Town of Keene

Water District #2 Well Field Evaluation

Preliminary Engineering Report (PER)
Project No.: 4893

Prepared for the
Town of Keene
10892 NYS Route 9N
Keene, NY 12942

March 22, 2022

AES NORTHEAST
Architecture, Engineering, and Land Surveying Northeast, PLLC
10-12 City Hall Place, Plattsburgh, New York
Tel: 518-561-1598 Fax: 518-561-1990
www.aesnortheast.com

Contents

1) EXECUTIVE SUMMARY

1.1 Background

The Town of Keene, herein known as the Town, is located in the heart of the Adirondack Mountains. The Hamlet of Keene Valley (within the Town of Keene) is located on Route 73, about ten miles west of Interstate 87, Exit 30.

The original water system in Keene Valley started as a privately-owned water system when it was constructed in the early 1990's. The system was sold by the Keene Valley Water Company to the Town of Keene as Water District #2, on December 28, 1955. Slide Brook was used as the original water supply (an untreated surface water source) for the water system. In 1998, the Water District completed the construction of two groundwater productions wells, a control building and chlorination facility with emergency generator backup and an 8" ductile iron water transmission main from the control building located (on Trails End Road) to and along Interbrook Lane to the original water storage reservoir north of Interbrook Lane.

A 2005 engineering report, "Engineering Report of Findings for the Town of Keene Waste District #2 Water System Improvements, prepared by AES Northeast, February 4, 2005, outlined several deficiencies that remained in the water system after the 1998 upgrades. These included:

- The replacement of the majority of the distribution system and laterals as these were found to be either leaking, of poor material quality, shallowly buried, undersized, or some combination of all four.
- Replacement of the water storage reservoir located on Interbrook Lane (west of Route 73) with a new storage tank.
- Replacement of a failing 1998 well.
- Miscellaneous upgrades to the well control building.

In in 2009-2010 a capital project completed the first two bullet points and part of the work at the well control building. The failed well was not replaced.

In 2019 an emergency project was implemented to replace the failed well with a new well.

In 2020, leaks at the Town's water storage tank were repaired.

The Town's remaining 1998 well is now nearing failure and requires replacement, it is currently out of service.

The Town's water storage tank is lacking outfall dechlorination and an internal mixer.

The Town's well control building requires repairs or replacement in addition to those that remain from the original reporting, mainly due to the age of the system.

The Town's system does not have water meters. Water meters are generally required for water systems.

The Town is looking to install a new Hiker's Center. The Center will require a water service.

1.2 Purpose

The goal of this report is to provide a review of the Town's water treatment and supply system and provide general recommendations for upgrades. Alternatives for replacement or repair of the well field control building as well as recommendations for replacing the failing well, upgrades to the water storage tank, addition of water meters and connection to a new hiking center are presented for consideration by the Town. This report is intended to be a preliminary engineering evaluation sufficient to begin pursing funding. Additional evaluations and reporting will be

required once a suitable replacement well is located and to provide the final scope of work based on the available funding.

1.3 Evaluations Conducted

AES Northeast gathered existing mapping, reviewed existing hydrogeological reports, and reviewed previous report data in order to provide recommendations for upgrades to the water system.

1.4 Recommendations

Three alternatives were evaluated to determine if they met the requirements of the Town. The three alternatives include replacement of the well field control building, repair of the well field control building, and a no action alternative. It is recommended that the replacement well field control building along with the replacement mechanically redundant well, installation of water meters, and the alternates (as funds allow) be pursued as a project.

2) PROJECT BACKGROUND & HISTORY

2.1 Relevant Documentation, Previous Reports, Local Planning Documents, Jurisdictional Permitting Agencies, and Regulatory Design Manuals.

2.1.1 Relevant Documentation

The following documents have been included for easy reference.

Well History Documentation.

- 2019-10-07 HydroSource Associates Preliminary Report Proposed Backup Well Source
- 2019-03-12 HydroSource Associates Final Report Proposed New Groundwater Source

Refer to Appendix A: *Relevant Documentation*.

2.1.2 Previous Reports

The following reports were reviewed in preparation of this report.

- Report of Findings for the Feasibility of Reducing Pressure for the Town of Keene, Hamlet of Keene Valley, Water District No. 2 – September 10, 2003, AES Northeast, PLLC, Project No. 2682
    - The purpose of this project is to propose the replacement of the "old" water distribution system and the installation of a new aboveground water storage tank.
- Report of Findings for the Feasibility of Reducing Pressure for the Town of Keene, Hamlet of Keene Valley, Water District No. 2 – February 4, 2005, AES Northeast, PLLC, Project No. 2682
    - This report is an update for funding purposes of the 2003 report.
- Town of Keene Water District #2 Well System Upgrades Map, Plan, and Report – July 24, 2019, AES Northeast, PLLC, Project No. 4782
    - The purpose of this report is to summarize the improvements and work needed to be completed under the 2019 emergency conditions to obtain funding.

2.1.3 Local Planning Documents

a. "Town of Keene Master Plan"

"Site Plan Review Law" As Amended and Enacted by the Town of Keene, November 12, 2003, In Accord with Town of Keene Master Plan of the Keene Planning Board.

2.1.4 Regulatory Design Manuals

a. "State of New York Unofficial Compilation of Codes, Rules and Regulations"

"Title 10. Department of health Chapter 1. State Sanitary Code Part 5. Drinking Water Supplies Subpart 5-1. Public Water Systems." – latest edition.

b. "10 States Standards"

Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, "Recommended Standards for Water Works," latest edition.

2.2 Site Information

2.2.1 Location

The water system serving the Hamlet of Keene Valley is located at the south edge of the school athletic fields on Trail's End Road in Keene Valley, New York.

Refer to Figure 2.1: *General Location Map.*

Refer to Figure 2.1.1: *Project Location Map*.

2.2.2 Land Use

a. State Conservation Areas – Wild Forests and Wilderness Areas

All land, both public and private, within the Adirondack Park has been designated a land use classification by the APA. The land use classification sets restrictions on land use and development and establishes setbacks from natural resources. The purpose of the APA land use classifications is to balance private ownership and economic growth and development with maintaining the natural character of the Adirondack Park. The treatment facilities are located within a Hamlet. (*APA River Corridors – August 20, 2013*)

Refer to Figure 2.2: *APA Land Use Designations.*

b. Scenic Byways

New York State and the federal government both have programs that identify historically and visually significant highways and manage projects in and around these highways to avoid disturbing aesthetics of the areas around the highways. Designated highways are known as Scenic Byways. NYSDOT is the agency responsible for managing this program. A review of the list of NYS Scenic Byways reveals that the scope of the project will have no effect on scenic byways.

Refer to Figure 2.3: *NYSDOT Scenic Byway*.

c. Zoning

The Town does not have zoning documents available for review. The Town does have an applicable Site Plan Review Law in place where its goal is "A clean, wholesome, attractive community…" focused on "…the natural and scenic qualities…" of the Town.

The project site is within the existing Hamlet boundaries outlined by the APA.

Refer to Appendix B: *APA Shoreline Restrictions*.

d. Agricultural and Industrial Land Use Activities

The project scope does not include or impact any agricultural or industrial land use activities.

2.2.3 Geologic Conditions

a. Topography

The land that the WTP is located on very flat site in a natural valley between the local mountains in Keene.

Refer to Figure 2.4: *Town of Keene Topography*.

Refer to Figure 2.4.1: *Project Site Topography*.

b. Soils

With regards to both site locations, the various soils found within their parcel boundaries are as follows: FnD-Fernlake Loamy fine sand at the water tower storage site. RyA-Rumney-Burnt, TuD-Turnbridge-Lymen 35% and 70% slopes, PoA-Podunk Very fine sand, ChE and ChB-Champlain loamy sand, CsB-Colton very gravelly sand, and NaA-Naumberg loamy fine sand. Since a majority of the soils are loamy sand or boulder type sands, both sites have well to moderate drainage with mixed drainage near areas of wetland delineation due to the shallow restrictive layer raising the water table up and inundating the soils. Combined with deep restrictive layers, this allows much of the drained groundwater to seep deep into the soil, with only the south western portion of the Keene School parcel having high water table depths due to the natural wetland inundating the soils near the more shallow restrictive layers in that area.

Refer to Figure 2.5: *USDA Soil Map.*

Refer to Figure 2.5.1: *USDA Hydrologic Soil Map.*

Refer to Figure 2.5.2: *USDA Restrictive Layer Map.*

Refer to Figure 2.5.3: *USDA Depth to Water Table.*

2.2.4 Subsurface Water Features

a. Water Supply Source

Currently, the Town sources water from wells located on the site of the well control building. There are two current wells, Well #1 and the newly installed Well #3. Well #2 was abandoned in 2019 and Well #1 is effectively offline and no longer usable as its production has declined over time although it is still connected to the system.

Well #1 is 270 ft bedrock well has previously shown to have a sustainable yield of approximately 200 gpm. Well #2, now disconnected from service, had a sustainable yield of approximately 150 GPM. Well #3 is a 150 ft gravel-pack well and pump tests indicate that 300 gpm is a sustainable yield for this well.

The water supplied by both Well #1, Well #2 and Well #3 have historically been of good quality.

2.2.5 Environmental Resources

a. Wetlands

The Adirondack Park Agency mapping of wetlands is usually the most comprehensive source of wetland mapping within the Park; however, the wetland mapping does not delineate wetlands within the planning area. Wetlands under 1 acre may not be jurisdictional by the APA, however the ACOE may take jurisdiction if any work disturbs the certain regulated wetlands (even temporarily).

Refer to Figure 2.6*: APA & DEC Wetland Map.*

b. Endangered Species

Both the New York Department of Environmental Conservation (NYSDEC) and United States Fish & Wildlife Service (USFWS) online databases were utilized to determine the presence of potential endangered species in the project planning area. The NYSDEC mapper showed that there is a presence of an endangered species. From the USFWS resource search indicated that the Indiana Bat and the Northern Long-Eared Bat have the potential to be impacted. However, within the scope of the project there is little chance for the species to be affected as the project site is mostly open field.

Working in areas that may impact the Indiana Bat places requirements related to tree cutting. Tree cutting is generally restricted to November 1st to March 31st, or if cutting must occur outside of those months, then biologists must be called in to determine if there will be any impacts to the bat. Previous work done on site shows a developed area for renovation and construction. The Northern Long-Eared Bat is federally listed as a threatened species. Both bats typically hibernate in caves/mines in the winter and roost in trees in the summer. Similar precautions should be taken to protect both species, although the requirements for protection of the Indiana Bat are more stringent based on its classification as Endangered.

There have been fourteen known species of migratory birds observed in the area. In the scope of the project it is unlikely that any harm will come to the birds as the site is relatively developed and the proposed work should not affect the migratory bird population.

Refer to Appendix C: *Environmental Fact Sheets & Resources*.

2.2.6 Floodplain Considerations

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) are used to determine the extent of the 100 year and 500-year flood. The existing well field control building is in Zone C, an area of minimal flooding.

Refer to Figure 2.7: *FEMA Flood Insurance Rate Map.*

2.3 Ownership and Service Area

2.3.1 Financial Status of Existing Facilities

The Town of Keene currently charges the users based on the total usage per service connection. According to the Town there are 263 Equivalent Dwelling Units (EDU) that are billed as single households. As of 2019 the Town bills each user $425 annually.

2.3.2 Water System Management

Keene Water District #2, which services the Hamlet of Keene Valley, is owned, and operated by the Town of Keene.

2.3.3 Population Trends and Growth

The Hamlet of Keene Valley (Water District #2) has approximately 165 year-round residences. This number increases during the summer months to approximately 240. People are attracted to the many offerings around Keene Valley including hiking, skiing, hunting, and fishing, to name a few. Future development is not included within the scope of this report and will be provided at a future date.

2.3.4 Historical and Projected Water Use Data

a. Type of Use

The Town supplies water to residential and local business users. It is expected that the Town continue to supply water in this way. At the time of writing this report, the Town is not expecting to supply water to industrial users.

b. Equivalent Dwelling Units (EDU)'s

There are 263 user units that are paying into the debt.

c. Daily Demands

The existing daily demand is approximately 170 GPM or 0.245 MGD.

d. Peak Hourly Flow

The highest fire flow value in Water District #2 is 2,250 GMP for a two-hour duration. This is supplied by the Town's water storage tank.

e. Unaccounted Water

The Town of Keene maintains water metering and actively pursues any potential leaks. The Town has noticed a steady leak of an average of 16 GPM which the water operators have attributed to the installation of a compression fittings on ¾" laterals. These compression fittings need to be replaced. In general, there are not expected to be significant problems with leaks within the system.

2.4 Community Engagement

Local residents understand that a reliable water source is essential to day-to-day activities and the growth of the Town. Water issues are communicated to the residents at Town Board meetings.

2.5 Existing Facilities & Present Condition

2.5.1 General Description & History

Wells

The Town currently is operating their water system using two (2) wells located on a parcel owned by the Keene Central School District. In 2000, less than a year after construction, one of these newly constructed wells (Well #2) began experiencing a significant decline in production. At that point, for all intents and purposes, Well #2 was taken offline. The Town had been operating their water supply system utilizing a singular well, Well #1 since that time. Well #1's production began to decline over time. The loss of production may be attributed to the sanding of the production fractures within the well or the clogging of the fractures themselves. With only one well operating and operating at a reduced capacity, the Town was a risk of running out of water.

In July of 2019, a secondary well (Well #3) was installed to comply with New York State Department of Health's (NYSDOH) requirement of having at least two (2) mechanically redundant wells. As part of the 2019 project, Well #2 was formally disconnected from service.

With the new Well #3, Well #1 cannot provide enough water and is rarely if ever used. Therefore, the Town again does not have a sufficient second well to meet the requirement of having a mechanically redundant well. This well must be replaced. The mechanically redundant well should be located so as not to impact the primary well during any rehabilitation efforts.

Water Supply Building

The 27' by 19' water supply building, located on the Keene Central School parcel, was completed in tandem with the installation of the two (2) original wells. The water treatment system utilizes the addition of sodium hypochlorite prior to distribution and storage. The water supply building is currently supplied by the original well, Well #1 (not current in service), and the new well, Well #3.

Water Storage Tank

The storage tank is located just off of John's Brook Lane, approximately one (1) mile northwest from the water supply building. The water storage tank is a 500,000-gallon tank installed in 2010.

There was a known leak within the storage facility that has since been fixed by the tank manufacturer, DN Tanks, by epoxy sealing the interior of the tank.

The storage tank currently does not have a dechlorination system installed on its outfall.

The storage tank does not have an internal mixing system.

Water Meters

The Town does not currently have water meters for its customers. Water meters are often requirements of NYSDEC for water supplies. The Town may be required to add water meters at some point in the future.

Refer to Figure 2.8: *Existing Water Supply and Storage*.

Refer to Figure 2.9: *Existing Well Field Map*.

2.5.2 Source Capacity

a. Description of Watershed

The watershed and resulting Wellhead Protection Area (WHPA) is approximately 1,000 acres. This includes a potential area of impact with a radius of 2,250 feet around Well #3, the areas between the south side of Johns Brook and the West side of the AuSable River, and the upgradient areas southwest of the wellhead generally defined by Rooster Comb, Hedgehog Mountain and Snow Mountain.

The upland areas are largely forested and contain few potential sources of contamination. There is a notably thick layer of lakebed clay at the well site that offers some protection from potential surface contaminants.

b. Ground Water Source

Hydrosource Associates (HSA) tested Well #3 and was able to determine that 300 gpm can be considered a conservative safe yield. According to HSA's pump test data, the well would be expected to consume only 30% of available draw down.

2.5.3 Water Quality

The most recent well, Well #3, was tested using a NYSDOH Part 5 at the end of a 72-Hour pump test. No parameter exceeded a Primary Maximum Contaminant Level (PMCL). Volatile organics were not detected. Bacteriological parameters were non-detects. Total Dissolved Solids (TDS) was 86 mg/L. Hardness was 60 mg/L indicating soft water. Well #1 was not tested as it is due to be replaced.

2.5.4 Unit Process Evaluation

SCADA

The SCADA system is the original installation, several components have failed, and the remaining original components are outdated. The components that have not been recently replaced are out of date and nearing the end of their useful life.

Chlorination

The chemical feed system is located inside the main room of the well field control building. The chemical feed system is experiencing corrosion and is showing its age. There is currently not a way to isolate the storage of the chemicals or chemical feed system from the main room.

Wells

Well #1's components are assumed to be nearing the end of their useful life. The well itself is not producing sufficient water to meet the Town's demand.

Well #3, having been installed in 2019, is presumed to be in good condition.

Well Field Control Building

The well field control building has aged electrical, mechanical, and architectural features. The main problem with the building is that it is small and poorly laid out. The electrical and control systems are located within the same room as the water mains and there is poor ventilation. This coupled with corrosion from the chlorination systems is accelerating degradation of the systems. The poor layout led to a lack of space for generally for working and maintenance of equipment. The building requires upgrades to these systems or replacement.

2.5.5 System Abilities

The system's fire flows, system pressures, and treatment objectives were outlined in the 2009-2010 water system upgrades with the replacement of the distribution tank and construction of the new water storage tank.

2.5.6 Generated Waste

This section is to be inserted at a later date.

2.5.7 Existing Energy Consumption

This section is to be inserted at a later date.

2.5.8 Suitability for Continued Use

Suitability of the existing infrastructure is largely dependent on the water supply source and the effects of adding additional wells in the immediate area. The well field control building recently received internal component upgrades and a new well was installed. With additional upgrades and repairs the existing infrastructure can continue to be used.

2.6 Definition of the Problem

2.6.1 Health, Sanitation, and Security

The availability of water service to the Hamlet is vital to the success of their tourism and the continued water service to their residents. Ensuring adequate water service to the Hamlet is the responsibility of the Town.

2.6.2 Aging Infrastructure

Wells

Well #2 failed and has been removed from service and was replaced with Well #3.

The Town was recently cited for operating without a mechanically redundant well because Well #1 is now in failing condition. Over the lifespan of Well #1 it has shown to have less of a sustainable yield than expected. This means

that the Town's is essentially operating solely Well #3 without a mechanically redundant well due to Well #1 not being able to produce a sufficient supply of water to serve the demand.

Well Field Control Building

The existing well field control building was constructed in 1992. This building is nearly thirty years old at the time of writing this report. It is assumed that the building and several internal components are outdated and nearing the end of their useful life. The current electrical and control system is suspected to be aged beyond its useful life. The chemical feed system is indoors and likely causing corrosion.

2.6.3 Reasonable Growth

The Town requires a reliable mechanically redundant well to ensure the protection of continued service to their residents and the school system. The Hamlet is an attractive location for seasonal tourism. The Town would like to ensure the growth and protection of this market.

2.6.4 Water and Energy Consumption and/or Waste Generation

Water and energy consumption and waste generation are within normal ranges for this type of system and are not expected to be significantly impacted by the proposed project alternative.

2.6.5 Storm and Flood Impacts

At the time of writing this report there have been no reported storm or flood impacts on the well field control building or wells in Water District #2.

2.6.6 Compliance with Accepted Standard's

The existing water supply for the system does not have a sufficient mechanically redundant well. The ultimate need for the project is to supply the Town with a new groundwater source in the form of a well. All modification and upgrades shall be in accordance with 10 States Standards, the National Electric Code, the National Building Code, and any other pertinent standards.

2.7 Capacity Development

This section is to be inserted at a later date.

3) ALTERNATIVE ANALYSIS

3.1 Alternative Description

The goal of the project is to replace the failing well and provide a mechanically redundant well along with upgrades to the well control building. The two main alternatives considered center around the control building. Full replacement vs rehabilitation was evaluated. The replacement well and water meters are common to either alternative. Two project alternates are presented to be completed if funds allow.

3.1.1 Common Components

a. Replacement Mechanically Redundant Well

A new well will be installed within the approximate confines of the existing well field. The new well will be connected to the well field control building with independent piping, electrical and controls. The exact location of the production well will be determined after completing a hydrogeological study and test well(s).

b. Water Meters

At the time of writing of this report there is no form of individual water metering throughout the Town of Keene. It is expected that water meters will be required by NYSDEC as a result of the installation of a new well. Water meters will be installed in each home (either in basements or water meter pits) and a fix-based meter reading system will be provided.

3.1.2 Alternative 1: Replacement Well Field Control Building

The existing well field control building will be replaced with a new well field control building. The new building will have separate spaces for chemical feed systems, electrical systems and controls, mechanical systems, water piping, and labs. The new building will be located adjacent to the existing building. Once the new building is completed, the existing building will be demolished.

3.1.3 Alternative 2: Well Field Control Building Upgrades

The existing well field control building is approximately 30 years old and requires updates to systems that are reaching the end of their useful life. Pending a formal Mechanical, Electrical and Plumbing Equipment code review the determination will be made regarding the replacement of several building related items. The items expected to be identified during the evaluations include the roof, siding, doors, controls and electrical. Evaluations may identify additional items to be addressed that were not previously listed. Implementation of SCADA, external controls and flow based chemical feed is also recommended.

3.1.4 Alternative 3: No Action Alternative

The No Action Alternative leaves the Town operating on a single well with no mechanical redundant well. Operating on the single well could leave the Town without a well water source supply during a loss of service. This alternative will not be considered further as it does not fit the criteria defined in the scope of this project or the goals of the Town. The potential loss of service to Water District #2 created by taking no action deems that this is not an acceptable course of action. This alternative will not be considered further.

3.1.5 Project Alternates

a. Water Storage Tank

If funding allows, it is recommended that the Town implement dechlorination at the tank discharge. A flow-based dosing system will be installed on the tank outfall to provide proper treatment of the chlorine residual. This system will be used to ensure the surrounding area does not receive highly chlorinated water when the water storage tank experiences an overflow or when the Town drains the tank for maintenance. The dechlorination system may be a requirement from NYSDEC at some point in the near future.

If funds allow, an internal tank mixing system is recommended. The tank mixing system helps keep the water fresh and reduces chlorine demand. The exact mixing system shall be determined during design. There are three main options:

- Passive mixing system. This type of system consists of valves on the inlet and outlet pipes to direct flow within the tank to promote mixing. These systems require the least maintenance but can be costly to install. They also have difficulty reaching peak performance in small systems, like Keene, with low tank turnover.
- Active mixing system, electrical power: This type of system consists of a mechanical mixer installed in the tank. These mixers run constantly to keep the water mixed. These are mechanical devise that require maintenance and are prone to failures. The electrical usage must be considered in O&M costs.
- Active mixing system, solar power: This is the same active mixing system except a solar panel(s) is installed to power the unit. The solar power increase installation costs but reduces O&M costs.

Leaks in the base of the tank were repaired in 2020. If any additional work to repair the tank is discovered, it should be addressed as needed.

b. Hiker Center Connection

The Town primarily intends to construct a Hiker Welcome Center on Marcy Field. Potential components to this project will include water main to service the Hiker Welcome Center.

In addition, the Town may incorporate additional users into the water district within reasonable distance to the new Welcome Center water main.

Final lengths of the water main and laterals and all remaining design components will be determined in the engineering design phase.

3.2 Impact on Existing Facilities

3.2.1 Alternative 1

Installing a new well field control building will allow the existing facility to remain online throughout construction. This will allow the Town to maintain water service.

3.2.2 Alternative 2

Rehabilitating the existing well field control building will require coordination and temporary facilities to allow the facility to maintain full operations. This will require considerable coordination during construction.

3.3 Map

Alternative Project Maps will be included at a later date.

3.4 Environmental Impacts

a. General Impacts of Replacement Alternatives

Both alternatives will have short term local impacts, that can be mitigated by proper construction methods, stormwater control, noise pollution, etc.

b. Alternative Specific Impacts

None

3.4.1 Land Requirements

a. Land Acquisition

The Town is required to own the land within the 100-foot radius of any well. The final siting of the new wells for either Alternative will determine if any land acquisition is required. Currently this is not the case and Keene Valley Central School owns the property that the well heads are currently located on. The Town will need to acquire the land surrounding the well heads to ensure proper well head protection practices are maintained.

b. Plant Expansion

No immediate future plant expansion is anticipated.

c. Easements Required

Temporary and permanent easements may be required to meet state and federal guidelines. The Town will need to ensure that they have easements in place for land within a 200-foot radius of the well to be able to enforce well head protection requirements to minimize potential risk of well contamination. Additionally, the Town will need easements for any new infrastructure located on neighboring properties.

If the Town cannot secure the minimum amount of land required for the well head protection setbacks, then the Town will be required to seek out a permanent easement with the Keene Central School.

d. Land Restrictions

There does not appear to be any applicable local land restrictions on the known areas of work. All work will comply with APA and DEC setback restrictions where they apply. There are required setbacks laid out by DOH for wellhead protections.

3.4.2 Potential Construction Problems

At the time of writing the report the main issue with construction is the determining the location of a reliable water supply source.

Phasing must be done in such a way that the existing plant can remain online throughout construction. Additional phasing and coordination will be the responsibility of the contractors and they will be required to submit a phasing plan as part of their submittals.

3.4.3 Sustainability Considerations

a. Water and Energy Efficiency

i. Alternative 1:

Alternative 1, may reduce energy with an increased efficiency of a new building.

ii. Alternative 2:

Alterative 2, does not likely significantly change energy usage.

b. Green Infrastructure

By nature, the project simply focuses on providing the Town a reliable mechanically redundant well. There is little opportunity for green infrastructure. Energy conscious engineering practices will be implemented such as the selection of new efficient motors and variable frequency drives throughout design and upgrades where appropriate.

3.4.4 Schedule and Constructability

The well system must remain online throughout construction. The contractor must coordinate with the Town to ensure service is maintained.

Alternative 1 is simpler to construct. The new well field control building would be constructed while the existing systems remain online.

Alternative 2 will require significant coordination for construction to occur and maintain water service. It is likely that temporary services will be required for electrical, controls, chemical feed systems, and possibly water systems while building systems are upgraded. The existing building is very small with little working room.

3.4.5 Operations and Maintenance

The O&M (Operations and Maintenance) of both alternates will be relatively the same.

3.5 Cost Estimates

Refer to Table 3.1: *Alternative Cost Comparison*.

4) SUMMARY & COMPARISON OF ALTERNATIVES

4.1 Alternative Summary and Comparison

The replacement well field control building provides a better long-term layout for the building and allows for complete replacement of a poorly laid out building as well as replace all aging infrastructure. A new building will also be considerably simpler to construct while maintaining service to the water system. With such a small, but complicated building, the cost benefit of upgrading a building vs building new leans heavily in the favor of building new.

5) RECOMMENDED ALTERNATIVE

5.1 Basis of Selection

Alternative 1, constructing a new well field control building, along with the common components, as well as alternatives. The exact final scope of each item and the inclusion of common components shall be based on preliminary design, review of any existing and new hydrogeological studies, and final cost/grant awards.

5.2 Preliminary Project Design

5.2.1 Water Supply

At the time of this report the Town currently has a water supply demand of 170 GPM or 0.245 MGD. The wells have generated water of good quality. Well #3, at the end of a 72-hour pump test, showing no PMCLs exceeding their limits.

5.2.2 Treatment

If a new well source is found within the existing well field, it is assumed that the water will need the same forms of treatment as the existing onsite wells. Water testing will be performed during development of the well to determine final treatment processes. The Well Control Building will be replaced.

5.2.3 Storage

No additional storage locations are planned for design and are out of the scope of this project. A dechlorination system may be added if required. If any additional repairs are needed, they should be completed.

5.2.4 Pumping Stations

No additional pump stations are planned for design and are out of the scope of this project.

5.2.5 Distribution Layout

Modifications to the water system include the installation of transmission mains from the new well to the existing well field control building. The sizing and length of the raw water transmission main will be determined in final design.

If selected, new water mains will be installed to service a new welcome center at Marcy Field.

5.2.6 Water Meters

If selected, an evaluation will be performed to determine the most effective implementation of a water metering system.

5.3 Project Map

The project map shows what is encompassed by the existing well field and building location.

Refer to Figure 5.1: *Alternative 1 – Site Plan*.

5.4 Permit Requirements

The project will be held to NYS DOH standards.

5.5 Project Schedule

The proposed project funding is expected to take approximately two years for funding, one year for design and two years for construction.

5.6 Total Project Cost Estimate

Refer to Table 5.1: *Alternative 1 – Cost Estimate.*

Refer to Table 5.2: *Project Financing and Estimated User Rates (WIIA Grants)*. Please note these grants have not yet been secured and only represent possible funding scenarios.

Refer to Table 5.3: *Project Financing and Estimated User Rates (No Grants)*.

5.7 Attached Signed Engineering Report Certification

Refer to Appendix D: *Engineering Report Certification*.

5.8 Attached Signed Smart Growth Assessment

Refer to Appendix E: *Smart Growth Assessment.*

6) FIGURES

7) TABLES

8) APPENDICES

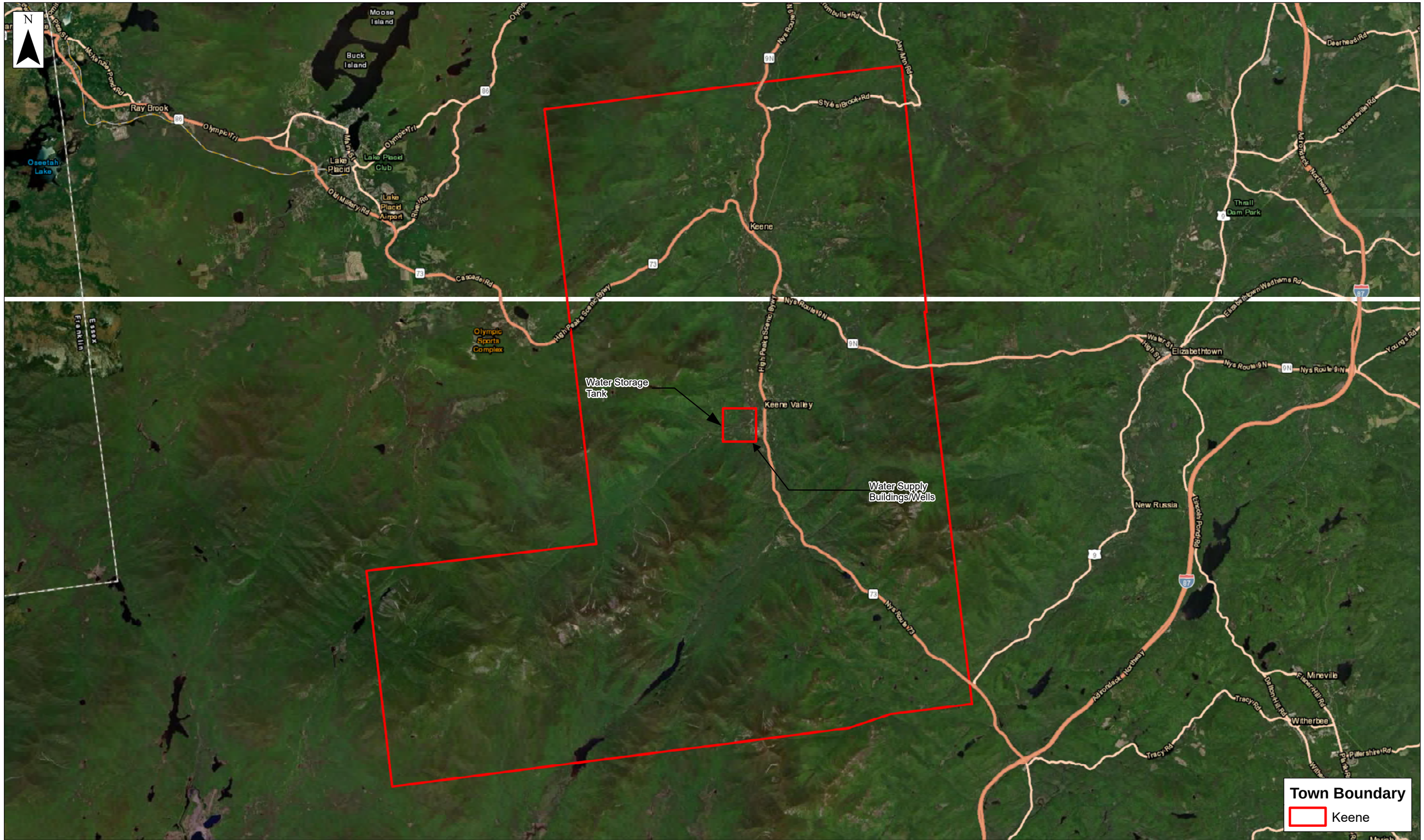
Appendix A: *Relevant Documentation*.

Appendix B: *APA Shoreline Restrictions*

Appendix C: *Environmental Fact Sheets & Resources*.

Appendix D: *Engineering Report Certification*

Appendix E: *Smart Growth Assessment*



AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

Notes:
1- Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile.
Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile.
Tax map line do not accurately depict the true location of property lines.
For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 001 Keene General Location
Date: 8/28/2020

1 inch = 15,000 feet

0 3,750 7,500 15,000
Feet

4893
Water District #2
Well Field Evaluation

Figure 2.1:
General Location Map
General location of the Town of Keene

AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

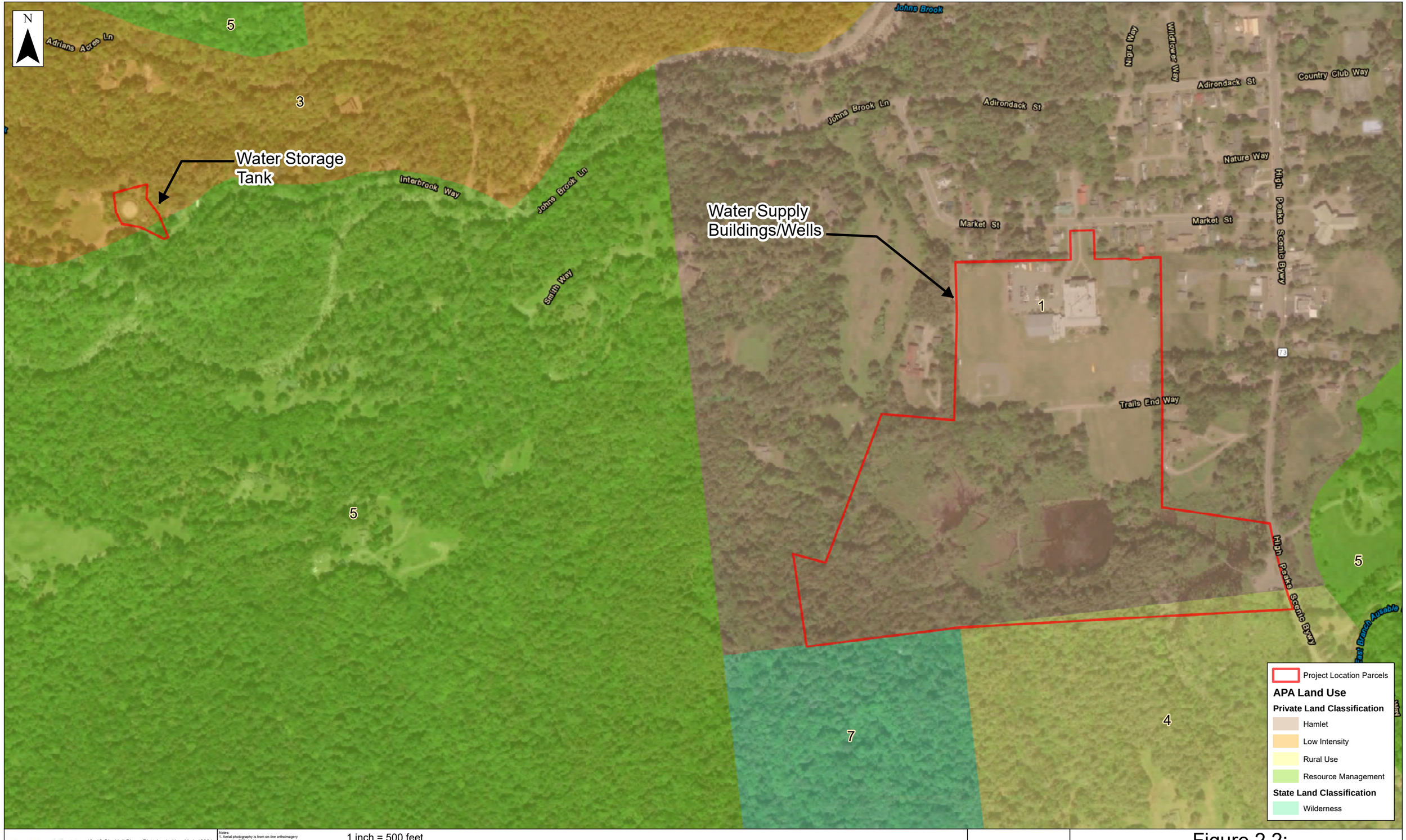
Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2016 County GIS shapefile.
Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile.
Tax map line do not accurately depict the true location of property lines. For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 001 Keene Site Location Map
Date: 8/28/2020

1 inch = 500 feet

0 130 260 520
Feet

4893
Water District #2
Well Field Evaluation

Figure 2.1.1:
Project Location Map
Site Location of the Keene Water Supply and Storage Sites



AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

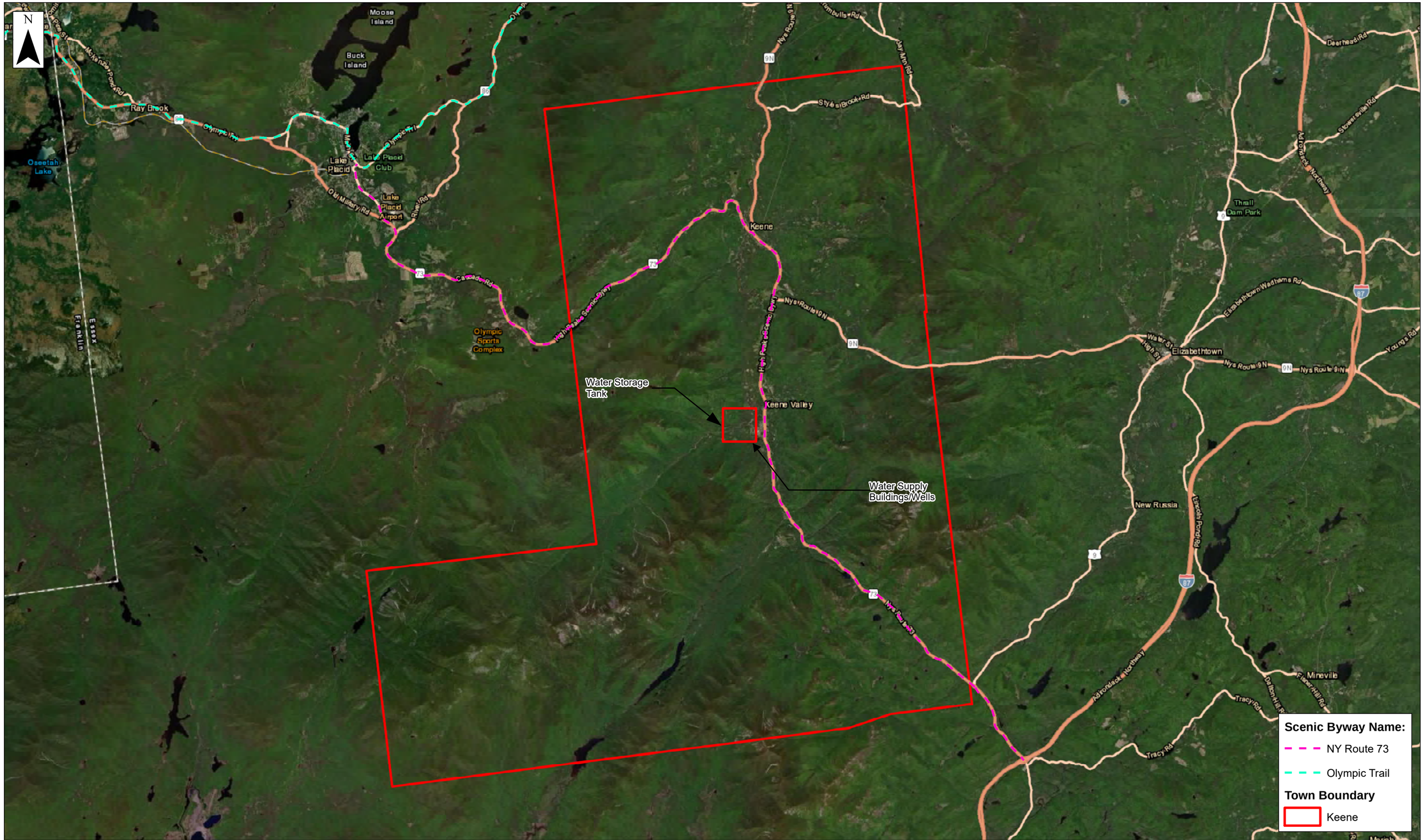
Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile.
Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile.
Tax map line do not accurately depict the true location of property lines. For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 002 Keene APA Zoning Map
Date: 8/28/2020

