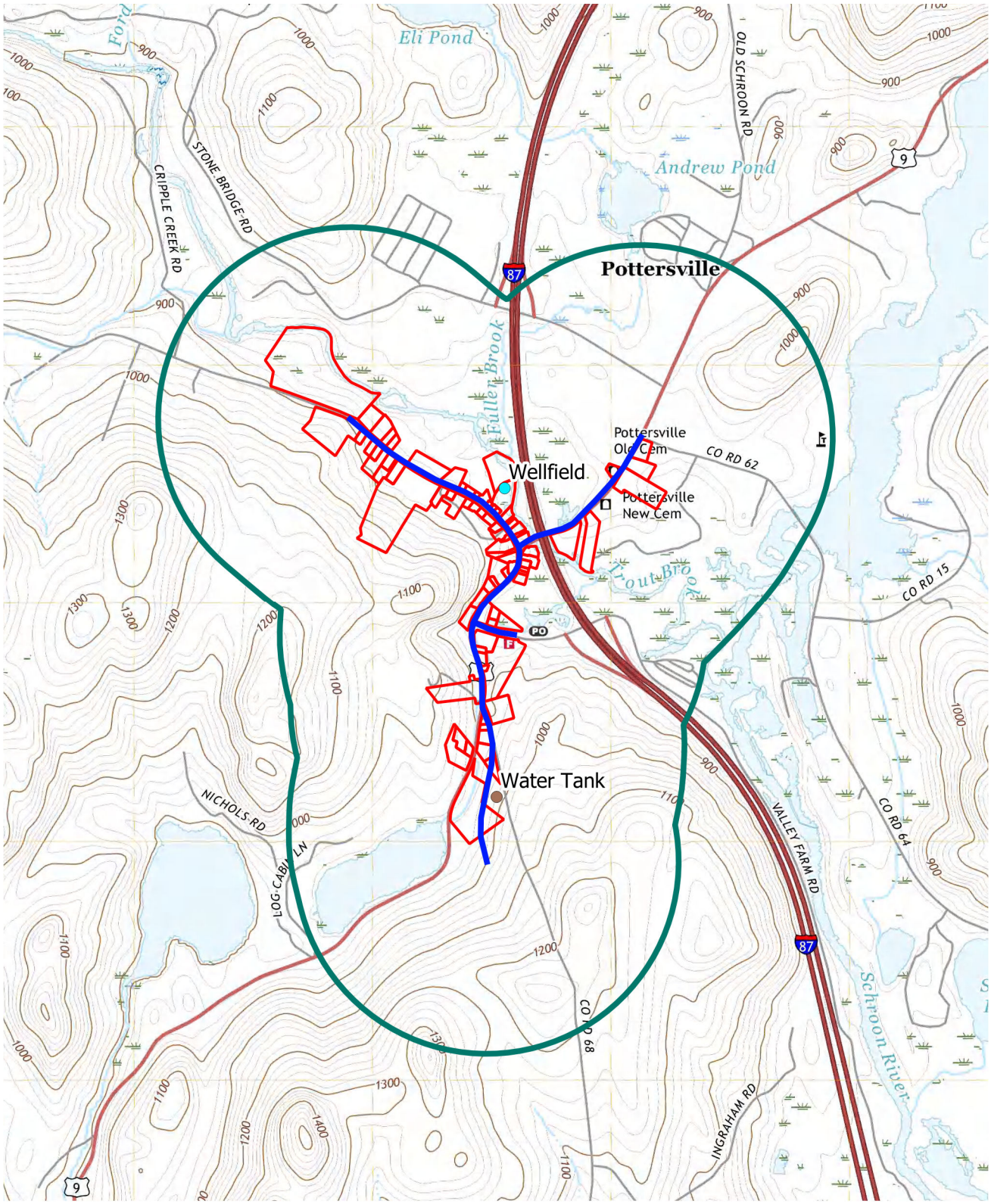


Figure 1 - System Map
Pottersville Water District

Figure 2 - Existing Wellfield
Pottersville Water District

Bedrock Geology

Figure 3 is a bedrock geologic map, adapted from a published state-wide map (Isachsen & Fisher, 1970). All of the mapped rock types are Precambrian-age metamorphic rocks, including rocks that had both sedimentary and igneous precursors. The most common rock type in the area is biotite or hornblende granite gneiss (map code hbg). Several patches of olivine metagabbro (gb) occur within the granite gneiss body. A thin band of anorthosite (a) can be seen near the north margin of the map. Anorthosite is the most common rock type in the central Adirondacks, and it is the rock that underlies Mt. Marcy and the region around it.

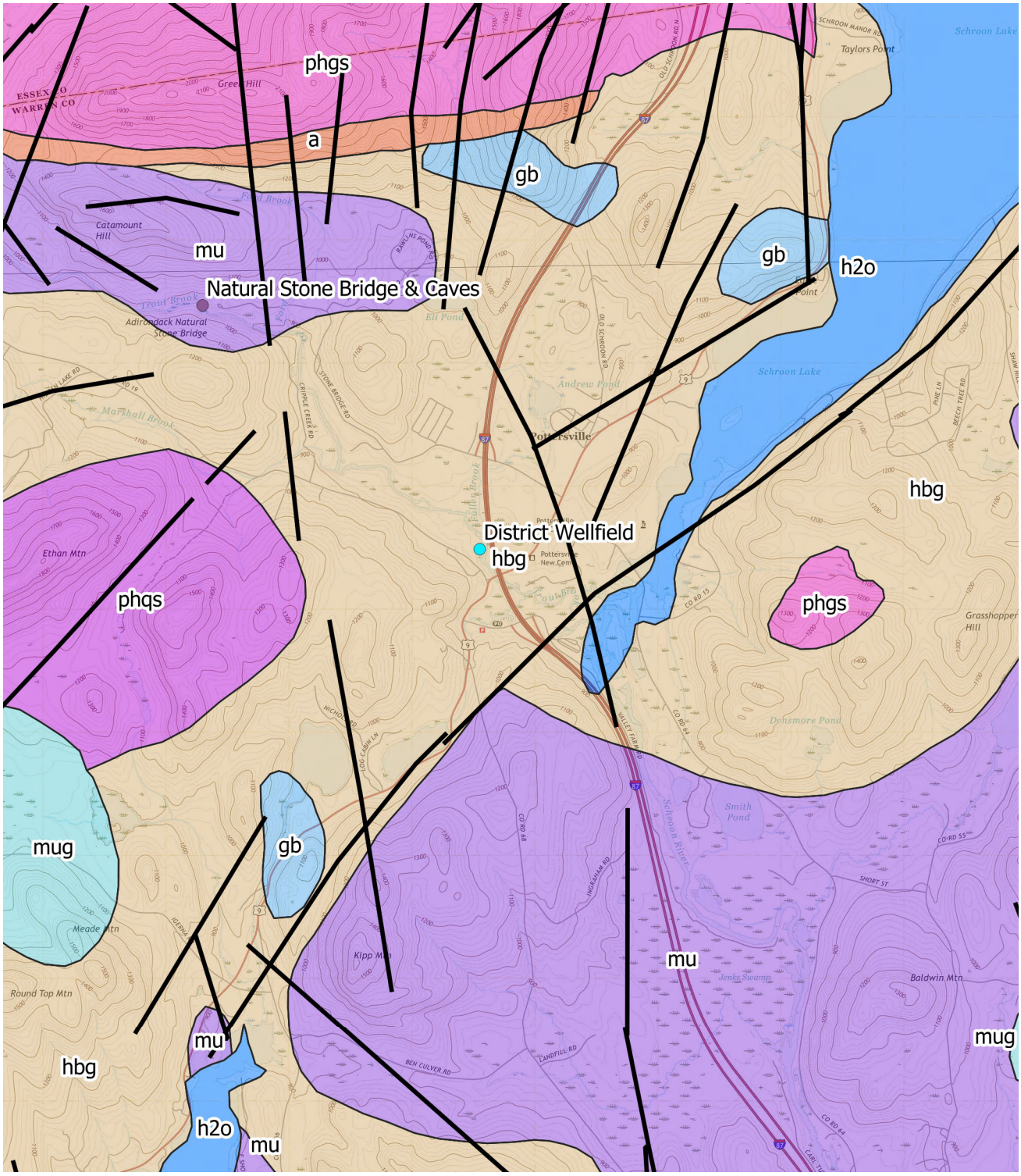
Also present are areas of metasedimentary rock and associated migmatite (mu). A migmatite is a metamorphosed sedimentary rock that had been heated sufficiently to become partially melted. Generally, this rock contains recognizable layering that has survived from the original stratified sediment, but these relict sedimentary layers are intermixed with layers of material that melted and flowed, before the molten material solidified when the rock cooled at the end of the metamorphic event. Natural Stone Bridge and Caves sits within this rock unit (Figure 3). The caves at this tourist attraction occur in a thin slice of marble (metamorphosed limestone). Formation of the caves began about 14,000 years ago, after the last retreat of glacial ice from the area, when water in Trout Brook began to dissolve the calcium carbonate of the marble.

Where they are unfractured, the metamorphic rocks of the Adirondacks do not contain any of the primary porosity or permeability that would allow transmission of useful quantities of groundwater to a well. Any pore space in the original sediments was destroyed during metamorphic recrystallization. Therefore, the only places where productive bedrock wells can be sited are places where the rock has been cut by fracturing. The most favorable well sites tend to occur along large-scale fracture zones that are interconnected, and that have a good hydraulic connection to a source of surface recharge.

Productive fracture zones may be associated with faults, and a number of faults run through the area. One regional-scale northeast-trending fault runs along the southeast shore of Schroon Lake, and continues south to the north end of Loon Lake. This fault is one member of a larger family of parallel faults that help define the southeast margin of the Adirondacks Uplift. Several other smaller subparallel faults can be seen in Figure 3.

Also present are a number of faults with a northerly trend. These faults also appear to fit into a larger regional trend.

Points along the mapped faults are of interest as potential well sites, and so are places where two mapped faults intersect. In such settings the potential for a concentration of water-bearing fractures is improved. It should also be kept in mind that the faults shown on a geologic map represent only a fraction of the number of faults that may exist in an area. Many faults lie hidden beneath a cover of glacial till and other overburden.