1 inch = 500 feet

0 130 260 520 Feet

4893
Water District #2
Well Field Evaluation

Figure 2.2:
APA Land Use Designations
APA Land Use Classification around Water Supply and Storage Sites



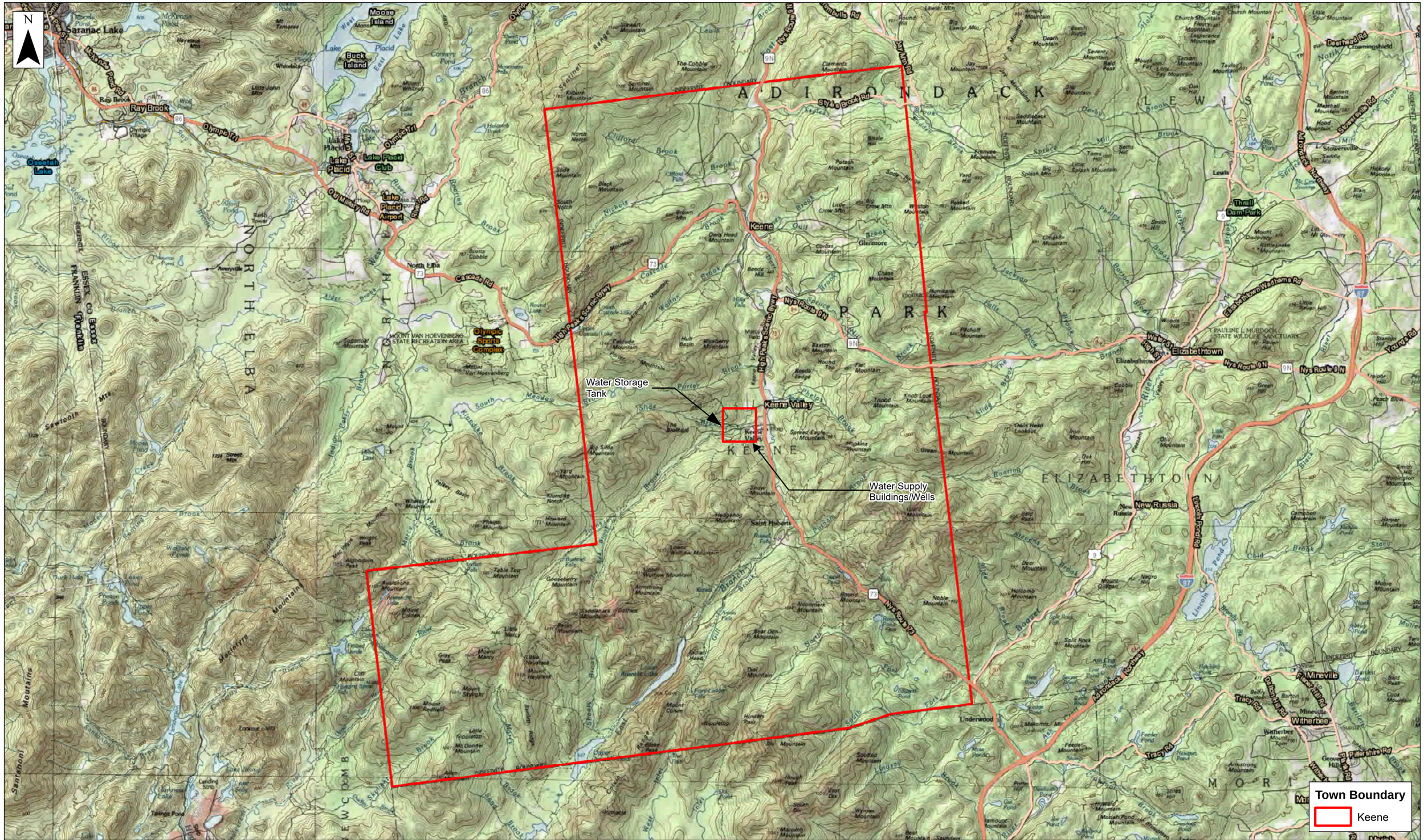
AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

Notes:
1- Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile.
Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile.
Tax map line do not accurately depict the true location of property lines.
For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 003 Keene Scenic Byways Map2
Date: 8/28/2020

1 inch = 15,000 feet
0 3,750 7,500 15,000
Feet

4893
Water District #2
Well Field Evaluation

Figure 2.3:
NYSDOT Scenic Byway
NYSDOT Scenic Byways near Keene



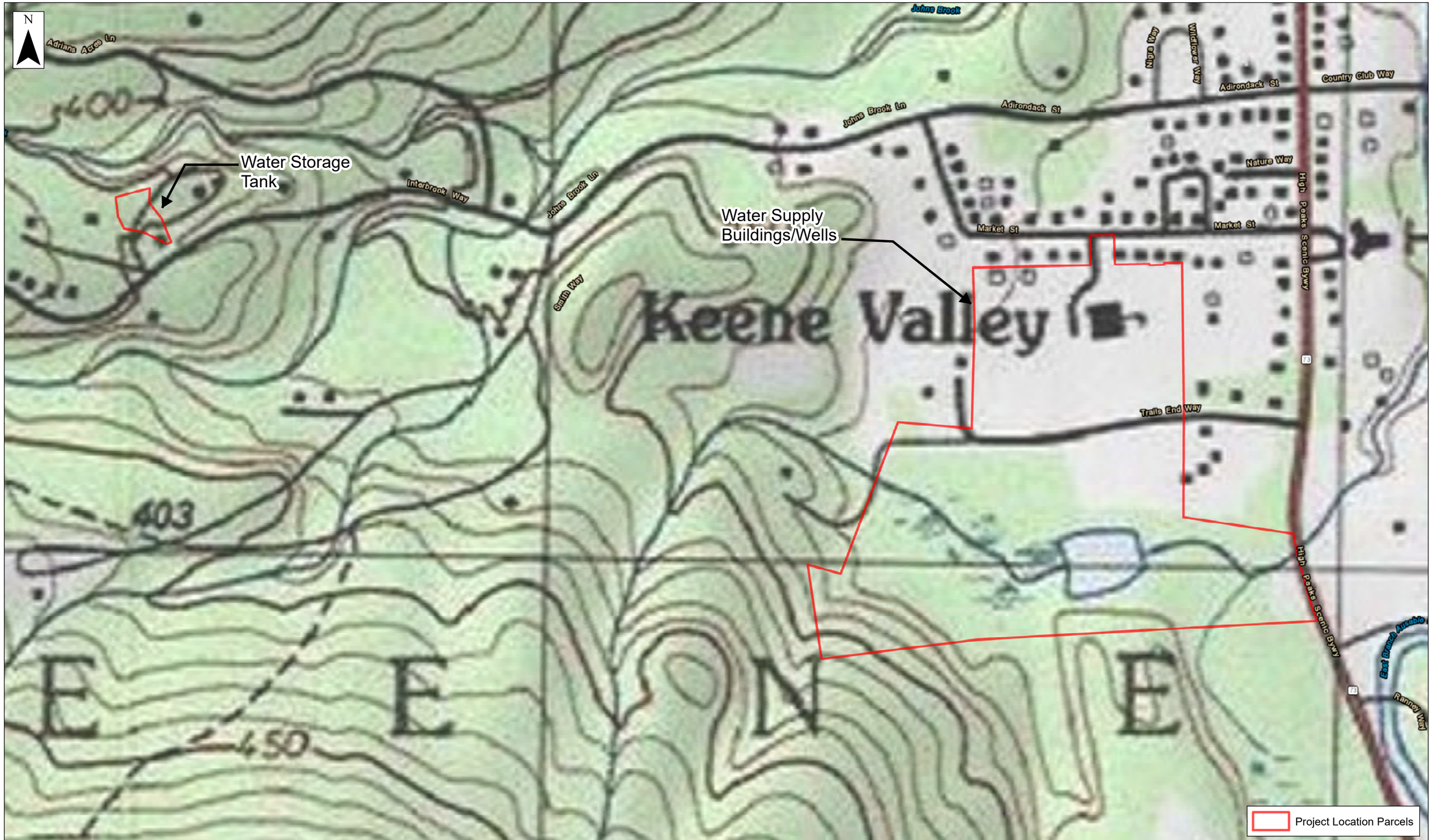
AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile. Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile. Tax map line do not accurately depict the true location of property lines. For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 004 Keene Topo
Date: 8/28/2020

1 inch = 15,000 feet
0 3,750 7,500 15,000
Feet

4893
Water District #2
Well Field Evaluation

Figure 2.4:
Town of Keene Topography
General Topography of the Town of Keene



AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

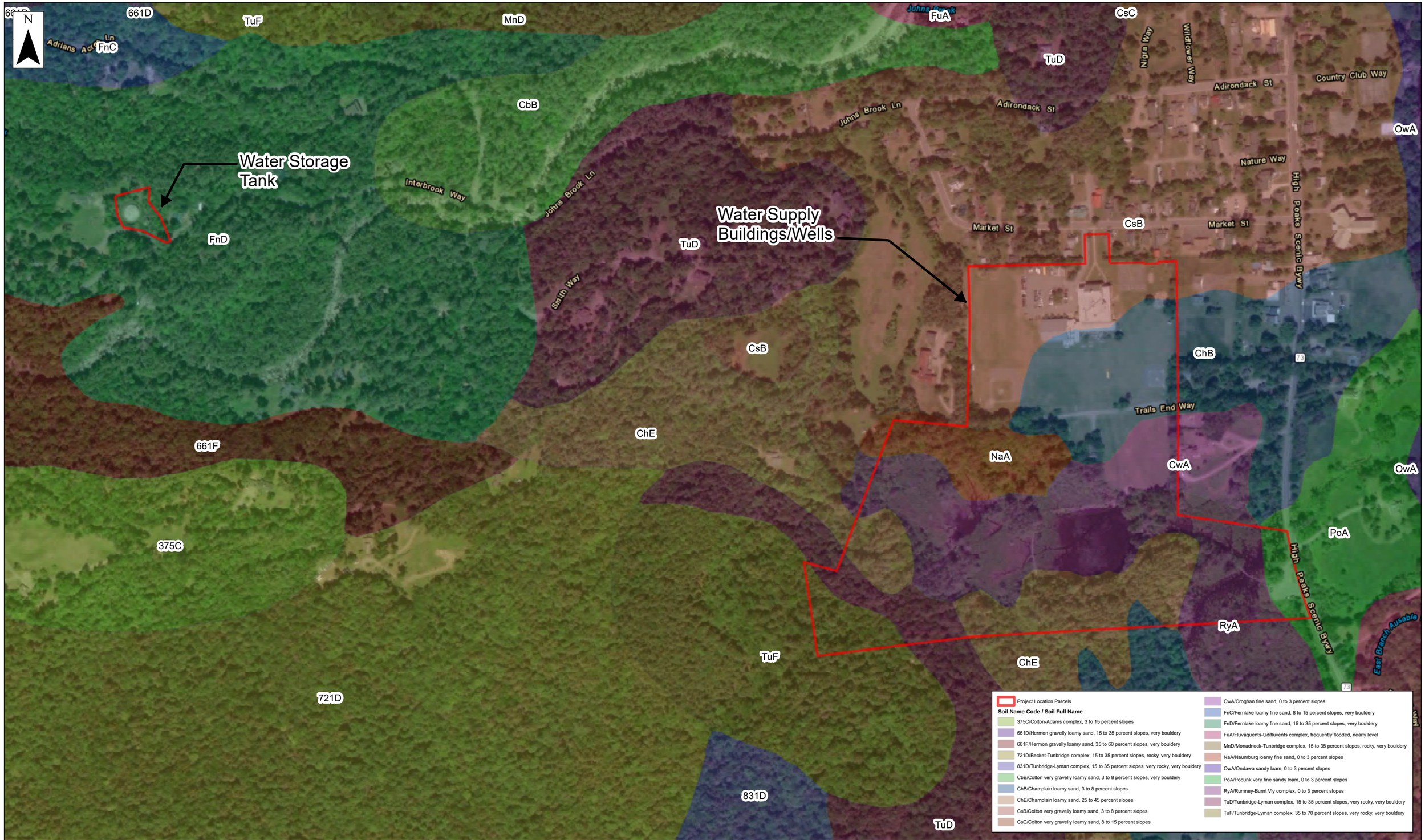
Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile. Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile. Tax map line do not accurately depict the true location of property lines. For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 005 Site Keene Topo
Date: 6/26/2020

1 inch = 500 feet

0 130 260 520
Feet

4893
Water District #2
Well Field Evaluation

Figure 2.4.1:
Project Site Topography
Site Topography around the Water Supply and Storage Sites



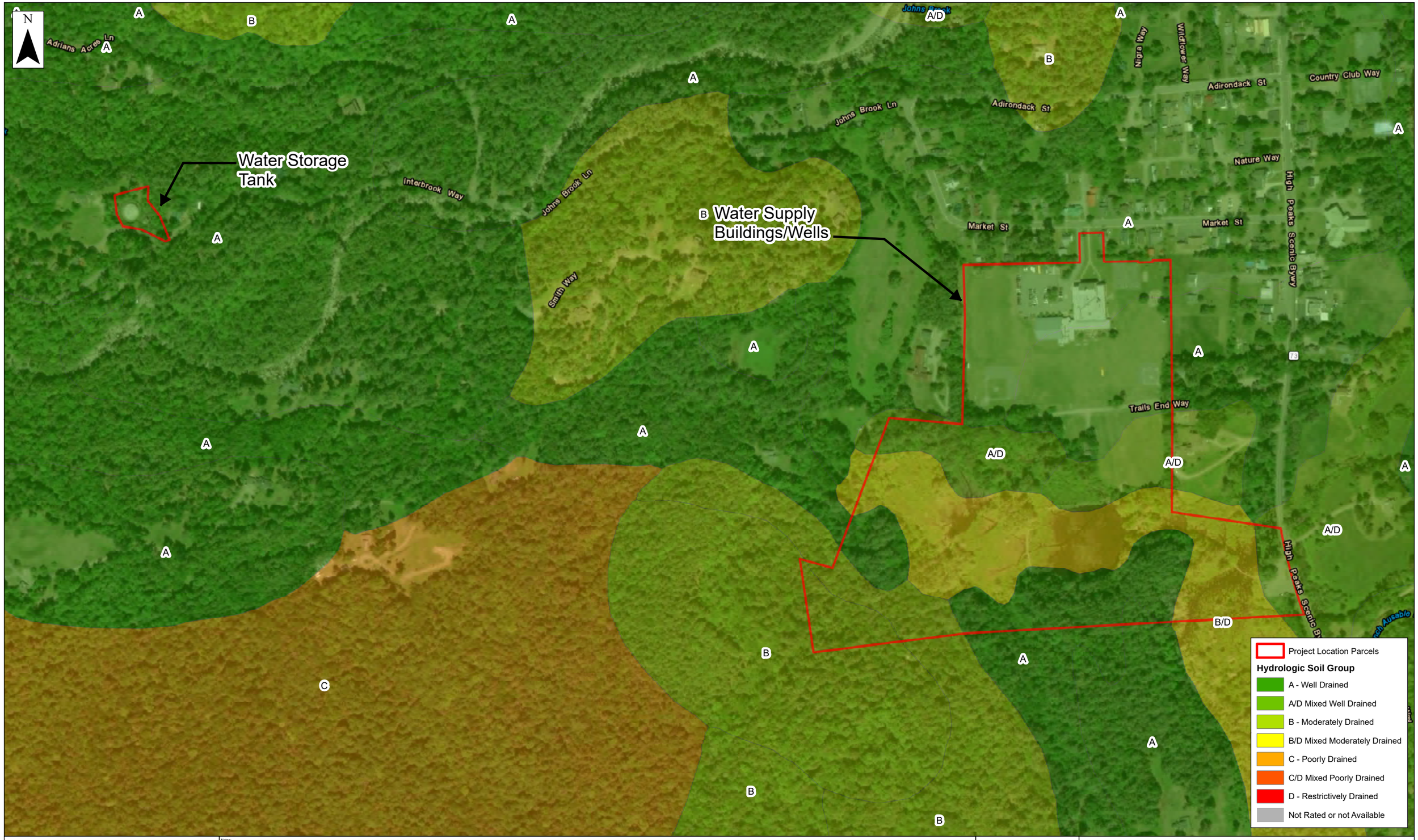
AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile. Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile. Tax map line do not accurately depict the true location of property lines. For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 006 USDA Soil
Date: 8/28/2020

1 inch = 500 feet
0 130 260 520
Feet

4893
Water District #2
Well Field Evaluation

Figure 2.5:
USDA Soil Map
Soil Identification at the site in the Town of Keene



AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

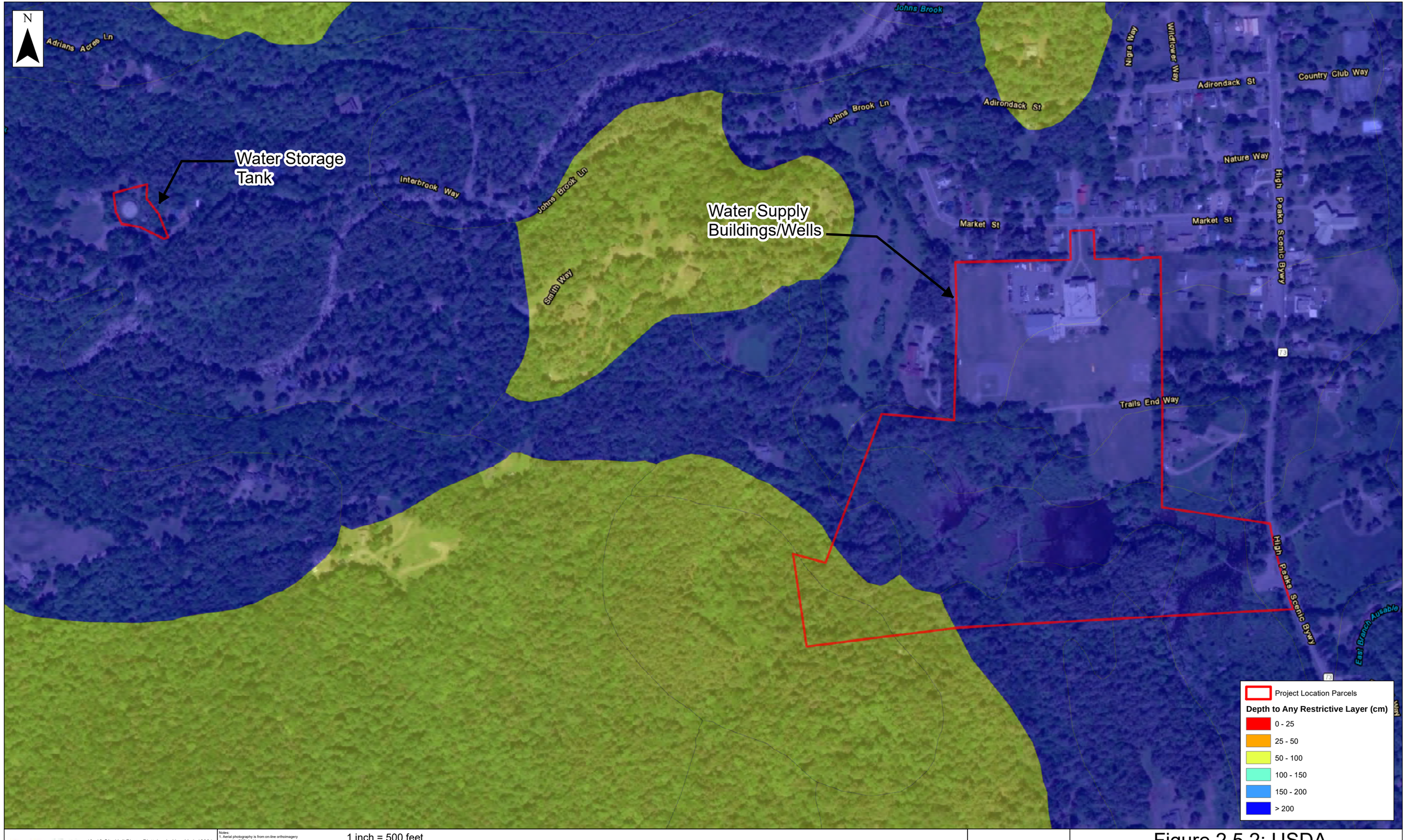
Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile. Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile. Tax map line do not accurately depict the true location of property lines. For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 0061 Hydrologic USDA Soil
Date: 8/28/2020

1 inch = 500 feet
0 130 260 520
Feet

4893
Water District #2
Well Field Evaluation

Figure 2.5.1: USDA Hydrologic Soil Map

Soil Hydrologic Grouping at Site in the Town of Keene



AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile.
Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile.
Tax map line do not accurately depict the true location of property lines. For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 0062 RestrictIve Layer USDA.mxd
Date: 8/28/2020

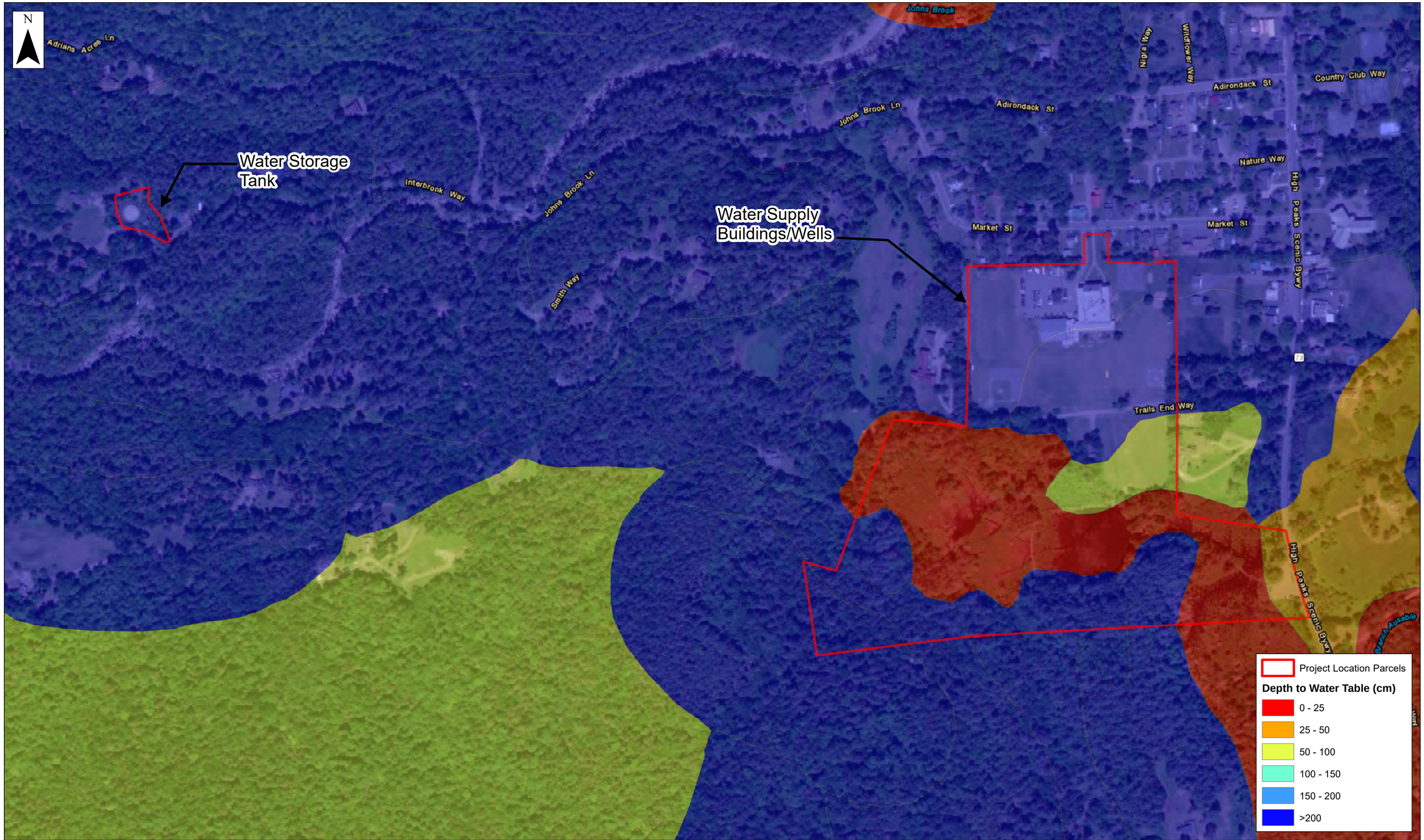
1 inch = 500 feet

0 130 260 520
Feet

4893
Water District #2
Well Field Evaluation

Figure 2.5.2: USDA Restrictive Layer Soil Map

Soil Depth to Any Restrictive Layer at Site in the Town of Keene



AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile.
Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile.
Tax map line do not accurately depict the true location of property lines.
For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 0063 Water Table USDA Soil
Date: 8/28/2020

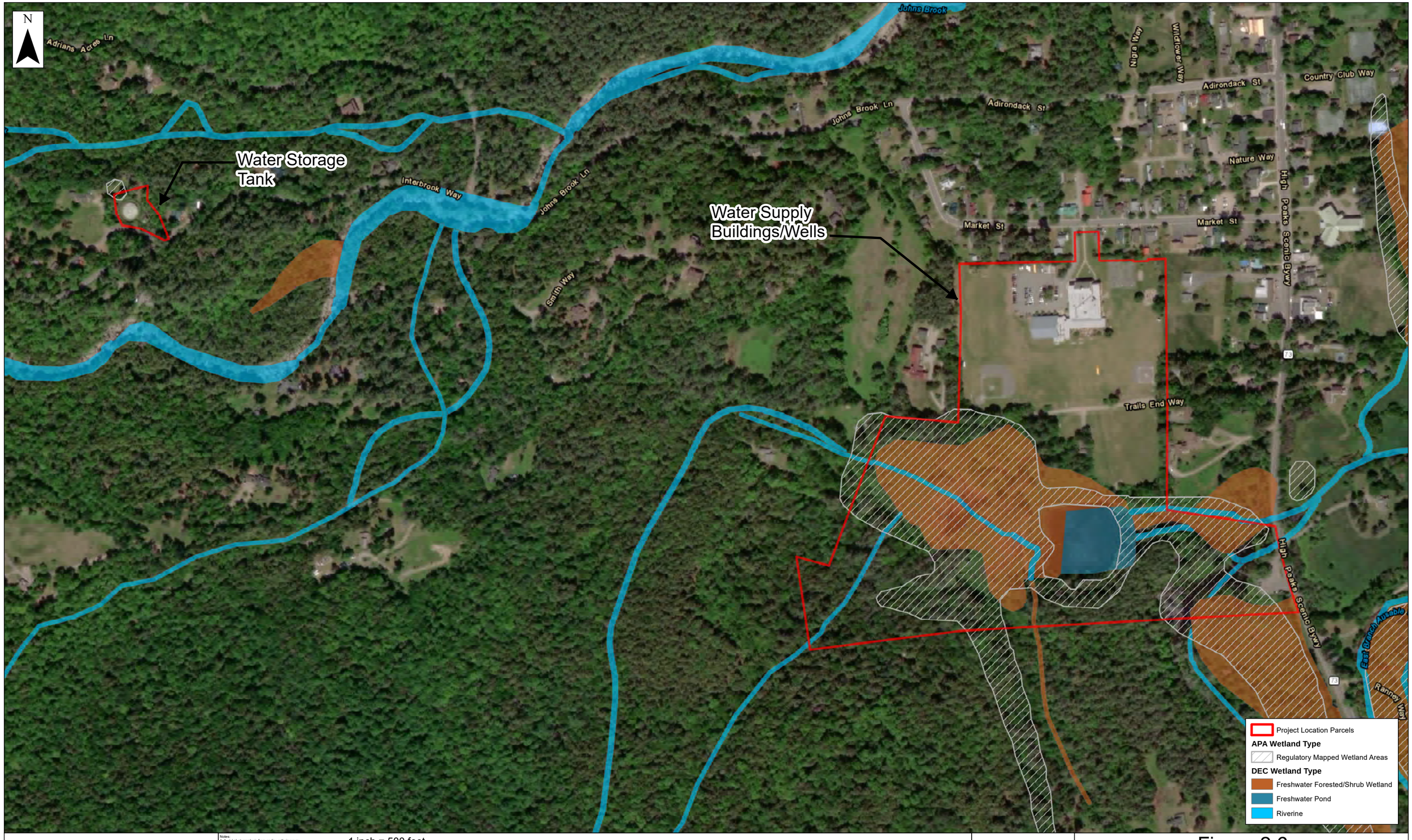
1 inch = 500 feet

0 130 260 520 Feet

4893
Water District #2
Well Field Evaluation

Figure 2.5.3: USDA Depth to Water Table Soil Map

Soil Depth to The Water Table at Site in the Town of Keene



AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile.
Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile.
Tax map line do not accurately depict the true location of property lines.
For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 007 APA DEC Wetland
Date: 8/28/2020

1 inch = 500 feet

0 130 260 520
Feet

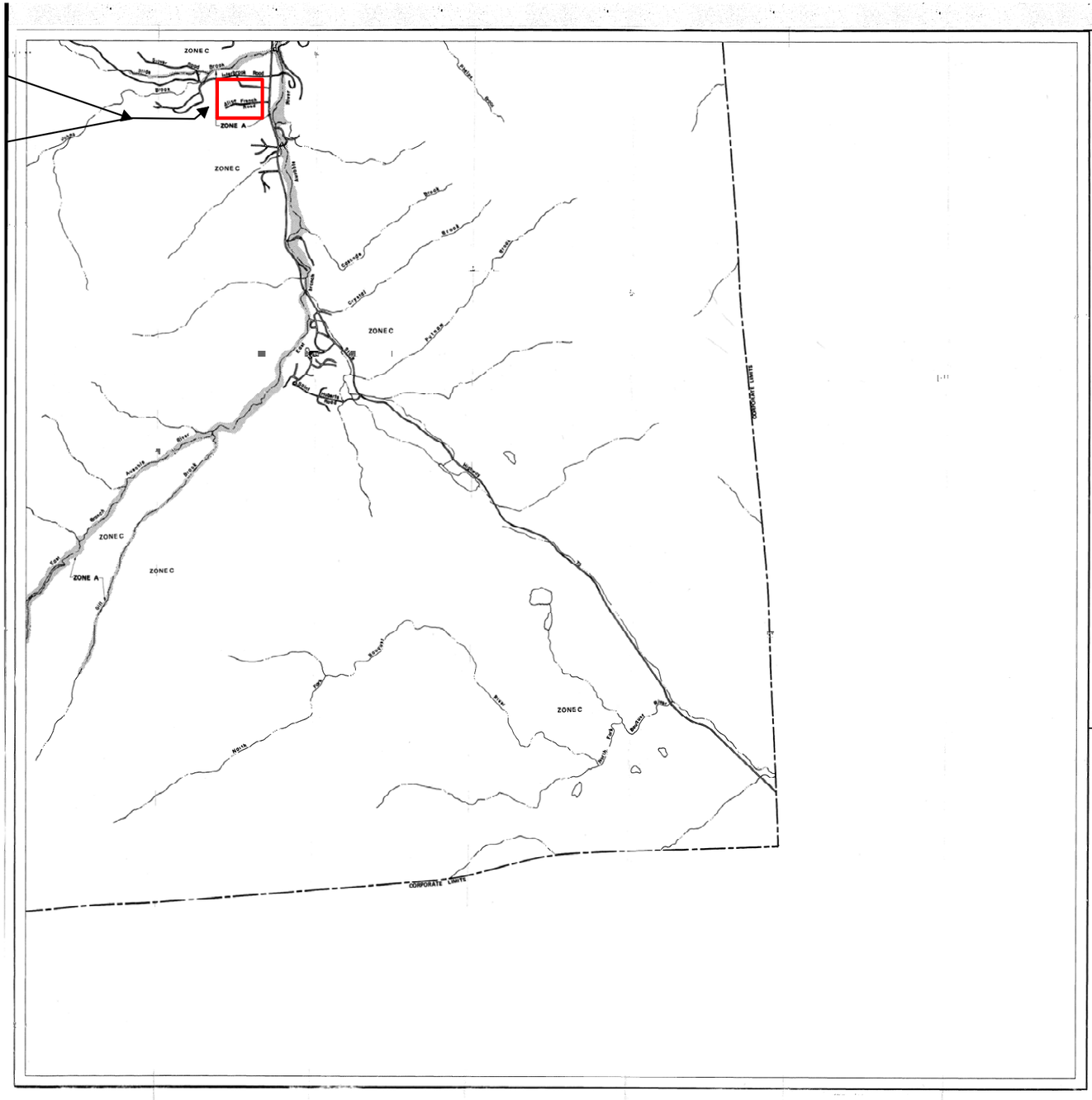
4893
Water District #2
Well Field Evaluation

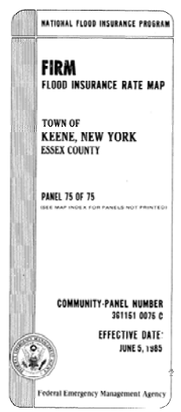
Figure 2.6:
APA & DEC Wetland Map
Wetland Delineations around the Site in the Town of Keene

N

Water Supply Buildings/Wells

Water Storage Tank





AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

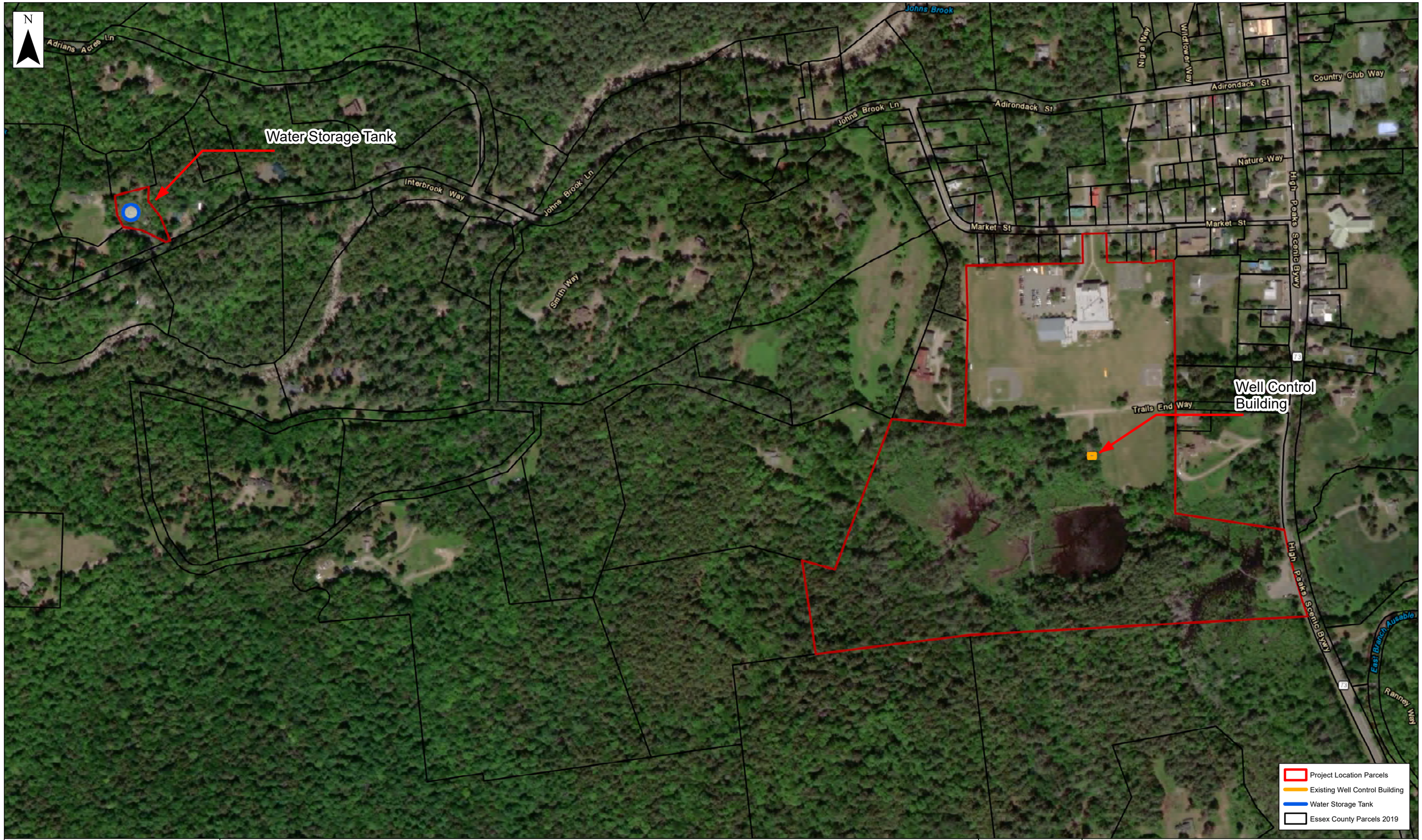
Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile. Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile. Tax map line do not accurately depict the true location of property lines. For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 008 FEMA
Date: 8/28/2020

1 inch = 10 feet

0 2.5 5 10
Feet

4893
Water District #2
Well Field Evaluation

Figure 2.7:
FEMA Flood Insurance Rate Map
FEMA Firmette Map for the Town of Keen



AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile.
Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile.
Tax map line do not accurately depict the true location of property lines. For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 008 Existing water Supply and Storage
Date: 9/16/2020

1 inch = 500 feet

0 130 260 520 Feet

4893
Water District #2
Well Field Evaluation

Figure 2.8:
Existing Water Supply and Storage
Existing Water Supply Buildings and Water Storage Tower

AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile.
Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile.
Tax map line do not accurately depict the true location of property lines. For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 010 Existing Well Field
Date: 8/28/2020

1 inch = 500 feet
0 125 250 500
Feet

4893
Water District #2
Well Field Evaluation

Figure 2.9:
Existing Well Field Map
Details of the Project Site's Existing Well Field

AES
10 -12 City Hall Place, Plattsbugh, New York 12901
Phone: (518) 561-1598 Fax: (518) 561-1990
www.aesnortheast.com

Notes:
1. Aerial photography is from on-line orthoimagery provided by ESRI ArcMap program.
2. Tax map parcel numbers, parcel lines, and owner names are from AES's version of the 2018 County GIS shapefile.
Parcel lines have been digitized by County from earlier paper copies of tax maps to create the County GISW shapefile.
Tax map line do not accurately depict the true location of property lines.
For accurate determination of the location of property lines, consult a Land Surveyor licensed by the State of New York.
Document Name: 011 Alternative 1 - Site Plan
Date: 8/28/2020

1 inch = 300 feet

0 75 150 300
Feet

4893
Water District #2
Well Field Evaluation

Figure 5.1:
Alternative 1 - Site Plan
Alternative Number 1 for the Site Plan at Keene School

Table 3.1
Town of Keene
Water District #2 Well Field Evaluation
Alternative Cost Comparison

Description	Alternative 1	Alternative 2
Total Construction Costs	$ 4,211,961.73	$ 2,977,771.22
Engineering, Construction Observation, Legal and Bonding Fees @ 20%	$ 842,392.35	$ 595,554.24
Project Contingencies @ 10%	$ 505,435.41	$ 357,332.55
Escalation @ 15%	$ 833,968.42	$ 589,598.70
Total Cost	$ 6,393,757.90	$ 4,520,256.71

Table 5.1
Town of Keene
Water District #2 Well Field Evaluation
Alternative 1 -- Cost Estimate

	Project Component		Cost
1	Tank Mixing System	$	100,000.00
2	Tank Dechlorination Unit	$	35,000.00
3	Water Meters	$	611,000.00
4	Water Distribution System: Connection to Hiker Center	$	1,024,000.00
5	Replacement Well Field Control Building	$	1,788,561.73
6	Source Development: New Well	$	450,000.00
7	New Well Construction	$	203,400.00
	Subtotal Construction	$	4,211,961.73
	Engineering Services, Construction Observation, Legal and Bonding Fees @ 20%	$	842,392.35
	Project Contingencies @ 10%	$	505,435.41
	Escalation @ 15%	$	833,968.42
	Total Project Costs	**$**	**6,393,757.90**

Table 5.2
Town of Keene
Water District #2 Well Field Evaluation
Project Financing and Proposed User Rates (WIIA Grant)

Total Project Costs

Improvement Projects

Total Proposed Project		**$ 6,393,757.90**
Total Project Cost		**$ 6,393,757.90**

Available Funding

WIIA Grant		$ 3,000,000
Total Loan		$ 3,393,758
Anticipated Loan Period	30 yrs	
Anticipated interest rate	0.00%	
Cost of Loan (Interest and Debt annually)		**$ 113,125.26**

Estimated Cost Per User

Existing Annual Sewer Rates

# of User Units (EDU)s

263 (Users that pay debt)

Summary of Total Costs Per User

Existing User Rate	$	425.00
Proposed Additional Debt	$	430.13
Debt to Retire in 2020	$	70.53
Total Additional Debt	$	359.60
Proposed New Rate	$	784.60

Table 5.3
Town of Keene
Water District #2 Well Field Evaluation
Project Financing and Proposed User Rates (No Grant)

Total Project Costs

Improvement Projects

Total Proposed Project		**$ 6,393,757.90**
Total Project Cost		**$ 6,393,757.90**

Available Funding

WIIA Grant		$ -
Total Loan		$ 6,393,758
Anticipated Loan Period	30 yrs	
Anticipated interest rate	0.00%	
Cost of Loan (Interest and Debt annually)		**$ 213,125.26**

Estimated Cost Per User

Existing Annual Sewer Rates

# of User Units (EDU)s

263 (Users that pay debt)

Summary of Total Costs Per User

Existing User Rate	$	425.00
Proposed Additional Debt	$	810.36
Debt to Retire in 2020	$	70.53
Total Additional Debt	$	739.83
Proposed New Rate	$	1,164.83

APPENDICES

APPENDIX A

RELEVANT DOCUMENTS

Preliminary Report
Proposed Backup Well Source
Town of Keene, New York

Submitted to

The New York State Department of Health
and the New York State Department
of Environmental Conservation

January 7, 2019

A Report By

HydroSource Associates, Inc.