LEGEND

h2O - Water
a - Anorthosite
gb - Olivine metagabbro
hbg - Biotite or hornblende granite gneiss
mu - Metasedimentary rock and related migmatite
mug - Interlayered metasedimentary rock and granitic gneiss
phgs - Charnockite, granitic and quartz syenite gneiss

Faults

Figure 3 - Bedrock Geology
Pottersville Water District

Lineaments

Lineaments are linear or curvilinear features that can be recognized on topographic maps, air photos, or other map-like images. In some settings, some lineaments can represent the surface expression of steeply dipping geologic structures like faults or zones of close-spaced jointing that may correspond with productive fractured-bedrock aquifers. In some cases lineaments may trace mapped faults, but they can also mark more-subtle features that may also have worthwhile groundwater development potential.

Figure 4 is a lineament map. The backdrop to this map is a hillshaded digital elevation model (DEM). The image is based on a DEM with a resolution of one meter, which is sufficiently high resolution to bring out considerable detail in the ground surface topography. The backdrop for this map shows how the ground surface would be shaded if it were illuminated by a low-angle light source shining from the southwest (that is, with a compass bearing of 225°). Easily recognizable reference points on this map include Interstate 87 (the Northway), Schroon Lake, and the north end of Loon Lake.

Lineaments were drawn using hillshaded DEM images illuminated from three different lighting directions. Lineaments shown using solid red lines were based on the topography as it would look if the light source were to the northeast (45°). Lineaments shown as yellow dotted lines were based on a southeasterly lighting direction (135°). Lineaments shown as blue dashed lines were drawn using the backdrop image shown in Figure 4, with a southwesterly lighting source (225°). The reason for using multiple lighting directions is that some linear features show up more clearly when the ground surface is illuminated from a particular direction.

In assessing the lineament map, it is important to keep in mind that many features that show up as lineaments may not represent geologic structures relevant to groundwater development. In the northeastern U. S., some lineaments show the linear glacial contouring that is a function of the ice transport direction during the ice advance. Other lineaments can represent gullying of unconsolidated sediments by post-glacial erosion. Beyond that, some of the Adirondack gneisses have pronounced compositional layering that shows up clearly where the layers happen to be steeply dipping, as can be seen in several places in Figure 4.

After we factor out the lineaments that appear unrelated to potential structures of interest, the remaining lineaments show patterns indicating a considerable amount of structural activity. Some of the lineaments show general coincidence with mapped faults. Others appear to fit in well with a structural framework that includes those faults. Overall, the lineament map suggests that structural targets (that is faults, fracture zones, or places where structural features intersect) possibly associated with water-bearing features in the bedrock could occur in a number of places within a reasonable distance from the distribution system.

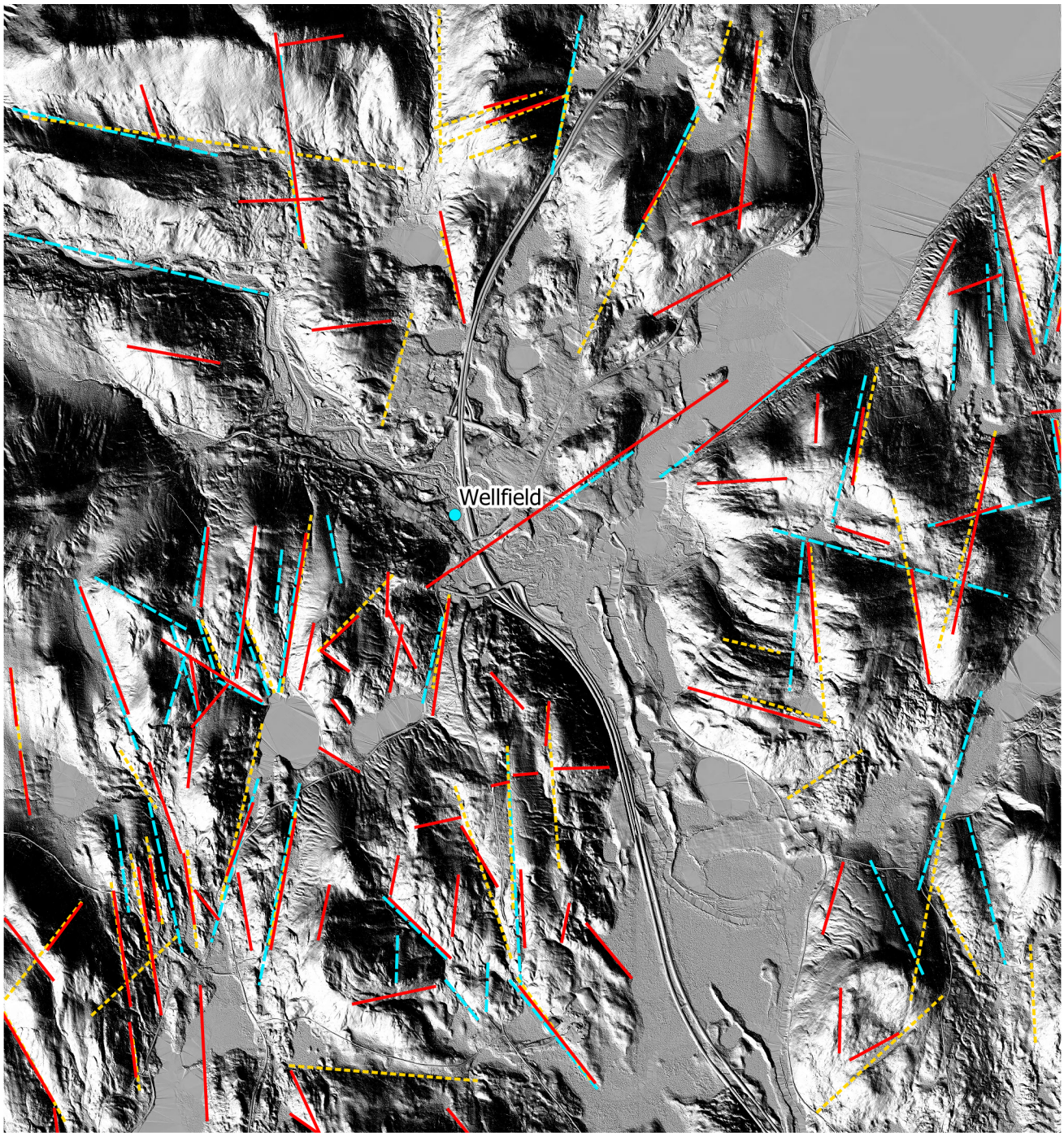


Figure 4 - Lineaments
Pottersville Water District

Note also that few lineaments have been drawn in the low-relief parts of the map (mainly the flat valley floor of the Schroon River south of Schroon Lake). Significant bedrock structure undoubtedly exists under the valley, and the presence of the valley itself could be partly the result of fracture-weakening of the underlying rock that made it more vulnerable to glacial erosion. However, the bedrock surface is buried beneath a substantial thickness of glacial sediments in the valley, which hides linear features of the kind that are so well expressed in the upland areas where bedrock is exposed or only thinly covered with till.

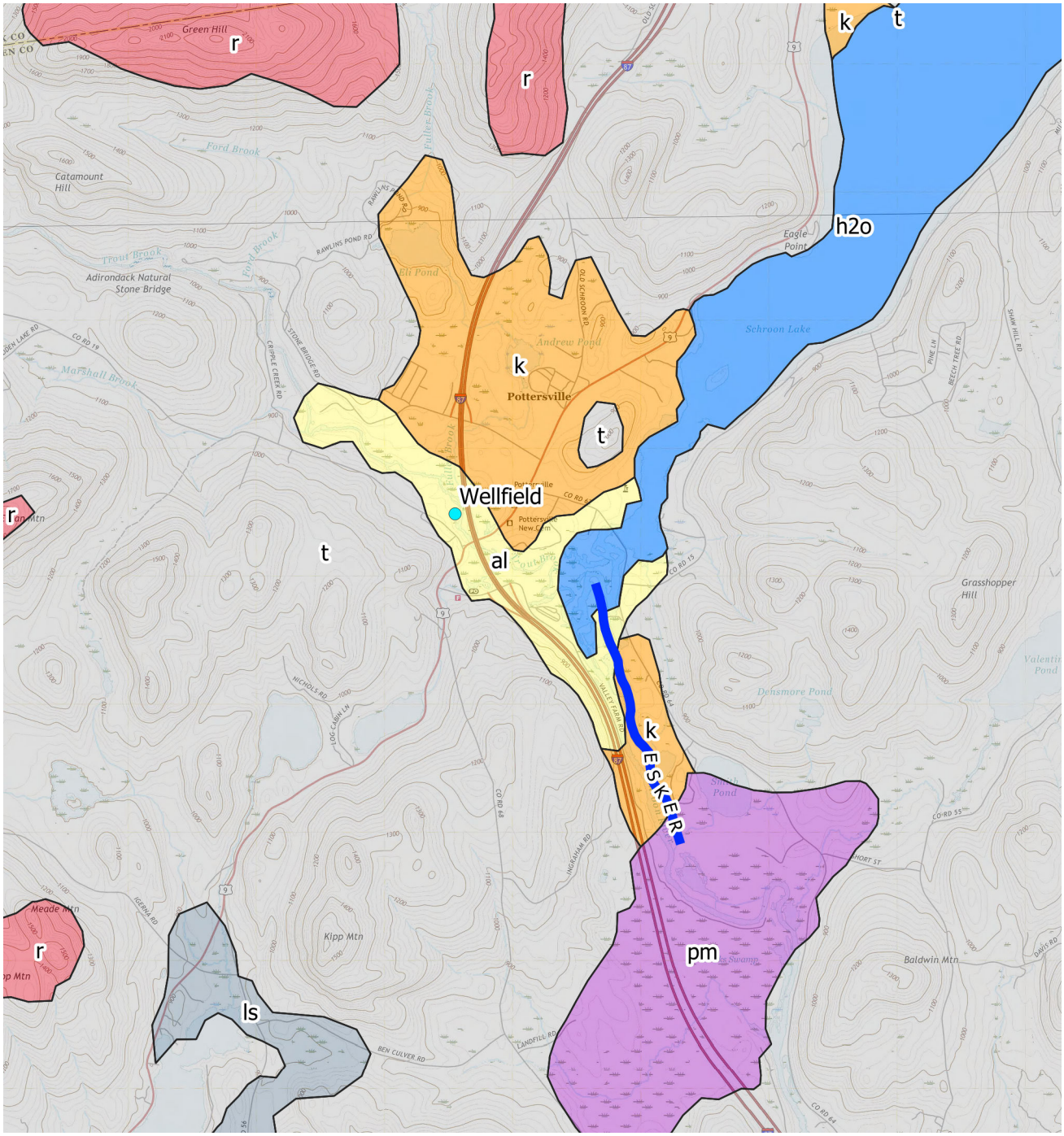
Surficial Geology

Figure 5 is a map of surficial geology, adapted from state-scale mapping (Cadwell & Pair, 1991). The unconsolidated sediments that cover bedrock in this region are mostly of glacial origin. They were deposited either during the time when the region was blanketed with ice, or during the period of the last retreat of the glacier, which took place about 14,000 years ago at this latitude. Also present is alluvium deposited along the courses of post-glacial streams, made up of glacial sediments that have been reworked by streamflow since the glacial retreat.