50 Winter Street, P.O. Box 609
Ashland, New Hampshire 03217
(603) 968-3733

Preliminary Report
Proposed New Groundwater Source
Town of Keene, New York,
Village of Keene Valley

submitted to

The New York State Department of Health (NYSDOH)
and The New York State Department
of Environmental Conservation (NYSDEC)

January 7, 2019

1.0 Introduction

The Town of Keene operates a water system serving the hamlet of Keene Valley (Keene Water District #2). The system is served by two bedrock wells at the south edge of the athletic fields adjacent to the local school (Figure 1, Figure 2). The primary well, Well 1, has been a reliable water source for the District since the well was constructed in 1992. However, experience has shown that the second well, Well 2, is not an adequate backup. The Town of Keene made a decision to develop a new backup well on the same property.

The Town hired HydroSource Associates (HSA) to search for an optimum site for a backup well. HSA has been working on this project with guidance from Todd Hodgson of Essex County. HSA carried out tasks including an assessment of background information on the wellfield, review of the site's geology, geophysical surveying, and test drilling. The work culminated in construction of a screened overburden well that is considered likely to be capable of meeting the Town's yield target. The new well is named Well 3.

This report is being submitted to the New York State Department of Health (NYSDOH) and the New York State Department of Environmental Conservation (NYSDEC). The purpose of the report is to provide the agencies with the information they need to make a preliminary judgment on the new well's ability to be approved as a water source for a public water supply. The report includes the following information:

- review of background hydrogeology;
- assessment of the existing wells and wellfield history;
- results of geophysical surveys;
- documentation of construction of the new well;
- preliminary delineation of a Wellhead Protection Area (WHPA);
- inventory of potential contaminant sources, and;
- proposed specifications for a 72-hour pumping test.

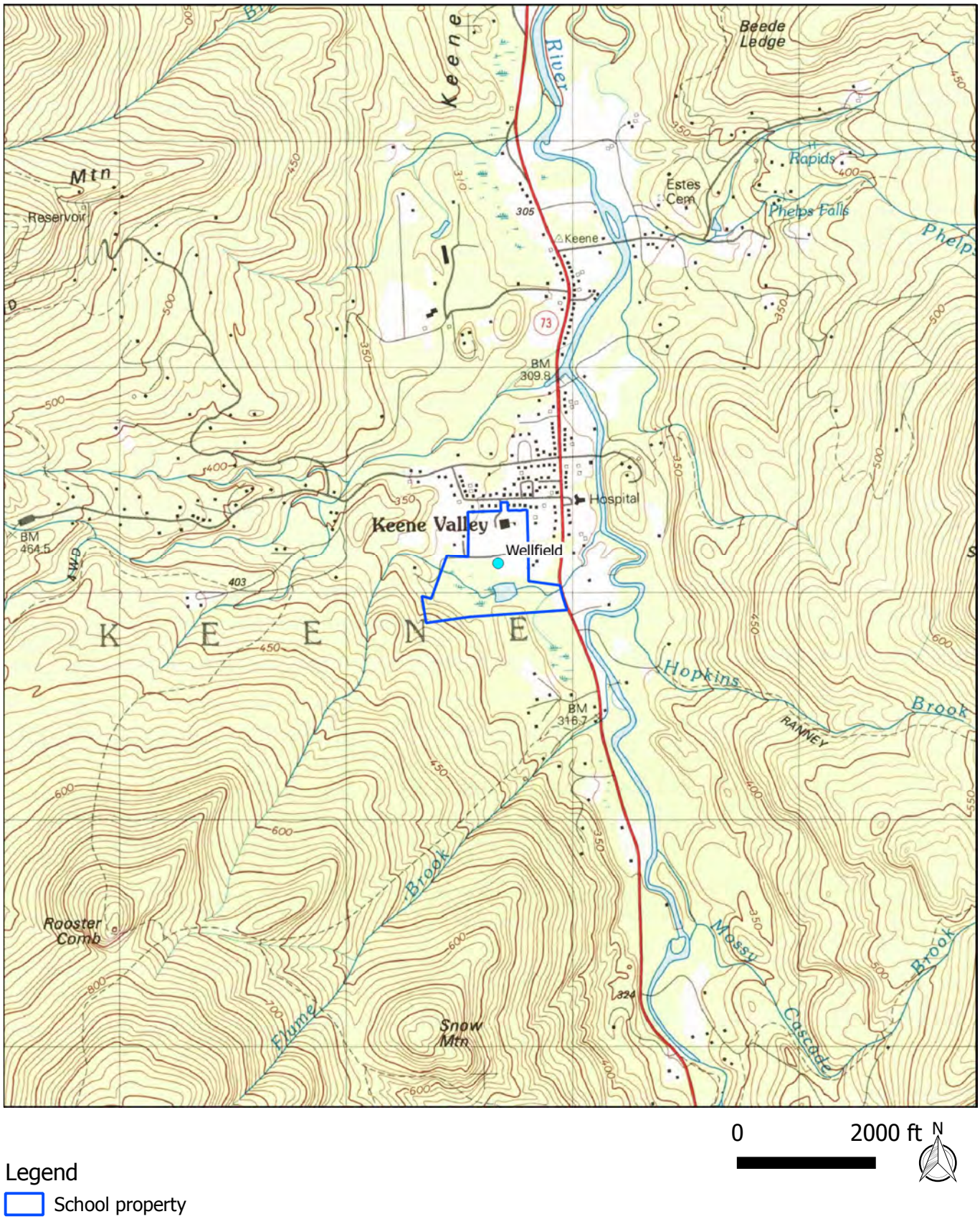


Figure 1 - Location Map

Figure 2 - Well Locations

2.0 Geology

Although the two wells that currently supply water to the Keene Valley system are both bedrock wells, Well 3 is a gravel-pack well completed in a sand layer just above the bedrock surface. Consequently, this report will provide only a brief overview of bedrock geology at the site, and will focus on surficial geology.

Figure 3 is a map of bedrock geology, based on published mapping at a scale of 1:250,000 (Isachsen & Fisher, 1970). All of the bedrock in the Keene region is of Precambrian age. Most of the rock near the wellfield is anorthosite of the Marcy massif, the dominant intrusive body of the Adirondacks Highlands. The intrusion's age is about 1.12 billion years (Williams et al., 2018). Small occurrences of related high-grade metasedimentary rocks can also be seen on Figure 3.

A number of faults are shown on Figure 3. The most prominent set of faults has a northeasterly trend, and the faults at this orientation are part of a family of faults that traverses the Adirondacks Highlands. Some of these faults coincide with well-defined northeast-trending valleys. However, the East Fork of the Ausable River closely coincides with a north-trending fault over much of the length of Keene Valley.

Little evidence of structural disruption is seen in outcrops near the Keene Valley wellfield. The closest exposures of anorthosite west and south of the wellfield are massive, displaying little jointing (Figure 4). Foliation in the anorthosite is visible but subdued.

Figure 5 is a map of the surficial geology of the area surrounding the school property, based on recent mapping of the Keene quadrangle (Clift & Graham, 2013). The majority of the higher-relief areas on both sides of the valley are underlain by glacial till ("diamicton" in the terminology of the published map). The thickness of the till is highly variabled, and anorthosite outcrops are common in the uplands.

Overburden along and near the flat floor of the valley is related either to the glacial lake that occupied the valley roughly 13,000 years ago (lithology code "Ps" of Figure 5), or to subsequent reworking of the glacial sediments by the East Fork of the Ausable River after the ice had retreated and the glacial lake had drained (lithology code "Hs").

Flat-topped delta forms can be seen west and south of the wellfield. Those to the west formed where meltwater streams in the Johns Brook drainage entered the glacial lake. The delta to the south formed at the mouth of the next major drainage to the south, on the east flank of Rooster Comb. Based on the elevation of the flat tops of the delta deposits, the water level in the glacial lake must have persisted at an elevation of about 1100 feet during the time when the neareby deltas were being built out into the lake. The elevation of the wellfield itself is about 1030 feet.

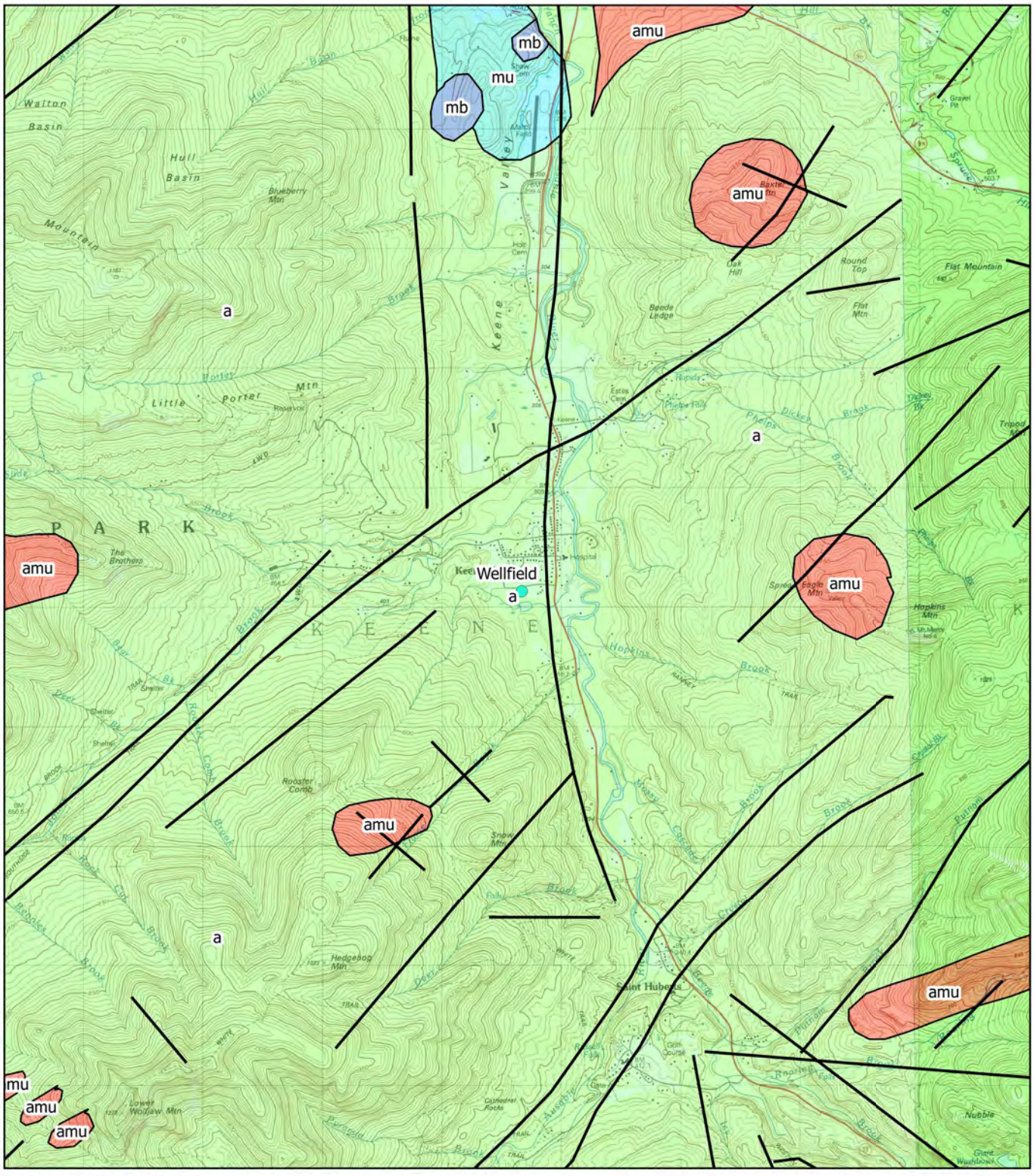


Figure 3 - Bedrock Geology

Figure 4 - Massive Anorthosite Outcrop

The sand and gravel that underlies much of the flat floor of the valley is probably thin in most places. At shallow depth, it is underlain by clay and silt deposited in the glacial lake. At the site of the new well, the silt and clay layer extends to a depth of 99 feet. The material intersected in the wellbore appears to be the classic varved clay that is typically deposited in glacial lakes in the northeast, with each thin varve lamination corresponding to one year's deposition of fine-grained sediment in the quiet water of the lake.

More information on the surfacial geology will be provided in the section covering construction of Well 3.

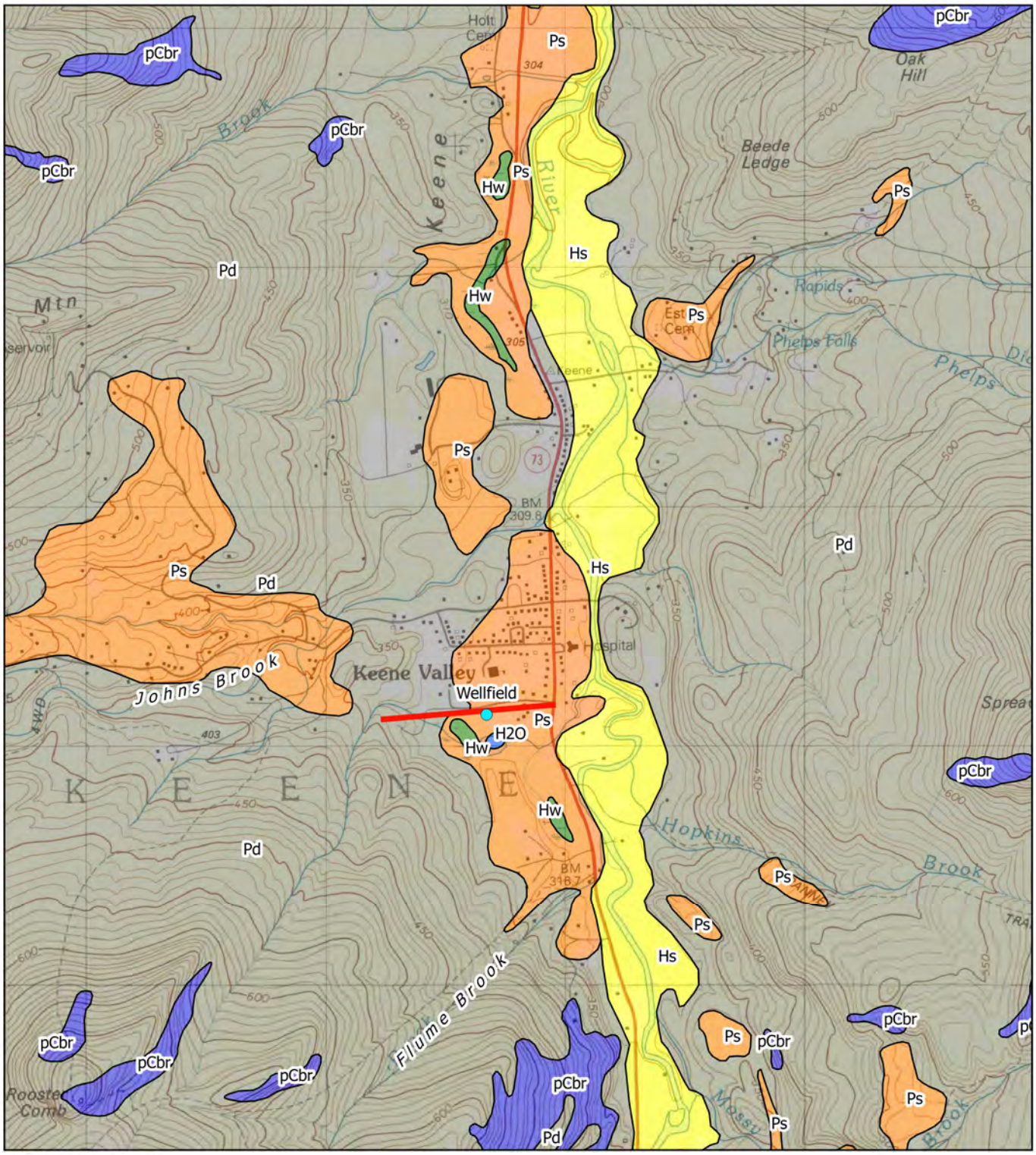


Figure 5 - Surficial Geology

3.0 Existing Wells

Water for Keene Water District #2 presently is supplied by Wells 1 and 2. Both of these bedrock wells were drilled and installed by Boyd Artesian Well in the 1990s on the property of Keene Central School, at the south end of the school's athletic fields. Figure 6 shows the locations of the wells in the existing wellfield, along with the location of Well 3 and two resistivity survey lines that are discussed in the next section. Testing done in 2006 indicated that the sustainable yield of Well 1 is more than 200 gallons per minute (gpm), and the well has been shown to be capable of satisfying the system's needs since it first went online. Well 2, the backup water supply, is less productive. Although 2006 testing reportedly had indicated the well could sustainably produce as much as 150 gpm, the Town's operational experience since that time has indicated the yield is much lower.

The informal driller's log from Boyd Artesian Well provided in the 2006 Caswell report confirms that Well 1 has always been substantially more productive than Well 2. The Caswell report is provided in Appendix A. Well 1 had an airlift yield of 300 gpm at the end of drilling. The well was drilled through the overburden by advancing eight-inch-diameter steel casing to a depth of 98 feet. The driller's notes say that an Odex drive shoe was used, which means that it should have been possible to collect representative samples of the overburden during drilling. However, the notes include no information on the sediments, and therefore it is not known whether the water-bearing potential of the sedimentary aquifer was seriously considered when the wells were drilled. It can be assumed that the casing was seated one or two feet into solid bedrock, which means that the unconsolidated sediments at Well 1 are no more than 96 feet thick.

The driller's log reports that Well 1 contained a single water-bearing fracture at a depth of 138 to 140 feet. At the end of drilling to the well's final depth of 270 feet, the airlift yield was reported as 300 gpm. A 72-hour pumping test was conducted at a rate of 221 gpm, and by the end of the test pumping had produced 27.5 feet of drawdown, to a final level of 40 feet.

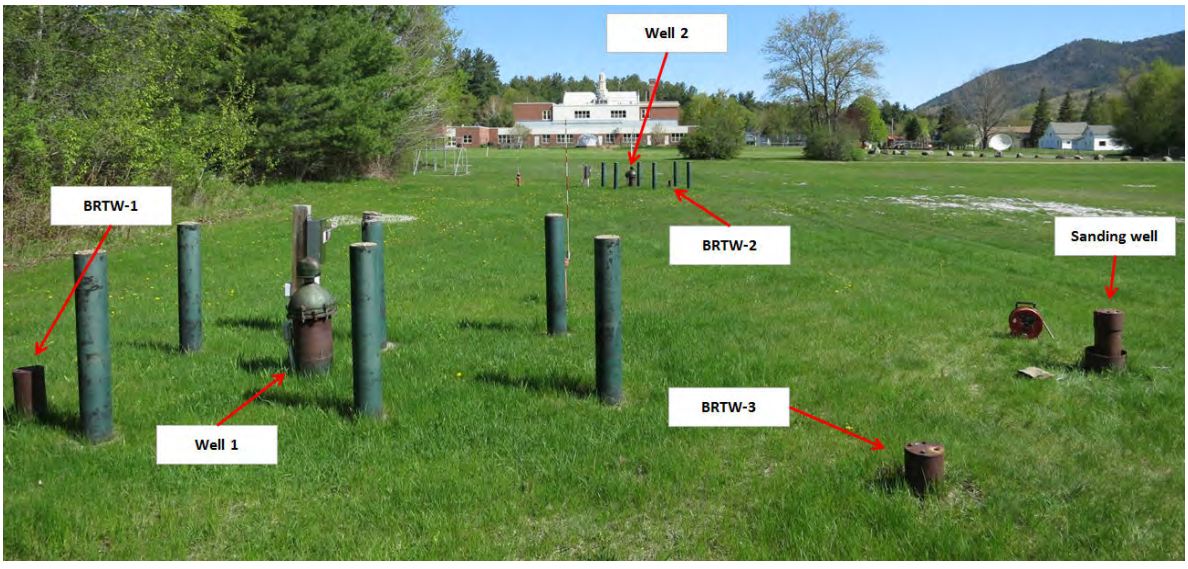
Well 2 was drilled using the same Odex casing advancement method. This well used 80 feet of eight-inch casing, indicating that bedrock is a little shallower at this site. Well 2 was initially drilled to a depth of 270 feet, with a reported airlift yield of 70 gpm at that depth. The notes do not report the depth of water-bearing fractures. The well was deepened to 395 feet, and a fracture producing an additional 50 gpm was encountered at 390 feet, resulting in a total airlift yield of 120 gpm. Caswell estimated that the sustainable yield of Well 2 was "in the range of 140 to 150 gpm," but the Town's experience using the well shows that this estimate was too optimistic.

Figure 6 - Wellfield and Resistivity Lines

Figure 6 shows a well labeled "sanding well" that is only about 15 feet east of Well 1. Figure 7 is a photograph of the existing wellfield facing north that includes this well. The Town has little information on the sanding well. It evidently was sited close to Well 1 to try to tap the same fracture that accounts for the primary well's productivity. The well is reported to have shown a yield of 300 gpm, but it had chronic sand production problems. The source of the sand is unknown. One possibility is that the casing was not seated deeply enough into bedrock, allowing sand at the bedrock surface to leak into the borehole. Another possibility is that shallow fractures are providing a sand pathway between where the fractures reach the bedrock surface and where they intersect the borehole. The Town concluded that further investment in this well was not prudent. NYSDOH requested that the Town properly abandon the well, and the Town plans to do this after Well 3 has been permitted.

Note that Figure 7 shows three wells that have not been previously discussed. We have not encountered records on these three wells, which appear to be six-inch-diameter bedrock test wells that were drilled prior to construction of each of the larger-diameter wells . We have arbitrarily assigned names to these wells, using the prefix "BRTW" to stand for "BedRock Test Well." Well BRTW-1 is about five feet from Well 1; Well BRTW-2 is the same distance from Well 2; and Well BRTW-3 is the same distance from the sanding well. These wells will be used as aquifer monitoring points during the constant rate test of Well 3.

Figure 7 - Existing Wells, View North



4.0 Geophysical Surveys

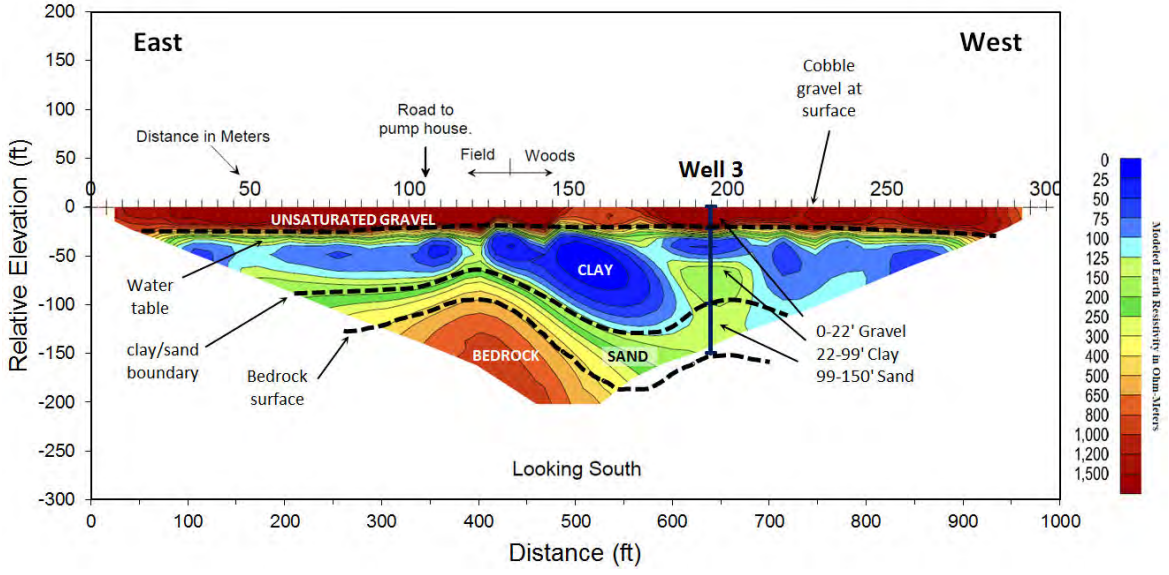
Resistivity surveys were conducted along two lines during the week of August 14, 2017. The line locations are shown in Figure 6. Figure 8 is the resistivity profile along Line 1, which also shows where Well 3 was drilled on the line, and includes a simplified description of the sedimentary sequence encountered in the well.

Inspection of Figure 8 shows a thin near-surface layer protrayed in shades of red. This relatively high-resistivity material is the unsaturated sediment layer above the water table. HSA's interpretation of the water table position is shown by the upper dashed black line.

Beneath that is a zone shown mostly in the shades of blue and green that represent lower resistivities. The regions in shades of blue probably roughly concide with the lakebed clay and silt layer. Under this layer is a region of intermediate resistivity portrayed in green and yellow. At the position of Well 3 on the resistivity line, much of this interval corresponded with fine-grained to medium-grained sand. Indeed, the Well 3 site was chosen because the low-resistivity layer (the lakebed clay) appeared to be interrupted at that location by material with higher resistivity, in the range that often would be associated with coarse-grained sand and gravel. This will be discussed further in the section on drilling of Well 3.

Finally, a zone of higher resistivity is shown near the middle of the line, and this has been interpreted as representing bedrock. The dashed line marking the interpreted bedrock surface shows an irregular surface, with bedrock coming within 100 feet of the ground surface about 250 feet east of Well 3. The depth to bedrock at the existing wells is around 100 feet, which confirms the interpretation of shallowing bedrock for at least a short distance toward the east. The topography of the shallow-to-bedrock uplands immediately to the southwest of the well site shows a strong northeast-trending ribbed pattern. There is no reason to expect that this ribbed bedrock topography pattern would not persist at depth beneath the wellfield.

Figure 8 - Line 1 Resistivity Profile



5.0 Well 3

Typically on a project like this one, construction of a production well at a previously untested site would be preceded by drilling of a six-inch-diameter test well to confirm the existence of an aquifer with the potential to meet a project's yield target. In this case, the Town made a decision to forego construction of a test well, and instead to move directly to installing a well with a diameter large enough to be used as a supply well, assuming that the Town's yield and water quality criteria were satisfied. A well with a diameter of eight inches was judged to be adequate to produce the volume of water required by the system, and the Town was willing to risk the incremental cost associated with the larger diameter.

5.1 Construction - The plan was to advance eight-inch casing to the bedrock surface, assessing the potential of sand and gravel deposits in the unconsolidated overburden. If insufficient potential had been seen in the overburden, the well was to be continued deeper to test the bedrock. As it happened, a productive sand layer was encountered in the sediments just above the bedrock surface, so that testing of the bedrock became unnecessary.

The Well 3 borehole was drilled on October 24, 2018 by Layne Christensen using a dual-rotary drill rig (Figure 9). Drilling began with advancement of temporary 12-inch-diameter surface casing to a depth of 25 feet. After that, eight-inch diameter casing was telescoped inside the surface casing, and advanced to the bedrock surface, which was encountered at a depth of 150 feet. Bedrock is fresh anorthosite similar to the rock in nearby outcrops (Figure 4).

The uppermost 22 feet of sediment is cobble gravel. This is underlain by varved gray lakebed clay that continues to a depth of 99 feet. The clay overlies brown, silty fine-grained sand that grades into medium-grained to coarse-grained sand beginning at 107 feet. The medium/coarse sand layer is quite uniform. It continues with little obvious grain size variation to the bedrock surface at 150 feet, with the addition of scattered pebbles in the last eight feet.

Sediment samples were collected at two-foot intervals beginning at a depth of 105 feet, and continuing to 150 feet. Each sample was split, with one sample set retained by Layne and the other by HSA. The two companies independently conducted grain size frequency analysis for the samples in the interval of interest.

The result of the sieve analysis confirmed the subjective observation that the sand is remarkably uniform. The sieve results were used to generate a custom screen design, following standard industry practices. The screen design is a simple one, consisting of 15-slot wire-wrap screen in the interval from 120 feet down to 150 feet. This puts the top of the screened interval 13 feet below the base of the fine-grained sand layer.

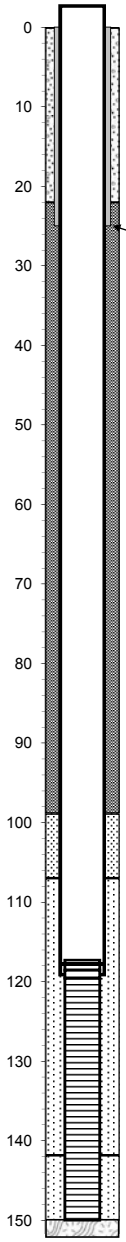
The screen was installed on November 27. From top to bottom, the screen assembly consists of: a K-packer (6 inches long) that snugly fits inside the eight-inch casing; tightwound screen (2 feet long); the 15-slot stainless steel wire-wrap screen (30 feet long); and a stainless steel end cap. After the screen assembly had been set at the intended depth, the eight-inch casing was withdrawn far enough to expose the entire length of screen.

Figure 9 - Keene Valley Well 3 Graphic Log

Project: Keene Valley
Well: Well 3
Completion date: 11/28/18
Well depth: 150 ft

Yield: 90 gpm
Driller: Layne
Water Level: 17.5 ft below TOC

Graphic Log



Lithology

0-22: Cobble gravel with fine-grained matrix.

22-99: Gray glacial lakebed varved clay.

Grouted around 8" casing to 25 ft.

99-107: Brown silty FG sand.

107-142: Brown M-C sand; uniform; feldspar-qtz-px-garnets.

142-150: Brown M-C sand with scattered pebbles.

150-152: Fresh light green anorthosite.

NOTES: Drilled by casing advancement. 12" surface casing to 25 ft. 8" casing to 150 ft. Collected sediment samples at 2' intervals from 105' downward. 15-slot screen from 120 to 150 ft. Top of K-packer at 117 ft. Pressure-grouted annular space around 8" casing, withdrew surface casing.

5.2 Development - The well was developed using the pump-and-surge method. Pumping was done by injecting compressed air into an eductor tube whose open end was just above the surge block. The procedure involved stationing the surge block within a given screen interval for a limited period of time. That time was broken up into alternating periods of pumping with surging, surging alone, or pumping alone. Then, the surge block was moved to the next depth interval (higher or lower), and the process was repeated. Observations were made periodically of the rate of sand production, and observations of specific capacity were made once or twice each day. Multiple passes were made through the screened interval. A total of 24 hours of development time was applied.

The pumping rate during the development process was consistently about 90 gpm. There was little change in the well's specific capacity over the course of the development period. Specific capacity generally varied between 15 and 16 gpm/ft, corresponding to a little less than 6 feet of drawdown at 90 gpm. The sediment production rate during surging gradually diminished with development time. By the time the operation had been completed, sand production was reported to be negligible under surging conditions, and pumping without surging resulted in sand-free water production at 90 gpm.

5.3 Step Test - A step test was conducted on Well 3 on December 6. The test consisted of six rate steps, each lasting one hour, with rates ranging from 125 gpm to 300 gpm (Figure 10). The static water level was 17.28 feet below the top of the casing, and the stickup of the measuring point above ground surface was about four feet. Recovery measurements were made for 30 minutes after the end of the 300-gpm step.

Inspection of Figure 10 shows that each rate increase was marked by a brief immediate water level decline, followed by a period of relatively stable water levels for the remainder of the step. The greatest water level depth at the end of the 300-gpm step was 42.44 feet, for drawdown of 25.16 feet and a specific capacity of 11.92 gpm/ft. Shutdown of the pump at the end of the test resulted in recovery of most of the drawdown in the first minute, followed by a period of slower continued recovery.

Figure 10 - Step Test Water Levels

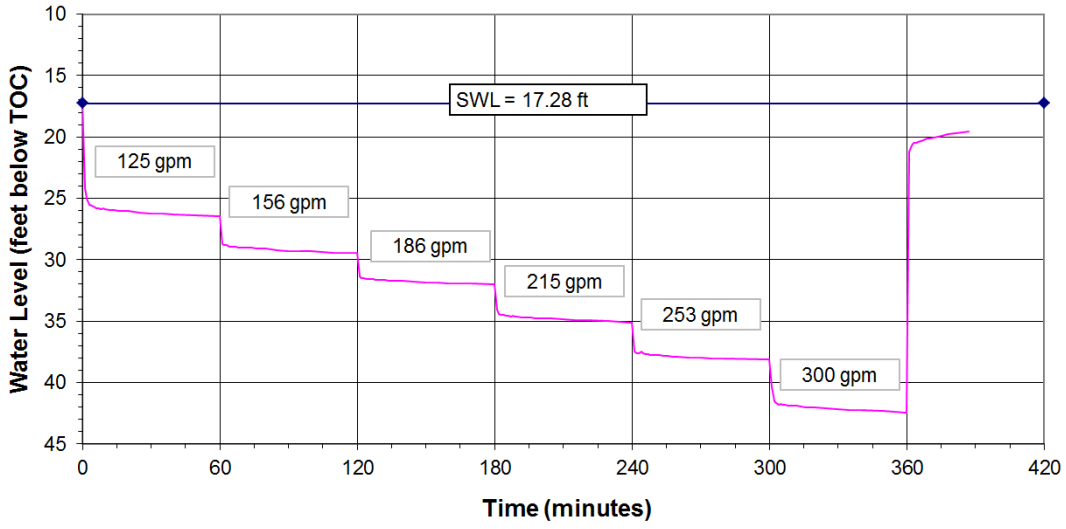


Figure 11 shows the same data, with the horizontal time axis shown as a logarithmic scale, and with data plotted with respect to minutes since the start of each step, or since the start of recovery. The curves for all of the rate steps show subhorizontal trends, and the water level appeared to have approached stabilization by the end of each step. Recovery performance appears strong.

Figure 11 - Semilog Water Level Graph

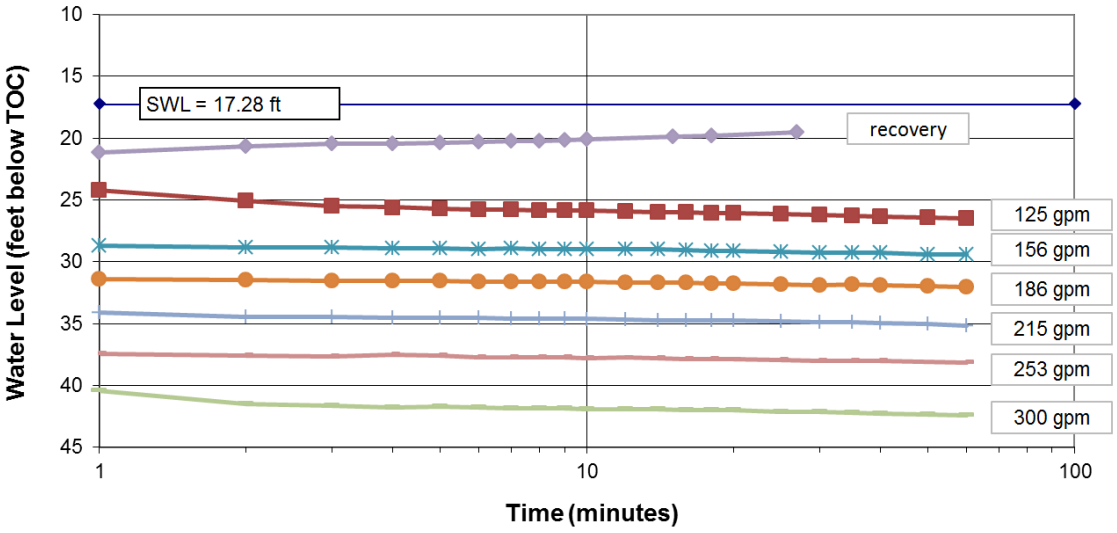
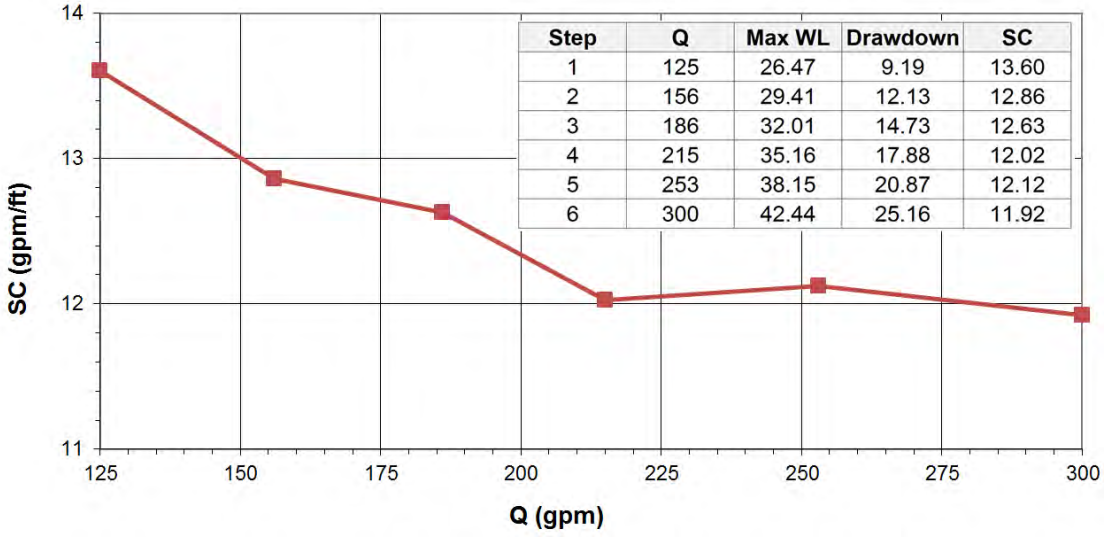


Figure 12 shows the variation of specific capacity vs. flow rate for the six flow rate steps. Specific capacity remained within a relatively restricted range, varying from 13.60 gpm/ft at 125 gpm to 11.92 gpm/ft at 300 gpm.

Figure 12 - Variation of Specific Capacity vs. Flow Rate



Step	Q	Max WL	Drawdown	SC
1	125	26.47	9.19	13.60
2	156	29.41	12.13	12.86
3	186	32.01	14.73	12.63
4	215	35.16	17.88	12.02
5	253	38.15	20.87	12.12
6	300	42.44	25.16	11.92

The top of the screen in Well 3 is at a depth of 120 feet. Assuming that the well were to be outfitted with a pump with an intake screen at 110 feet, and assuming a water level 13 feet below ground surface, then available drawdown would amount to 97 feet. Thus, the drawdown produced by the 300-gpm step amounted to about 25% of available drawdown.

Water samples were collected from the Well 3 discharge stream near the end of the final step, and were analyzed for a range of water quality parameters. Results for a few key parameters are provided in Table 1, and lab reports are provided in Appendix B.

Overall, water quality looks to be quite good. No parameter was present above its allowable Maximum Contaminant Level (MCL). No volatile organic compounds were detected. The common "nuisance" parameters iron and manganese were both below lab detection limits. Hardness, at 65 mg/L, is below the value of 100 mg/L that marks the division between "soft" and "hard" water. The level of total dissolved solids (93 mg/L) is modest.

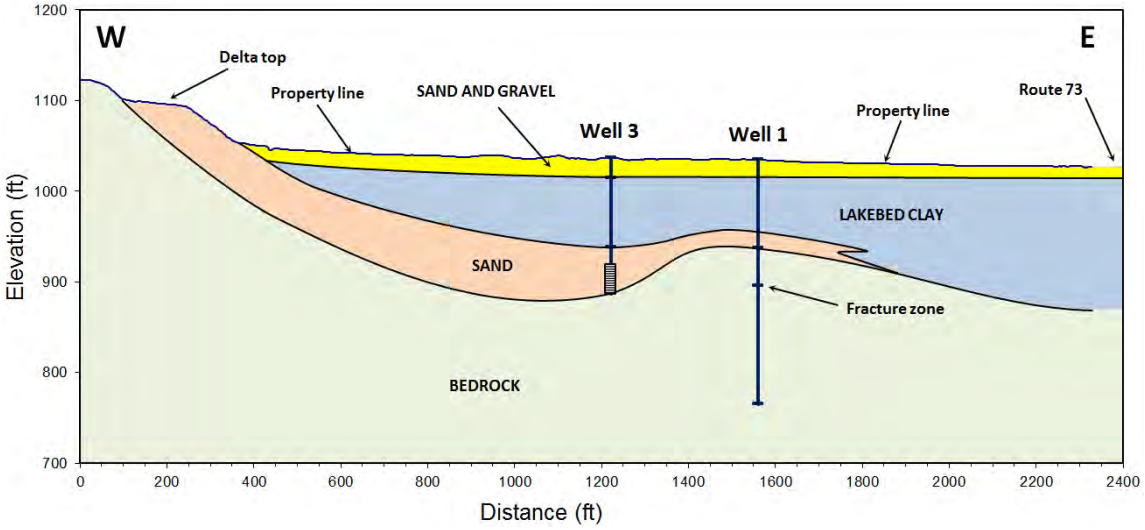
Parameter	Result	Units
Chloride	16.0	mg/L
Fluoride	<0.5	mg/L
Nitrate	<0.5	mg/L
Nitrite	<0.5	mg/L
Sulfate	6.0	mg/L
Iron	<0.020	mg/L
Manganese	<0.004	mg/L
Sodium	8	mg/L
Hardness	65	mg/L
pH	7.5	-
TDS	93	mg/L
Alkalinity	40	mg/L
Gross Alpha	0.4 +/- 0.7	pCi/L
Uranium	<0.001	mg/L

6.0 Conceptual Model

Figure 13 is a schematic east-west cross section through the Well 3 site, from Route 73 on the east through the delta on the line's west end. Well 1 has been projected onto the plane of the section. The section has a vertical exaggeration of 2:1. The location of the section line is shown on Figure 5. The water table has not been shown on the cross section because it is not practical to show it at the scale of the section, but water was about 13 feet below ground surface at Well 3 when the step test was run.

The cross section shows the bedrock surface as irregular. The depth to bedrock is 150 feet at Well 3, but only 98 feet at Well 1. The shape of the bedrock surface has also been drawn to generally honor the pattern seen in the resistivity profile (Figure 8). It is worth noting that the main water-bearing fracture in Well 1 is at about the same elevation as the bedrock surface at Well 3.

Figure 13 - Cross Section



The cross section shows the sand layer tapped by Well 3 as being continuous with the delta to the west, but that does not mean that the sand layer at Well 3 was being deposited at the same time as the delta in the cross section was being built out into the lake. The delta top at 1,100 feet might be graded to one of the later, lower levels of the glacial lake that occupied the valley. Clearly, the sand layer tapped by Well 3 must have been deposited very early in the glacial lake's history, because it is the first sediment deposited after the ice left the bedrock surface exposed. The lake level at the time of the sand's deposition may have been considerably higher than the level of the delta top in the section. The important point is that the sand is likely to extend relatively continuously toward the west valley wall, since tributary streams and the shore of the lake along that adjacent valley wall are the likeliest source of the sediment. If the sand layer is indeed continuous to the west, then water flowing toward Well 3 will likely have originated in the upgradient western watershed areas.

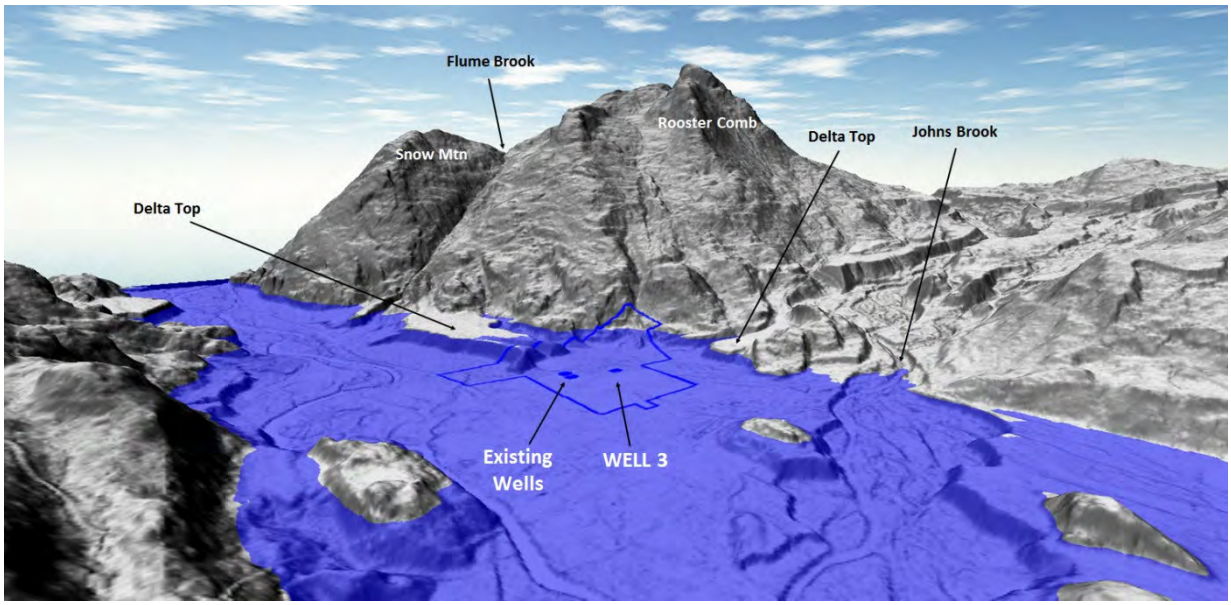
The cross section shows the basal sand interval pinching out east of Well 1. The presence of the sanding well suggests that the sand layer must persist at least as far east as that well. As already discussed, it seems likely that the source of the sand entering the well must be a shallow fracture connecting the wellbore at a point just below the bottom of the casing. The fracture must have a steady source of sand from the point where the fracture intersects the bedrock surface nearby, and thus there must be a layer of sand directly overlying bedrock in that area. The large volume of water produced by this well (reportedly around 300 gpm) also would be consistent with a good connection to a prolific aquifer in the sediments at the bedrock surface. If this explanation is correct, then it seems reasonable to expect that the 72-hour pumping test of Well 3 will produce a well-defined impact at the sanding well.

The layer of varved clay overlying the sand might represent several hundred years of deposition in the glacial lake. The thick clay layer would be expected to provide ample protection from surface contamination at the well site, or from points to the east.

Figure 14 is a perspective view of Keene Valley looking toward the southwest. The image is a hillshaded digital elevation model, and like the cross section it uses a vertical exaggeration of 2:1. The wells are labeled, and the school property is shown by the dark blue line. The translucent blue surface, at the modern-day elevation of 1,100 feet, is intended to show the glacial lake level when the flat-topped deltas nearest the wellfield were forming, graded to the lake level at their time of formation (the modifer "modern-day" being necessary because isostatic rebound following removal of the ice sheet was incomplete when the glacial lake occupied the valley).

Two such deltas are labeled, one of them coming out of the Johns Brook drainage, the other growing from the mouth of Flume Brook. The image makes it clear that the basal sand tapped by Well 3 must have been transported by meltwater originating from the tributary drainages on the west side of the valley. It should also be kept in mind that when the glacial lake first became established and the basal sand was being deposited, much of the valley may still have been occupied by residual ice that could have limited the available pathways for meltwater flow. Thus the productive sand layer could represent delta foreset beds, the distal facies of beach deposits, or deposition from higher-velocity meltwater flowing between remnant ice chunks partly floating in the lake.

Figure 14 - Perspective View toward Southwest



7.0 Wellhead Protection Area (WHPA) and Potential Contaminant Sources

Figure 15 shows the proposed WHPA around Well 3. This preliminary WHPA takes in an area of roughly 1,000 acres. The WHPA was delineated by starting with the assumption that the cone of depression associated with the proposed groundwater withdrawal would extend 1,000 feet from Well 3 in the unconsolidated sedimentary aquifer. The WHPA was then drawn to enclose this 1000-foot radius, plus a small buffer, and to take in the upgradient watershed area beyond the extent of the glacial sediment aquifer. This includes the high-relief slopes south and west of Trail End Road, which are exposed bedrock or covered with a thin layer of till. The eastern boundary of the WHPA is taken as the East Branch Ausable River. The WHPA will be refined as necessary based on water level observations made during the 72-hour pumping test of Well 3.

A preliminary review was made of potential sources of groundwater contamination in the area surrounding the proposed well site. Only a few potential contaminant sources have been identified, and these are shown on Figure 15. A query was made of the NYSDEC database of bulk storage tanks. The three sites within the WHPA having database entries are listed in Table 2, and their locations are shown on Figure 15, marked by the map codes shown in the table. Tanks at two of the sites remain in use, but those at the Keene Valley Garage have been closed.

A query was made of the NYSDEC spills database, covering spills that occurred over the past 10 years (Table 3, Figure 15). Only one spill with a known mapped location appears to have occurred within the WHPA, and that was a half-gallon of gasoline, apparently at one of the underground tanks at the school. The only other spill having a definite location within the map view of Figure 15 is a spill of fuel oil that occurred one-quarter mile downstream from the edge of the WHPA near the junction of Johns Brook with the East Branch Ausable River.

Two spills of transformer oil occurred at unspecified locations along Route 73, but whether the location of either one was in the WHPA is not known. An unknown quantity of transmission fluid was spilled somewhere along Johns Brook in 2008, presumably from a motor vehicle accident. None of the spills listed in the database would appear to constitute a serious contaminant threat to the Well 3 aquifer.

Table 2 - Petroleum Storage Tanks

Map Code	NYSDEC Site #	Facility Name	Status	Active Tanks	Closed/ Removed
1	5-076279	Keene Central School District	Active	4	6
2	5-299634	Keene Valley Garage	Closed	0	10
3	5-488755	Keene Valley Neighborhood Services	Active	2	1

Table 3 - Spills

Map Code	NYSDEC ID	Spill Date	Date Reported	Closed Date	Material	Amount	Resource Affected
1	1206933	9/18/2012	10/15/2012	3/12/2013	gasoline	0.5 gal	unknown
2	1106393	8/30/2011	8/30/2011	8/30/2011	#2 fuel oil	130 gal	soil, GW
-	1107166	9/8/2011	9/8/2011	9/8/2011	transformer oil	65 gal	soil, SW (Ausable River)
-	1205736	9/8/2012	9/8/2012	9/9/2012	non-PCB oil	2 gal	soil
-	712101	2/16/2008	2/16/2008	2/22/2008	transmission fluid	unknown	SW (Johns Brook)

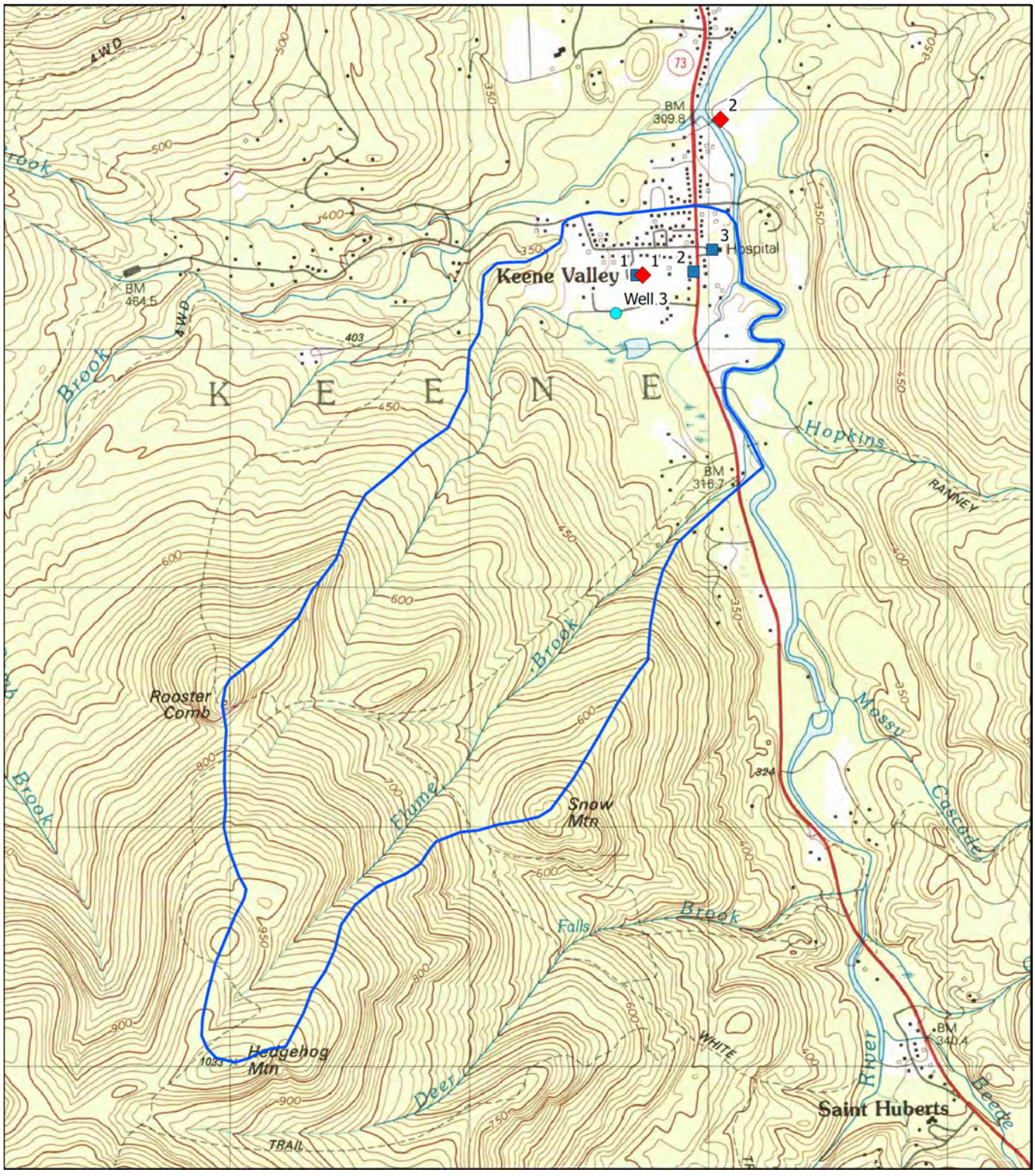


Figure 15 - WHPA & Potential Contaminant Sources

A query of the NYSDEC Environmental Site Remediation database turned up no entries in or near the WHPA.

Most of the area inside the WHPA is mountainous, undeveloped forest, in which little activity takes place that would be considered to present a threat to groundwater quality. Land uses on the valley floor at the north end of the WHPA include residential housing, the school, and a few commercial establishments along Route 73 that do not involve routine handling of hazardous materials. It is assumed that fertilizer and pesticides may be applied to the school's athletic fields. The nearest commercial establishment is the Trails End Bed & Breakfast, 500 feet northwest of the well. Overall, the WHPA contains few sites hosting land uses that appear to pose a contamination risk. Beyond that, the thick layer of lakebed clay and silt that overlies the aquifer should provide excellent protection from local contaminant releases at the surface.

8.0 Pumping Test

Well 3 will be subjected to a 72-hour pumping test. The test will be preceded by a seven-day ambient conditions monitoring period. Based on the results of the step test, the targeted pumping rate for the 72-hour test will be 250 gpm. Water samples will be collected at the end of the pumping period, and analyzed for the parameters required under Part 5 of the NYSDOH regulations governing water quality standards for public drinking water sources.

Wellhead Setup - A submersible pump will be set just above the top of the screen assembly in Well 3. The pump will be powered by a portable generator. A plastic monitoring tube will be installed in the well, to eliminate the risk that the water level probe could get tangled with the pump's power cable.

A gate valve that permits precise control of the flow rate will be installed at the wellhead. A sampling spigot will be installed in the same area. The flow rate will be measured using an orifice weir that is appropriately sized for the planned pumping rate.

Monitoring Points - Points to be monitored during the pumping test are shown in Figure 16 and listed in Table 4. Plans call for monitoring water levels in: the pumping well, Well 3; Wells BRTW-1 and BRTW-2, the six-inch-diameter bedrock test wells adjacent to Well 1 and Well 2; and the sanding well. BRTW-1 and BRTW-2 are believed to be completed in the bedrock aquifer, and presumably are open to the main water-bearing fractures in the adjacent large-diameter wells.

The sanding well is considered to constitute a reasonable substitute for a monitoring well completed in the basal sand. The well's chronic sand production problem under pumping conditions suggests that near-surface fractures are providing a direct pathway for movement of sand from the bedrock surface into the well. If the fractures permit that much sand production, they may also provide a good hydraulic connection between the sanding well and the basal sand layer.

Figure 16 - Monitoring Points

Table 4 - Monitoring Points

Point	Distance (ft)	Monitoring Schedule
Wells		
Well 3	-	A
BRTW-2	380	B
BRTW-1	400	B
Sanding well	408	B
PZ-1	75	C
Staff Gage		
SG-1	380	C
Discharge		
Discharge point	450	-

A well point will be driven a few feet into the sediments beyond the end of the Well 3 drill pad (Figure 16). The water table is quite close to the surface in that area. A staff gage will be installed in the wetland southwest of Well 3.

A rain gage will be set up on the site at the beginning of the monitoring period. For parts of the monitoring period when personnel are not at the site, weather data gathered at the site may be supplemented with data from the nearest recording weather station, which is four miles north in Keene.

The orifice weir will be set up at the edge of the pond south of the existing wellfield, about 450 feet from Well 3. At the point where discharged water strikes the ground, the ground surface will be protected from erosion using plywood or plastic sheeting.

Monitoring Schedule - Letter codes in Table 4 refer to different monitoring schedules in Table 5. The testing period is divided into ambient conditions, pumping period, and recovery period categories. The ambient conditions monitoring period will have a duration of seven days. The pumping period will be 72 hours. Recovery measurements will be made until 90% recovery has been achieved, but at least for 24 hours.

Water levels will be measured manually using a Solinst-style water level probe in Well 3 for the pumping period and the beginning of the recovery period. A pressure transducer will be used to measure water levels in that well during the ambient conditions period and the later part of the recovery period. Transducers will be used in the other wells. Water levels will be measured manually in the shallow piezometer.

Table 5 - Monitoring Schedule

Schedule	Methods/Monitoring Frequency
A	Ambient conditions period: transducer, 15 minute intervals.
	Pumping period: manual; once a minute through 10 minutes; once every two minutes through 20 minutes; once every five minutes through 50 minutes; once every 10 minutes through 120 minutes; hourly thereafter.
	Recovery period: manual first two hours, and same schedule as pumping period; thereafter, transducer, 15-minute intervals.
B	Ambient conditions period: transducer, 15 minute intervals.
	Pumping period: transducer; once every two minutes through 20 minutes; once every five minutes through 60 minutes; 15-minute intervals thereafter.
	Recovery period: same as pumping period.
C	Ambient conditions period: manual; first day, last day.
	Pumping period: manual; twice a day.
	Recovery period: manual; first day and last day.

Water quality analysis - Water samples will be collected for laboratory analysis of the suite of parameters that are required for public water supplies under the NYSDOH Part 5 regulations. Waivers are requested for the following list of typically waived parameters:

- Asbestos
- Beta Particles
- Polychlorinated biphenyls (PCB)
- Dalapon
- Diquat
- Endothall
- Glyphosate
- 2,3,7,8 TCCD (Dioxin)
- Bromate
- Chlorite
- Haloacetic Acids

The water samples will be collected near the end of the 72-hour pumping period, following normal sampling protocols, and abiding by lab-specified holding times.

The water quality testing will include an assessment of the risk of surface water influence (Groundwater Under the Direct Influence of surface water, or GUIDI). A microscopic particulate analysis (MPA) sample will be collected during the final 24 hours of the pumping period. The assessment will also include field measurement of pH, temperature, and TDS in samples of Well 3 discharge water and samples of water from the wetland. These samples will be collected three times a day during the pumping period to allow assessment of whether the characteristics of the water pumped from Well 3 become more like those of the adjacent surface water over time.

9.0 Final Report

A final report on Well 3 will be submitted to NYSDOH and NYSDEC following completion of the 72-hour pumping test. The report will include the following:

- documentation of the 72-hour pumping test;
- analysis of test results;
- opinion of safe yield;
- water quality summary, with lab reports;
- assessment of GUIDI risk;
- refinement of the WHPA, as appropriate;
- recommendations, on pumping regimes, routine specific capacity monitoring, and periodic redevelopment.

10.0 References

Clift, Andrew, and Brandon Graham, 2013. Surficial Geology of the Keene Valley Quadrangle, Essex County, New York. New York State Museum Map & Chart No. 59.

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

Williams, M. L., T. W. Grover, C. R. Pless, K. A. Suarez, S. P. Regan, and G. B. Baird, 2018. Migmatites of the Eastern Adirondack Mountains: New Constraints on the Timing, Petrology, and Tectonic Setting of Partial Melting. In, Guidebook for Field Trips in New York and Vermont, 2018 New England Intercollegiate Geological Conference, T. Grover and H. Mango editors.

Final Report
Proposed New Groundwater Source
Town of Keene, New York,
Hamlet of Keene Valley

submitted to

The New York State Department of Health (NYSDOH)
and The New York State Department
of Environmental Conservation (NYSDEC)

March 12, 2019

1.0 Introduction

This is the Final Report on a new well that is to serve the water system of the hamlet of Keene Valley. Well 3 is a screened well that was constructed in late 2018 on property of the Keene Valley Central School, at the south edge of the school's athletic fields (Figure 1, Figure 2). The two bedrock wells that currently serve the water system are nearby on the same property.

The Town hired HydroSource Associates (HSA) to site the new well, observe its construction, development, and testing, and to prepare this report. HSA has been working on this project in consultation with Essex County.

A Preliminary Report on Well 3 was submitted to NYSDOH and NYSDEC on January 7, 2019. That report includes an explanation of the reasons a new well was necessary, details of site geology, documentation of construction and preliminary testing of Well 3, a proposal for a 72-hour constant rate pumping test at a target rate of 250 gallons per minute (gpm), and other information intended to allow the agencies to make a decision on whether the site would be a satisfactory location for a new water source for a public water system.

NYSDOH and NYSDEC approved the Preliminary Report. However, NYSDOH suggested increasing the target rate to 300 gpm, since the results of the step test indicated that the well may support the higher rate. With NYSDEC concurrence, HSA agreed, and the test was carried out at 300 gpm.

Well 3

Well 3 was described in detail in the Preliminary Report, but the well log is provided again here (Figure 3). A well completion report is included in Appendix A. The depth to bedrock at the Well 3 site is 150 feet. The unconsolidated sedimentary sequence includes a layer of silty gravel at the surface, glacial lakebed silt and clay to a depth of 99 feet, and mostly uniform medium-grained to coarse-grained sand to the bedrock surface. Bedrock consists of light green anorthosite.

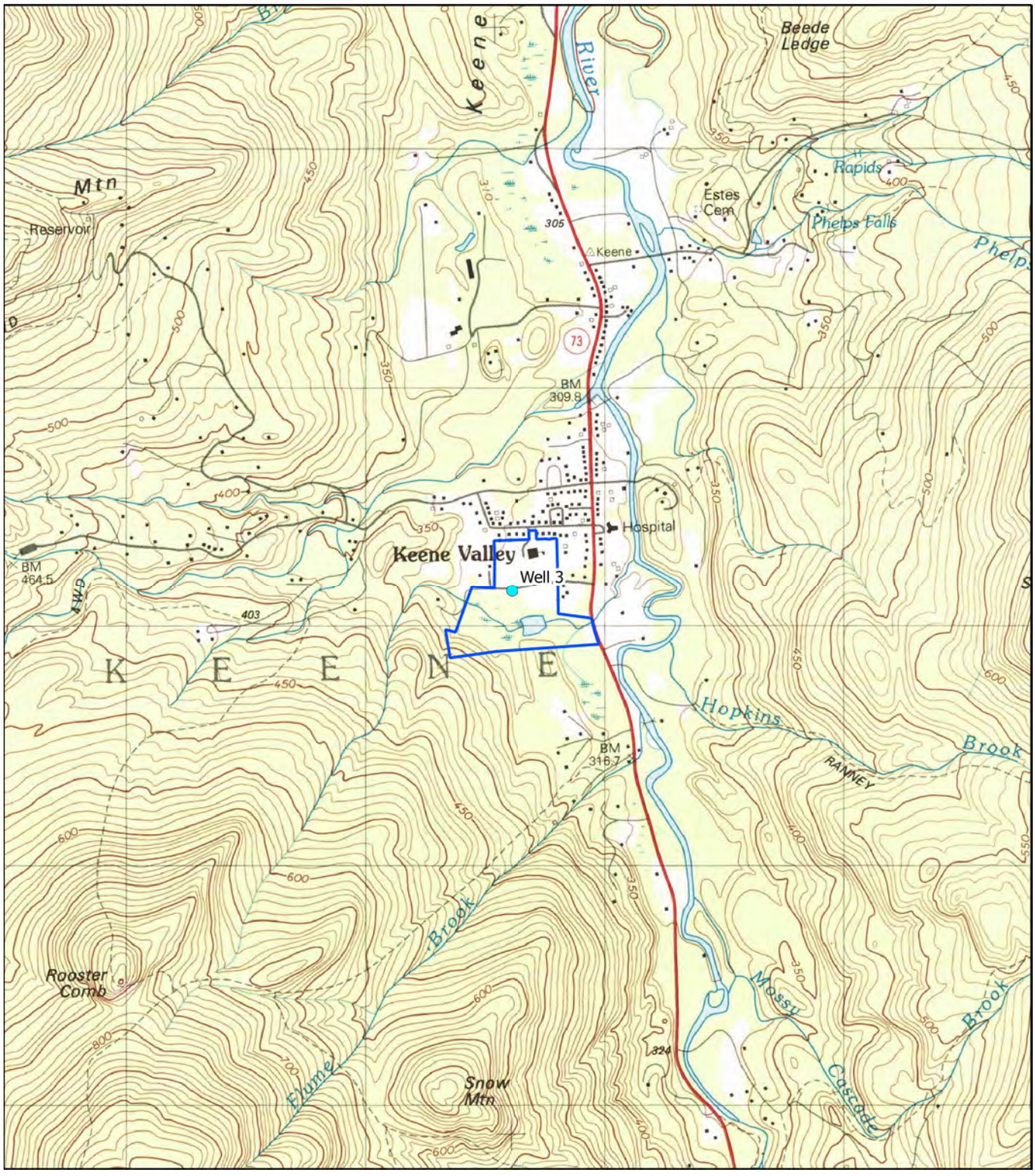


Figure 1 - Location Map

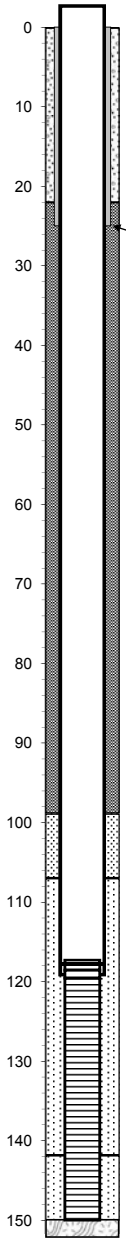
Figure 2 - Well Locations

Figure 3 - Keene Valley Well 3 Graphic Log

Project: Keene Valley
Well: Well 3
Completion date: 11/28/18
Well depth: 150 ft

Airlift Yield: 90 gpm
Driller: Layne Christensen Co.
Static Water Level: 17.15 ft below TOC

Graphic Log



Lithology

0-22: Cobble gravel with fine-grained matrix.

22-99: Gray glacial lakebed varved clay.

Grouted around 8" casing to 25 ft.

99-107: Brown silty FG sand.

107-142: Brown M-C sand; uniform; feldspar-qtz-px-garnets.

142-150: Brown M-C sand with scattered pebbles.

150-152: Fresh light green anorthosite.

NOTES: Drilled by casing advancement. 12" surface casing to 25 ft. 8" casing to 150 ft. Collected sediment samples at 2' intervals from 105' downward. 15-slot screen from 120 to 150 ft. Top of K-packer at 117 ft. Pressure-grouted annular space around 8" casing, withdrew surface casing.

The well was drilled by advancing 8-inch steel casing. It was completed with 15-slot wire-wrap stainless steel screen from 120 to 150 feet. Other details on construction and development were provided in the Preliminary Report.

Pumping Test

Test Start - The Well 3 pumping test began on the morning of Monday, January 28. The 72-hour test started at 10:54 (all times are reported using the military time convention; that is, 1:00 P. M. is 13:00). The initial attempt to start the test at 10:30 had to be abandoned when ice clogged the discharge line, and a section of the hose burst. The section of damaged hose was replaced. Because the temperature was near zero fahrenheit, it was considered advisable to re-start the test as quickly as possible after the repair had been made, to minimize the risk that the discharge line would ice up before flow was reestablished. That is why the test was re-started at 10:54, instead of on the hour at 11:00.

Monitoring Points - Figure 4 is a map of points monitored during the test. Table 1 lists the monitored points, and shows distances between Well 3 and the other monitored points. Aquifer water levels were monitored in three wells in addition to the pumping well. Well BRTW-1 is a six-inch bedrock test well offset about five feet from Well 1, the primary supply well in the existing wellfield. Well BRTW-2 is another six-inch test well offset five feet from Well 2, the current backup well. The sanding well, near Well 1, is an eight-inch-diameter bedrock well that was originally intended to be a mechanical backup for Well 1, but which could not be used to supply the system because it displayed a chronic sanding problem.

Table 1 - Monitoring Points

	ID	Distance
Wells		
	Well 3	-
	BRTW-2	328
	BRTW-1	348
	Sanding well	360
Shallow piezometer		
	PZ-1	50
Staff gage		
	SG-1	1050
Discharge		450

Figure 4 - Monitoring Points

Wells BRTW-1, BRTW-2, and the sanding well were monitored using pressure transducers. Water levels in Well 3 were monitored using a manual water level probe during the pumping period and the first 20 minutes of recovery, and using a transducer during the ambient conditions period and later recovery. A barometric transducer was set above the water level in the sanding well, and the resulting data was used to correct the data from the other transducers for changes in barometric pressure.

PZ-1 is a shallow driven piezometer that was installed in a poorly drained area adjacent to the elevated area around Well 3. The screen was set about five feet below ground surface. PZ-1 water levels were measured manually using a Solinst-style water level probe. The water level at the piezometer site was near ground surface throughout the test, and in the very cold temperatures that occurred during the test the shallowest portion of the water column in the piezometer froze. To make a reading, it was often necessary to first melt the ice using a piece of rebar heated with a torch.

SG-1 is a staff gage set in a small stream near Route 73. In the original pumping test plan, the staff gage was to have been set in a wetland area upgradient to the west from the pond beside the existing wellfield. The temperature had been so low in the weeks preceding the test that the open water that had been expected to be the planned site of the staff gage was completely frozen, and no practical monitoring site was available there. As a consequence, an alternate site had to be chosen.

The chosen site is on a small drainage that flows to the northeast into a small beaver pond just west of Route 73 (Figure 4). The beaver pond is more visible in Figure 2, just to the north of a nature trail parking area at the extreme southeast corner of the school property. The water level at SG-1 is controlled by levels in the beaver pond, and those levels in turn may have been artificially elevated by inflow from the pond by the wellfield, which received the Well 3 discharge.

Wellhead Setup - The same setup used during the Well 3 step test was retained for the 72-hour test (as described in the Preliminary Report). The submersible pump had been set at a depth near 100 feet. The setup included a plastic monitoring tube extending down to the top of the pump. Electric power for the pump came from a portable diesel-powered generator. The setup included a gate valve, two sample spigots, and a pressure gage. Discharge water was carried through flexible hose to the discharge point at the edge of the pond (Figure 4). An orifice weir was set up at the berm separating the playing fields from the wellfield pond, and the discharge stream went into the swampy ground along the edge of the pond. Plastic sheeting was used under the outfall to prevent erosion.

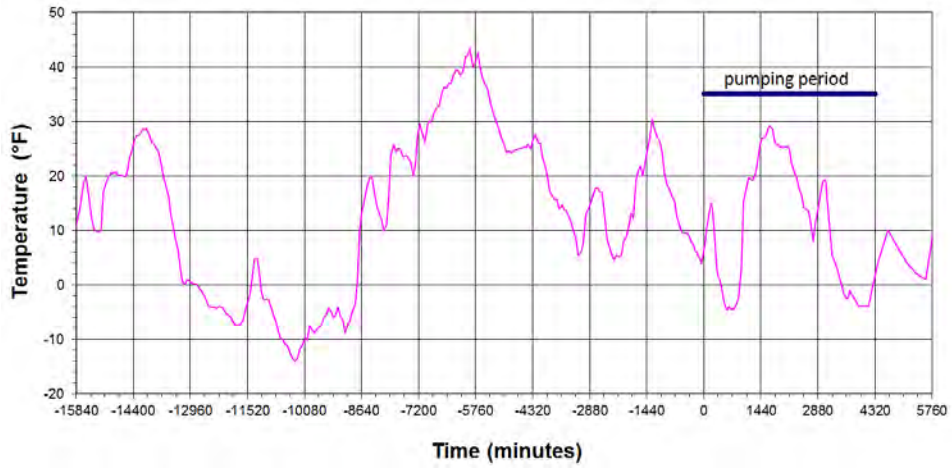
Schedule - Monitoring began 11 days before the start of the 72-hour test. The transducers set in Well 3 and the other aquifer monitoring points were programmed to take readings at 15-minute intervals throughout the ambient conditions period.

The staff gage and shallow piezometer were not monitored during the ambient conditions period. During the pumping period, measurements were made at both points several times a day.

The transducers were reprogrammed to collect data at a higher frequency before the start of the pumping period. Water level measurements in Well 3 were made on a schedule that allowed good definition of water level trends in logarithmic time, and a similar measurement frequency was adopted for the recovery period. Recovery measurements were made for 24 hours. Appendix B includes data collected at the monitored wells, staff gage, and shallow piezometer.

Weather - Weather observations made at the Birch Point weather station, 4.5 miles north of Well 3 in Keene, were obtained from Weatherunderground. Figure 5 is a graph of temperature during the monitoring period. In this graph, and all subsequent graphs that do not use a log time scale, the pumping period is marked with a heavy blue line (that is, the time from zero through 4,320 minutes). Inspection of the graph shows that the temperature was below freezing for most of the 15-day monitoring period. The warmest temperatures occurred on the Wednesday and Thursday preceding the test, with the temperature peaking at around 40 degrees fahrenheit on the morning of Thursday, January 24 (-5,760 minutes on Figure 5).

Figure 5 - Temperature



The time of higher temperatures roughly coincides with the only measurable precipitation that fell during the monitoring period. Figure 6 shows the precipitation rate. A total of 0.69 inches of precipitation fell during the evening of January 23 through the morning of January 24. This presumably fell as rain, and it produced a small rise in background water levels in the wells (as discussed later in the report). Otherwise, because of lack of precipitation and below-freezing temperatures, the aquifer experienced no recharge events.

Variations in barometric pressure, as measured by the transducer in the sanding well, are shown in Figure 7.