Essentially all of the higher-relief uplands areas surrounding Pottersville are covered by a layer of glacial till. The till is a poorly sorted sediment, often with a dense matrix of clay, silt, and fine-grained sand, but including fragments ranging up to the size of boulders. Basal till, or lodgment till, represents ground-up bedrock that was laid down beneath the ice, and it can be quite dense where it was deposited under the full weight of the ice sheet. This material is often referred to as hardpan. Sometimes this basal till is itself covered by a layer of ablation till, which consists of sediment that was dropped in place when the ice in which it had been carried melted. Till tends to be relatively impermeable, and it has little groundwater development potential.

Kame consists of generally coarse-grained, well-sorted sand and gravel deposits that were deposited by glacial meltwater streams running in close proximity to ice during the glacial retreat. Kame deposits can constitute highly productive aquifers, in places where they have sufficient thickness and lateral extent below the water table, and where they are connected hydraulically to a source of surface recharge (such as Schroon Lake). The aquifer tapped by the District's existing wellfield is likely to be kame sand and gravel, capped by a thin cover of the younger alluvium deposited along Trout Brook.

Three patches mapped as kame can be seen in Figure 5. The largest of these underlies the hamlet, and extends westward from the west shore of Schroon Lake to low-lying areas west of the interstate, including Eli Pond. A second patch can be seen northwest of Smith Pond, running along the floor of the Schroon River valley. Part of a third patch is visible at the north edge of the map on the west shore of Schroon Lake.



LITHOLOGY CODES

h2o - Surface water bodies
al - Alluvium
pm - Marsh deposits
ls - Lakebed sand
k - Kame
t - Till
r - Bedrock

Esker

Figure 5 - Surficial Geology
Pottersville Water District

An esker segment is marked on Figure 5, and it stands out clearly on the hillshaded DEM of Figure 6. The esker runs along the east side of the Schroon River, extending from a point about even with the I-87 interchange south as far as Smith Pond. Eskers represent one variety of kame deposit. An esker is a sinuous, steep-sided ridge of sand and gravel that was deposited from a fast-moving meltwater stream flowing inside an ice tunnel, often near the terminus of a tongue of ice filling a valley. The esker segment south of Pottersville runs along the middle of the valley, where the depth to bedrock is likely to be greatest. In this location, it seems likely that the saturated thickness of permeable esker sand and gravel may be substantial. Sites along this esker would offer considerable promise as locations for high-yielding screened wells.

NYSDEC Wells Database

The New York State Department of Environmental Conservation (NYSDEC) maintains a database of water wells that have been drilled since the year 2000. The database contains information on well depth, yield, and certain construction parameters. Sometimes the data reveals patterns that can be helpful in guiding groundwater exploration programs, especially when the patterns in the well data are considered together with data of other types.

Figure 7 shows the yields of 82 wells that are inside a two-mile buffer drawn around the distribution system. Four of the wells are screened wells, tapping sand and gravel aquifers, and the other 78 are bedrock wells. The average yield of the screened wells is 31.3 gpm, with yields ranging from 10 to 50 gpm. The average yield of the bedrock wells is 12.7 gpm, with yields ranging from 0.5 to 100 gpm. In assessing the yields, it must be kept in mind that the values in the NYSDEC database are those reported by drillers based on a relatively brief airlift[1] yield test, which can be expected to produce a value higher than the sustainable yield that would be determined based on a constant rate pumping test. Also, there can be considerable variation in the quality and reliability of data reported by individual drillers. Nonetheless, the results provide some sense of yields that can be expected from the average well that is randomly sited near Pottersville.

[1] "Airlifting" is a process during rotary percussion drilling where the borehole is purged of water and drill cuttings by injecting compressed air (the same air used to actuate the rotary drill hammer), and "lifting" water-borne soil and rock drilling debris to the ground surface and out of the well. The rate of water purged is used as a preliminary estimate of the well's productivity (yield). Airlift yields are usually an over-estimate of the actual sustainable rate at which a well can be pumped. Pumping tests are required to determine sustainable withdrawal rates. In bedrock wells, airlift rates are important in that knowledge of the depth and respective proportion of contributing yield of each fracture is critical to estimating accurate sustainable yields from bedrock wells. If shallow water-bearing fractures are present that yield a significant proportion of the well's total yield, then the well's sustainable pumping capacity usually must be managed to avoid lowering the water level below these fractures. Airlifting is also typically performed after each water-bearing depth interval is penetrated and/or after a well has been drilled to its final depth. It is used as a means of "developing" a well, whereby the airlifting process creates highly turbulent water flow within the borehole, suspending fine-grained geologic material (e.g., sand, silt, etc.) and other debris, allowing it to be purged from the borehole. For a bedrock well, it helps clear the water produced of turbidity while stabilizing the borehole walls, removing rock material that could later fall into and block the well or fall on the pump, and "developing" the fracture zones. The development process usually results in the well producing clearer water while it also creates clearer, less-impeded pathways for water to flow into the well from the sediments surrounding a well screen, and/or debris from fracture networks (i.e., the bedrock aquifer), overall improving the well's yield and efficiency.