Figure 6 - Precipitation Rate

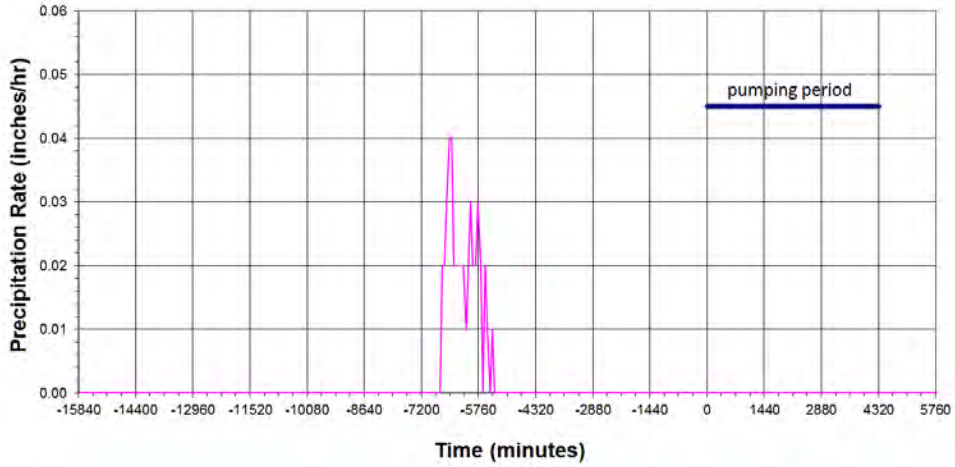
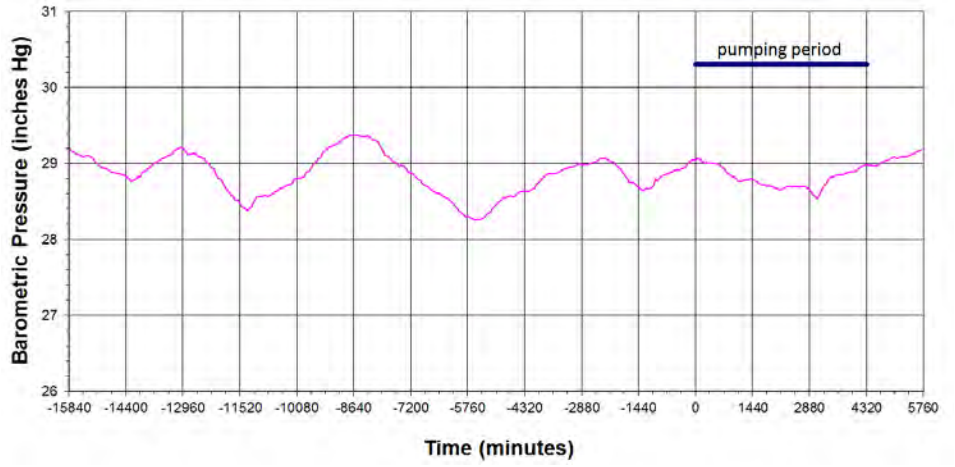


Figure 7 - Barometric Pressure



Well 3 - Figure 8 is a graph of water level versus time in Well 3 during the monitoring period. The first point to make about this graph is that Well 1 pumping cycles produce an obvious impact at Well 3. Each Well 1 pumping event is marked by a temporary depression of the Well 3 water level, producing a sawtooth pattern in the curve. Six pumping cycles occurred during the 11-day ambient conditions period. One Well 1 pumping event took place about a day into the Well 3 pumping test, and another event began just before the Well 3 test ended. On average, Well 1 pumping events produced 2.05 feet of drawdown at Well 3.

Table 2 shows the individual Well 1 pumping events, based on the responses in the monitored wells. On average, pumping events lasted 9.6 hours, and the average time between the end of one event and the beginning of the next was 37.6 hours. Based on the Town's records for the total volume of water pumped during the ambient conditions period, the average flow rate of Well 1 is 141 gpm. Only Well 1 was in use during the monitoring period; Well 2 was idle.

Figure 8 - Water Levels in Well 3

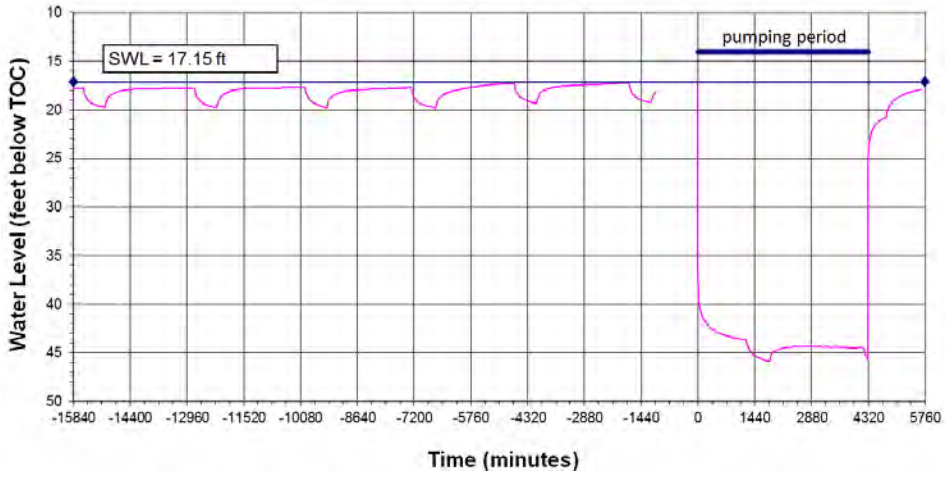


Table 2 - Well 1 Pumping Cycles

	Start		End			
Well 1 Pumping Event	Date	Time	Date	Time	Pumping Duration (hrs)	Time Between Events (hrs)
1	1/17/19	15:00	1/18/19	0:15	9.3	37.8
2	1/19/19	14:00	1/19/19	23:30	9.5	37.3
3	1/21/19	12:45	1/21/19	22:00	9.3	35.8
4	1/23/19	9:45	1/23/19	20:00	10.3	33.3
5	1/25/19	5:15	1/25/19	14:45	9.5	39.0
6	1/27/19	5:45	1/27/19	15:15	9.5	40.3
7	1/29/19	7:30	1/29/19	17:15	9.8	39.8
8	1/31/19	9:00	1/31/19	18:30	9.5	-

Returning to Figure 8, the static water level during the first six days of the ambient conditions period was around 17.75 feet, ignoring the periodic declines produced by Well 1 pumping. The water level rose by about a half-foot over the next two days, in response to the rain and warming event of January 23 and 24. The static water level just before the start of the test was 17.15 feet below the measuring point at the top of the casing. The casing stickup was about four feet, so that the water level was roughly 13 feet below ground surface. Data was not collected from Well 3 during the final 17 hours of the ambient conditions period. The transducer had been removed to avoid the risk of damage while the drillers worked around the well before the test.

The target rate of 300 gpm was reached after the first few minutes, and remained within one percent of that value (that is, no lower than 297 gpm) for the remainder of the test. When the pump was turned on, the water level showed a rapid initial decline, followed by a more modest continuing decline. After factoring out the influence of Well 1 pumping, the slope of the decline diminished with time. The water level appeared to be approaching stabilization during the last minutes of the pumping period that were not affected by the final Well 1 pumping event. The water level at 5:00 on the final morning of the test (time equals 3966 minutes) was 44.48 feet, which amounts to drawdown of 27.33 feet, and a specific capacity of 10.98 gpm/ft.

Figure 9 is a graph of Well 3 water levels during the pumping period using a log-scale time axis. The affects of a flow rate adjustment can be seen during the first three minutes. The curve is essentially horizontal during the time from about 2,000 to 4,000 minutes.

Figure 9 - Well 3 Pumping Period

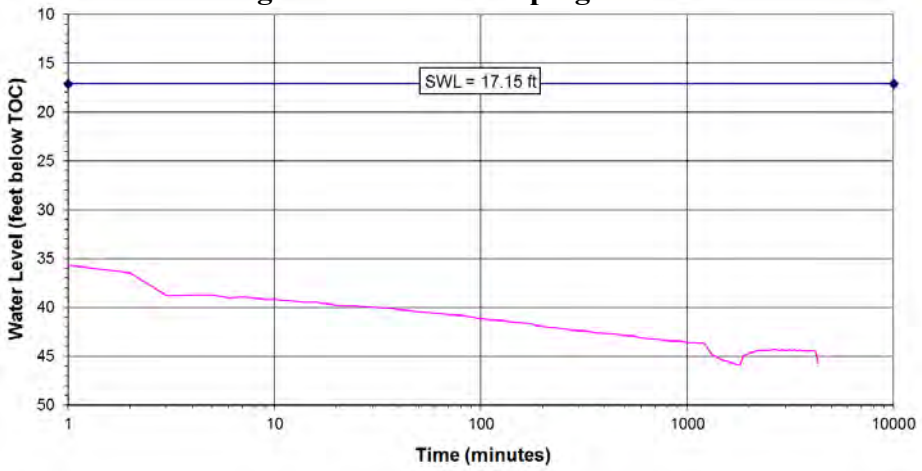
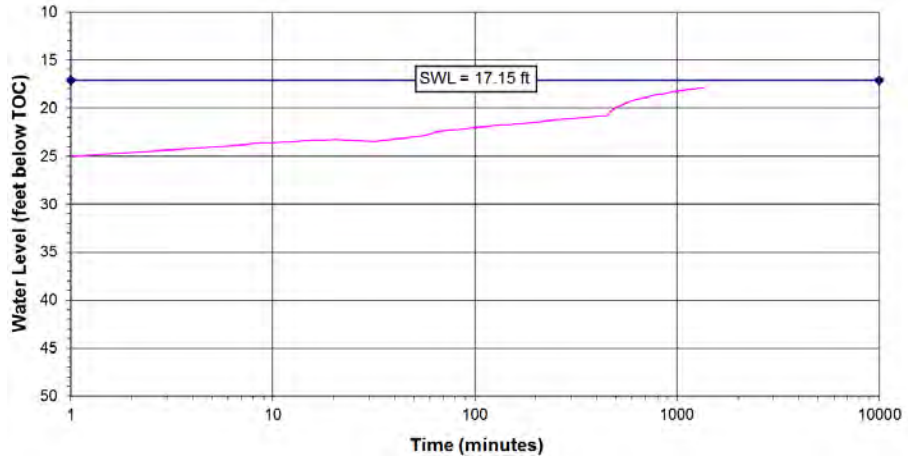


Figure 10 is a semilog graph of recovery period water levels. Inspection of the graph shows that a large fraction of the recovery occurred during the first minute after the pump was shut down. After that, the slope of the curve is approximately the same as the slope seen during the pumping period, again after allowing for the impact produced by the last Well 1 pumping event.

Figure 10 - Well 3 Recovery Period

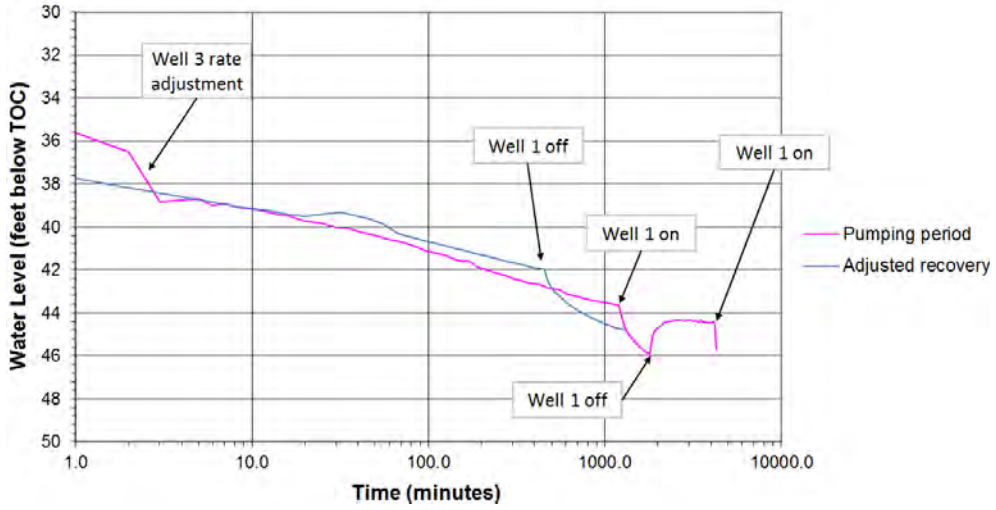


One means of assessing the sustainability of a given tested flow rate is to compare the amount of water level rebound that has occurred after some specified period of recovery against the amount of drawdown that occurred after the same duration of pumping. In this case, the comparison must consider recovery and drawdown durations that are relatively unaffected by impacts from Well 1 pumping cycles. The first Well 1 pumping cycle occurring during the Well 3 pumping period began around 7:30 on January 29 (Table 2), which was 1,236 minutes from the start of the Well 3 pumping period. The last Well 3 water level reading unaffected by the Well 1 pumping event was at 1,206 minutes, when the water level was 43.66 feet, which corresponds to drawdown of 26.51 feet.

The water level after 1,206 minutes of recovery was 18.02 feet. This amounts to recovery of 26.46 feet from the maximum water level of 44.48 feet reached prior to the start of the final Well 1 pumping event. The 1,206-minute mark during recovery is about 12 hours after the end of the final Well 1 pumping event, when the effects of that event on Well 3 would have largely dissipated. The recovery value of 26.46 feet represents 99.8% of the original drawdown of 26.51 feet. By this measure, the recovery performance of Well 3 was quite good.

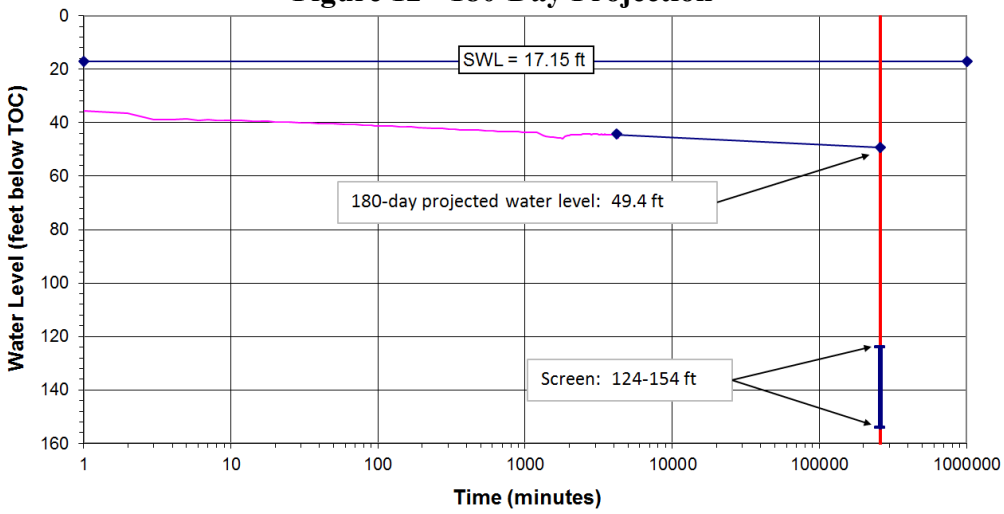
The purpose of Figure 11 is to compare the trend of the recovery curve with the drawdown curve on a graph with a log time scale. In this graph, the recovery data has been adjusted by inverting the curve about a horizontal axis and then offsetting the curve by an arbitrary amount to make the recovery curve match the drawdown curve as closely as possible. The "noise" introduced by the Well 1 pumping events makes the match less than perfect, but it is still clear that the rate at which the water level rebounded from pumping closely follows the rate of drawdown during the pumping period. By this measure, recovery performance appears good.

Figure 11 - Comparison of Well 3 Pumping & Adjusted Recovery



180-Day Projection - Figure 12 is a 180-day projection of the water level trend that prevailed near the end of the pumping period, during the hours just before the start of the final Well 1 pumping cycle. If the trend that existed at the end of the test persisted during six months of pumping at 300 gpm, the water level would be expected to reach 49.4 feet below the measuring point, amounting to drawdown of about 32 feet. The top of the screen is at 124 feet below the measuring point (120 feet below ground), and available drawdown is about 107 feet. Thus, six months of continuous pumping at 300 gpm would be expected to consume only 30% of available drawdown. Typically we require that a 180-day projection would indicate that no more than about two-thirds of available drawdown would be consumed. Consequently, 300 gpm can be considered to represent a conservative safe yield for Well 3.

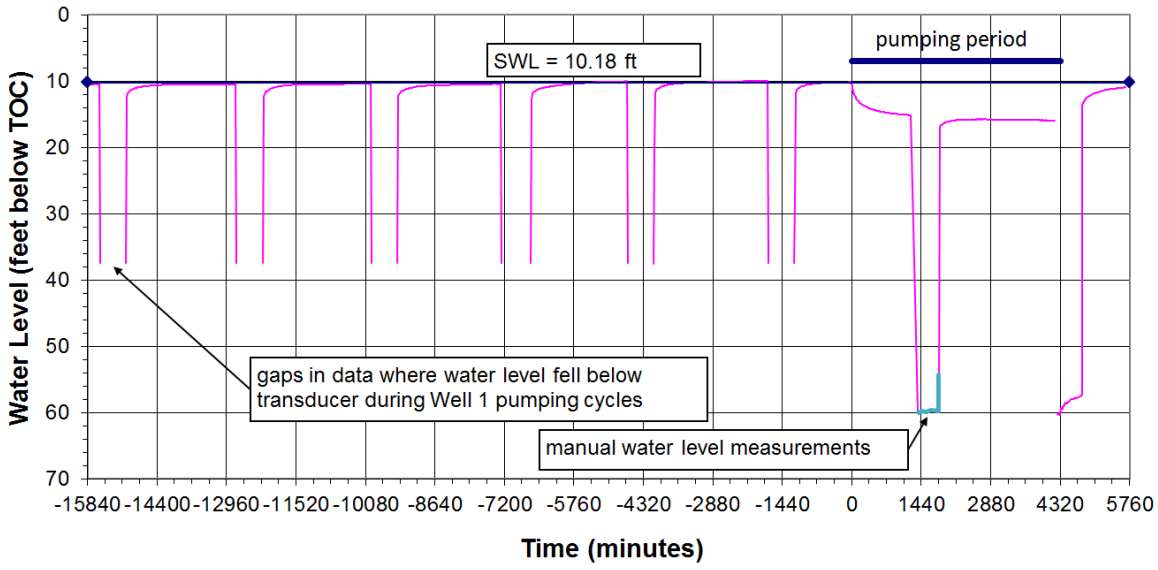
Figure 12 - 180-Day Projection



Other Wells - Figures 13, 14, and 15 are graphs of water level vs. time for Well BRTW-1, the sanding well, and Well BRTW-2, respectively.

Well BRTW-1, which at five feet away was the monitored well closest to Well 1, showed the greatest impact from Well 1 pumping cycles. The transducer in BRTW-1 was set at a depth of about 37.5 feet, which turned out to be shallower than the water level during Well 1 pumping events. Consequently, Figure 13 shows only a fraction of the drawdown that occurred in response to the six Well 1 pumping cycles that occurred during the ambient conditions monitoring period. Well BRTW-1 water levels were measured manually during the Well 1 pumping cycle that took place in the first part of the Well 3 pumping period. The BRTW-1 water level was 15.15 feet just before the Well 1 pump came on, and the water level then fell to about 60 feet. Therefore, Well 1 pumping cycles produce about 45 feet of drawdown in BRTW-1. The 72-hour test of Well 3 produced a total of 5.75 feet of drawdown in BRTW-1.

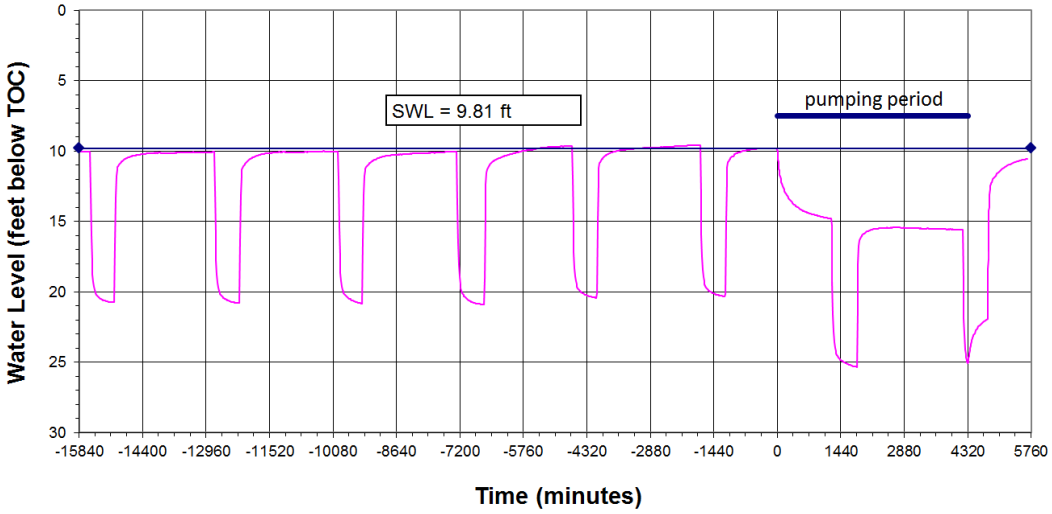
Figure 13 - Well BRTW-1



The final Well 1 pumping cycle began roughly two hours before the end of the Well 3 pumping period (Table 2). As it happened, the BRTW-1 transducer was being reset during the first hour of the Well 1 cycle, so data from that time period was missed. However, Figure 13 shows water levels beginning to recover after the Well 3 pump was shut down. After about 7.5 hours of recovery from the Well 3 test, Well 1 also shut down, producing the final steep rebound of the water level (which began at the 4,778-minute mark).

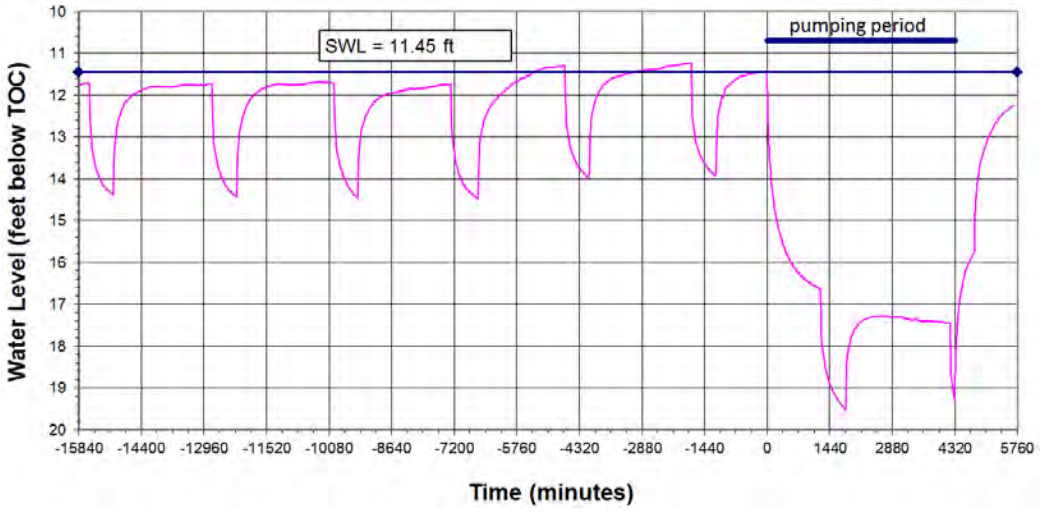
The sanding well is 11 feet from Well 1, and 360 feet from Well 3. Each Well 1 pumping event produced about 10 feet of drawdown at the sanding well. The Well 3 test produced 5.78 feet of drawdown by the end of the pumping period, excluding data from the last two hours when Well 1 was pumping (Figure 14).

Figure 14 - Sanding Well



Well BRTW-2 is 95 feet from Well 1 and 328 feet from Well 3. Well 1 pumping events produce about 2.7 feet of drawdown at BRTW-2. The Well 3 test produced a maximum of 6.0 feet of drawdown at BRTW-2. Note also that the background water level rose by about 0.4 feet between days six and eight of the ambient conditions period, in response to the precipitation event. Similar responses are seen in BRTW-1 and the sanding well, but the responses are less obvious in the graphs for those wells because the range of the vertical scales is larger.

Figure 15 - Well BRTW-2



Aquifer Parameters - Aquifer parameters were estimated with the Jacob analytical method, using time-drawdown data from the pumping period at the sanding well. These results should be given limited weight, because the situation fails to satisfy assumptions of the Jacob method. In particular, the sanding well (which is nominally a bedrock well) is not completed in the same aquifer layer as Well 3. Nonetheless, the results can be considered to provide at least a rough estimate of aquifer properties. The method produces a transmissivity of about 4,100 ft^2/day. If the aquifer thickness is taken as 43 feet (see Figure 3), the hydraulic conductivity is 95 ft/day. Storativity is 0.001, a reasonable value for a confined aquifer.

Shallow Piezometer and Staff Gage - No pumping-related impacts are recognized in the water level in shallow piezometer PZ-1 (Table 3). The water level remained near ground surface throughout the pumping period. The variation seen between readings may be mostly a function of the difficulty of getting accurate measurements in a situation where the top of the water column in the piezometer was often frozen. As noted above, before the first reading could be made on each day of the test, it was necessary to heat a steel rod with a propane torch to melt the ice plug that had formed in the upper part of the pipe. Even after the ice plug had been melted, the water in the tube was somewhat slushy, making it difficult to get reliable readings.

Table 3 - Shallow Piezometer PZ-1

Date	Time	WL
1/28/2019	9:18	1.78
1/28/2019	11:34	1.81
1/28/2019	13:15	1.75
1/29/2019	9:40	1.85
1/29/2019	10:45	1.75
1/29/2019	11:50	1.75
1/30/2019	11:19	1.80

Table 4 shows water levels at staff gage SG-1. As noted above, water levels in the stream at the site of the staff gage could have been influenced by a downstream beaver pond that also received drainage from the pond beside the wellfield. Therefore, the data in Table 4 should be treated with caution.

Table 4 shows that water levels varied within a small range during the pumping period. Subjectively, surface water levels appeared stable during the pumping period. This would be consistent with the observed weather. The temperature remained continuously below the freezing mark beginning three days before the start of pumping, and continuing through the end of the recovery period, and there would be no reason to expect substantial surface water changes under these conditions.

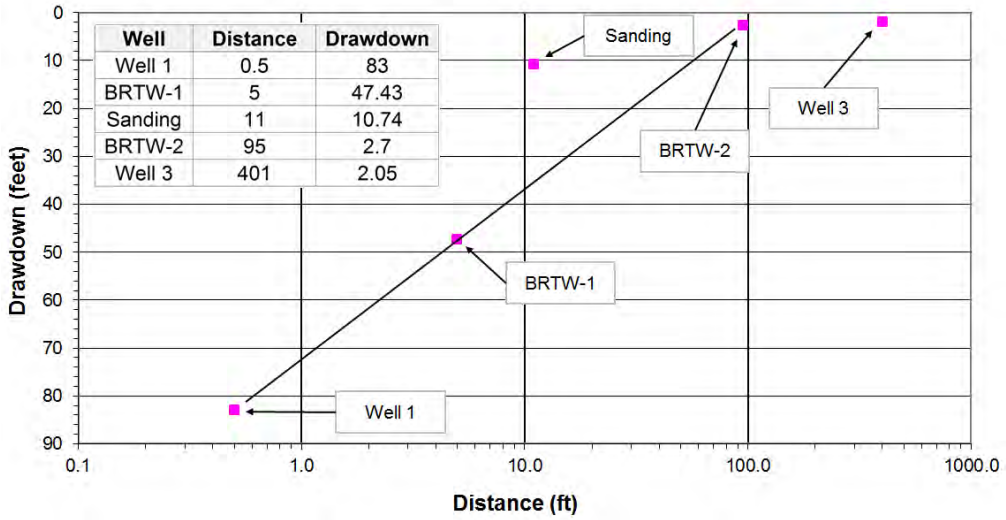
Table 4 - Staff Gage SG-1

Date	Time	WL
1/28/2019	10:13	1.02
1/28/2019	12:34	1.05
1/28/2019	14:44	1.08
1/28/2019	8:24	1.09
1/29/2019	10:04	1.07
1/29/2019	12:51	1.07
1/29/2019	16:10	1.09
1/30/2019	8:30	1.09
1/30/2019	11:14	1.05
1/30/2019	12:07	1.06

Performance of Well 1 - The impact of Well 1 pumping events on the surrounding wells has already been discussed, but it is possible to make additional comments on the well's current characteristics based on data collected during the monitoring period for the Well 3 test. Figure 16 is a distance-drawdown diagram based on data collected at the end of one of the Well 1 pumping periods. Well 1 water levels were not monitored during the test, so the drawdown value of 83 feet is an estimate based on the trend defined by measured water levels in BRTW-1 and BRTW-2. These two wells were chosen because they are both bedrock wells, and should be the available monitoring points most appropriate to represent water levels in the fractured-bedrock aquifer. It has been speculated that the water level in the sanding well may be controlled or strongly influenced by the basal sand aquifer, and Well 3 itself is of course completed in the basal sand, so these points were ignored in drawing the trendline of Figure 16.

It should be kept in mind that the trendline connecting BRTW-1 and BRTW-2 may give only a rough approximation of drawdown in Well 1. Any hydraulic inefficiency in that well would result in drawdown greater than that implied by the drawdown trend in neighboring bedrock wells, and in any event, distance-drawdown trends in bedrock aquifers are not necessarily linear. Nonetheless, the drawdown estimated for Well 1 is considered reasonable. Given drawdown of 83 feet, and the indicated flow rate of 141 gpm, the specific capacity of Well 1 after nine hours of pumping would be about 1.7 gpm/ft.

Figure 16 - Well 1 Distance-Drawdown at End of Pumping Cycle



Well 1 was subjected to a 72-hour test in 2006. That test was conducted at a rate of 221 gpm, and drawdown at the end of the test was 27.5 feet. This results in a 72-hour specific capacity of about 8.0 gpm/ft, much higher than the value estimated from the 2019 monitoring results. Though we do not know exactly how much drawdown occurred in Well 1 during the recent testing, it was clearly more than the 47.43 feet of drawdown measured in BRTW-1. Therefore, it is obvious that Well 1 is much less productive now than it was in 2006.

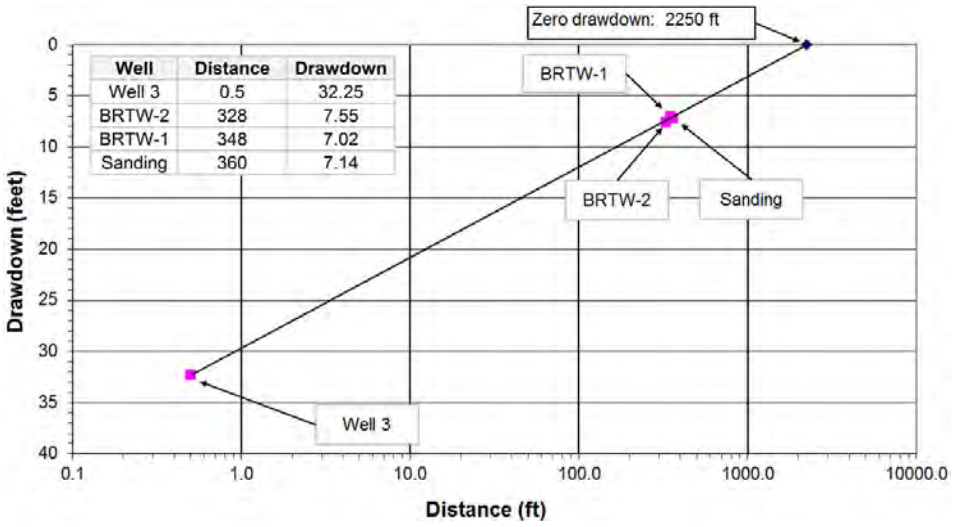
The main water-bearing fracture that was recognized in Well 1 was at a depth of 138 to 140 feet. The well's total depth is 270 feet. One possible explanation for the well's lower productivity is that the bottom of the well has filled in with sediment sufficient to cover the productive fractures. A second possibility is that the fractures themselves have become partially clogged. Whatever the explanation, the Town may want to get the problem diagnosed with the expectation of redeveloping the well after Well 3 goes online.

Revised WHPA - The Preliminary Report included a preliminary version of the Well 3 Wellhead Protection Area (WHPA) that was based on the assumption that the cone of depression associated with the proposed withdrawal would have a radius of 1,000 feet. Data generated during the Well 3 test indicates that the cone of depression associated with a pumping rate of 300 gpm should be more extensive. Figure 17 is a distance-drawdown graph based on 180-day projections of end-of-test trends in Well 3, BRTW-1, BRTW-2, and the sanding well. The graph indicates that the zero-drawdown distance after 180 days of pumping at 300 gpm would be 2,250 feet.

It should be pointed out that the available data set has a few weaknesses that limit its appropriateness for characterizing the Well 3 cone of depression. One weakness is that all three non-pumping wells are at a similar distance from Well 3, and they all plot at approximately the same point on the graph. This means that the distance-drawdown trendline is defined by only two points, the cluster of non-pumping wells, and Well 3 itself. Ideally, the point representing

Well 3 would not be used at all, because drawdown at that point has two components: the aquifer response, plus inefficiency associated with the pumping well.

Figure 17 - Well 3 Projected 180-Day Distance-Drawdown



A second weakness is that all three non-pumping wells are offset in roughly the same direction from Well 3. Consequently, the distance-drawdown relationship is defined only in one direction.

Finally, Well 3 taps the basal sand aquifer. The other three wells are bedrock wells, though it is suspected that the sanding well in particular may have a close connection with the unconsolidated sedimentary aquifer.

Despite these weaknesses, we assume the distance-drawdown graph still represents an adequate foundation for WHPA delineation.

Figure 18 shows the revised WHPA, along with sites in the contaminant source inventory. The revised WHPA is little changed from the original one. The 2,250-foot radius has been plotted on Figure 18. In drawing the WHPA, a decision was made to consider Johns Brook and the East Fork of the Ausable River as hydraulic boundaries. Therefore, areas within the radius that fall on the north side of Johns Brook, and on the east side of the river, are excluded from the WHPA. The WHPA has been drawn to include the upgradient areas southwest of the cone of depression. It takes in the topographic basin defined by Rooster Comb, Hedgehog Mountain, and Snow Mountain.

The WHPA contains few potential contaminant sources. The uplands areas are mostly wild forested land. Table 5 is a list of petroleum storage tank sites, repeated from the Preliminary Report and based on a query of the NYSDEC database. Table 6 is a list of spills, also from the NYSDEC database, and also repeated from the Preliminary Report. Moreover, the great thickness of lakebed clay at the well site should provide a good measure of protection from contaminant releases at the surface.

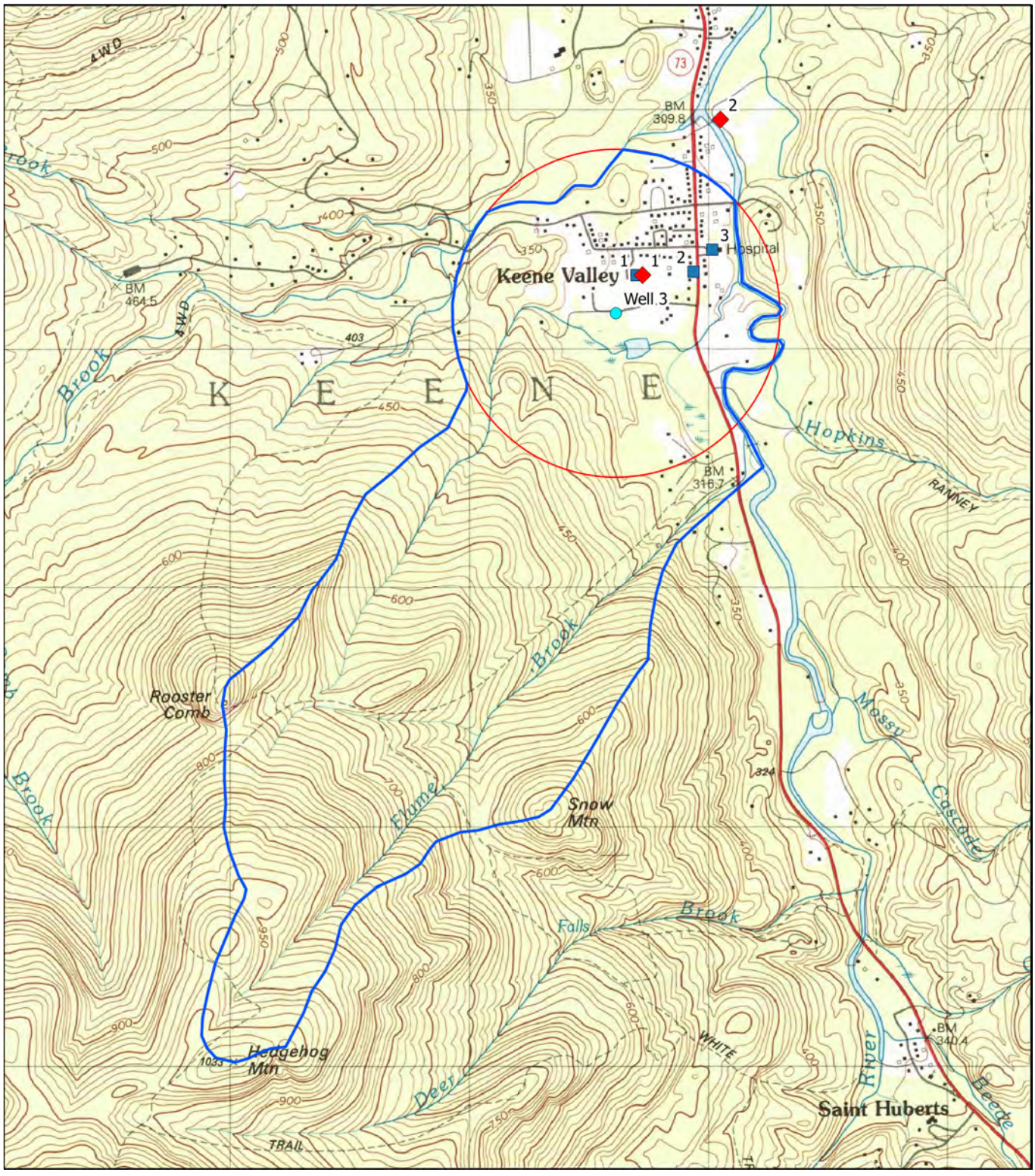


Figure 18 - WHPA & Potential Contaminant Sources

Table 5 - Petroleum Storage Tanks

Map Code	NYSDEC Site #	Facility Name	Status	Active Tanks	Closed/ Removed
1	5-076279	Keene Central School District	Active	4	6
2	5-299634	Keene Valley Garage	Closed	0	10
3	5-488755	Keene Valley Neighborhood Services	Active	2	1

Table 6 - Spills

Map Code	NYSDEC ID	Spill Date	Date Reported	Closed Date	Material	Amount	Resource Affected
1	1206933	9/18/2012	10/15/2012	3/12/2013	gasoline	0.5 gal	unknown
2	1106393	8/30/2011	8/30/2011	8/30/2011	#2 fuel oil	130 gal	soil, GW
-	1107166	9/8/2011	9/8/2011	9/8/2011	transformer oil	65 gal	soil, SW (Ausable River)
-	1205736	9/8/2012	9/8/2012	9/9/2012	non-PCB oil	2 gal	soil
-	712101	2/16/2008	2/16/2008	2/22/2008	transmission fluid	unknown	SW (Johns Brook)

Water Quality - Water samples for lab analysis were collected in the final minutes of the 72-hour test. The samples were analyzed for parameters on the NYSDOH Part 5 list, with the exception of the following "waiver list" parameters: diquat, endothall, glyphosate, and dioxin. The samples were analyzed by Endyne in Plattsburgh, and the lab report is in Appendix C.

Results for a few key parameters are provided in Table 7. Overall, water quality appears very good. No parameter exceeded a Primary Maximum Contaminant Level (PMCL). There were no detections for any parameters in the volatile organic categories. Bacteriological parameters were nondetects. Radiological parameters were below acceptable limits. The concentration of total dissolved solids, at 86 mg/l, was comparatively low. Hardness, at 60 mg/l, was well below the boundary between "soft" and "hard" water. Levels of the common "nuisance" parameters iron and manganese were below their respective Secondary Maximum Contaminant Levels (SMCL).