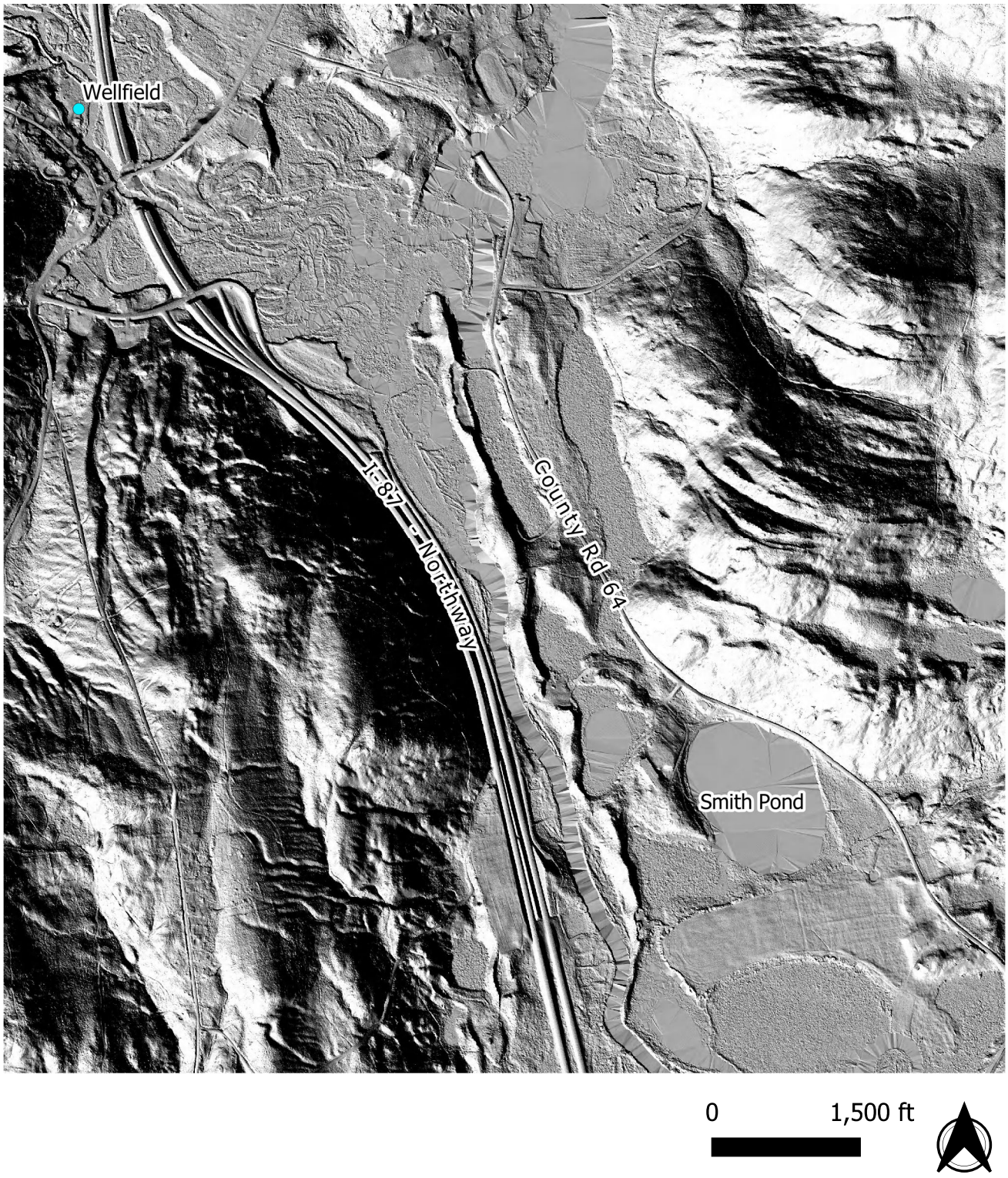


Figure 6 - Esker Between Northway & County Road 64
Pottersville Water District

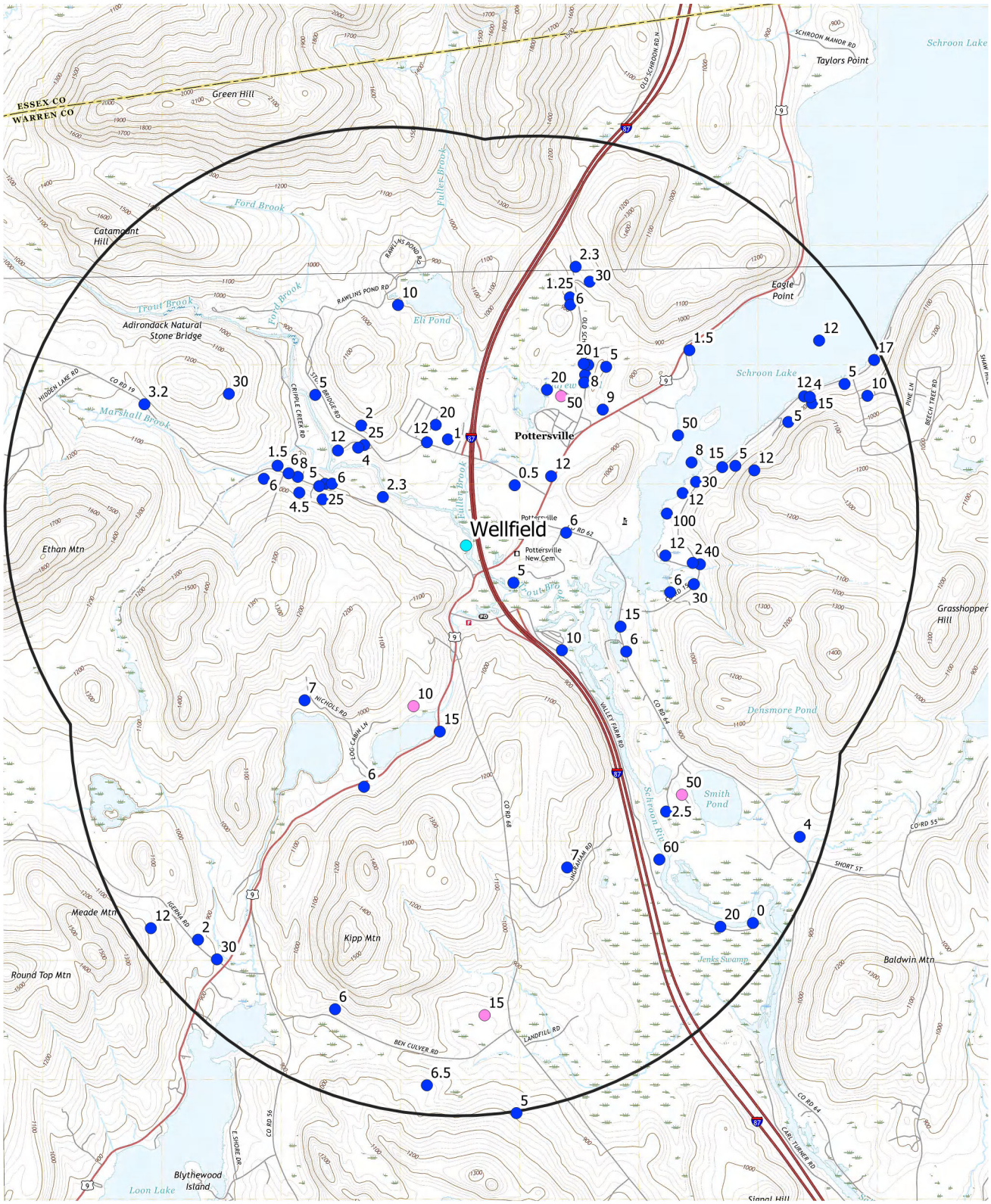


Figure 7 - NYSDEC Wells Database Yield
Pottersville Water District

Figure 8 shows total depths for the same wells. The average depth of the four screened wells was about 80 feet, with depths ranging from 27 to 123 feet. The average bedrock well depth was 406 feet, with reported depths ranging from 83 to 848 feet.

The average yield of the screened wells is considerably higher than that of the bedrock wells, and the screened well yields are likely to understate the groundwater development potential of the sand and gravel aquifers the wells tap. That is because the wells were completed in a manner adequate to satisfy the needs of a single-family household. In all likelihood, a well designed to take full advantage of the sand and gravel aquifer would produce considerably higher yields. Note that the two screened wells with yields of 50 gpm are sited in areas underlain by kame, which provides further confirmation of the productivity the kame gravels may present at specific locations around Pottersville. Considering the data on wells in unconsolidated sediments both from the NYSDEC database and the Town's existing wellfield, it seems clear that the sand and gravel deposits around Pottersville have the potential to support new wells meeting the District's yield target.

Regarding bedrock wells, the NYSDEC wells data is also comparatively favorable. Only three wells in the data set had yields of one gpm or less. The least-productive well had a reported yield of 0.5 gpm, and a total depth of 848 feet. Otherwise, most well owners were able to develop sufficient water to meet the needs of a household without drilling more than 500 feet. Aside from that, nine well had yields of 30 gpm or more, and the average depth of these wells was only 260 feet. Locations for these wells were chosen based on convenience. Bedrock wells whose locations were chosen based on geologic factors (proximity to a major fault or fracture zone) should be expected to have higher yields.

Although the data indicates reasonable prospects for groundwater development exist in both the fractured-bedrock and sand and gravel aquifers, the kame sand and gravel deposits appear to offer the best and lowest-risk opportunity for locating and developing a new well for Pottersville.

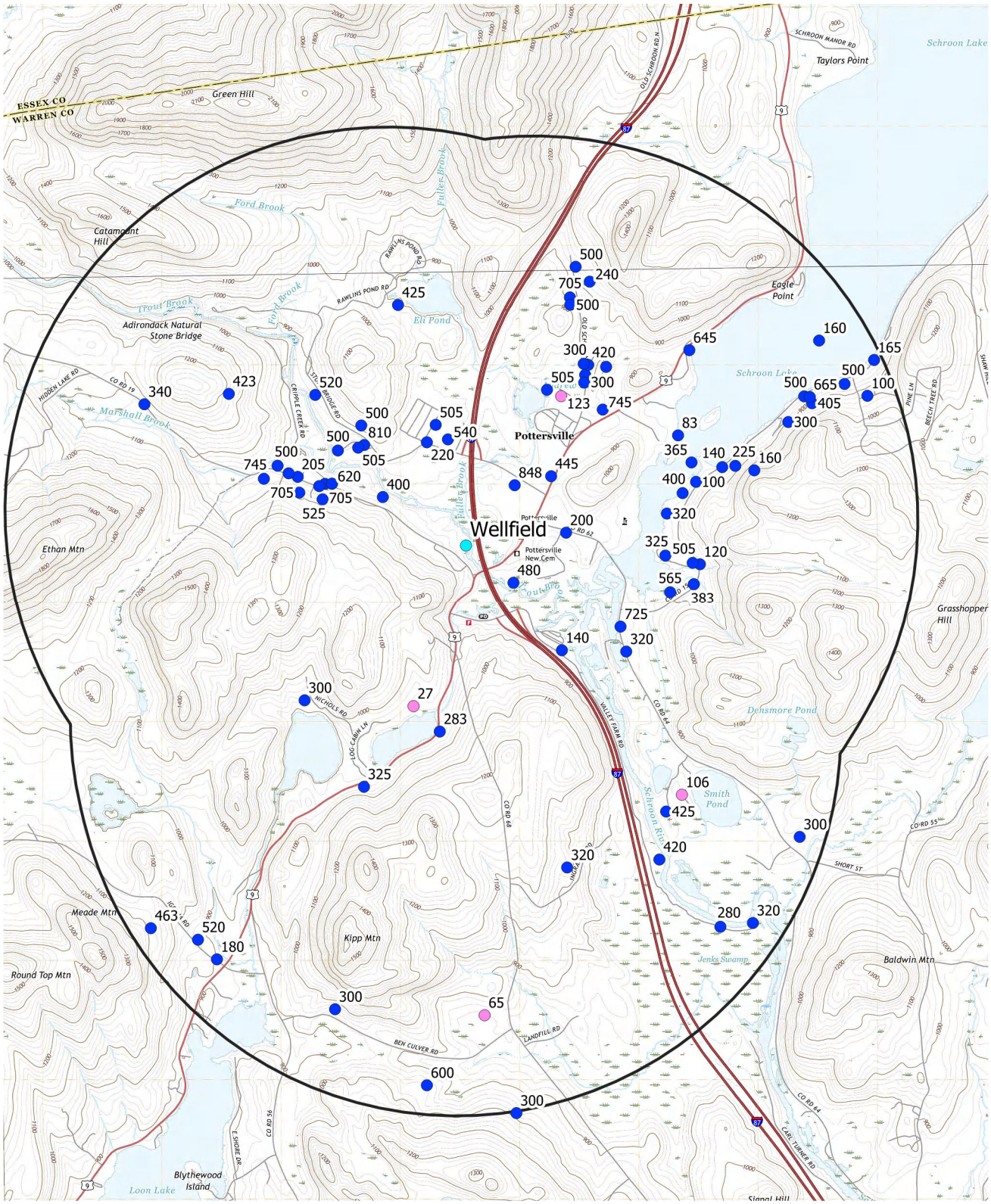


Figure 8 - NYSDEC Wells Database Total Depth
Pottersville Water District

Contaminant Source Inventory

HSA made an inventory of potential sources of groundwater contamination. The inventory was based on a query of NYSDEC environmental databases, and a "windshield survey" that was a combination of a Google Maps/Google Earth virtual tour with a driving tour undertaken during the site visit. Figure 9 is a map of sites where we suspect activities involving potential groundwater contaminants might take place.

The NYSDEC database of remediation sites contains no entries for Pottersville.

Table 1 lists the seven sites where permitted petroleum storage tanks exist or have been registered. The sites are shown on Figure 9, labeled with their NYSDEC identification numbers. Only two of the sites are active. The other five are no longer used, and most of them were closed many years ago.

Table 1 - Bulk Storage Facilities

NYSDEC ID	Name	Status	Permit Expiration
5-022527	WORD OF LIFE BIBLE INSTITUTE	ACTIVE	9/19/2027
5-066869	RIVERSIDE DEPOT	UNREGULATED/CLOSED	2/5/1997
5-393800	POTTERSVILLE GARAGE	UNREGULATED/CLOSED	7/10/1992
5-422150	STONE BRIDGE GARAGE	UNREGULATED/CLOSED	7/14/1992
5-600136	POTTERSVILLE VALERO #80003647	ACTIVE	7/26/2023
5-600298	THREE SPRINGS APARTMENTS LLC	UNREGULATED/CLOSED	12/5/2024
5-601032	RIVERSIDE GAS & OIL CO. INC.	UNREGULATED/CLOSED	10/15/2013

NYSDEC also maintains a spills database, which includes records of spills associated with such things as leaking heating oil tanks, traffic accidents, and leaking transformers. HSA will query this database after the District's search for potential well sites has been narrowed down.

Sites identified through the windshield survey are shown on Figure 9. It is important to keep in mind that these are not sites that are necessarily actual contaminant sources. Instead, they are sites where activities involving potential groundwater contaminants may occur, or may have occurred in the past.

Gravel pits are widely scattered around the area, which is not surprising considering the extent of the mapped kame deposits. Two pits appear to be present on the esker southeast of the hamlet. The inventory includes auto and truck fueling and repair shops. Not shown on Figure 9 is the closed Chestertown landfill, which now is used as a transfer station. This facility is two miles south of the hamlet off Route 68. At that downgradient location, any possible groundwater contamination associated with the facility would not be likely to affect properties considered as candidates for well sites for the Pottersville Water District.

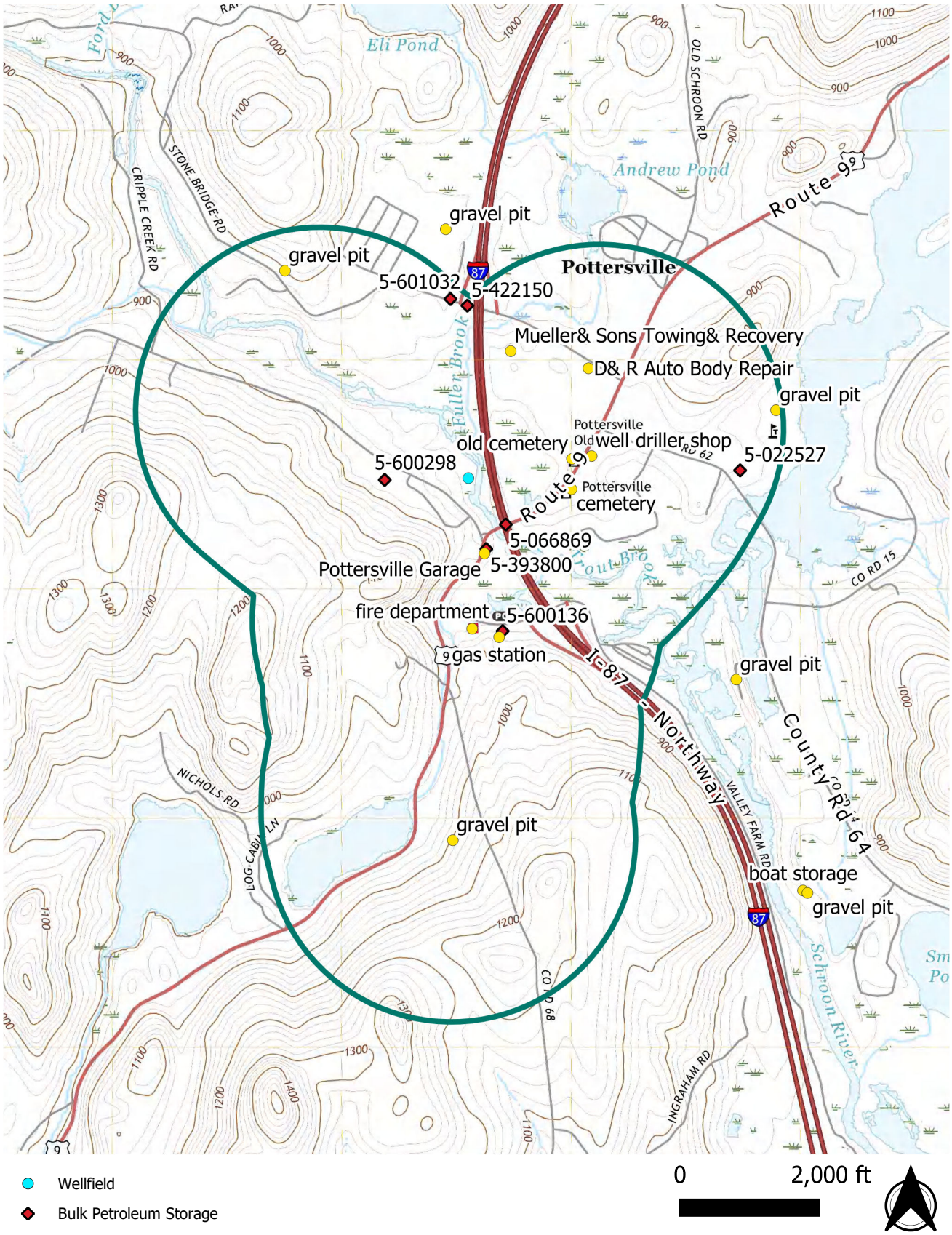


Figure 9 - Potential Contaminant Threats
Pottersville Water District

Properties of Interest

Cedarwood has identified several properties near the distribution system that might be available as well sites, or otherwise are of interest, and these are listed in Table 2 and shown on Figure 10.

Table 2 - Properties Identified by Cedarwood

Tax ID	Owner	Acreage
35.4-1-14	Erickson, Sarah M	23.5
52.-1-14.2	AuClaire, James R	5.78
53.-3-51.2	Borrello, Dennis	1.93
53.-3-51.3	Borrello, Dennis	2.22
53.-3-51.4	Borrello, Dennis	1.84
53.-3-51.5	Borrello, Dennis	2.42

Also shown on Figure 10 are other properties of interest, and these are listed in Table 3.

Table 3 - Other Properties of Interest

Tax ID	Owner	Acreage
35.-1-3.9	Phil & Kristen Beckler Trst	33.42
35.-1-10	Walter Vink	9.83
35.4-1-3.1	Margaret Andrews	10.60
35.4-1-15	Spuehler, Walter	70.77
36.-1-5.1	Camp of the Pines	83.26
36.-1-14	James Ruotolo	22.30
36.-1-15	William Wicks	11.00
53.-1-1.1	Linda Krihak Boden	10.87
53.-1-2	Missthing Enterprises	12.80
53.-3-51.1	Dennis Borrello	33.35

The individual properties listed in Tables 2 and 3 are assessed in the following paragraphs, beginning with the properties identified by Cedarwood.

35.4-1-14 (Erickson) - This property is a half-mile northwest of the existing wellfield, on the south side of Trout Brook (Figure 10, Figure 11). It is currently for sale. A strip along the northeast side of the property is underlain by alluvium, and it is possible, perhaps likely, that the alluvium overlies kame sand and gravel at the western extremity of the large kame exposure that extends to the south end of Schroon Lake. Based on projecting the slopes of the valley walls toward the center of the valley, it appears that the depth to bedrock along the axis of the Trout Brook valley could be as much as 100 feet. If that were true, and if the sediments below the shallow alluvium consist of coarse-grained kame gravels, this property might be capable of hosting a high-yielding screened well. There is a low density of development in the surrounding and upgradient area, so that potential sources of contamination appear limited. It also appears

that setback requirements could be satisfied on portions of the property where a well would be most likely to be sited.

The property was inspected during a site visit on March 20. A narrow strip of the property along its southern margin is at the elevation of Olmstedville Road. A steep embankment separates this section from the floodplain of Trout Brook, which is 30 to 40 feet lower in elevation, and which accounts for most of the lot. Well-rounded cobbles were seen in several places at that lower level on the property. No evidence was seen of bedrock on the property or on the adjacent reach of the brook, supporting the conclusion that a substantial saturated thickness of sand and gravel could underlie the property. The upgradient Trout Brook watershed area is extensive and should be more than capable of providing sufficient recharge to support the rate of groundwater withdrawal sought by the District.

52.-1-14.2 (AuClaire) - Cedarwood has told us that a source at the Town reported that a well was drilled on this property, which is the site of an old gravel pit, but that after the well was drilled no further work was done (Figure 10, Figure 12). We understand that no information is available on the well (that is, the drilling date, total depth, yield, water quality, etc.). The property is within an area mapped as glacial till, but some sand and gravel deposits are simply too small to be mapped at the scale of the state-scale surficial geology map, and that is apparently the case here. The gravel pit sits back only 500 feet from Warner Pond. The pond might appear to be a good source of recharge for a well at this location, but the topography of the area suggests that any permeable sand and gravel deposits are relatively thin, probably with limited saturated thickness, and the bottom of the gravel layer is probably above the level of the pond. Accordingly, the sand-and-gravel development potential of this property seems limited. It is true that the property is also on the trend of the regional-scale fault that defines the southeast shore of Schroon Lake, so that a well drilled here could target that fault. However, there is no evidence we can see that the fault underlies this specific area. The property is also relatively small such that a 200-foot protective radius would necessarily overlap onto one of the neighboring parcels. In our opinion, several other locations proximal to the District offer greater potential for developing a sufficiently productive new well source with fewer challenges, so that further investigation of this property is not warranted.