Table 7 - Water Quality Summary

Parameter	Result	Units
Chloride	21	mg/L
Fluoride	<0.08	mg/L
Nitrate	0.19	mg/L
Nitrite	<0.02	mg/L
Sulfate	<10	mg/L
Iron	0.025	mg/L
Manganese	<0.010	mg/L
Sodium	10	mg/L
Hardness	60.0	mg/L
pH	8.1	-
TDS	86.0	mg/L
Alkalinity	53	mg/L
Gross Alpha	1.43 +/- 1.21	pCi/L
Uranium	<1.0	ug/L

GUIDI Assessment - An MPA (multiparticulate analysis) test was run during the final 24 hours of the pumping test. Analysis of the filter sample was done by CH Diagnostics, and the lab report is included in Appendix C. The lab, using the scoring protocol of the EPA Consensus Method for the analysis, reported a score of zero, indicating a low probability of surface water influence.

As a companion to the MPA test, field analysis of paired samples of surface water and Well 3 discharge water was done several times a day for pH, total dissolved solids, specific conductance, and temperature. The surface water samples were collected near the staff gage. The results are shown in Table 7. Examination of the table shows that there was no tendency for the characteristics of the water pumped from Well 3 to become more like the nearby surface water. Taken together, the MPA analysis and GUIDI screening results indicate a low risk that Well 3 would be under the influence of surface water. This is consistent with the site geology, given that the basal sand-and-gravel aquifer is capped by roughly 100 feet of fine-grained glacial lakebed sediments.

Table 8 - GUIDI Screening

		Surface Water				Groundwater			
Date	Time	pH	TDS	SC	T	pH	TDS	SC	T
1/28/2019	12:34	7.4	66	160	38	8.1	81	190	46
1/28/2019	14:44	7.6	53	140	38	8.3	70	180	46
1/28/2019	16:35	7.5	54	140	36	8.1	78	180	46
1/29/2019	10:08	7.6	47	130	34	8.2	84	190	47
1/29/2019	12:51	7.0	55	130	34	8.1	89	180	46
1/29/2019	16:10	6.7	50	110	34	8.2	91	180	46
1/30/2019	8:30	7.1	54	130	33	8.4	96	190	46
1/30/2019	12:15	7.0	47	110	33	8.3	91	190	46
1/30/2019	16:10	7.1	52	120	34	8.4	93	190	46

Conclusions and Recommendations

The 72-hour pumping test indicates that 300 gpm is a reasonable safe, sustainable yield for Well 3. Natural water quality appears very good. The WHPA associated with the well includes few contaminant threats, and the thick layer of lakebed sediments capping the basal gravel aquifer should offer protection from contaminant releases near the well.

Observations made during the Well 3 72-hour test indicate that the specific capacity of Well 1 is much lower than it was when the well was installed. After Well 3 goes into service, it would be prudent for the Town to check out the condition of Well 1 with the expectation that redevelopment or other action may allow restoration of some of the well's lost productivity.

APPENDIX A
Well Completion Report

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

(1) COUNTY ESSEX

(2) TOWN KEENE

WATER WELL COMPLETION REPORT

(3) DEC Well Number: EX 2265

(4) OWNER: Town of KEENE

(5) ADDRESS: 10892 NYS ROUTE 9N, KEENE, NY

(6) LOCATION OF WELL (See Instructions On Reverse) (Check here ☐ if address is same as above): OFF TRAIL END ROAD - SEE BELOW SKETCH

(7) LATITUDE/LONGITUDE AND METHOD USED: ☐ GPS ☐ Map MAP INTERPOLATION 44° 11' 14.29" N 73° 47' 26.60" W

(8) TAX MAP NO.

(9) DEPTH OF WELL BELOW LAND SURFACE (feet): 150'

(10) DEPTH TO GROUNDWATER BELOW LAND SURFACE (feet): 17.28 DATE MEASURED: 12-6-18

CASINGS

(11) DIAMETER	12 in.	8 in.	in.	in.
(12) LENGTH	25 ft.	154 ft.	ft.	ft.

(13) GROUT TYPE / SEALING: CEMENT GROUT

(14) GROUT / SEALING INTERVAL (feet) FROM 25' TO G.L.

SCREENS

(15) MAKE & MATERIAL: Johnson Stainless Steel

(16) OPENINGS: 15 SLOT

(17) DIAMETER	8 in.	in.	in.	in.
(18) LENGTH	33 ft.	ft.	ft.	ft.

(19) DEPTH TO TOP OF SCREEN, FROM TOP OF CASING (Feet): 117'

YIELD TEST

(20) DATE: 1/28/2019

(21) DURATION OF TEST: 72 - HOURS

(22) LIFT METHOD: ☒ Pump ☐ Air Lift ☐ Bailer

(23) STABILIZED DISCHARGE (GPM): 297

(24) STATIC LEVEL PRIOR TO TEST (feet/inches below top of casing): 17.15'

(25) MAXIMUM DRAWDOWN (Stabilized) (feet/inches below top of casing): 44.48'

(26) RECOVERY (Time in hours/minutes): others

(27) Was the water produced during the test discharged away from immediate area? Yes X No ____

PUMP INSTALLATION

(28) PUMP INSTALLED? YES ____ NO X

(29) DATE

(30) CERTIFIED PUMP INSTALLER

(31) TYPE

(32) MAKE

(33) MODEL

(34) MAXIMUM CAPACITY (GPM)

(35) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)

DRILLER INFORMATION

(36) METHOD OF DRILLING: ☒ Rotary ☐ Cable Tool ☐ Other

(37) USE OF WATER (See instructions for choices): TEST

(38) DATE DRILLING WORK STARTED: 10/18

(39) DATE DRILLING WORK COMPLETED: 11/18

(40) DATE REPORT FILED

(41) REGISTERED COMPANY: LAYNE CHRISTENSEN COMPANY

(42) DEC REGISTRATION NO.: NYRD 10233

(43) CERTIFIED DRILLER (Print name): ROBERT REHBERG

(44) CERTIFIED DRILLER SIGNATURE *

* By signing this document I hereby affirm that: (1) I am certified to supervise water well drilling activities as defined by Environmental Conservation Law 15-1502; (2) this water well was constructed in accordance with water well standards promulgated by the New York State Department of Health; (3) under the penalty of perjury the information provided in this Well Completion Report is true, accurate and complete, and I understand that any false statement made herein is punishable as a Class A Misdemeanor under Penal Law §210.45.

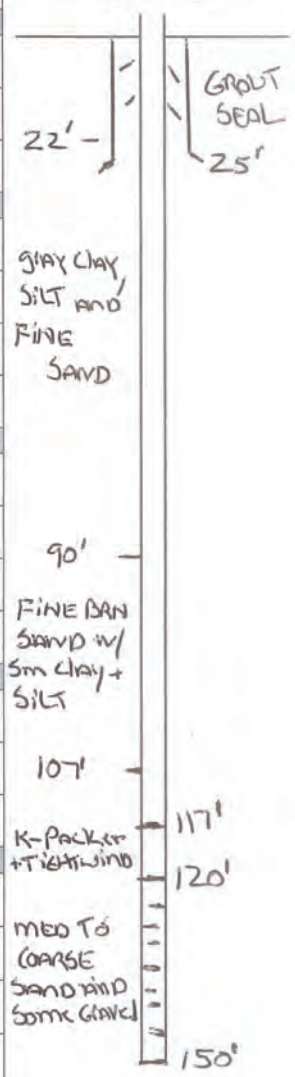
10/2013

(45) WELL LOG

Depth to Bedrock 150 (ft. below land surface)

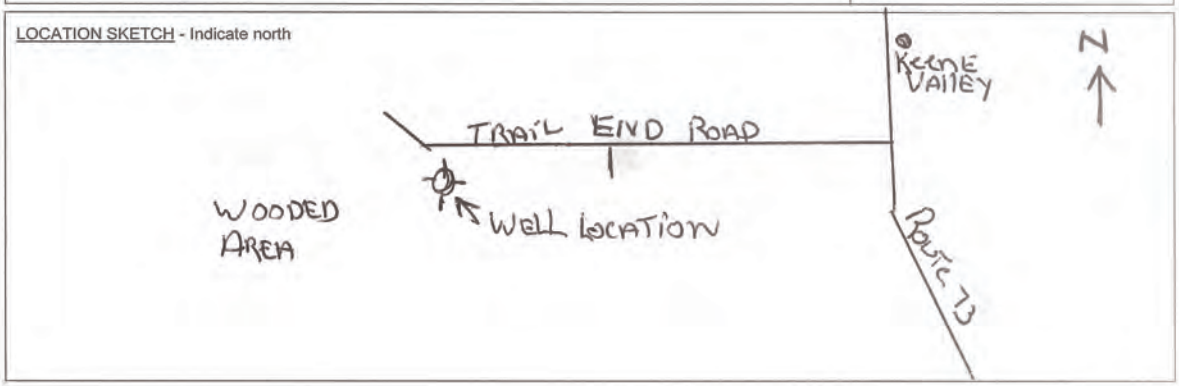
Ground Elevation ~1,049 (ft. above sea level)

Top of Casing ~2 (ft. above (+) or below (-) land surface)



NYSDEC

LOCATION SKETCH - Indicate north



APPENDIX B
Water Level Data

WELL 3 PUMPING TEST WATER LEVEL DATA

Data columns include date, military time, duration in minutes since the beginning of pumping, and water level in feet as measured from the designated measuring point. A blank line appears where there are gaps in the data.

Well 3

Date	Time	Minutes	WL
1/17/19	10:45	-15849	17.77
1/17/19	11:00	-15834	17.77
1/17/19	11:15	-15819	17.78
1/17/19	11:30	-15804	17.77
1/17/19	11:45	-15789	17.77
1/17/19	12:00	-15774	17.76
1/17/19	12:15	-15759	17.74
1/17/19	12:30	-15744	17.75
1/17/19	12:45	-15729	17.74
1/17/19	13:00	-15714	17.73
1/17/19	13:15	-15699	17.74
1/17/19	13:30	-15684	17.73
1/17/19	13:45	-15669	17.73
1/17/19	14:00	-15654	17.73
1/17/19	14:15	-15639	17.73
1/17/19	14:30	-15624	17.73
1/17/19	14:45	-15609	17.72
1/17/19	15:00	-15594	17.72
1/17/19	15:15	-15579	18.04
1/17/19	15:30	-15564	18.30
1/17/19	15:45	-15549	18.48
1/17/19	16:00	-15534	18.60
1/17/19	16:15	-15519	18.71
1/17/19	16:30	-15504	18.81
1/17/19	16:45	-15489	18.90
1/17/19	17:00	-15474	18.97
1/17/19	17:15	-15459	19.02
1/17/19	17:30	-15444	19.09
1/17/19	17:45	-15429	19.15
1/17/19	18:00	-15414	19.19
1/17/19	18:15	-15399	19.24
1/17/19	18:30	-15384	19.28
1/17/19	18:45	-15369	19.32
1/17/19	19:00	-15354	19.36
1/17/19	19:15	-15339	19.39
1/17/19	19:30	-15324	19.42
1/17/19	19:45	-15309	19.46
1/17/19	20:00	-15294	19.48
1/17/19	20:15	-15279	19.51
1/17/19	20:30	-15264	19.52
1/17/19	20:45	-15249	19.55
1/17/19	21:00	-15234	19.57
1/17/19	21:15	-15219	19.59
1/17/19	21:30	-15204	19.61
1/17/19	21:45	-15189	19.63
1/17/19	22:00	-15174	19.63
1/17/19	22:15	-15159	19.64
1/17/19	22:30	-15144	19.66
1/17/19	22:45	-15129	19.67
1/17/19	23:00	-15114	19.68
1/17/19	23:15	-15099	19.70
1/17/19	23:30	-15084	19.71
1/17/19	23:45	-15069	19.72
1/18/19	0:00	-15054	19.73
1/18/19	0:15	-15039	19.73
1/18/19	0:30	-15024	19.40
1/18/19	0:45	-15009	19.17
1/18/19	1:00	-14994	19.01
1/18/19	1:15	-14979	18.89
1/18/19	1:30	-14964	18.79
1/18/19	1:45	-14949	18.71
1/18/19	2:00	-14934	18.64
1/18/19	2:15	-14919	18.58
1/18/19	2:30	-14904	18.52
1/18/19	2:45	-14889	18.47
1/18/19	3:00	-14874	18.44
1/18/19	3:15	-14859	18.39
1/18/19	3:30	-14844	18.33
1/18/19	3:45	-14829	18.31
1/18/19	4:00	-14814	18.28
1/18/19	4:15	-14799	18.25
1/18/19	4:30	-14784	18.22
1/18/19	4:45	-14769	18.19
1/18/19	5:00	-14754	18.19
1/18/19	5:15	-14739	18.15
1/18/19	5:30	-14724	18.13
1/18/19	5:45	-14709	18.12
1/18/19	6:00	-14694	18.10
1/18/19	6:15	-14679	18.07
1/18/19	6:30	-14664	18.07
1/18/19	6:45	-14649	18.05
1/18/19	7:00	-14634	18.04
1/18/19	7:15	-14619	18.03
1/18/19	7:30	-14604	18.01
1/18/19	7:45	-14589	18.00
1/18/19	8:00	-14574	18.00
1/18/19	8:15	-14559	17.98
1/18/19	8:30	-14544	17.98
1/18/19	8:45	-14529	17.97
1/18/19	9:00	-14514	17.96
1/18/19	9:15	-14499	17.95
1/18/19	9:30	-14484	17.94
1/18/19	9:45	-14469	17.92
1/18/19	10:00	-14454	17.93
1/18/19	10:15	-14439	17.92
1/18/19	10:30	-14424	17.92
1/18/19	10:45	-14409	17.90
1/18/19	11:00	-14394	17.91
1/18/19	11:15	-14379	17.89
1/18/19	11:30	-14364	17.89
1/18/19	11:45	-14349	17.88
1/18/19	12:00	-14334	17.88
1/18/19	12:15	-14319	17.86
1/18/19	12:30	-14304	17.86
1/18/19	12:45	-14289	17.85
1/18/19	13:00	-14274	17.84
1/18/19	13:15	-14259	17.84
1/18/19	13:30	-14244	17.84
1/18/19	13:45	-14229	17.84
1/18/19	14:00	-14214	17.83
1/18/19	14:15	-14199	17.82
1/18/19	14:30	-14184	17.83
1/18/19	14:45	-14169	17.82
1/18/19	15:00	-14154	17.81
1/18/19	15:15	-14139	17.82
1/18/19	15:30	-14124	17.81
1/18/19	15:45	-14109	17.81
1/18/19	16:00	-14094	17.82
1/18/19	16:15	-14079	17.81
1/18/19	16:30	-14064	17.81
1/18/19	16:45	-14049	17.81
1/18/19	17:00	-14034	17.81
1/18/19	17:15	-14019	17.81
1/18/19	17:30	-14004	17.80
1/18/19	17:45	-13989	17.82
1/18/19	18:00	-13974	17.82
1/18/19	18:15	-13959	17.80
1/18/19	18:30	-13944	17.82
1/18/19	18:45	-13929	17.80
1/18/19	19:00	-13914	17.81
1/18/19	19:15	-13899	17.82
1/18/19	19:30	-13884	17.81
1/18/19	19:45	-13869	17.81
1/18/19	20:00	-13854	17.82
1/18/19	20:15	-13839	17.81
1/18/19	20:30	-13824	17.80
1/18/19	20:45	-13809	17.80
1/18/19	21:00	-13794	17.81
1/18/19	21:15	-13779	17.81
1/18/19	21:30	-13764	17.82
1/18/19	21:45	-13749	17.81
1/18/19	22:00	-13734	17.81
1/18/19	22:15	-13719	17.81
1/18/19	22:30	-13704	17.80
1/18/19	22:45	-13689	17.82
1/18/19	23:00	-13674	17.80
1/18/19	23:15	-13659	17.81
1/18/19	23:30	-13644	17.80
1/18/19	23:45	-13629	17.80
1/19/19	0:00	-13614	17.79
1/19/19	0:15	-13599	17.79
1/19/19	0:30	-13584	17.79
1/19/19	0:45	-13569	17.78
1/19/19	1:00	-13554	17.79
1/19/19	1:15	-13539	17.77
1/19/19	1:30	-13524	17.77
1/19/19	1:45	-13509	17.77
1/19/19	2:00	-13494	17.78
1/19/19	2:15	-13479	17.77
1/19/19	2:30	-13464	17.77
1/19/19	2:45	-13449	17.77

1/19/19	3:00	-13434	17.77	1/19/19	17:30	-12564	19.28	1/20/19	8:00	-11694	17.90
1/19/19	3:15	-13419	17.76	1/19/19	17:45	-12549	19.30	1/20/19	8:15	-11679	17.88
1/19/19	3:30	-13404	17.77	1/19/19	18:00	-12534	19.35	1/20/19	8:30	-11664	17.89
1/19/19	3:45	-13389	17.76	1/19/19	18:15	-12519	19.39	1/20/19	8:45	-11649	17.87
1/19/19	4:00	-13374	17.76	1/19/19	18:30	-12504	19.43	1/20/19	9:00	-11634	17.86
1/19/19	4:15	-13359	17.76	1/19/19	18:45	-12489	19.44	1/20/19	9:15	-11619	17.85
1/19/19	4:30	-13344	17.76	1/19/19	19:00	-12474	19.48	1/20/19	9:30	-11604	17.85
1/19/19	4:45	-13329	17.74	1/19/19	19:15	-12459	19.51	1/20/19	9:45	-11589	17.84
1/19/19	5:00	-13314	17.75	1/19/19	19:30	-12444	19.55	1/20/19	10:00	-11574	17.84
1/19/19	5:15	-13299	17.75	1/19/19	19:45	-12429	19.54	1/20/19	10:15	-11559	17.83
1/19/19	5:30	-13284	17.76	1/19/19	20:00	-12414	19.57	1/20/19	10:30	-11544	17.83
1/19/19	5:45	-13269	17.76	1/19/19	20:15	-12399	19.59	1/20/19	10:45	-11529	17.81
1/19/19	6:00	-13254	17.75	1/19/19	20:30	-12384	19.61	1/20/19	11:00	-11514	17.81
1/19/19	6:15	-13239	17.76	1/19/19	20:45	-12369	19.62	1/20/19	11:15	-11499	17.80
1/19/19	6:30	-13224	17.76	1/19/19	21:00	-12354	19.64	1/20/19	11:30	-11484	17.78
1/19/19	6:45	-13209	17.76	1/19/19	21:15	-12339	19.66	1/20/19	11:45	-11469	17.79
1/19/19	7:00	-13194	17.75	1/19/19	21:30	-12324	19.68	1/20/19	12:00	-11454	17.78
1/19/19	7:15	-13179	17.76	1/19/19	21:45	-12309	19.70	1/20/19	12:15	-11439	17.79
1/19/19	7:30	-13164	17.76	1/19/19	22:00	-12294	19.71	1/20/19	12:30	-11424	17.77
1/19/19	7:45	-13149	17.76	1/19/19	22:15	-12279	19.73	1/20/19	12:45	-11409	17.77
1/19/19	8:00	-13134	17.76	1/19/19	22:30	-12264	19.73	1/20/19	13:00	-11394	17.77
1/19/19	8:15	-13119	17.76	1/19/19	22:45	-12249	19.75	1/20/19	13:15	-11379	17.76
1/19/19	8:30	-13104	17.76	1/19/19	23:00	-12234	19.76	1/20/19	13:30	-11364	17.76
1/19/19	8:45	-13089	17.77	1/19/19	23:15	-12219	19.76	1/20/19	13:45	-11349	17.75
1/19/19	9:00	-13074	17.76	1/19/19	23:30	-12204	19.78	1/20/19	14:00	-11334	17.74
1/19/19	9:15	-13059	17.77	1/19/19	23:45	-12189	19.42	1/20/19	14:15	-11319	17.75
1/19/19	9:30	-13044	17.77	1/20/19	0:00	-12174	19.20	1/20/19	14:30	-11304	17.74
1/19/19	9:45	-13029	17.76	1/20/19	0:15	-12159	19.04	1/20/19	14:45	-11289	17.74
1/19/19	10:00	-13014	17.77	1/20/19	0:30	-12144	18.90	1/20/19	15:00	-11274	17.74
1/19/19	10:15	-12999	17.77	1/20/19	0:45	-12129	18.82	1/20/19	15:15	-11259	17.74
1/19/19	10:30	-12984	17.76	1/20/19	1:00	-12114	18.72	1/20/19	15:30	-11244	17.75
1/19/19	10:45	-12969	17.76	1/20/19	1:15	-12099	18.66	1/20/19	15:45	-11229	17.75
1/19/19	11:00	-12954	17.75	1/20/19	1:30	-12084	18.59	1/20/19	16:00	-11214	17.73
1/19/19	11:15	-12939	17.76	1/20/19	1:45	-12069	18.54	1/20/19	16:15	-11199	17.73
1/19/19	11:30	-12924	17.76	1/20/19	2:00	-12054	18.49	1/20/19	16:30	-11184	17.75
1/19/19	11:45	-12909	17.76	1/20/19	2:15	-12039	18.43	1/20/19	16:45	-11169	17.73
1/19/19	12:00	-12894	17.76	1/20/19	2:30	-12024	18.39	1/20/19	17:00	-11154	17.75
1/19/19	12:15	-12879	17.75	1/20/19	2:45	-12009	18.34	1/20/19	17:15	-11139	17.74
1/19/19	12:30	-12864	17.75	1/20/19	3:00	-11994	18.33	1/20/19	17:30	-11124	17.74
1/19/19	12:45	-12849	17.74	1/20/19	3:15	-11979	18.28	1/20/19	17:45	-11109	17.75
1/19/19	13:00	-12834	17.74	1/20/19	3:30	-11964	18.24	1/20/19	18:00	-11094	17.75
1/19/19	13:15	-12819	17.74	1/20/19	3:45	-11949	18.22	1/20/19	18:15	-11079	17.74
1/19/19	13:30	-12804	17.73	1/20/19	4:00	-11934	18.18	1/20/19	18:30	-11064	17.75
1/19/19	13:45	-12789	17.74	1/20/19	4:15	-11919	18.15	1/20/19	18:45	-11049	17.74
1/19/19	14:00	-12774	17.73	1/20/19	4:30	-11904	18.13	1/20/19	19:00	-11034	17.75
1/19/19	14:15	-12759	18.04	1/20/19	4:45	-11889	18.11	1/20/19	19:15	-11019	17.75
1/19/19	14:30	-12744	18.30	1/20/19	5:00	-11874	18.08	1/20/19	19:30	-11004	17.76
1/19/19	14:45	-12729	18.47	1/20/19	5:15	-11859	18.07	1/20/19	19:45	-10989	17.74
1/19/19	15:00	-12714	18.62	1/20/19	5:30	-11844	18.04	1/20/19	20:00	-10974	17.75
1/19/19	15:15	-12699	18.71	1/20/19	5:45	-11829	18.01	1/20/19	20:15	-10959	17.76
1/19/19	15:30	-12684	18.81	1/20/19	6:00	-11814	18.01	1/20/19	20:30	-10944	17.75
1/19/19	15:45	-12669	18.90	1/20/19	6:15	-11799	17.98	1/20/19	20:45	-10929	17.75
1/19/19	16:00	-12654	18.97	1/20/19	6:30	-11784	17.97	1/20/19	21:00	-10914	17.76
1/19/19	16:15	-12639	19.03	1/20/19	6:45	-11769	17.97	1/20/19	21:15	-10899	17.76
1/19/19	16:30	-12624	19.09	1/20/19	7:00	-11754	17.94	1/20/19	21:30	-10884	17.74
1/19/19	16:45	-12609	19.13	1/20/19	7:15	-11739	17.94	1/20/19	21:45	-10869	17.76
1/19/19	17:00	-12594	19.19	1/20/19	7:30	-11724	17.93	1/20/19	22:00	-10854	17.75
1/19/19	17:15	-12579	19.24	1/20/19	7:45	-11709	17.91	1/20/19	22:15	-10839	17.74

1/20/19	22:30	-10824	17.76	1/21/19	13:00	-9954	17.93	1/22/19	3:30	-9084	18.21
1/20/19	22:45	-10809	17.76	1/21/19	13:15	-9939	18.24	1/22/19	3:45	-9069	18.19
1/20/19	23:00	-10794	17.74	1/21/19	13:30	-9924	18.43	1/22/19	4:00	-9054	18.17
1/20/19	23:15	-10779	17.75	1/21/19	13:45	-9909	18.58	1/22/19	4:15	-9039	18.15
1/20/19	23:30	-10764	17.74	1/21/19	14:00	-9894	18.68	1/22/19	4:30	-9024	18.13
1/20/19	23:45	-10749	17.75	1/21/19	14:15	-9879	18.78	1/22/19	4:45	-9009	18.13
1/21/19	0:00	-10734	17.75	1/21/19	14:30	-9864	18.86	1/22/19	5:00	-8994	18.10
1/21/19	0:15	-10719	17.74	1/21/19	14:45	-9849	18.93	1/22/19	5:15	-8979	18.10
1/21/19	0:30	-10704	17.73	1/21/19	15:00	-9834	19.01	1/22/19	5:30	-8964	18.07
1/21/19	0:45	-10689	17.73	1/21/19	15:15	-9819	19.06	1/22/19	5:45	-8949	18.08
1/21/19	1:00	-10674	17.74	1/21/19	15:30	-9804	19.12	1/22/19	6:00	-8934	18.07
1/21/19	1:15	-10659	17.74	1/21/19	15:45	-9789	19.16	1/22/19	6:15	-8919	18.06
1/21/19	1:30	-10644	17.72	1/21/19	16:00	-9774	19.21	1/22/19	6:30	-8904	18.04
1/21/19	1:45	-10629	17.72	1/21/19	16:15	-9759	19.25	1/22/19	6:45	-8889	18.03
1/21/19	2:00	-10614	17.73	1/21/19	16:30	-9744	19.30	1/22/19	7:00	-8874	18.03
1/21/19	2:15	-10599	17.73	1/21/19	16:45	-9729	19.33	1/22/19	7:15	-8859	18.01
1/21/19	2:30	-10584	17.72	1/21/19	17:00	-9714	19.36	1/22/19	7:30	-8844	18.02
1/21/19	2:45	-10569	17.72	1/21/19	17:15	-9699	19.39	1/22/19	7:45	-8829	18.02
1/21/19	3:00	-10554	17.71	1/21/19	17:30	-9684	19.42	1/22/19	8:00	-8814	17.98
1/21/19	3:15	-10539	17.71	1/21/19	17:45	-9669	19.46	1/22/19	8:15	-8799	17.99
1/21/19	3:30	-10524	17.71	1/21/19	18:00	-9654	19.49	1/22/19	8:30	-8784	17.98
1/21/19	3:45	-10509	17.71	1/21/19	18:15	-9639	19.52	1/22/19	8:45	-8769	17.97
1/21/19	4:00	-10494	17.70	1/21/19	18:30	-9624	19.52	1/22/19	9:00	-8754	17.98
1/21/19	4:15	-10479	17.71	1/21/19	18:45	-9609	19.56	1/22/19	9:15	-8739	17.97
1/21/19	4:30	-10464	17.70	1/21/19	19:00	-9594	19.58	1/22/19	9:30	-8724	17.97
1/21/19	4:45	-10449	17.70	1/21/19	19:15	-9579	19.62	1/22/19	9:45	-8709	17.97
1/21/19	5:00	-10434	17.69	1/21/19	19:30	-9564	19.63	1/22/19	10:00	-8694	17.95
1/21/19	5:15	-10419	17.69	1/21/19	19:45	-9549	19.64	1/22/19	10:15	-8679	17.95
1/21/19	5:30	-10404	17.70	1/21/19	20:00	-9534	19.68	1/22/19	10:30	-8664	17.94
1/21/19	5:45	-10389	17.69	1/21/19	20:15	-9519	19.69	1/22/19	10:45	-8649	17.94
1/21/19	6:00	-10374	17.68	1/21/19	20:30	-9504	19.70	1/22/19	11:00	-8634	17.95
1/21/19	6:15	-10359	17.68	1/21/19	20:45	-9489	19.73	1/22/19	11:15	-8619	17.94
1/21/19	6:30	-10344	17.68	1/21/19	21:00	-9474	19.75	1/22/19	11:30	-8604	17.94
1/21/19	6:45	-10329	17.68	1/21/19	21:15	-9459	19.75	1/22/19	11:45	-8589	17.92
1/21/19	7:00	-10314	17.68	1/21/19	21:30	-9444	19.77	1/22/19	12:00	-8574	17.93
1/21/19	7:15	-10299	17.67	1/21/19	21:45	-9429	19.79	1/22/19	12:15	-8559	17.92
1/21/19	7:30	-10284	17.68	1/21/19	22:00	-9414	19.81	1/22/19	12:30	-8544	17.91
1/21/19	7:45	-10269	17.69	1/21/19	22:15	-9399	19.44	1/22/19	12:45	-8529	17.92
1/21/19	8:00	-10254	17.69	1/21/19	22:30	-9384	19.23	1/22/19	13:00	-8514	17.92
1/21/19	8:15	-10239	17.69	1/21/19	22:45	-9369	19.08	1/22/19	13:15	-8499	17.90
1/21/19	8:30	-10224	17.70	1/21/19	23:00	-9354	18.98	1/22/19	13:30	-8484	17.91
1/21/19	8:45	-10209	17.69	1/21/19	23:15	-9339	18.87	1/22/19	13:45	-8469	17.89
1/21/19	9:00	-10194	17.69	1/21/19	23:30	-9324	18.79	1/22/19	14:00	-8454	17.89
1/21/19	9:15	-10179	17.69	1/21/19	23:45	-9309	18.73	1/22/19	14:15	-8439	17.88
1/21/19	9:30	-10164	17.70	1/22/19	0:00	-9294	18.68	1/22/19	14:30	-8424	17.88
1/21/19	9:45	-10149	17.69	1/22/19	0:15	-9279	18.61	1/22/19	14:45	-8409	17.87
1/21/19	10:00	-10134	17.70	1/22/19	0:30	-9264	18.58	1/22/19	15:00	-8394	17.87
1/21/19	10:15	-10119	17.70	1/22/19	0:45	-9249	18.52	1/22/19	15:15	-8379	17.89
1/21/19	10:30	-10104	17.72	1/22/19	1:00	-9234	18.49	1/22/19	15:30	-8364	17.87
1/21/19	10:45	-10089	17.72	1/22/19	1:15	-9219	18.46	1/22/19	15:45	-8349	17.87
1/21/19	11:00	-10074	17.71	1/22/19	1:30	-9204	18.42	1/22/19	16:00	-8334	17.86
1/21/19	11:15	-10059	17.71	1/22/19	1:45	-9189	18.39	1/22/19	16:15	-8319	17.85
1/21/19	11:30	-10044	17.71	1/22/19	2:00	-9174	18.36	1/22/19	16:30	-8304	17.86
1/21/19	11:45	-10029	17.70	1/22/19	2:15	-9159	18.33	1/22/19	16:45	-8289	17.85
1/21/19	12:00	-10014	17.72	1/22/19	2:30	-9144	18.32	1/22/19	17:00	-8274	17.85
1/21/19	12:15	-9999	17.71	1/22/19	2:45	-9129	18.28	1/22/19	17:15	-8259	17.86
1/21/19	12:30	-9984	17.71	1/22/19	3:00	-9114	18.26	1/22/19	17:30	-8244	17.84
1/21/19	12:45	-9969	17.72	1/22/19	3:15	-9099	18.23	1/22/19	17:45	-8229	17.84

1/22/19	18:00	-8214	17.84	1/23/19	8:30	-7344	17.71	1/23/19	23:00	-6474	18.47
1/22/19	18:15	-8199	17.83	1/23/19	8:45	-7329	17.72	1/23/19	23:15	-6459	18.43
1/22/19	18:30	-8184	17.84	1/23/19	9:00	-7314	17.71	1/23/19	23:30	-6444	18.39
1/22/19	18:45	-8169	17.82	1/23/19	9:15	-7299	17.72	1/23/19	23:45	-6429	18.38
1/22/19	19:00	-8154	17.82	1/23/19	9:30	-7284	17.71	1/24/19	0:00	-6414	18.33
1/22/19	19:15	-8139	17.83	1/23/19	9:45	-7269	17.71	1/24/19	0:15	-6399	18.31
1/22/19	19:30	-8124	17.83	1/23/19	10:00	-7254	18.11	1/24/19	0:30	-6384	18.28
1/22/19	19:45	-8109	17.82	1/23/19	10:15	-7239	18.33	1/24/19	0:45	-6369	18.26
1/22/19	20:00	-8094	17.82	1/23/19	10:30	-7224	18.50	1/24/19	1:00	-6354	18.23
1/22/19	20:15	-8079	17.82	1/23/19	10:45	-7209	18.63	1/24/19	1:15	-6339	18.21
1/22/19	20:30	-8064	17.81	1/23/19	11:00	-7194	18.73	1/24/19	1:30	-6324	18.19
1/22/19	20:45	-8049	17.83	1/23/19	11:15	-7179	18.81	1/24/19	1:45	-6309	18.17
1/22/19	21:00	-8034	17.82	1/23/19	11:30	-7164	18.91	1/24/19	2:00	-6294	18.16
1/22/19	21:15	-8019	17.82	1/23/19	11:45	-7149	18.98	1/24/19	2:15	-6279	18.13
1/22/19	21:30	-8004	17.81	1/23/19	12:00	-7134	19.03	1/24/19	2:30	-6264	18.11
1/22/19	21:45	-7989	17.83	1/23/19	12:15	-7119	19.10	1/24/19	2:45	-6249	18.11
1/22/19	22:00	-7974	17.81	1/23/19	12:30	-7104	19.15	1/24/19	3:00	-6234	18.08
1/22/19	22:15	-7959	17.80	1/23/19	12:45	-7089	19.20	1/24/19	3:15	-6219	18.08
1/22/19	22:30	-7944	17.81	1/23/19	13:00	-7074	19.24	1/24/19	3:30	-6204	18.04
1/22/19	22:45	-7929	17.81	1/23/19	13:15	-7059	19.28	1/24/19	3:45	-6189	18.04
1/22/19	23:00	-7914	17.79	1/23/19	13:30	-7044	19.31	1/24/19	4:00	-6174	18.01
1/22/19	23:15	-7899	17.80	1/23/19	13:45	-7029	19.36	1/24/19	4:15	-6159	17.99
1/22/19	23:30	-7884	17.80	1/23/19	14:00	-7014	19.38	1/24/19	4:30	-6144	17.98
1/22/19	23:45	-7869	17.78	1/23/19	14:15	-6999	19.42	1/24/19	4:45	-6129	17.98
1/23/19	0:00	-7854	17.79	1/23/19	14:30	-6984	19.45	1/24/19	5:00	-6114	17.95
1/23/19	0:15	-7839	17.79	1/23/19	14:45	-6969	19.48	1/24/19	5:15	-6099	17.95
1/23/19	0:30	-7824	17.79	1/23/19	15:00	-6954	19.50	1/24/19	5:30	-6084	17.93
1/23/19	0:45	-7809	17.78	1/23/19	15:15	-6939	19.52	1/24/19	5:45	-6069	17.91
1/23/19	1:00	-7794	17.79	1/23/19	15:30	-6924	19.53	1/24/19	6:00	-6054	17.89
1/23/19	1:15	-7779	17.79	1/23/19	15:45	-6909	19.56	1/24/19	6:15	-6039	17.88
1/23/19	1:30	-7764	17.79	1/23/19	16:00	-6894	19.58	1/24/19	6:30	-6024	17.87
1/23/19	1:45	-7749	17.79	1/23/19	16:15	-6879	19.59	1/24/19	6:45	-6009	17.85
1/23/19	2:00	-7734	17.79	1/23/19	16:30	-6864	19.61	1/24/19	7:00	-5994	17.83
1/23/19	2:15	-7719	17.78	1/23/19	16:45	-6849	19.62	1/24/19	7:15	-5979	17.82
1/23/19	2:30	-7704	17.79	1/23/19	17:00	-6834	19.64	1/24/19	7:30	-5964	17.82
1/23/19	2:45	-7689	17.77	1/23/19	17:15	-6819	19.66	1/24/19	7:45	-5949	17.81
1/23/19	3:00	-7674	17.78	1/23/19	17:30	-6804	19.67	1/24/19	8:00	-5934	17.79
1/23/19	3:15	-7659	17.77	1/23/19	17:45	-6789	19.69	1/24/19	8:15	-5919	17.77
1/23/19	3:30	-7644	17.75	1/23/19	18:00	-6774	19.70	1/24/19	8:30	-5904	17.77
1/23/19	3:45	-7629	17.76	1/23/19	18:15	-6759	19.71	1/24/19	8:45	-5889	17.75
1/23/19	4:00	-7614	17.74	1/23/19	18:30	-6744	19.72	1/24/19	9:00	-5874	17.74
1/23/19	4:15	-7599	17.75	1/23/19	18:45	-6729	19.75	1/24/19	9:15	-5859	17.73
1/23/19	4:30	-7584	17.73	1/23/19	19:00	-6714	19.75	1/24/19	9:30	-5844	17.72
1/23/19	4:45	-7569	17.73	1/23/19	19:15	-6699	19.77	1/24/19	9:45	-5829	17.70
1/23/19	5:00	-7554	17.74	1/23/19	19:30	-6684	19.78	1/24/19	10:00	-5814	17.70
1/23/19	5:15	-7539	17.73	1/23/19	19:45	-6669	19.77	1/24/19	10:15	-5799	17.68
1/23/19	5:30	-7524	17.72	1/23/19	20:00	-6654	19.79	1/24/19	10:30	-5784	17.68
1/23/19	5:45	-7509	17.73	1/23/19	20:15	-6639	19.63	1/24/19	10:45	-5769	17.68
1/23/19	6:00	-7494	17.72	1/23/19	20:30	-6624	19.32	1/24/19	11:00	-5754	17.67
1/23/19	6:15	-7479	17.72	1/23/19	20:45	-6609	19.13	1/24/19	11:15	-5739	17.66
1/23/19	6:30	-7464	17.72	1/23/19	21:00	-6594	18.99	1/24/19	11:30	-5724	17.66
1/23/19	6:45	-7449	17.72	1/23/19	21:15	-6579	18.88	1/24/19	11:45	-5709	17.65
1/23/19	7:00	-7434	17.71	1/23/19	21:30	-6564	18.81	1/24/19	12:00	-5694	17.62
1/23/19	7:15	-7419	17.72	1/23/19	21:45	-6549	18.73	1/24/19	12:15	-5679	17.61
1/23/19	7:30	-7404	17.72	1/23/19	22:00	-6534	18.66	1/24/19	12:30	-5664	17.61
1/23/19	7:45	-7389	17.72	1/23/19	22:15	-6519	18.61	1/24/19	12:45	-5649	17.61
1/23/19	8:00	-7374	17.73	1/23/19	22:30	-6504	18.55	1/24/19	13:00	-5634	17.60
1/23/19	8:15	-7359	17.72	1/23/19	22:45	-6489	18.51	1/24/19	13:15	-5619	17.60