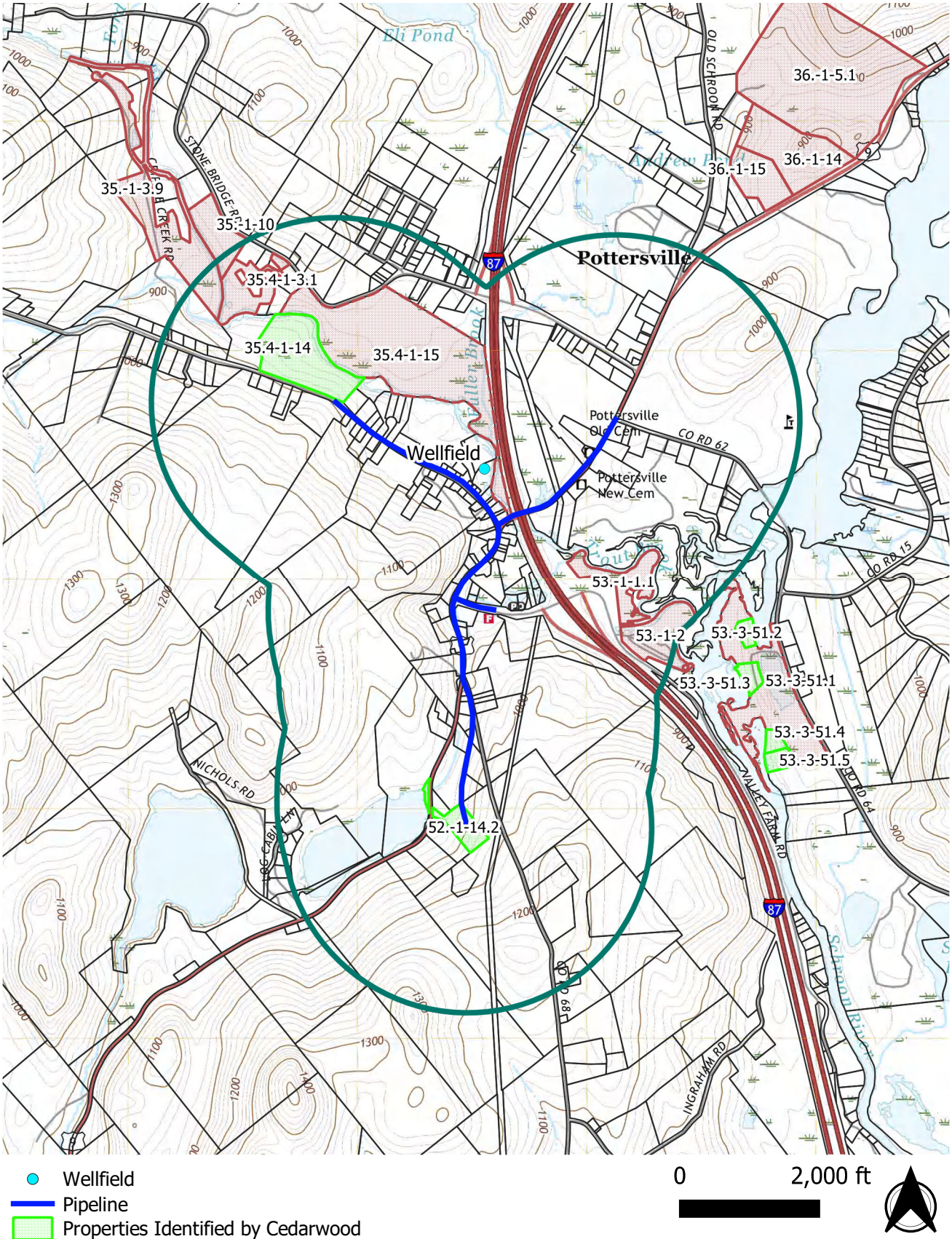


Figure 10 - Properties of Interest
Pottersville Water District

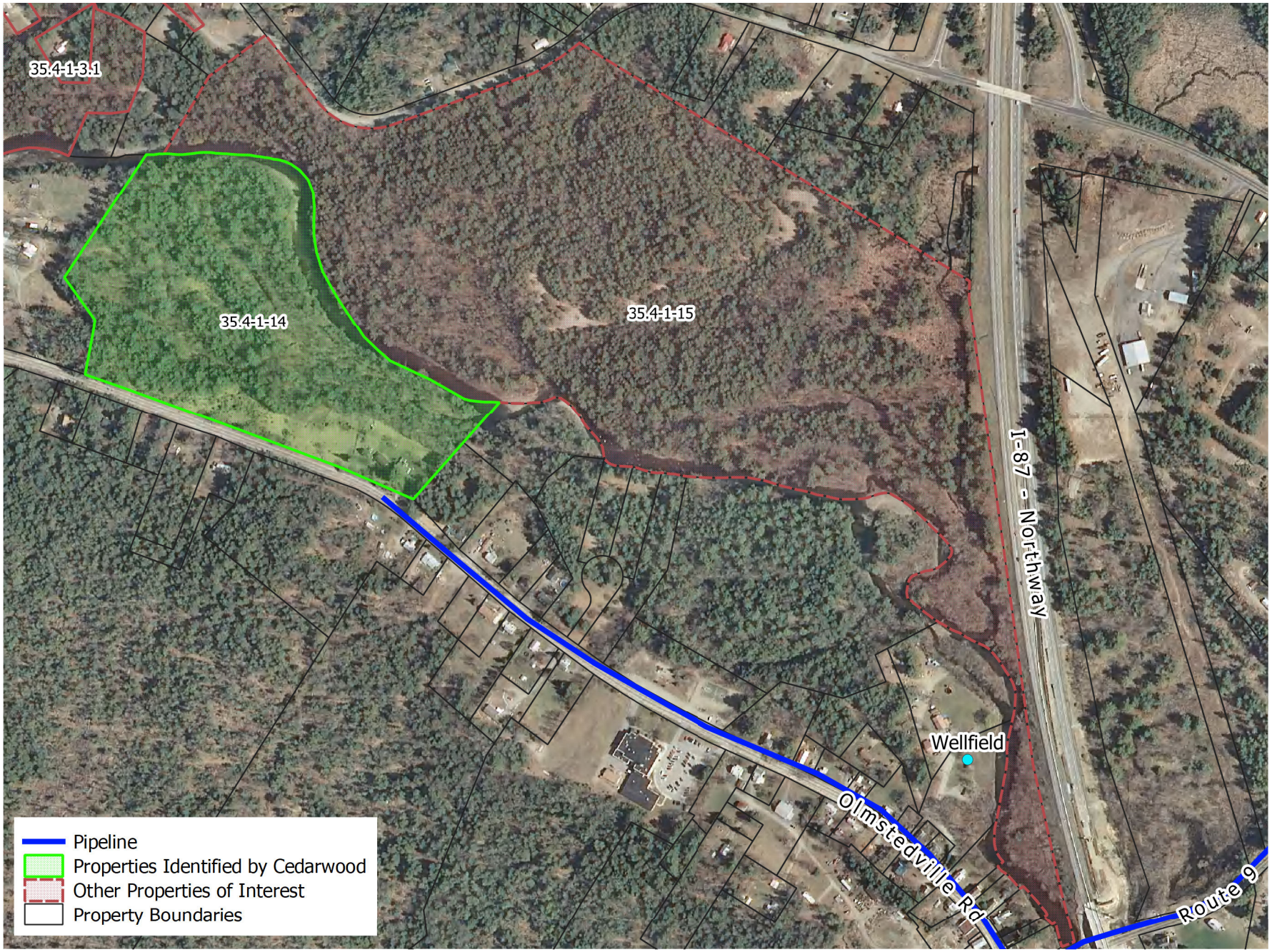


Figure 11 - Lots 35.4-1-14 & 35.4-1-15
Pottersville Water District

Figure 12 - Lot 52.-1-14.2
Pottersville Water District

53.-3-51.2, 53.-3-51.3, 53.-3-51.4, & 53.-3-51.5 (Borrello) - These four properties on the east side of the Schroon River south of the hamlet are all listed as being for sale, and all of them are owned by Dennis Borrello (Figure 10, Figure 13). These lots evidently were carved out of a single larger property, Tax ID 53.-3-51.1, which is also owned by Mr. Borrello, but which presumably is not for sale. The larger property is classified as "common area" in the Warren County tax map database. All of the properties sit astride the esker that starts near the south end of Schroon Lake and continues south to Smith Pond. All of them have very good potential as high-yielding well sites, and the amount of groundwater recharge available from the upgradient watershed area of the Schroon River should greatly exceed that needed to sustain the rate of groundwater withdrawal sought by the District.

Elevated levels of dissolved iron and manganese sometimes occur where wells are completed in sand and gravel deposits near wetlands underlain by substantial accumulations of organic matter. The risk that such conditions could be encountered in this esker is hard to assess, but it would appear least likely near the north end of the esker. There, the river wraps around the end of the esker, which means that wells drilled in this area would have less opportunity to receive recharge dominantly from areas influenced by wetlands. For that reason, we would suggest focusing attention on the northernmost parcel, Lot 53.-3-51.2, if a water source is to be pursued somewhere along the esker.

Other Properties - Lot 35.4-1-15 (Spuehler) is adjacent to Lot 35.4-1-14, on the north side of Trout Brook (Figure 11). The lot is bordered by Fuller Brook on the east side. Some portions of the lot are a considerable distance from the nearest till or shallow bedrock exposures. The part of the lot closest to the confluence of Fuller Brook and Trout Brook would be likely to show a substantial saturated thickness of kame deposits. It would be well positioned to receive recharge from both brooks, and appears to have modest exposure to contaminant risk, with the possible exception of a spill due to a vehicular accident or road salt application on the nearby stretch of I-87. The likelihood of impacts from contaminants originating along the interstate should be minimal for a well located in the western portion of the property however.

Three lots upstream from the Erickson property on Trout Brook could have both sand-and-gravel aquifer potential and bedrock aquifer potential. These are Lots 35.-1-3.9 (Beckler Trust), 35.-1-10 (Vink), and 35.4-1-3.1 (Andrews) (Figure 14). Regarding their sand and gravel potential, they are similar to the Erickson property, although it is possible that the saturated thickness of permeable sediments could gradually diminish with distance up the valley. No bedrock outcrop was seen along the brook during the visit on March 20, which supports the possibility that a substantial saturated thickness of water-bearing sediments exists under the properties. Regarding the potential of the fractured-bedrock aquifer, faults and lineaments at several orientations can be seen in the surrounding area. The properties appear well protected from contamination, with mostly undeveloped land upgradient in the watershed, and available recharge is expected to be ample given the size of the upgradient watershed.

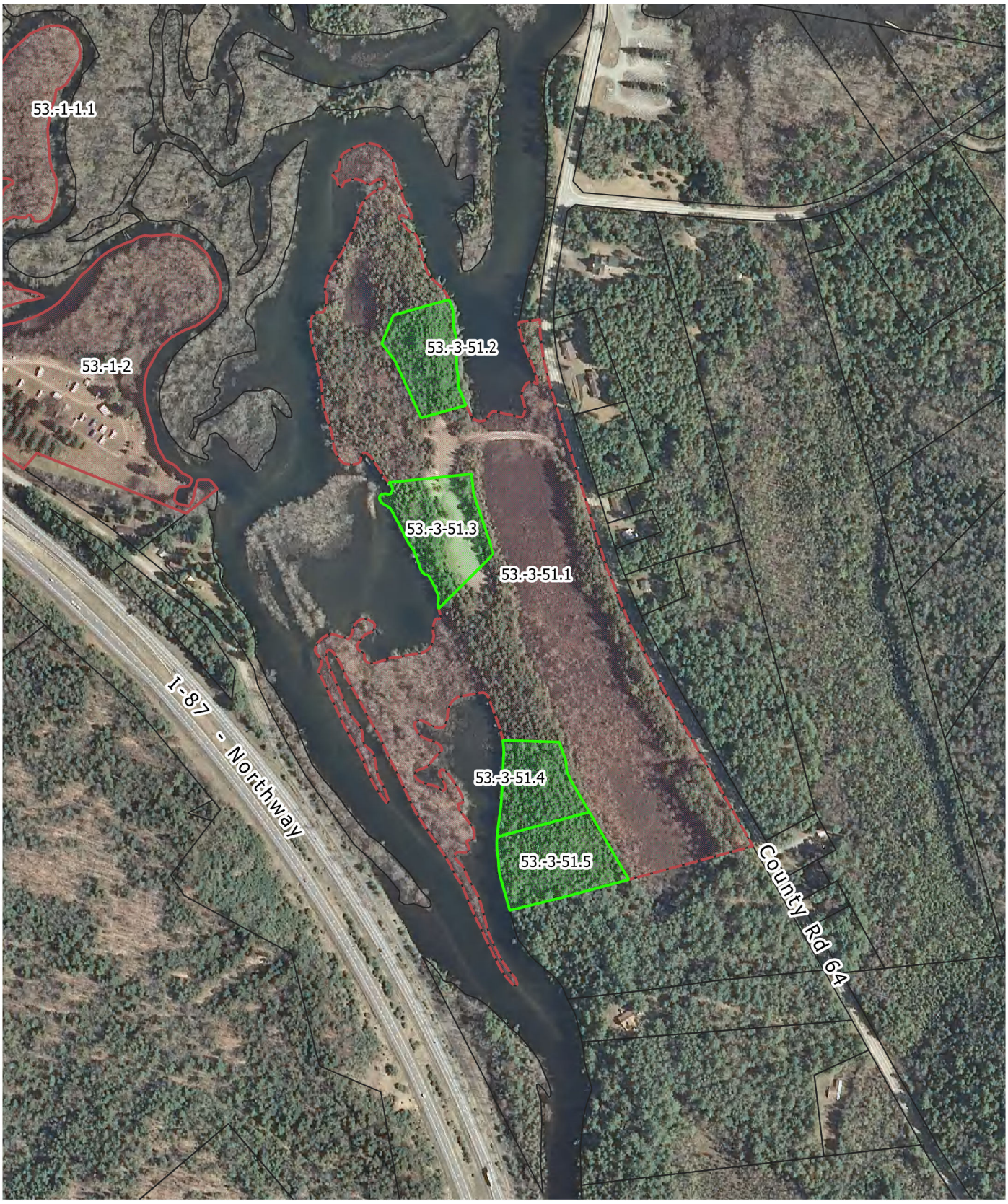


Figure 13 - Lots along Esker
Pottersville Water District

Figure 14 - East of South Interchange
Pottersville Water District

Lots 53.-1-1.1 (Boden) and 53.-1-2 (Missthing Enterprises, a campground) are on the southwest side of Trout Brook just upstream from the brook's junction with the Schroon River, very near the north end of the esker (Figure 15). Both properties are bounded by meander loops of Trout Brook. A well near the center of either loop would be surrounded on three sides by Trout Brook. The DEM shows that the sites are low in the floodplain, and that the meander development history of Trout Brook has been complicated. It appears that a 200-foot radius would be available at both properties, though there would be little flexibility as to where a well could be placed at either one. Although these sites are close to the north end of the visible esker, they are not on trend with it. However, they are far enough out into the valley that substantial overburden thickness seems likely, and it seems likely that kame deposits could exist beneath the alluvium.

The properties are also near an intersection of major mapped faults, which theoretically could allow the bedrock aquifer to be tested in addition to the sand and gravel.

Contamination from road salt applied along the interstate and at its intersection could be a risk at these properties. Also, considerable organic material may have been deposited along with sand and gravel in this area of low-gradient, slow-moving meandering streams. Such material sometimes can be associated with elevated levels of dissolved iron and manganese. Overall, although the properties appear to have some potential, we would not recommend pursuing them unless other more promising options are not available.

Lot 53.-3-51.1 (Borello) has already been mentioned, that being the "common area" lot from which the four lots listed for sale along the esker were carved out (Figure 13). Even if a well site were identified on Lot 53.-3-51.2, it might be necessary to obtain access or an easement to part of the larger lot to accommodate the required protective radius for a new well.

Lots 36.-1-5.1 (Camp of the Pines), 36.-1-14 (Ruotolo), and 36.-1-15 (Wicks) are on the north side of Route 9, across from the Word of Life complex (Figure 16). Wells on these properties would test the bedrock aquifer. Two mapped faults intersect here, and there is also some support for structural activity in the lineament data. The kame body that underlies much of Pottersville extends into this area. Although the kame may not be thick enough here to support a screened well, the saturated sediment could provide groundwater storage for recharge of fractures in the underlying bedrock. Schroon Lake itself would also be a potential source of recharge. These properties have merit as bedrock targets, but their potential seems lower than that of the primary sand and gravel targets (specifically, the lots just upstream on Trout Brook from the existing wellfield, and the lots along the esker).

Figure 15 - North of Word of Life
Pottersville Water District

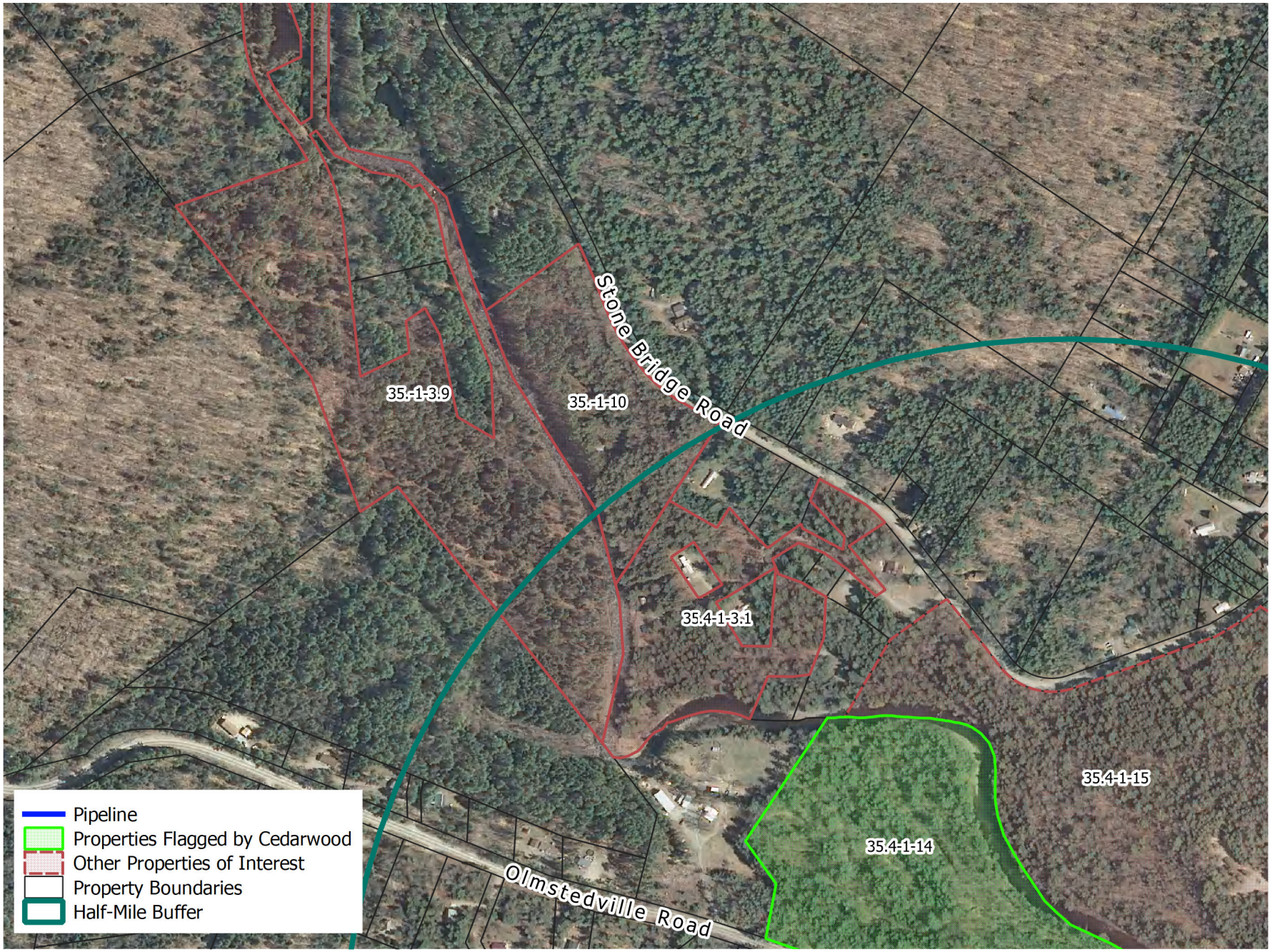


Figure 16 - Upper Trout Brook
Pottersville Water District

Conclusions, Opinions and Recommendations

Several properties have considerable promise as sites for a new supply well that could satisfy the District's water needs. We have divided the properties considered above into three groups, ranked by their perceived favorability.

Group 1 - The top-ranked group includes Lot 35.4-1-14 (Erickson), Lot 53.-3-51.2 (Borrello), and Lot 35.4-1-15 (Spuehler). The Erickson and Spuehler lots, on opposite sides of Trout Brook upstream from the existing wellfield, would appear likely to have adequate saturated thicknesses of permeable sand and gravel to support wells capable of delivering the yields targeted by the District. They are well positioned to receive recharge from Trout Brook. They also appear well protected from potential contamination.

The esker that runs beneath the Borrello property has the potential to host very high-yielding wells, and at the north end of the esker the potential for natural water quality problems associated with accumulated swamp and wetland deposits should be minimized. The site appears well protected from contamination. Recharge potential from the Schroon River is excellent.

Group 2 - This group consists of the three properties upstream from the Erickson property on Trout Brook. They are Lot 35.-1-3.9 (Beckler Trust), Lot 35.-1-10 (Vink), and Lot 35.4-1-3.1 (Andrews). These are ranked lower than the Erickson property because of the likelihood that the saturated thickness of the water-producing sediments diminishes with upstream distance in the valley. However, there is still a high potential that they possess multiple sites where wells meeting the District's needs could be developed. They also have bedrock aquifer potential, though this is considered secondary to their sand and gravel potential.

Group 3 - The two properties in this group are Lot 53.-1-1.1 (Boden) and Lot 53.-1-2 (Missthing Enterprises), which are bounded by meander loops of Trout Brook just upstream from its junction with the Schroon River. Both properties are likely to be underlain by substantial thicknesses of productive water-bearing sediments. They might come with a risk of elevated iron and manganese associated with proximity to accumulations of organic debris deposited in the swampy areas along these slow-moving stream segments. There may be a risk of salt contamination from the interstate and the northbound off-ramp. Both lots are relatively small, leaving little flexibility in choosing well sites that satisfy setback criteria. We propose that these sites should be pursued only if the other higher-ranked sites are not available.