1/24/19	13:30	-5604	17.59	1/25/19	4:00	-4734	17.31	1/25/19	18:30	-3864	17.92
1/24/19	13:45	-5589	17.58	1/25/19	4:15	-4719	17.30	1/25/19	18:45	-3849	17.89
1/24/19	14:00	-5574	17.57	1/25/19	4:30	-4704	17.30	1/25/19	19:00	-3834	17.86
1/24/19	14:15	-5559	17.57	1/25/19	4:45	-4689	17.31	1/25/19	19:15	-3819	17.83
1/24/19	14:30	-5544	17.56	1/25/19	5:00	-4674	17.31	1/25/19	19:30	-3804	17.82
1/24/19	14:45	-5529	17.54	1/25/19	5:15	-4659	17.30	1/25/19	19:45	-3789	17.80
1/24/19	15:00	-5514	17.54	1/25/19	5:30	-4644	17.56	1/25/19	20:00	-3774	17.79
1/24/19	15:15	-5499	17.54	1/25/19	5:45	-4629	17.85	1/25/19	20:15	-3759	17.76
1/24/19	15:30	-5484	17.53	1/25/19	6:00	-4614	18.04	1/25/19	20:30	-3744	17.75
1/24/19	15:45	-5469	17.51	1/25/19	6:15	-4599	18.17	1/25/19	20:45	-3729	17.73
1/24/19	16:00	-5454	17.51	1/25/19	6:30	-4584	18.27	1/25/19	21:00	-3714	17.72
1/24/19	16:15	-5439	17.49	1/25/19	6:45	-4569	18.36	1/25/19	21:15	-3699	17.70
1/24/19	16:30	-5424	17.48	1/25/19	7:00	-4554	18.44	1/25/19	21:30	-3684	17.68
1/24/19	16:45	-5409	17.48	1/25/19	7:15	-4539	18.52	1/25/19	21:45	-3669	17.68
1/24/19	17:00	-5394	17.47	1/25/19	7:30	-4524	18.57	1/25/19	22:00	-3654	17.66
1/24/19	17:15	-5379	17.47	1/25/19	7:45	-4509	18.63	1/25/19	22:15	-3639	17.65
1/24/19	17:30	-5364	17.45	1/25/19	8:00	-4494	18.70	1/25/19	22:30	-3624	17.64
1/24/19	17:45	-5349	17.45	1/25/19	8:15	-4479	18.73	1/25/19	22:45	-3609	17.62
1/24/19	18:00	-5334	17.44	1/25/19	8:30	-4464	18.78	1/25/19	23:00	-3594	17.62
1/24/19	18:15	-5319	17.44	1/25/19	8:45	-4449	18.81	1/25/19	23:15	-3579	17.61
1/24/19	18:30	-5304	17.43	1/25/19	9:00	-4434	18.86	1/25/19	23:30	-3564	17.60
1/24/19	18:45	-5289	17.43	1/25/19	9:15	-4419	18.89	1/25/19	23:45	-3549	17.60
1/24/19	19:00	-5274	17.42	1/25/19	9:30	-4404	18.93	1/26/19	0:00	-3534	17.59
1/24/19	19:15	-5259	17.40	1/25/19	9:45	-4389	18.97	1/26/19	0:15	-3519	17.58
1/24/19	19:30	-5244	17.41	1/25/19	10:00	-4374	18.99	1/26/19	0:30	-3504	17.58
1/24/19	19:45	-5229	17.41	1/25/19	10:15	-4359	19.01	1/26/19	0:45	-3489	17.57
1/24/19	20:00	-5214	17.39	1/25/19	10:30	-4344	19.04	1/26/19	1:00	-3474	17.57
1/24/19	20:15	-5199	17.39	1/25/19	10:45	-4329	19.07	1/26/19	1:15	-3459	17.57
1/24/19	20:30	-5184	17.39	1/25/19	11:00	-4314	19.08	1/26/19	1:30	-3444	17.56
1/24/19	20:45	-5169	17.37	1/25/19	11:15	-4299	19.11	1/26/19	1:45	-3429	17.56
1/24/19	21:00	-5154	17.38	1/25/19	11:30	-4284	19.13	1/26/19	2:00	-3414	17.55
1/24/19	21:15	-5139	17.37	1/25/19	11:45	-4269	19.15	1/26/19	2:15	-3399	17.55
1/24/19	21:30	-5124	17.36	1/25/19	12:00	-4254	19.17	1/26/19	2:30	-3384	17.53
1/24/19	21:45	-5109	17.36	1/25/19	12:15	-4239	19.19	1/26/19	2:45	-3369	17.53
1/24/19	22:00	-5094	17.36	1/25/19	12:30	-4224	19.21	1/26/19	3:00	-3354	17.53
1/24/19	22:15	-5079	17.36	1/25/19	12:45	-4209	19.22	1/26/19	3:15	-3339	17.53
1/24/19	22:30	-5064	17.34	1/25/19	13:00	-4194	19.24	1/26/19	3:30	-3324	17.53
1/24/19	22:45	-5049	17.34	1/25/19	13:15	-4179	19.26	1/26/19	3:45	-3309	17.51
1/24/19	23:00	-5034	17.35	1/25/19	13:30	-4164	19.27	1/26/19	4:00	-3294	17.52
1/24/19	23:15	-5019	17.33	1/25/19	13:45	-4149	19.28	1/26/19	4:15	-3279	17.51
1/24/19	23:30	-5004	17.35	1/25/19	14:00	-4134	19.31	1/26/19	4:30	-3264	17.51
1/24/19	23:45	-4989	17.35	1/25/19	14:15	-4119	19.32	1/26/19	4:45	-3249	17.50
1/25/19	0:00	-4974	17.35	1/25/19	14:30	-4104	19.34	1/26/19	5:00	-3234	17.51
1/25/19	0:15	-4959	17.34	1/25/19	14:45	-4089	19.32	1/26/19	5:15	-3219	17.49
1/25/19	0:30	-4944	17.34	1/25/19	15:00	-4074	18.92	1/26/19	5:30	-3204	17.50
1/25/19	0:45	-4929	17.34	1/25/19	15:15	-4059	18.72	1/26/19	5:45	-3189	17.48
1/25/19	1:00	-4914	17.32	1/25/19	15:30	-4044	18.58	1/26/19	6:00	-3174	17.48
1/25/19	1:15	-4899	17.34	1/25/19	15:45	-4029	18.47	1/26/19	6:15	-3159	17.45
1/25/19	1:30	-4884	17.34	1/25/19	16:00	-4014	18.39	1/26/19	6:30	-3144	17.47
1/25/19	1:45	-4869	17.33	1/25/19	16:15	-3999	18.30	1/26/19	6:45	-3129	17.47
1/25/19	2:00	-4854	17.33	1/25/19	16:30	-3984	18.23	1/26/19	7:00	-3114	17.46
1/25/19	2:15	-4839	17.33	1/25/19	16:45	-3969	18.18	1/26/19	7:15	-3099	17.46
1/25/19	2:30	-4824	17.33	1/25/19	17:00	-3954	18.13	1/26/19	7:30	-3084	17.45
1/25/19	2:45	-4809	17.33	1/25/19	17:15	-3939	18.08	1/26/19	7:45	-3069	17.45
1/25/19	3:00	-4794	17.31	1/25/19	17:30	-3924	18.04	1/26/19	8:00	-3054	17.44
1/25/19	3:15	-4779	17.32	1/25/19	17:45	-3909	17.99	1/26/19	8:15	-3039	17.45
1/25/19	3:30	-4764	17.32	1/25/19	18:00	-3894	17.96	1/26/19	8:30	-3024	17.46
1/25/19	3:45	-4749	17.32	1/25/19	18:15	-3879	17.95	1/26/19	8:45	-3009	17.43

1/26/19	9:00	-2994	17.44	1/26/19	23:30	-2124	17.29	1/27/19	14:00	-1254	19.21
1/26/19	9:15	-2979	17.44	1/26/19	23:45	-2109	17.28	1/27/19	14:15	-1239	19.22
1/26/19	9:30	-2964	17.42	1/27/19	0:00	-2094	17.29	1/27/19	14:30	-1224	19.24
1/26/19	9:45	-2949	17.44	1/27/19	0:15	-2079	17.28	1/27/19	14:45	-1209	19.24
1/26/19	10:00	-2934	17.44	1/27/19	0:30	-2064	17.28	1/27/19	15:00	-1194	19.26
1/26/19	10:15	-2919	17.43	1/27/19	0:45	-2049	17.27	1/27/19	15:15	-1179	19.27
1/26/19	10:30	-2904	17.43	1/27/19	1:00	-2034	17.27	1/27/19	15:30	-1164	18.87
1/26/19	10:45	-2889	17.42	1/27/19	1:15	-2019	17.27	1/27/19	15:45	-1149	18.66
1/26/19	11:00	-2874	17.41	1/27/19	1:30	-2004	17.27	1/27/19	16:00	-1134	18.51
1/26/19	11:15	-2859	17.41	1/27/19	1:45	-1989	17.26	1/27/19	16:15	-1119	18.40
1/26/19	11:30	-2844	17.42	1/27/19	2:00	-1974	17.26	1/27/19	16:30	-1104	18.35
1/26/19	11:45	-2829	17.40	1/27/19	2:15	-1959	17.26	1/27/19	16:45	-1089	18.26
1/26/19	12:00	-2814	17.40	1/27/19	2:30	-1944	17.26	1/27/19	17:00	-1074	18.19
1/26/19	12:15	-2799	17.40	1/27/19	2:45	-1929	17.26	1/27/19	17:15	-1059	18.12
1/26/19	12:30	-2784	17.40	1/27/19	3:00	-1914	17.25	1/27/19	17:30	-1044	18.06
1/26/19	12:45	-2769	17.40	1/27/19	3:15	-1899	17.24				
1/26/19	13:00	-2754	17.40	1/27/19	3:30	-1884	17.25	1/28/19	10:54	0	17.15
1/26/19	13:15	-2739	17.40	1/27/19	3:45	-1869	17.24	1/28/19	10:55	1	35.63
1/26/19	13:30	-2724	17.41	1/27/19	4:00	-1854	17.25	1/28/19	10:56	2	36.51
1/26/19	13:45	-2709	17.40	1/27/19	4:15	-1839	17.25	1/28/19	10:57	3	38.83
1/26/19	14:00	-2694	17.40	1/27/19	4:30	-1824	17.24	1/28/19	10:58	4	38.75
1/26/19	14:15	-2679	17.40	1/27/19	4:45	-1809	17.24	1/28/19	10:59	5	38.69
1/26/19	14:30	-2664	17.41	1/27/19	5:00	-1794	17.25	1/28/19	11:00	6	39.02
1/26/19	14:45	-2649	17.39	1/27/19	5:15	-1779	17.23	1/28/19	11:01	7	38.92
1/26/19	15:00	-2634	17.39	1/27/19	5:30	-1764	17.24	1/28/19	11:02	8	39.04
1/26/19	15:15	-2619	17.40	1/27/19	5:45	-1749	17.22	1/28/19	11:03	9	39.13
1/26/19	15:30	-2604	17.40	1/27/19	6:00	-1734	17.60	1/28/19	11:04	10	39.15
1/26/19	15:45	-2589	17.39	1/27/19	6:15	-1719	17.84	1/28/19	11:06	12	39.28
1/26/19	16:00	-2574	17.39	1/27/19	6:30	-1704	18.00	1/28/19	11:08	14	39.43
1/26/19	16:15	-2559	17.39	1/27/19	6:45	-1689	18.15	1/28/19	11:10	16	39.48
1/26/19	16:30	-2544	17.40	1/27/19	7:00	-1674	18.22	1/28/19	11:12	18	39.60
1/26/19	16:45	-2529	17.38	1/27/19	7:15	-1659	18.32	1/28/19	11:14	20	39.74
1/26/19	17:00	-2514	17.38	1/27/19	7:30	-1644	18.41	1/28/19	11:19	25	39.82
1/26/19	17:15	-2499	17.38	1/27/19	7:45	-1629	18.49	1/28/19	11:24	30	40.01
1/26/19	17:30	-2484	17.37	1/27/19	8:00	-1614	18.53	1/28/19	11:29	35	40.06
1/26/19	17:45	-2469	17.37	1/27/19	8:15	-1599	18.60	1/28/19	11:34	40	40.20
1/26/19	18:00	-2454	17.36	1/27/19	8:30	-1584	18.65	1/28/19	11:44	50	40.41
1/26/19	18:15	-2439	17.35	1/27/19	8:45	-1569	18.69	1/28/19	11:54	60	40.58
1/26/19	18:30	-2424	17.35	1/27/19	9:00	-1554	18.74	1/28/19	12:04	70	40.71
1/26/19	18:45	-2409	17.35	1/27/19	9:15	-1539	18.77	1/28/19	12:14	80	40.84
1/26/19	19:00	-2394	17.36	1/27/19	9:30	-1524	18.81	1/28/19	12:24	90	40.98
1/26/19	19:15	-2379	17.34	1/27/19	9:45	-1509	18.84	1/28/19	12:30	96	41.10
1/26/19	19:30	-2364	17.35	1/27/19	10:00	-1494	18.87	1/28/19	12:45	111	41.23
1/26/19	19:45	-2349	17.33	1/27/19	10:15	-1479	18.89	1/28/19	13:00	126	41.35
1/26/19	20:00	-2334	17.34	1/27/19	10:30	-1464	18.93	1/28/19	13:15	141	41.51
1/26/19	20:15	-2319	17.33	1/27/19	10:45	-1449	18.95	1/28/19	13:30	156	41.59
1/26/19	20:30	-2304	17.33	1/27/19	11:00	-1434	18.98	1/28/19	13:45	171	41.61
1/26/19	20:45	-2289	17.31	1/27/19	11:15	-1419	19.00	1/28/19	14:02	188	41.85
1/26/19	21:00	-2274	17.32	1/27/19	11:30	-1404	19.02	1/28/19	15:00	246	42.15
1/26/19	21:15	-2259	17.30	1/27/19	11:45	-1389	19.05	1/28/19	15:30	276	42.27
1/26/19	21:30	-2244	17.32	1/27/19	12:00	-1374	19.06	1/28/19	16:00	306	42.40
1/26/19	21:45	-2229	17.31	1/27/19	12:15	-1359	19.08	1/28/19	16:30	336	42.48
1/26/19	22:00	-2214	17.32	1/27/19	12:30	-1344	19.10	1/28/19	17:00	366	42.60
1/26/19	22:15	-2199	17.30	1/27/19	12:45	-1329	19.13	1/28/19	18:00	426	42.67
1/26/19	22:30	-2184	17.30	1/27/19	13:00	-1314	19.14	1/28/19	19:00	486	42.86
1/26/19	22:45	-2169	17.29	1/27/19	13:15	-1299	19.16	1/28/19	20:00	546	42.92
1/26/19	23:00	-2154	17.29	1/27/19	13:30	-1284	19.17	1/28/19	21:00	606	43.11
1/26/19	23:15	-2139	17.29	1/27/19	13:45	-1269	19.19	1/28/19	22:00	666	43.19

1/28/19	23:00	726	43.27
1/29/19	0:00	786	43.35
1/29/19	1:00	846	43.42
1/29/19	2:00	906	43.45
1/29/19	3:00	966	43.49
1/29/19	4:00	1026	43.55
1/29/19	5:00	1086	43.58
1/29/19	6:00	1146	43.62
1/29/19	7:00	1206	43.66
1/29/19	8:00	1266	44.35
1/29/19	9:00	1326	44.82
1/29/19	10:00	1386	45.07
1/29/19	12:00	1506	45.45
1/29/19	13:00	1566	45.55
1/29/19	15:00	1686	45.77
1/29/19	16:00	1746	45.84
1/29/19	17:00	1806	45.88
1/29/19	18:00	1866	45.06
1/29/19	19:00	1926	44.86
1/29/19	20:00	1986	44.72
1/29/19	21:00	2046	44.64
1/29/19	22:00	2106	44.54
1/29/19	23:00	2166	44.48
1/30/19	0:00	2226	44.43
1/30/19	1:00	2286	44.40
1/30/19	2:00	2346	44.39
1/30/19	3:00	2406	44.38
1/30/19	4:00	2466	44.37
1/30/19	5:00	2526	44.37
1/30/19	6:00	2586	44.36
1/30/19	7:00	2646	44.36
1/30/19	8:00	2706	44.34
1/30/19	9:00	2766	44.37
1/30/19	10:00	2826	44.38
1/30/19	11:00	2886	44.36
1/30/19	12:00	2946	44.37
1/30/19	13:00	3006	44.37
1/30/19	14:00	3066	44.37
1/30/19	15:00	3126	44.36
1/30/19	16:00	3186	44.40
1/30/19	17:00	3246	44.38
1/30/19	18:00	3306	44.36
1/30/19	19:00	3366	44.39
1/30/19	20:00	3426	44.46
1/30/19	21:00	3486	44.33
1/30/19	22:00	3546	44.43
1/30/19	23:00	3606	44.44
1/31/19	0:00	3666	44.43
1/31/19	1:00	3726	44.45
1/31/19	2:00	3786	44.46
1/31/19	3:00	3846	44.47
1/31/19	4:00	3906	44.47
1/31/19	5:00	3966	44.48
1/31/19	6:00	4026	44.47
1/31/19	7:00	4086	44.45
1/31/19	8:00	4146	44.43
1/31/19	9:00	4206	44.54
1/31/19	10:00	4266	45.29
1/31/19	10:54	4320	45.69
1/31/19	10:55	4321	25.01
1/31/19	11:01	4327	23.82
1/31/19	11:02	4328	23.69
1/31/19	11:03	4329	23.65
1/31/19	11:04	4330	23.61
1/31/19	11:05	4331	23.55
1/31/19	11:06	4332	23.53
1/31/19	11:08	4334	23.43
1/31/19	11:10	4336	23.34
1/31/19	11:12	4338	23.30
1/31/19	11:14	4340	23.25
1/31/19	11:26	4352	23.45
1/31/19	11:30	4356	23.33
1/31/19	11:40	4366	23.13
1/31/19	11:50	4376	22.87
1/31/19	12:00	4386	22.45
1/31/19	12:10	4396	22.31
1/31/19	12:20	4406	22.20
1/31/19	12:30	4416	22.09
1/31/19	12:40	4426	22.00
1/31/19	12:50	4436	21.92
1/31/19	13:00	4446	21.85
1/31/19	13:10	4456	21.79
1/31/19	13:20	4466	21.72
1/31/19	13:30	4476	21.66
1/31/19	14:00	4506	21.50
1/31/19	14:30	4536	21.37
1/31/19	15:00	4566	21.26
1/31/19	15:30	4596	21.17
1/31/19	16:00	4626	21.07
1/31/19	16:30	4656	21.00
1/31/19	17:00	4686	20.93
1/31/19	17:30	4716	20.87
1/31/19	18:00	4746	20.82
1/31/19	18:26	4772	20.78
1/31/19	18:28	4774	20.78
1/31/19	18:30	4776	20.76
1/31/19	18:32	4778	20.73
1/31/19	18:34	4780	20.65
1/31/19	18:36	4782	20.57
1/31/19	18:38	4784	20.51
1/31/19	18:40	4786	20.45
1/31/19	18:42	4788	20.41
1/31/19	18:44	4790	20.37
1/31/19	18:46	4792	20.33
1/31/19	18:48	4794	20.29
1/31/19	18:50	4796	20.25
1/31/19	18:52	4798	20.22
1/31/19	18:54	4800	20.19
1/31/19	18:56	4802	20.16
1/31/19	18:58	4804	20.14
1/31/19	19:00	4806	20.12
1/31/19	19:10	4816	19.98
1/31/19	19:20	4826	19.88
1/31/19	19:30	4836	19.79
1/31/19	19:40	4846	19.71
1/31/19	19:50	4856	19.64
1/31/19	20:00	4866	19.57
1/31/19	20:30	4896	19.38
1/31/19	21:00	4926	19.23
1/31/19	21:30	4956	19.10
1/31/19	22:00	4986	18.99
1/31/19	22:30	5016	18.89
1/31/19	23:00	5046	18.81
1/31/19	23:30	5076	18.73
2/1/19	0:00	5106	18.64
2/1/19	0:30	5136	18.56
2/1/19	1:00	5166	18.52
2/1/19	1:30	5196	18.46
2/1/19	2:00	5226	18.40
2/1/19	2:30	5256	18.34
2/1/19	3:00	5286	18.29
2/1/19	3:30	5316	18.25
2/1/19	4:00	5346	18.20
2/1/19	4:30	5376	18.16
2/1/19	5:00	5406	18.14
2/1/19	5:30	5436	18.09
2/1/19	6:00	5466	18.07
2/1/19	6:30	5496	18.03
2/1/19	7:00	5526	18.02
2/1/19	7:30	5556	17.98
2/1/19	8:00	5586	17.98
2/1/19	8:30	5616	17.94
2/1/19	9:00	5646	17.92

BRTW-1			
Date	**Time**	**Minutes**	**WL**
1/17/19	9:00	-15954	10.53
1/17/19	9:15	-15939	10.53
1/17/19	9:30	-15924	10.53
1/17/19	9:45	-15909	10.52
1/17/19	10:00	-15894	10.52
1/17/19	10:15	-15879	10.51
1/17/19	10:30	-15864	10.52
1/17/19	10:45	-15849	10.50
1/17/19	11:00	-15834	10.49
1/17/19	11:15	-15819	10.49
1/17/19	11:30	-15804	10.47
1/17/19	11:45	-15789	10.48
1/17/19	12:00	-15774	10.46
1/17/19	12:15	-15759	10.45
1/17/19	12:30	-15744	10.45
1/17/19	12:45	-15729	10.46
1/17/19	13:00	-15714	10.45
1/17/19	13:15	-15699	10.46
1/17/19	13:30	-15684	10.44
1/17/19	13:45	-15669	10.44
1/17/19	14:00	-15654	10.45
1/17/19	14:15	-15639	10.44
1/17/19	14:30	-15624	10.44
1/17/19	14:45	-15609	10.44
1/17/19	15:00	-15594	10.43
1/17/19	15:15	-15579	37.47
1/18/19	0:15	-15039	37.50

1/18/19	0:30	-15024	12.20	1/18/19	15:00	-14154	10.53	1/19/19	5:30	-13284	10.48
1/18/19	0:45	-15009	11.90	1/18/19	15:15	-14139	10.54	1/19/19	5:45	-13269	10.47
1/18/19	1:00	-14994	11.73	1/18/19	15:30	-14124	10.52	1/19/19	6:00	-13254	10.46
1/18/19	1:15	-14979	11.61	1/18/19	15:45	-14109	10.53	1/19/19	6:15	-13239	10.48
1/18/19	1:30	-14964	11.50	1/18/19	16:00	-14094	10.53	1/19/19	6:30	-13224	10.48
1/18/19	1:45	-14949	11.42	1/18/19	16:15	-14079	10.53	1/19/19	6:45	-13209	10.48
1/18/19	2:00	-14934	11.35	1/18/19	16:30	-14064	10.53	1/19/19	7:00	-13194	10.47
1/18/19	2:15	-14919	11.28	1/18/19	16:45	-14049	10.52	1/19/19	7:15	-13179	10.47
1/18/19	2:30	-14904	11.23	1/18/19	17:00	-14034	10.52	1/19/19	7:30	-13164	10.48
1/18/19	2:45	-14889	11.18	1/18/19	17:15	-14019	10.52	1/19/19	7:45	-13149	10.48
1/18/19	3:00	-14874	11.12	1/18/19	17:30	-14004	10.53	1/19/19	8:00	-13134	10.49
1/18/19	3:15	-14859	11.10	1/18/19	17:45	-13989	10.54	1/19/19	8:15	-13119	10.48
1/18/19	3:30	-14844	11.04	1/18/19	18:00	-13974	10.53	1/19/19	8:30	-13104	10.49
1/18/19	3:45	-14829	11.02	1/18/19	18:15	-13959	10.53	1/19/19	8:45	-13089	10.49
1/18/19	4:00	-14814	10.98	1/18/19	18:30	-13944	10.53	1/19/19	9:00	-13074	10.49
1/18/19	4:15	-14799	10.96	1/18/19	18:45	-13929	10.51	1/19/19	9:15	-13059	10.49
1/18/19	4:30	-14784	10.93	1/18/19	19:00	-13914	10.53	1/19/19	9:30	-13044	10.50
1/18/19	4:45	-14769	10.91	1/18/19	19:15	-13899	10.53	1/19/19	9:45	-13029	10.49
1/18/19	5:00	-14754	10.89	1/18/19	19:30	-13884	10.53	1/19/19	10:00	-13014	10.49
1/18/19	5:15	-14739	10.86	1/18/19	19:45	-13869	10.53	1/19/19	10:15	-12999	10.49
1/18/19	5:30	-14724	10.85	1/18/19	20:00	-13854	10.52	1/19/19	10:30	-12984	10.49
1/18/19	5:45	-14709	10.82	1/18/19	20:15	-13839	10.52	1/19/19	10:45	-12969	10.49
1/18/19	6:00	-14694	10.81	1/18/19	20:30	-13824	10.52	1/19/19	11:00	-12954	10.48
1/18/19	6:15	-14679	10.79	1/18/19	20:45	-13809	10.52	1/19/19	11:15	-12939	10.48
1/18/19	6:30	-14664	10.79	1/18/19	21:00	-13794	10.52	1/19/19	11:30	-12924	10.47
1/18/19	6:45	-14649	10.76	1/18/19	21:15	-13779	10.51	1/19/19	11:45	-12909	10.47
1/18/19	7:00	-14634	10.75	1/18/19	21:30	-13764	10.53	1/19/19	12:00	-12894	10.47
1/18/19	7:15	-14619	10.74	1/18/19	21:45	-13749	10.52	1/19/19	12:15	-12879	10.46
1/18/19	7:30	-14604	10.73	1/18/19	22:00	-13734	10.53	1/19/19	12:30	-12864	10.47
1/18/19	7:45	-14589	10.72	1/18/19	22:15	-13719	10.53	1/19/19	12:45	-12849	10.46
1/18/19	8:00	-14574	10.71	1/18/19	22:30	-13704	10.52	1/19/19	13:00	-12834	10.47
1/18/19	8:15	-14559	10.70	1/18/19	22:45	-13689	10.53	1/19/19	13:15	-12819	10.45
1/18/19	8:30	-14544	10.69	1/18/19	23:00	-13674	10.53	1/19/19	13:30	-12804	10.45
1/18/19	8:45	-14529	10.67	1/18/19	23:15	-13659	10.52	1/19/19	13:45	-12789	10.46
1/18/19	9:00	-14514	10.66	1/18/19	23:30	-13644	10.52	1/19/19	14:00	-12774	10.45
1/18/19	9:15	-14499	10.66	1/18/19	23:45	-13629	10.52	1/19/19	14:15	-12759	37.47
1/18/19	9:30	-14484	10.64	1/19/19	0:00	-13614	10.51				
1/18/19	9:45	-14469	10.64	1/19/19	0:15	-13599	10.51	1/19/19	23:30	-12204	37.49
1/18/19	10:00	-14454	10.65	1/19/19	0:30	-13584	10.50	1/19/19	23:45	-12189	12.23
1/18/19	10:15	-14439	10.64	1/19/19	0:45	-13569	10.50	1/20/19	0:00	-12174	11.95
1/18/19	10:30	-14424	10.63	1/19/19	1:00	-13554	10.50	1/20/19	0:15	-12159	11.77
1/18/19	10:45	-14409	10.61	1/19/19	1:15	-13539	10.50	1/20/19	0:30	-12144	11.64
1/18/19	11:00	-14394	10.62	1/19/19	1:30	-13524	10.50	1/20/19	0:45	-12129	11.54
1/18/19	11:15	-14379	10.60	1/19/19	1:45	-13509	10.50	1/20/19	1:00	-12114	11.45
1/18/19	11:30	-14364	10.60	1/19/19	2:00	-13494	10.50	1/20/19	1:15	-12099	11.38
1/18/19	11:45	-14349	10.60	1/19/19	2:15	-13479	10.49	1/20/19	1:30	-12084	11.31
1/18/19	12:00	-14334	10.58	1/19/19	2:30	-13464	10.49	1/20/19	1:45	-12069	11.26
1/18/19	12:15	-14319	10.58	1/19/19	2:45	-13449	10.49	1/20/19	2:00	-12054	11.21
1/18/19	12:30	-14304	10.57	1/19/19	3:00	-13434	10.48	1/20/19	2:15	-12039	11.15
1/18/19	12:45	-14289	10.56	1/19/19	3:15	-13419	10.48	1/20/19	2:30	-12024	11.10
1/18/19	13:00	-14274	10.56	1/19/19	3:30	-13404	10.49	1/20/19	2:45	-12009	11.06
1/18/19	13:15	-14259	10.55	1/19/19	3:45	-13389	10.49	1/20/19	3:00	-11994	11.04
1/18/19	13:30	-14244	10.54	1/19/19	4:00	-13374	10.48	1/20/19	3:15	-11979	10.99
1/18/19	13:45	-14229	10.56	1/19/19	4:15	-13359	10.48	1/20/19	3:30	-11964	10.95
1/18/19	14:00	-14214	10.54	1/19/19	4:30	-13344	10.47	1/20/19	3:45	-11949	10.93
1/18/19	14:15	-14199	10.54	1/19/19	4:45	-13329	10.47	1/20/19	4:00	-11934	10.90
1/18/19	14:30	-14184	10.54	1/19/19	5:00	-13314	10.47	1/20/19	4:15	-11919	10.86
1/18/19	14:45	-14169	10.54	1/19/19	5:15	-13299	10.47	1/20/19	4:30	-11904	10.84

1/20/19	4:45	-11889	10.83	1/20/19	19:15	-11019	10.48	1/21/19	9:45	-10149	10.43
1/20/19	5:00	-11874	10.80	1/20/19	19:30	-11004	10.48	1/21/19	10:00	-10134	10.42
1/20/19	5:15	-11859	10.79	1/20/19	19:45	-10989	10.48	1/21/19	10:15	-10119	10.42
1/20/19	5:30	-11844	10.76	1/20/19	20:00	-10974	10.48	1/21/19	10:30	-10104	10.43
1/20/19	5:45	-11829	10.74	1/20/19	20:15	-10959	10.48	1/21/19	10:45	-10089	10.42
1/20/19	6:00	-11814	10.73	1/20/19	20:30	-10944	10.47	1/21/19	11:00	-10074	10.44
1/20/19	6:15	-11799	10.71	1/20/19	20:45	-10929	10.48	1/21/19	11:15	-10059	10.43
1/20/19	6:30	-11784	10.70	1/20/19	21:00	-10914	10.48	1/21/19	11:30	-10044	10.43
1/20/19	6:45	-11769	10.68	1/20/19	21:15	-10899	10.49	1/21/19	11:45	-10029	10.42
1/20/19	7:00	-11754	10.67	1/20/19	21:30	-10884	10.46	1/21/19	12:00	-10014	10.43
1/20/19	7:15	-11739	10.65	1/20/19	21:45	-10869	10.48	1/21/19	12:15	-9999	10.43
1/20/19	7:30	-11724	10.65	1/20/19	22:00	-10854	10.48	1/21/19	12:30	-9984	10.45
1/20/19	7:45	-11709	10.64	1/20/19	22:15	-10839	10.47	1/21/19	12:45	-9969	10.42
1/20/19	8:00	-11694	10.63	1/20/19	22:30	-10824	10.48	1/21/19	13:00	-9954	37.47
1/20/19	8:15	-11679	10.62	1/20/19	22:45	-10809	10.48				
1/20/19	8:30	-11664	10.61	1/20/19	23:00	-10794	10.47	1/21/19	22:00	-9414	37.50
1/20/19	8:45	-11649	10.60	1/20/19	23:15	-10779	10.46	1/21/19	22:15	-9399	12.25
1/20/19	9:00	-11634	10.58	1/20/19	23:30	-10764	10.47	1/21/19	22:30	-9384	11.99
1/20/19	9:15	-11619	10.59	1/20/19	23:45	-10749	10.48	1/21/19	22:45	-9369	11.82
1/20/19	9:30	-11604	10.57	1/21/19	0:00	-10734	10.46	1/21/19	23:00	-9354	11.69
1/20/19	9:45	-11589	10.56	1/21/19	0:15	-10719	10.47	1/21/19	23:15	-9339	11.60
1/20/19	10:00	-11574	10.56	1/21/19	0:30	-10704	10.47	1/21/19	23:30	-9324	11.50
1/20/19	10:15	-11559	10.55	1/21/19	0:45	-10689	10.45	1/21/19	23:45	-9309	11.45
1/20/19	10:30	-11544	10.54	1/21/19	1:00	-10674	10.46	1/22/19	0:00	-9294	11.39
1/20/19	10:45	-11529	10.53	1/21/19	1:15	-10659	10.46	1/22/19	0:15	-9279	11.33
1/20/19	11:00	-11514	10.53	1/21/19	1:30	-10644	10.45	1/22/19	0:30	-9264	11.29
1/20/19	11:15	-11499	10.52	1/21/19	1:45	-10629	10.45	1/22/19	0:45	-9249	11.25
1/20/19	11:30	-11484	10.51	1/21/19	2:00	-10614	10.45	1/22/19	1:00	-9234	11.20
1/20/19	11:45	-11469	10.52	1/21/19	2:15	-10599	10.45	1/22/19	1:15	-9219	11.16
1/20/19	12:00	-11454	10.51	1/21/19	2:30	-10584	10.43	1/22/19	1:30	-9204	11.13
1/20/19	12:15	-11439	10.51	1/21/19	2:45	-10569	10.45	1/22/19	1:45	-9189	11.11
1/20/19	12:30	-11424	10.50	1/21/19	3:00	-10554	10.44	1/22/19	2:00	-9174	11.08
1/20/19	12:45	-11409	10.50	1/21/19	3:15	-10539	10.44	1/22/19	2:15	-9159	11.03
1/20/19	13:00	-11394	10.49	1/21/19	3:30	-10524	10.44	1/22/19	2:30	-9144	11.01
1/20/19	13:15	-11379	10.49	1/21/19	3:45	-10509	10.44	1/22/19	2:45	-9129	11.00
1/20/19	13:30	-11364	10.48	1/21/19	4:00	-10494	10.43	1/22/19	3:00	-9114	10.98
1/20/19	13:45	-11349	10.47	1/21/19	4:15	-10479	10.43	1/22/19	3:15	-9099	10.95
1/20/19	14:00	-11334	10.47	1/21/19	4:30	-10464	10.43	1/22/19	3:30	-9084	10.93
1/20/19	14:15	-11319	10.47	1/21/19	4:45	-10449	10.42	1/22/19	3:45	-9069	10.91
1/20/19	14:30	-11304	10.47	1/21/19	5:00	-10434	10.42	1/22/19	4:00	-9054	10.88
1/20/19	14:45	-11289	10.47	1/21/19	5:15	-10419	10.42	1/22/19	4:15	-9039	10.87
1/20/19	15:00	-11274	10.48	1/21/19	5:30	-10404	10.42	1/22/19	4:30	-9024	10.84
1/20/19	15:15	-11259	10.46	1/21/19	5:45	-10389	10.42	1/22/19	4:45	-9009	10.84
1/20/19	15:30	-11244	10.48	1/21/19	6:00	-10374	10.41	1/22/19	5:00	-8994	10.81
1/20/19	15:45	-11229	10.48	1/21/19	6:15	-10359	10.41	1/22/19	5:15	-8979	10.81
1/20/19	16:00	-11214	10.46	1/21/19	6:30	-10344	10.41	1/22/19	5:30	-8964	10.80
1/20/19	16:15	-11199	10.46	1/21/19	6:45	-10329	10.41	1/22/19	5:45	-8949	10.79
1/20/19	16:30	-11184	10.46	1/21/19	7:00	-10314	10.41	1/22/19	6:00	-8934	10.78
1/20/19	16:45	-11169	10.46	1/21/19	7:15	-10299	10.41	1/22/19	6:15	-8919	10.77
1/20/19	17:00	-11154	10.47	1/21/19	7:30	-10284	10.41	1/22/19	6:30	-8904	10.74
1/20/19	17:15	-11139	10.46	1/21/19	7:45	-10269	10.41	1/22/19	6:45	-8889	10.75
1/20/19	17:30	-11124	10.47	1/21/19	8:00	-10254	10.41	1/22/19	7:00	-8874	10.74
1/20/19	17:45	-11109	10.47	1/21/19	8:15	-10239	10.42	1/22/19	7:15	-8859	10.72
1/20/19	18:00	-11094	10.48	1/21/19	8:30	-10224	10.41	1/22/19	7:30	-8844	10.73
1/20/19	18:15	-11079	10.47	1/21/19	8:45	-10209	10.42	1/22/19	7:45	-8829	10.72
1/20/19	18:30	-11064	10.47	1/21/19	9:00	-10194	10.42	1/22/19	8:00	-8814	10.70
1/20/19	18:45	-11049	10.48	1/21/19	9:15	-10179	10.42	1/22/19	8:15	-8799	10.70
1/20/19	19:00	-11034	10.47	1/21/19	9:30	-10164	10.42	1/22/19	8:30	-8784	10.69