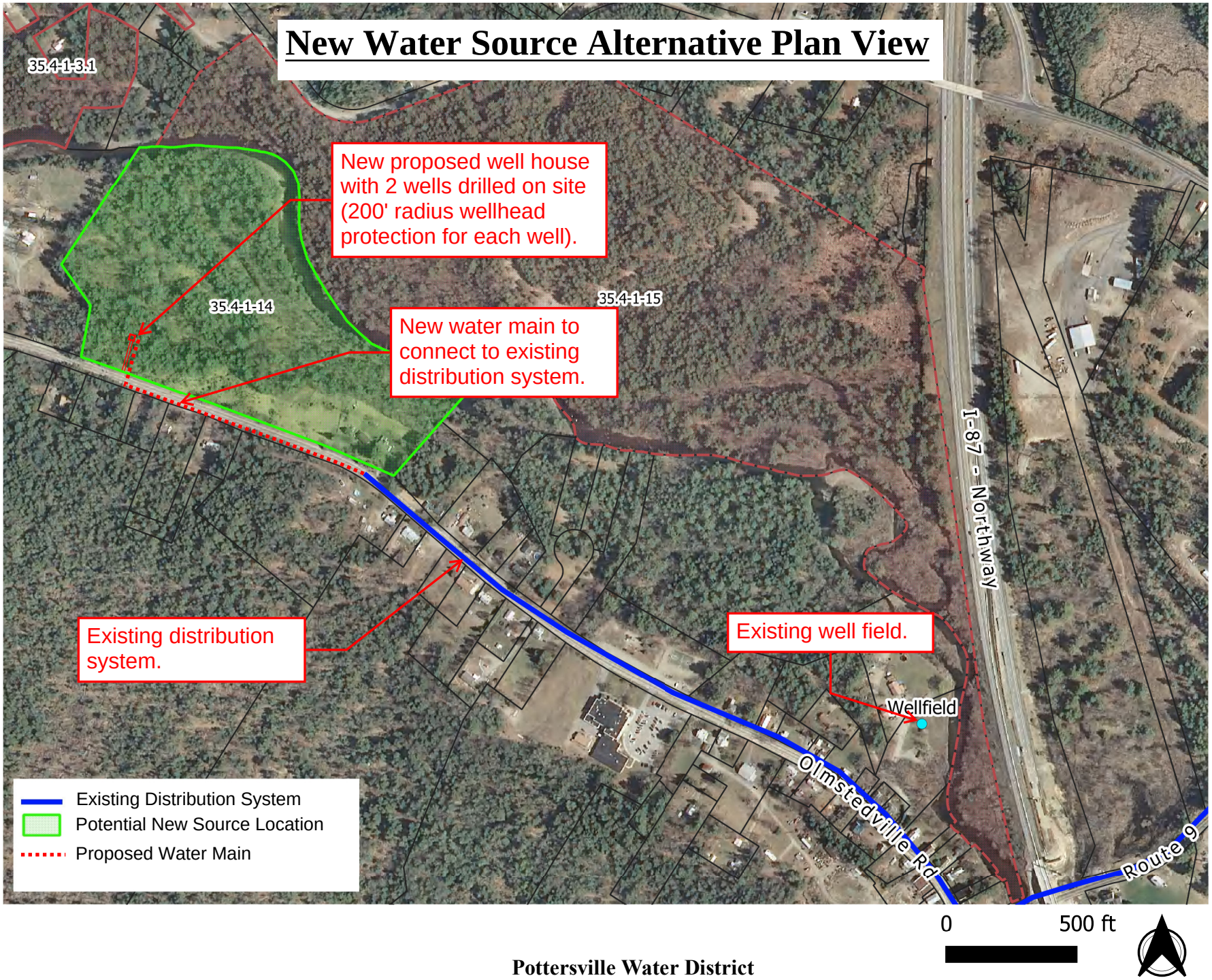
Group 4 - This group includes three properties on the north side of Route 9, across the road from the Word of Life complex. They are Lot 36.-1-5.1 (Camp of the Pines), Lot 36.-1-14 (Ruotolo), and Lot 36.-1-15 (Wicks). These are offered as bedrock aquifer targets. Considered purely on structural geology grounds, they have reasonably good potential. However, their potential is considered lower than that of the higher-ranked groups.

References

Cadwell, Donald H. and Pair, Donald L., Editors, 1991. Surficial Geologic Map of New York State: Adirondack Sheet. Map & Chart Series 40, New York State Museum.

Isachsen, Y. W., and D. W. Fisher, 1970. Geological Map of New York, Adirondack Sheet. Map & Chart Series 15, New York State Museum.

Appendix O – New Well Source Alternative Map
1 - 8.5 x 11 pages



Pottersville Water District

NEW YORK STATE OF OPPORTUNITY. | Department of Health | Environmental Facilities Corporation

Smart Growth Assessment Form

This form should be completed by an authorized representative of the applicant, preferably the project engineer or other design professional.[1]

Section 1 – General Applicant and Project Information

Applicant: Town of Chester

Project No.: Cedarwood Project No. 22-057

Project Name: Pottersville Water District Upgrade

Is project construction complete? ☐ Yes, date: ☑ No

Please provide a brief project summary in plain language including the location of the area the project serves:

The Pottersville WD (PWSID No. NY5600110) provides water for 88 service connections to a population of around 240 people. The proposed project mandates minor existing source and treatment upgrades, replacement of the existing 6" Asbestos cement water mains, hydrants, services, and appurtenances and rehabilitation of the existing 200,000 gallon welded steel storage tank.

Section 2 – Screening Questions

A. Prior Approvals

1. Has the project been previously approved for Environmental Facilities Corporation (EFC) financial assistance? ☐ Yes ☑ No
2. If yes to A(1), what is the project number(s) for the prior approval(s)? Project No.:
3. If yes to A(1), is the scope of the previously-approved project substantially the same as the current project? ☐ Yes ☐ No

If your responses to A(1) and A(3) are both yes, please proceed to Section 5, Signature.

B. New or Expanded Infrastructure

1. Does the project involve the construction or reconstruction of new or expanded infrastructure? ☐ Yes ☑ No

Examples of new or expanded infrastructure include, but are not limited to:

(i) The addition of new wastewater collection/new water mains or a new wastewater treatment system/water treatment plant where none existed previously;

(ii) An increase of the State Pollutant Discharge Elimination System (SPDES) permitted flow capacity for an existing wastewater treatment system; and OR

[1] If project construction is complete and the project was not previously financed through EFC, an authorized municipal representative may complete and sign this assessment.

(iii) An increase of the permitted water withdrawal or the permitted flow capacity for the water treatment system such that a Department of Environmental Conservation (DEC) water withdrawal permit will need to be obtained or modified, or result in the Department of Health (DOH) approving an increase in the capacity of the water treatment plant.

If your response to B(1) is no, please proceed to Section 5, Signature.

Section 3 –Smart Growth Criteria

Your project must be consistent will all relevant Smart Growth criteria. For each question below please provide a response and explanation.

1. Does the project use, maintain, or improve existing infrastructure?
   ☑ Yes ☐ No

   Explain your response: Upgrades to existing system.

2. Is the project located in a (1) municipal center, (2) area adjacent to a municipal center, or (3) area designated as a future municipal center, as such terms are defined herein (please select one response)?

   ☑ Yes, my project is located in a municipal center, which is an area of concentrated and mixed land uses that serves as a center for various activities, including but not limited to: central business districts, main streets, downtown areas, brownfield opportunity areas (see www.dos.ny.gov for more information), downtown areas of local waterfront revitalization program areas (see www.dos.ny.gov for more information), areas of transit-oriented development, environmental justice areas (see *www.dec.ny.gov/public/899.html* for more information), and hardship areas (projects that primarily serve census tracts or block numbering areas with a poverty rate of at least twenty percent according to the latest census data).

   ☐ Yes, my project is located in an area adjacent to a municipal center which has clearly defined borders, is designated for concentrated development in the future in a municipal or regional comprehensive plan, and exhibits strong land use, transportation, infrastructure, and economic connections to an existing municipal center.

   ☐ Yes, my project is located in an area designated as a future municipal center in a municipal or comprehensive plan and is appropriately zoned in a municipal zoning ordinance

   ☐ No, my project is not located in a (1) municipal center, (2) area adjacent to a municipal center, or (3) area designated as a future municipal center.

   Explain your response and reference any applicable plans:

   See attached engineering report.

3. Is the project located in a developed area or an area designated for concentrated infill development in a municipally-approved comprehensive land use plan, local waterfront revitalization plan, and/or brownfield opportunity area plan?

☑Yes ☐No

Explain your response and reference any applicable plans:

Pottersville W.D. is located in the Hamlet of Pottersville in the Town of Chester, NY in Warren County

4. Does the project protect, preserve, and enhance the State's resources, including surface and groundwater, agricultural land, forests, air quality, recreation and open space, scenic areas, and significant historic and archaeological resources?

☑Yes ☐No

Explain your response:

All proposed work will be completed and comply with permitting requirements of all jurisdictional agencies.

5. Does the project foster mixed land uses and compact development, downtown revitalization, brownfield redevelopment, the enhancement of beauty in public spaces, the diversity and affordability of housing in proximity to places of employment, recreation and commercial development, and the integration of all income and age groups?

☑Yes ☐No

Explain your response:

6. Does the project provide mobility through transportation choices including improved public transportation and reduced automobile dependency?

☐Yes ☑No ☑N/A

Explain your response:

Not applicable to project.

7. Does the project involve coordination between State and local government, intermunicipal planning, or regional planning?

☑Yes ☐No

Explain your response and reference any applicable plans:

Town coordination and permitting with county and state agencies will be required for project completion.

8. Does the project involve community-based planning and collaboration?

   ☑Yes ☐No

   Explain your response and reference any applicable plans:

   Public hearings during planning and design stages.

9. Does the project support predictability in building and land use codes?

   ☑Yes ☐No ☐N/A

   Explain your response:

   Comply with Town and County codes and requirements.

10. Does the project promote sustainability by adopting measures such as green infrastructure techniques, decentralized infrastructure techniques, or energy efficiency measures?

    ☑Yes ☐No

    Explain your response and reference any applicable plans:

    Energy efficiency measures will be completed, as applicable during the design stage.

11. Does the project mitigate future physical climate risk due to sea-level rise, storm surges, and/or flooding, based on available data predicting the likelihood of future extreme weather events, including hazard risk analysis data, if applicable?

    ☐Yes ☑No

    Explain your response and reference any applicable plans:

    Not applicable

Section 4 – Miscellaneous

1. Is the project expressly required by a court or administrative consent order? ☐ Yes ☑ No

   If yes, and you have not previously provided the applicable order to EFC/DOH, please submit it with this form.

Section 5 – Signature

By signing below, you agree that you are authorized to act on behalf of the applicant and that the information contained in this Smart Growth Assessment is true, correct and complete to the best of your knowledge and belief.

Applicant: Town of Chester	Phone Number: 518-494-2711
Name and Title of Signatory: Johnathan Soukup, P.E.- Principal at Cedarwood Engineering Services PLLC	
Signature:	Date: 5/12/2023