1/22/19	8:45	-8769	10.68	1/22/19	23:15	-7899	10.52	1/23/19	23:15	-6459	11.13
1/22/19	9:00	-8754	10.68	1/22/19	23:30	-7884	10.53	1/23/19	23:30	-6444	11.10
1/22/19	9:15	-8739	10.67	1/22/19	23:45	-7869	10.51	1/23/19	23:45	-6429	11.09
1/22/19	9:30	-8724	10.67	1/23/19	0:00	-7854	10.51	1/24/19	0:00	-6414	11.05
1/22/19	9:45	-8709	10.67	1/23/19	0:15	-7839	10.52	1/24/19	0:15	-6399	11.02
1/22/19	10:00	-8694	10.66	1/23/19	0:30	-7824	10.52	1/24/19	0:30	-6384	10.99
1/22/19	10:15	-8679	10.65	1/23/19	0:45	-7809	10.51	1/24/19	0:45	-6369	10.97
1/22/19	10:30	-8664	10.66	1/23/19	1:00	-7794	10.52	1/24/19	1:00	-6354	10.95
1/22/19	10:45	-8649	10.65	1/23/19	1:15	-7779	10.52	1/24/19	1:15	-6339	10.93
1/22/19	11:00	-8634	10.65	1/23/19	1:30	-7764	10.52	1/24/19	1:30	-6324	10.91
1/22/19	11:15	-8619	10.64	1/23/19	1:45	-7749	10.51	1/24/19	1:45	-6309	10.90
1/22/19	11:30	-8604	10.64	1/23/19	2:00	-7734	10.51	1/24/19	2:00	-6294	10.88
1/22/19	11:45	-8589	10.64	1/23/19	2:15	-7719	10.50	1/24/19	2:15	-6279	10.85
1/22/19	12:00	-8574	10.63	1/23/19	2:30	-7704	10.49	1/24/19	2:30	-6264	10.84
1/22/19	12:15	-8559	10.63	1/23/19	2:45	-7689	10.49	1/24/19	2:45	-6249	10.82
1/22/19	12:30	-8544	10.62	1/23/19	3:00	-7674	10.50	1/24/19	3:00	-6234	10.80
1/22/19	12:45	-8529	10.62	1/23/19	3:15	-7659	10.48	1/24/19	3:15	-6219	10.78
1/22/19	13:00	-8514	10.63	1/23/19	3:30	-7644	10.48	1/24/19	3:30	-6204	10.77
1/22/19	13:15	-8499	10.62	1/23/19	3:45	-7629	10.48	1/24/19	3:45	-6189	10.76
1/22/19	13:30	-8484	10.62	1/23/19	4:00	-7614	10.47	1/24/19	4:00	-6174	10.74
1/22/19	13:45	-8469	10.61	1/23/19	4:15	-7599	10.49	1/24/19	4:15	-6159	10.72
1/22/19	14:00	-8454	10.61	1/23/19	4:30	-7584	10.46	1/24/19	4:30	-6144	10.71
1/22/19	14:15	-8439	10.61	1/23/19	4:45	-7569	10.46	1/24/19	4:45	-6129	10.69
1/22/19	14:30	-8424	10.59	1/23/19	5:00	-7554	10.46	1/24/19	5:00	-6114	10.67
1/22/19	14:45	-8409	10.59	1/23/19	5:15	-7539	10.45	1/24/19	5:15	-6099	10.67
1/22/19	15:00	-8394	10.60	1/23/19	5:30	-7524	10.46	1/24/19	5:30	-6084	10.65
1/22/19	15:15	-8379	10.59	1/23/19	5:45	-7509	10.45	1/24/19	5:45	-6069	10.63
1/22/19	15:30	-8364	10.60	1/23/19	6:00	-7494	10.44	1/24/19	6:00	-6054	10.61
1/22/19	15:45	-8349	10.59	1/23/19	6:15	-7479	10.45	1/24/19	6:15	-6039	10.61
1/22/19	16:00	-8334	10.59	1/23/19	6:30	-7464	10.45	1/24/19	6:30	-6024	10.59
1/22/19	16:15	-8319	10.57	1/23/19	6:45	-7449	10.43	1/24/19	6:45	-6009	10.58
1/22/19	16:30	-8304	10.57	1/23/19	7:00	-7434	10.44	1/24/19	7:00	-5994	10.56
1/22/19	16:45	-8289	10.56	1/23/19	7:15	-7419	10.44	1/24/19	7:15	-5979	10.56
1/22/19	17:00	-8274	10.57	1/23/19	7:30	-7404	10.43	1/24/19	7:30	-5964	10.54
1/22/19	17:15	-8259	10.57	1/23/19	7:45	-7389	10.43	1/24/19	7:45	-5949	10.53
1/22/19	17:30	-8244	10.56	1/23/19	8:00	-7374	10.44	1/24/19	8:00	-5934	10.51
1/22/19	17:45	-8229	10.55	1/23/19	8:15	-7359	10.43	1/24/19	8:15	-5919	10.50
1/22/19	18:00	-8214	10.56	1/23/19	8:30	-7344	10.44	1/24/19	8:30	-5904	10.50
1/22/19	18:15	-8199	10.55	1/23/19	8:45	-7329	10.44	1/24/19	8:45	-5889	10.48
1/22/19	18:30	-8184	10.55	1/23/19	9:00	-7314	10.44	1/24/19	9:00	-5874	10.47
1/22/19	18:45	-8169	10.54	1/23/19	9:15	-7299	10.45	1/24/19	9:15	-5859	10.46
1/22/19	19:00	-8154	10.54	1/23/19	9:30	-7284	10.44	1/24/19	9:30	-5844	10.45
1/22/19	19:15	-8139	10.55	1/23/19	9:45	-7269	10.45	1/24/19	9:45	-5829	10.44
1/22/19	19:30	-8124	10.55	1/23/19	10:00	-7254	37.46	1/24/19	10:00	-5814	10.42
1/22/19	19:45	-8109	10.54					1/24/19	10:15	-5799	10.41
1/22/19	20:00	-8094	10.54	1/23/19	20:00	-6654	37.49	1/24/19	10:30	-5784	10.42
1/22/19	20:15	-8079	10.54	1/23/19	20:15	-6639	12.60	1/24/19	10:45	-5769	10.41
1/22/19	20:30	-8064	10.54	1/23/19	20:30	-6624	12.08	1/24/19	11:00	-5754	10.40
1/22/19	20:45	-8049	10.54	1/23/19	20:45	-6609	11.87	1/24/19	11:15	-5739	10.40
1/22/19	21:00	-8034	10.54	1/23/19	21:00	-6594	11.71	1/24/19	11:30	-5724	10.39
1/22/19	21:15	-8019	10.53	1/23/19	21:15	-6579	11.61	1/24/19	11:45	-5709	10.38
1/22/19	21:30	-8004	10.53	1/23/19	21:30	-6564	11.52	1/24/19	12:00	-5694	10.36
1/22/19	21:45	-7989	10.55	1/23/19	21:45	-6549	11.44	1/24/19	12:15	-5679	10.34
1/22/19	22:00	-7974	10.53	1/23/19	22:00	-6534	11.37	1/24/19	12:30	-5664	10.34
1/22/19	22:15	-7959	10.52	1/23/19	22:15	-6519	11.32	1/24/19	12:45	-5649	10.33
1/22/19	22:30	-7944	10.53	1/23/19	22:30	-6504	11.26	1/24/19	13:00	-5634	10.33
1/22/19	22:45	-7929	10.53	1/23/19	22:45	-6489	11.21	1/24/19	13:15	-5619	10.34
1/22/19	23:00	-7914	10.52	1/23/19	23:00	-6474	11.18	1/24/19	13:30	-5604	10.33

1/24/19	13:45	-5589	10.32	1/25/19	4:15	-4719	10.04	1/26/19	3:15	-3339	10.26
1/24/19	14:00	-5574	10.32	1/25/19	4:30	-4704	10.05	1/26/19	3:30	-3324	10.26
1/24/19	14:15	-5559	10.31	1/25/19	4:45	-4689	10.04	1/26/19	3:45	-3309	10.25
1/24/19	14:30	-5544	10.30	1/25/19	5:00	-4674	10.05	1/26/19	4:00	-3294	10.26
1/24/19	14:45	-5529	10.28	1/25/19	5:15	-4659	10.03	1/26/19	4:15	-3279	10.25
1/24/19	15:00	-5514	10.27	1/25/19	5:30	-4644	37.46	1/26/19	4:30	-3264	10.24
1/24/19	15:15	-5499	10.27					1/26/19	4:45	-3249	10.24
1/24/19	15:30	-5484	10.25	1/25/19	14:30	-4104	37.51	1/26/19	5:00	-3234	10.24
1/24/19	15:45	-5469	10.24	1/25/19	14:45	-4089	20.20	1/26/19	5:15	-3219	10.22
1/24/19	16:00	-5454	10.24	1/25/19	15:00	-4074	11.72	1/26/19	5:30	-3204	10.23
1/24/19	16:15	-5439	10.22	1/25/19	15:15	-4059	11.49	1/26/19	5:45	-3189	10.22
1/24/19	16:30	-5424	10.21	1/25/19	15:30	-4044	11.33	1/26/19	6:00	-3174	10.22
1/24/19	16:45	-5409	10.21	1/25/19	15:45	-4029	11.21	1/26/19	6:15	-3159	10.20
1/24/19	17:00	-5394	10.19	1/25/19	16:00	-4014	11.13	1/26/19	6:30	-3144	10.21
1/24/19	17:15	-5379	10.20	1/25/19	16:15	-3999	11.05	1/26/19	6:45	-3129	10.21
1/24/19	17:30	-5364	10.17	1/25/19	16:30	-3984	10.98	1/26/19	7:00	-3114	10.20
1/24/19	17:45	-5349	10.18	1/25/19	16:45	-3969	10.92	1/26/19	7:15	-3099	10.20
1/24/19	18:00	-5334	10.16	1/25/19	17:00	-3954	10.86	1/26/19	7:30	-3084	10.20
1/24/19	18:15	-5319	10.18	1/25/19	17:15	-3939	10.82	1/26/19	7:45	-3069	10.19
1/24/19	18:30	-5304	10.16	1/25/19	17:30	-3924	10.78	1/26/19	8:00	-3054	10.18
1/24/19	18:45	-5289	10.16	1/25/19	17:45	-3909	10.74	1/26/19	8:15	-3039	10.18
1/24/19	19:00	-5274	10.15	1/25/19	18:00	-3894	10.71	1/26/19	8:30	-3024	10.18
1/24/19	19:15	-5259	10.14	1/25/19	18:15	-3879	10.67	1/26/19	8:45	-3009	10.17
1/24/19	19:30	-5244	10.14	1/25/19	18:30	-3864	10.65	1/26/19	9:00	-2994	10.18
1/24/19	19:45	-5229	10.13	1/25/19	18:45	-3849	10.62	1/26/19	9:15	-2979	10.18
1/24/19	20:00	-5214	10.12	1/25/19	19:00	-3834	10.60	1/26/19	9:30	-2964	10.16
1/24/19	20:15	-5199	10.12	1/25/19	19:15	-3819	10.57	1/26/19	9:45	-2949	10.17
1/24/19	20:30	-5184	10.11	1/25/19	19:30	-3804	10.55	1/26/19	10:00	-2934	10.16
1/24/19	20:45	-5169	10.10	1/25/19	19:45	-3789	10.53	1/26/19	10:15	-2919	10.16
1/24/19	21:00	-5154	10.11	1/25/19	20:00	-3774	10.51	1/26/19	10:30	-2904	10.16
1/24/19	21:15	-5139	10.09	1/25/19	20:15	-3759	10.49	1/26/19	10:45	-2889	10.15
1/24/19	21:30	-5124	10.09	1/25/19	20:30	-3744	10.48	1/26/19	11:00	-2874	10.15
1/24/19	21:45	-5109	10.10	1/25/19	20:45	-3729	10.46	1/26/19	11:15	-2859	10.15
1/24/19	22:00	-5094	10.08	1/25/19	21:00	-3714	10.44	1/26/19	11:30	-2844	10.15
1/24/19	22:15	-5079	10.08	1/25/19	21:15	-3699	10.43	1/26/19	11:45	-2829	10.15
1/24/19	22:30	-5064	10.09	1/25/19	21:30	-3684	10.42	1/26/19	12:00	-2814	10.14
1/24/19	22:45	-5049	10.09	1/25/19	21:45	-3669	10.41	1/26/19	12:15	-2799	10.13
1/24/19	23:00	-5034	10.08	1/25/19	22:00	-3654	10.38	1/26/19	12:30	-2784	10.14
1/24/19	23:15	-5019	10.07	1/25/19	22:15	-3639	10.37	1/26/19	12:45	-2769	10.14
1/24/19	23:30	-5004	10.08	1/25/19	22:30	-3624	10.37	1/26/19	13:00	-2754	10.13
1/24/19	23:45	-4989	10.08	1/25/19	22:45	-3609	10.36	1/26/19	13:15	-2739	10.14
1/25/19	0:00	-4974	10.08	1/25/19	23:00	-3594	10.34	1/26/19	13:30	-2724	10.14
1/25/19	0:15	-4959	10.08	1/25/19	23:15	-3579	10.34	1/26/19	13:45	-2709	10.13
1/25/19	0:30	-4944	10.08	1/25/19	23:30	-3564	10.34	1/26/19	14:00	-2694	10.13
1/25/19	0:45	-4929	10.08	1/25/19	23:45	-3549	10.33	1/26/19	14:15	-2679	10.12
1/25/19	1:00	-4914	10.06	1/26/19	0:00	-3534	10.32	1/26/19	14:30	-2664	10.13
1/25/19	1:15	-4899	10.07	1/26/19	0:15	-3519	10.31	1/26/19	14:45	-2649	10.13
1/25/19	1:30	-4884	10.07	1/26/19	0:30	-3504	10.32	1/26/19	15:00	-2634	10.13
1/25/19	1:45	-4869	10.07	1/26/19	0:45	-3489	10.30	1/26/19	15:15	-2619	10.13
1/25/19	2:00	-4854	10.07	1/26/19	1:00	-3474	10.30	1/26/19	15:30	-2604	10.12
1/25/19	2:15	-4839	10.06	1/26/19	1:15	-3459	10.30	1/26/19	15:45	-2589	10.12
1/25/19	2:30	-4824	10.06	1/26/19	1:30	-3444	10.30	1/26/19	16:00	-2574	10.11
1/25/19	2:45	-4809	10.06	1/26/19	1:45	-3429	10.29	1/26/19	16:15	-2559	10.12
1/25/19	3:00	-4794	10.06	1/26/19	2:00	-3414	10.28	1/26/19	16:30	-2544	10.12
1/25/19	3:15	-4779	10.06	1/26/19	2:15	-3399	10.28	1/26/19	16:45	-2529	10.12
1/25/19	3:30	-4764	10.06	1/26/19	2:30	-3384	10.28	1/26/19	17:00	-2514	10.11
1/25/19	3:45	-4749	10.05	1/26/19	2:45	-3369	10.28	1/26/19	17:15	-2499	10.11
1/25/19	4:00	-4734	10.05	1/26/19	3:00	-3354	10.27	1/26/19	17:30	-2484	10.10

1/26/19	17:45	-2469	10.10	1/27/19	16:45	-1089	11.00	1/28/19	7:15	-219	10.19
1/26/19	18:00	-2454	10.09	1/27/19	17:00	-1074	10.92	1/28/19	7:30	-204	10.19
1/26/19	18:15	-2439	10.09	1/27/19	17:15	-1059	10.86	1/28/19	7:45	-189	10.19
1/26/19	18:30	-2424	10.10	1/27/19	17:30	-1044	10.81	1/28/19	8:00	-174	10.19
1/26/19	18:45	-2409	10.09	1/27/19	17:45	-1029	10.75	1/28/19	8:15	-159	10.18
1/26/19	19:00	-2394	10.09	1/27/19	18:00	-1014	10.78	1/28/19	8:30	-144	10.19
1/26/19	19:15	-2379	10.08	1/27/19	18:15	-999	10.75	1/28/19	8:45	-129	10.18
1/26/19	19:30	-2364	10.07	1/27/19	18:30	-984	10.65	1/28/19	9:02	-112	10.18
1/26/19	19:45	-2349	10.07	1/27/19	18:45	-969	10.59	1/28/19	9:30	-84	10.17
1/26/19	20:00	-2334	10.06	1/27/19	19:00	-954	10.58	1/28/19	10:00	-54	10.17
1/26/19	20:15	-2319	10.06	1/27/19	19:15	-939	10.54	1/28/19	10:30	-24	10.17
1/26/19	20:30	-2304	10.06	1/27/19	19:30	-924	10.54	1/28/19	10:54	0	10.21
1/26/19	20:45	-2289	10.05	1/27/19	19:45	-909	10.53	1/28/19	10:56	2	10.32
1/26/19	21:00	-2274	10.05	1/27/19	20:00	-894	10.52	1/28/19	10:58	4	10.49
1/26/19	21:15	-2259	10.04	1/27/19	20:15	-879	10.51	1/28/19	11:00	6	10.66
1/26/19	21:30	-2244	10.05	1/27/19	20:30	-864	10.48	1/28/19	11:02	8	10.77
1/26/19	21:45	-2229	10.04	1/27/19	20:45	-849	10.47	1/28/19	11:04	10	10.88
1/26/19	22:00	-2214	10.03	1/27/19	21:00	-834	10.46	1/28/19	11:06	12	10.98
1/26/19	22:15	-2199	10.03	1/27/19	21:15	-819	10.44	1/28/19	11:08	14	11.06
1/26/19	22:30	-2184	10.03	1/27/19	21:30	-804	10.43	1/28/19	11:10	16	11.13
1/26/19	22:45	-2169	10.02	1/27/19	21:45	-789	10.41	1/28/19	11:12	18	11.21
1/26/19	23:00	-2154	10.02	1/27/19	22:00	-774	10.41	1/28/19	11:14	20	11.27
1/26/19	23:15	-2139	10.02	1/27/19	22:15	-759	10.39	1/28/19	11:18	24	11.40
1/26/19	23:30	-2124	10.02	1/27/19	22:30	-744	10.39	1/28/19	11:22	28	11.51
1/26/19	23:45	-2109	10.02	1/27/19	22:45	-729	10.36	1/28/19	11:26	32	11.61
1/27/19	0:00	-2094	10.02	1/27/19	23:00	-714	10.35	1/28/19	11:30	36	11.70
1/27/19	0:15	-2079	10.02	1/27/19	23:15	-699	10.35	1/28/19	11:34	40	11.78
1/27/19	0:30	-2064	10.01	1/27/19	23:30	-684	10.34	1/28/19	11:38	44	11.87
1/27/19	0:45	-2049	10.01	1/27/19	23:45	-669	10.32	1/28/19	11:42	48	11.95
1/27/19	1:00	-2034	10.00	1/28/19	0:00	-654	10.31	1/28/19	11:46	52	12.02
1/27/19	1:15	-2019	10.00	1/28/19	0:15	-639	10.30	1/28/19	11:50	56	12.09
1/27/19	1:30	-2004	10.01	1/28/19	0:30	-624	10.30	1/28/19	11:54	60	12.14
1/27/19	1:45	-1989	9.99	1/28/19	0:45	-609	10.28	1/28/19	12:00	66	12.25
1/27/19	2:00	-1974	10.01	1/28/19	1:00	-594	10.28	1/28/19	12:14	80	12.42
1/27/19	2:15	-1959	9.99	1/28/19	1:15	-579	10.28	1/28/19	12:30	96	12.62
1/27/19	2:30	-1944	10.00	1/28/19	1:30	-564	10.27	1/28/19	12:44	110	12.78
1/27/19	2:45	-1929	10.00	1/28/19	1:45	-549	10.27	1/28/19	13:00	126	12.91
1/27/19	3:00	-1914	9.99	1/28/19	2:00	-534	10.25	1/28/19	13:14	140	13.03
1/27/19	3:15	-1899	9.98	1/28/19	2:15	-519	10.25	1/28/19	13:30	156	13.14
1/27/19	3:30	-1884	9.99	1/28/19	2:30	-504	10.25	1/28/19	13:44	170	13.25
1/27/19	3:45	-1869	9.98	1/28/19	2:45	-489	10.25	1/28/19	14:00	186	13.35
1/27/19	4:00	-1854	9.98	1/28/19	3:00	-474	10.24	1/28/19	14:14	200	13.43
1/27/19	4:15	-1839	9.97	1/28/19	3:15	-459	10.23	1/28/19	14:30	216	13.52
1/27/19	4:30	-1824	9.98	1/28/19	3:30	-444	10.23	1/28/19	14:44	230	13.59
1/27/19	4:45	-1809	9.97	1/28/19	3:45	-429	10.22	1/28/19	15:00	246	13.66
1/27/19	5:00	-1794	9.97	1/28/19	4:00	-414	10.22	1/28/19	15:14	260	13.73
1/27/19	5:15	-1779	9.97	1/28/19	4:15	-399	10.22	1/28/19	15:24	270	13.77
1/27/19	5:30	-1764	9.97	1/28/19	4:30	-384	10.21	1/28/19	15:45	291	13.84
1/27/19	5:45	-1749	9.96	1/28/19	4:45	-369	10.22	1/28/19	16:00	306	13.90
1/27/19	6:00	-1734	37.46	1/28/19	5:00	-354	10.21	1/28/19	16:15	321	13.94
				1/28/19	5:15	-339	10.21	1/28/19	16:30	336	14.00
1/27/19	15:00	-1194	37.49	1/28/19	5:30	-324	10.21	1/28/19	16:45	351	14.05
1/27/19	15:15	-1179	27.26	1/28/19	5:45	-309	10.21	1/28/19	17:00	366	14.09
1/27/19	15:30	-1164	11.67	1/28/19	6:00	-294	10.20	1/28/19	17:15	381	14.13
1/27/19	15:45	-1149	11.43	1/28/19	6:15	-279	10.20	1/28/19	17:30	396	14.18
1/27/19	16:00	-1134	11.27	1/28/19	6:30	-264	10.19	1/28/19	17:45	411	14.22
1/27/19	16:15	-1119	11.15	1/28/19	6:45	-249	10.20	1/28/19	18:00	426	14.26
1/27/19	16:30	-1104	11.08	1/28/19	7:00	-234	10.19	1/28/19	18:15	441	14.30

1/28/19	18:30	456	14.33
1/28/19	18:45	471	14.36
1/28/19	19:00	486	14.40
1/28/19	19:15	501	14.43
1/28/19	19:30	516	14.46
1/28/19	19:45	531	14.50
1/28/19	20:00	546	14.52
1/28/19	20:15	561	14.54
1/28/19	20:30	576	14.57
1/28/19	20:45	591	14.59
1/28/19	21:00	606	14.61
1/28/19	21:15	621	14.63
1/28/19	21:30	636	14.65
1/28/19	21:45	651	14.67
1/28/19	22:00	666	14.69
1/28/19	22:15	681	14.71
1/28/19	22:30	696	14.73
1/28/19	22:45	711	14.75
1/28/19	23:00	726	14.76
1/28/19	23:15	741	14.77
1/28/19	23:30	756	14.80
1/28/19	23:45	771	14.81
1/29/19	0:00	786	14.83
1/29/19	0:15	801	14.85
1/29/19	0:30	816	14.86
1/29/19	0:45	831	14.86
1/29/19	1:00	846	14.87
1/29/19	1:15	861	14.89
1/29/19	1:30	876	14.90
1/29/19	1:45	891	14.91
1/29/19	2:00	906	14.92
1/29/19	2:15	921	14.94
1/29/19	2:30	936	14.95
1/29/19	2:45	951	14.96
1/29/19	3:00	966	14.98
1/29/19	3:15	981	14.99
1/29/19	3:30	996	15.00
1/29/19	3:45	1011	15.01
1/29/19	4:00	1026	15.03
1/29/19	4:15	1041	15.03
1/29/19	4:30	1056	15.05
1/29/19	4:45	1071	15.05
1/29/19	5:00	1086	15.06
1/29/19	5:15	1101	15.07
1/29/19	5:30	1116	15.07
1/29/19	5:45	1131	15.09
1/29/19	6:00	1146	15.10
1/29/19	6:15	1161	15.11
1/29/19	6:30	1176	15.12
1/29/19	6:45	1191	15.12
1/29/19	7:00	1206	15.14
1/29/19	7:15	1221	15.15
1/29/19	9:51	1377	59.85

Manual water level measurements

1/29/19	9:51	1377.00	59.85
1/29/19	10:18	1404.00	59.97
1/29/19	11:25	1471.00	59.83
1/29/19	12:44	1550.00	59.85
1/29/19	14:04	1630.00	59.60
1/29/19	14:42	1668.00	59.66
1/29/19	17:02	1808.00	59.75
1/29/19	17:03	1809.00	54.30

Resume transducer data

1/29/19	17:03	1809	54.30
1/29/19	17:15	1821	17.13
1/29/19	17:30	1836	16.86
1/29/19	17:45	1851	16.69
1/29/19	18:00	1866	16.57
1/29/19	18:15	1881	16.49
1/29/19	18:30	1896	16.41
1/29/19	18:45	1911	16.35
1/29/19	19:00	1926	16.30
1/29/19	19:15	1941	16.25
1/29/19	19:30	1956	16.20
1/29/19	19:45	1971	16.16
1/29/19	20:00	1986	16.13
1/29/19	20:15	2001	16.10
1/29/19	20:30	2016	16.07
1/29/19	20:45	2031	16.06
1/29/19	21:00	2046	16.03
1/29/19	21:15	2061	16.01
1/29/19	21:30	2076	15.99
1/29/19	21:45	2091	15.97
1/29/19	22:00	2106	15.96
1/29/19	22:15	2121	15.94
1/29/19	22:30	2136	15.93
1/29/19	22:45	2151	15.91
1/29/19	23:00	2166	15.90
1/29/19	23:15	2181	15.88
1/29/19	23:30	2196	15.87
1/29/19	23:45	2211	15.87
1/30/19	0:00	2226	15.86
1/30/19	0:15	2241	15.86
1/30/19	0:30	2256	15.85
1/30/19	0:45	2271	15.84
1/30/19	1:00	2286	15.84
1/30/19	1:15	2301	15.82
1/30/19	1:30	2316	15.81
1/30/19	1:45	2331	15.81
1/30/19	2:00	2346	15.82
1/30/19	2:15	2361	15.80
1/30/19	2:30	2376	15.80
1/30/19	2:45	2391	15.79
1/30/19	3:00	2406	15.80
1/30/19	3:15	2421	15.79
1/30/19	3:30	2436	15.79
1/30/19	3:45	2451	15.78
1/30/19	4:00	2466	15.79
1/30/19	4:15	2481	15.78
1/30/19	4:30	2496	15.78
1/30/19	4:45	2511	15.77
1/30/19	5:00	2526	15.79
1/30/19	5:15	2541	15.78
1/30/19	5:30	2556	15.78
1/30/19	5:45	2571	15.77
1/30/19	6:00	2586	15.78
1/30/19	6:15	2601	15.77
1/30/19	6:30	2616	15.77
1/30/19	6:45	2631	15.77
1/30/19	7:00	2646	15.78
1/30/19	7:15	2661	15.77
1/30/19	7:30	2676	15.76
1/30/19	7:45	2691	15.77
1/30/19	8:00	2706	15.78
1/30/19	8:15	2721	15.77
1/30/19	8:30	2736	15.76
1/30/19	8:45	2751	15.77
1/30/19	9:00	2766	15.77
1/30/19	9:15	2781	15.76
1/30/19	10:00	2826	15.78
1/30/19	10:15	2841	15.79
1/30/19	10:30	2856	15.79
1/30/19	10:45	2871	15.79
1/30/19	11:00	2886	15.78
1/30/19	11:15	2901	15.79
1/30/19	11:30	2916	15.80
1/30/19	11:45	2931	15.79
1/30/19	12:00	2946	15.80
1/30/19	12:15	2961	15.79
1/30/19	12:30	2976	15.79
1/30/19	12:45	2991	15.79
1/30/19	13:00	3006	15.79
1/30/19	13:15	3021	15.79
1/30/19	13:30	3036	15.79
1/30/19	13:45	3051	15.79
1/30/19	14:00	3066	15.79
1/30/19	14:15	3081	15.79
1/30/19	14:30	3096	15.79
1/30/19	14:45	3111	15.80
1/30/19	15:00	3126	15.80
1/30/19	15:15	3141	15.81
1/30/19	15:30	3156	15.81
1/30/19	15:45	3171	15.82
1/30/19	16:00	3186	15.82
1/30/19	16:15	3201	15.83
1/30/19	16:30	3216	15.83
1/30/19	16:45	3231	15.84
1/30/19	17:00	3246	15.85
1/30/19	17:15	3261	15.84
1/30/19	17:30	3276	15.85
1/30/19	17:45	3291	15.85
1/30/19	18:00	3306	15.86
1/30/19	18:15	3321	15.85
1/30/19	18:30	3336	15.86
1/30/19	18:45	3351	15.88
1/30/19	19:00	3366	15.87
1/30/19	19:15	3381	15.86
1/30/19	19:30	3396	15.82
1/30/19	19:45	3411	15.80
1/30/19	20:00	3426	15.84
1/30/19	20:15	3441	15.85
1/30/19	20:30	3456	15.86

1/30/19	20:45	3471	15.86	1/31/19	10:54	4320	60.33	1/31/19	19:50	4856	12.64
1/30/19	21:00	3486	15.87	1/31/19	10:56	4322	60.23	1/31/19	20:00	4866	12.56
1/30/19	21:15	3501	15.88	1/31/19	10:58	4324	59.95	1/31/19	20:30	4896	12.39
1/30/19	21:30	3516	15.89	1/31/19	11:00	4326	59.87	1/31/19	21:00	4926	12.24
1/30/19	21:45	3531	15.88	1/31/19	11:02	4328	59.95	1/31/19	21:30	4956	12.11
1/30/19	22:00	3546	15.89	1/31/19	11:04	4330	59.75	1/31/19	22:00	4986	12.01
1/30/19	22:15	3561	15.89	1/31/19	11:06	4332	59.65	1/31/19	22:30	5016	11.90
1/30/19	22:30	3576	15.89	1/31/19	11:08	4334	59.65	1/31/19	23:00	5046	11.82
1/30/19	22:45	3591	15.89	1/31/19	11:10	4336	59.61	1/31/19	23:30	5076	11.73
1/30/19	23:00	3606	15.89	1/31/19	11:12	4338	59.64	2/1/19	0:00	5106	11.66
1/30/19	23:15	3621	15.89	1/31/19	11:14	4340	59.50	2/1/19	0:30	5136	11.59
1/30/19	23:30	3636	15.89	1/31/19	11:18	4344	59.34	2/1/19	1:00	5166	11.54
1/30/19	23:45	3651	15.89	1/31/19	11:22	4348	59.49	2/1/19	1:30	5196	11.47
1/31/19	0:00	3666	15.89	1/31/19	11:26	4352	59.43	2/1/19	2:00	5226	11.42
1/31/19	0:15	3681	15.89	1/31/19	11:30	4356	59.41	2/1/19	2:30	5256	11.37
1/31/19	0:30	3696	15.89	1/31/19	11:40	4366	59.44	2/1/19	3:00	5286	11.33
1/31/19	0:45	3711	15.90	1/31/19	11:50	4376	59.07	2/1/19	3:30	5316	11.28
1/31/19	1:00	3726	15.90	1/31/19	12:00	4386	59.06	2/1/19	4:00	5346	11.24
1/31/19	1:15	3741	15.89	1/31/19	12:10	4396	58.99	2/1/19	4:30	5376	11.20
1/31/19	1:30	3756	15.90	1/31/19	12:20	4406	58.85	2/1/19	5:00	5406	11.18
1/31/19	1:45	3771	15.89	1/31/19	12:30	4416	58.61	2/1/19	5:30	5436	11.14
1/31/19	2:00	3786	15.91	1/31/19	12:40	4426	58.62	2/1/19	6:00	5466	11.11
1/31/19	2:15	3801	15.89	1/31/19	12:50	4436	58.52	2/1/19	6:30	5496	11.08
1/31/19	2:30	3816	15.90	1/31/19	13:00	4446	58.58	2/1/19	7:00	5526	11.06
1/31/19	2:45	3831	15.90	1/31/19	13:10	4456	58.54	2/1/19	7:30	5556	11.03
1/31/19	3:00	3846	15.90	1/31/19	13:20	4466	58.58	2/1/19	8:00	5586	11.02
1/31/19	3:15	3861	15.89	1/31/19	13:30	4476	58.30	2/1/19	8:30	5616	10.99
1/31/19	3:30	3876	15.90	1/31/19	14:00	4506	58.32	2/1/19	9:00	5646	10.97
1/31/19	3:45	3891	15.90	1/31/19	14:30	4536	58.01	2/1/19	9:30	5676	10.95
1/31/19	4:00	3906	15.90	1/31/19	15:00	4566	57.98				
1/31/19	4:15	3921	15.91	1/31/19	15:30	4596	57.97	**BRTW-2**			
1/31/19	4:30	3936	15.90	1/31/19	16:00	4626	57.70	**Date**	**Time**	**Minutes**	**WL**
1/31/19	4:45	3951	15.90	1/31/19	16:30	4656	57.87	1/17/19	9:00	-15954	11.78
1/31/19	5:00	3966	15.91	1/31/19	17:00	4686	57.67	1/17/19	9:15	-15939	11.78
1/31/19	5:15	3981	15.91	1/31/19	17:30	4716	57.59	1/17/19	9:30	-15924	11.77
1/31/19	5:30	3996	15.91	1/31/19	18:00	4746	57.54	1/17/19	9:45	-15909	11.78
1/31/19	5:45	4011	15.91	1/31/19	18:26	4772	57.34	1/17/19	10:00	-15894	11.77
1/31/19	6:00	4026	15.90	1/31/19	18:28	4774	57.35	1/17/19	10:15	-15879	11.75
1/31/19	6:15	4041	15.92	1/31/19	18:30	4776	56.52	1/17/19	10:30	-15864	11.76
1/31/19	6:30	4056	15.91	1/31/19	18:32	4778	15.79	1/17/19	10:45	-15849	11.75
1/31/19	6:45	4071	15.91	1/31/19	18:34	4780	13.99	1/17/19	11:00	-15834	11.75
1/31/19	7:00	4086	15.91	1/31/19	18:36	4782	13.79	1/17/19	11:15	-15819	11.75
1/31/19	7:15	4101	15.92	1/31/19	18:38	4784	13.66	1/17/19	11:30	-15804	11.75
1/31/19	7:30	4116	15.92	1/31/19	18:40	4786	13.57	1/17/19	11:45	-15789	11.75
1/31/19	7:45	4131	15.93	1/31/19	18:42	4788	13.50	1/17/19	12:00	-15774	11.73
1/31/19	8:00	4146	15.93	1/31/19	18:44	4790	13.45	1/17/19	12:15	-15759	11.73
1/31/19	8:15	4161	15.92	1/31/19	18:46	4792	13.39	1/17/19	12:30	-15744	11.73
1/31/19	8:30	4176	15.93	1/31/19	18:48	4794	13.35	1/17/19	12:45	-15729	11.73
1/31/19	8:45	4191	15.93	1/31/19	18:50	4796	13.31	1/17/19	13:00	-15714	11.71
1/31/19	9:00	4206	15.93	1/31/19	18:52	4798	13.27	1/17/19	13:15	-15699	11.73
				1/31/19	18:54	4800	13.23	1/17/19	13:30	-15684	11.71
1/31/19	10:00	4266	60.18	1/31/19	18:56	4802	13.20	1/17/19	13:45	-15669	11.72
1/31/19	10:10	4276	60.12	1/31/19	18:58	4804	13.15	1/17/19	14:00	-15654	11.72
1/31/19	10:20	4286	60.24	1/31/19	19:00	4806	13.13	1/17/19	14:15	-15639	11.72
1/31/19	10:30	4296	60.30	1/31/19	19:10	4816	13.00	1/17/19	14:30	-15624	11.72
1/31/19	10:40	4306	60.21	1/31/19	19:20	4826	12.89	1/17/19	14:45	-15609	11.71
1/31/19	10:50	4316	60.12	1/31/19	19:30	4836	12.80	1/17/19	15:00	-15594	11.72
1/31/19	10:52	4318	60.01	1/31/19	19:40	4846	12.71	1/17/19	15:15	-15579	12.62

1/17/19	15:30	-15564	12.91	1/18/19	6:00	-14694	12.10	1/18/19	20:30	-13824	11.80
1/17/19	15:45	-15549	13.11	1/18/19	6:15	-14679	12.06	1/18/19	20:45	-13809	11.80
1/17/19	16:00	-15534	13.25	1/18/19	6:30	-14664	12.06	1/18/19	21:00	-13794	11.80
1/17/19	16:15	-15519	13.35	1/18/19	6:45	-14649	12.05	1/18/19	21:15	-13779	11.79
1/17/19	16:30	-15504	13.46	1/18/19	7:00	-14634	12.03	1/18/19	21:30	-13764	11.81
1/17/19	16:45	-15489	13.55	1/18/19	7:15	-14619	12.01	1/18/19	21:45	-13749	11.80
1/17/19	17:00	-15474	13.61	1/18/19	7:30	-14604	12.00	1/18/19	22:00	-13734	11.82
1/17/19	17:15	-15459	13.67	1/18/19	7:45	-14589	12.00	1/18/19	22:15	-13719	11.80
1/17/19	17:30	-15444	13.73	1/18/19	8:00	-14574	11.99	1/18/19	22:30	-13704	11.81
1/17/19	17:45	-15429	13.80	1/18/19	8:15	-14559	11.97	1/18/19	22:45	-13689	11.81
1/17/19	18:00	-15414	13.86	1/18/19	8:30	-14544	11.96	1/18/19	23:00	-13674	11.81
1/17/19	18:15	-15399	13.88	1/18/19	8:45	-14529	11.96	1/18/19	23:15	-13659	11.81
1/17/19	18:30	-15384	13.93	1/18/19	9:00	-14514	11.94	1/18/19	23:30	-13644	11.80
1/17/19	18:45	-15369	13.96	1/18/19	9:15	-14499	11.94	1/18/19	23:45	-13629	11.80
1/17/19	19:00	-15354	14.01	1/18/19	9:30	-14484	11.92	1/19/19	0:00	-13614	11.79
1/17/19	19:15	-15339	14.04	1/18/19	9:45	-14469	11.92	1/19/19	0:15	-13599	11.79
1/17/19	19:30	-15324	14.07	1/18/19	10:00	-14454	11.92	1/19/19	0:30	-13584	11.79
1/17/19	19:45	-15309	14.10	1/18/19	10:15	-14439	11.91	1/19/19	0:45	-13569	11.78
1/17/19	20:00	-15294	14.13	1/18/19	10:30	-14424	11.89	1/19/19	1:00	-13554	11.80
1/17/19	20:15	-15279	14.16	1/18/19	10:45	-14409	11.88	1/19/19	1:15	-13539	11.77
1/17/19	20:30	-15264	14.17	1/18/19	11:00	-14394	11.89	1/19/19	1:30	-13524	11.77
1/17/19	20:45	-15249	14.19	1/18/19	11:15	-14379	11.88	1/19/19	1:45	-13509	11.77
1/17/19	21:00	-15234	14.21	1/18/19	11:30	-14364	11.87	1/19/19	2:00	-13494	11.76
1/17/19	21:15	-15219	14.23	1/18/19	11:45	-14349	11.87	1/19/19	2:15	-13479	11.76
1/17/19	21:30	-15204	14.24	1/18/19	12:00	-14334	11.86	1/19/19	2:30	-13464	11.76
1/17/19	21:45	-15189	14.27	1/18/19	12:15	-14319	11.85	1/19/19	2:45	-13449	11.75
1/17/19	22:00	-15174	14.27	1/18/19	12:30	-14304	11.85	1/19/19	3:00	-13434	11.75
1/17/19	22:15	-15159	14.28	1/18/19	12:45	-14289	11.83	1/19/19	3:15	-13419	11.76
1/17/19	22:30	-15144	14.29	1/18/19	13:00	-14274	11.82	1/19/19	3:30	-13404	11.75
1/17/19	22:45	-15129	14.31	1/18/19	13:15	-14259	11.82	1/19/19	3:45	-13389	11.75
1/17/19	23:00	-15114	14.33	1/18/19	13:30	-14244	11.81	1/19/19	4:00	-13374	11.75
1/17/19	23:15	-15099	14.34	1/18/19	13:45	-14229	11.82	1/19/19	4:15	-13359	11.75
1/17/19	23:30	-15084	14.33	1/18/19	14:00	-14214	11.81	1/19/19	4:30	-13344	11.75
1/17/19	23:45	-15069	14.35	1/18/19	14:15	-14199	11.81	1/19/19	4:45	-13329	11.75
1/18/19	0:00	-15054	14.36	1/18/19	14:30	-14184	11.81	1/19/19	5:00	-13314	11.74
1/18/19	0:15	-15039	14.37	1/18/19	14:45	-14169	11.80	1/19/19	5:15	-13299	11.74
1/18/19	0:30	-15024	13.46	1/18/19	15:00	-14154	11.80	1/19/19	5:30	-13284	11.74
1/18/19	0:45	-15009	13.17	1/18/19	15:15	-14139	11.81	1/19/19	5:45	-13269	11.74
1/18/19	1:00	-14994	13.03	1/18/19	15:30	-14124	11.80	1/19/19	6:00	-13254	11.75
1/18/19	1:15	-14979	12.89	1/18/19	15:45	-14109	11.80	1/19/19	6:15	-13239	11.76
1/18/19	1:30	-14964	12.79	1/18/19	16:00	-14094	11.80	1/19/19	6:30	-13224	11.75
1/18/19	1:45	-14949	12.70	1/18/19	16:15	-14079	11.79	1/19/19	6:45	-13209	11.76
1/18/19	2:00	-14934	12.63	1/18/19	16:30	-14064	11.79	1/19/19	7:00	-13194	11.76
1/18/19	2:15	-14919	12.55	1/18/19	16:45	-14049	11.80	1/19/19	7:15	-13179	11.74
1/18/19	2:30	-14904	12.50	1/18/19	17:00	-14034	11.79	1/19/19	7:30	-13164	11.75
1/18/19	2:45	-14889	12.45	1/18/19	17:15	-14019	11.79	1/19/19	7:45	-13149	11.75
1/18/19	3:00	-14874	12.41	1/18/19	17:30	-14004	11.80	1/19/19	8:00	-13134	11.75
1/18/19	3:15	-14859	12.37	1/18/19	17:45	-13989	11.80	1/19/19	8:15	-13119	11.75
1/18/19	3:30	-14844	12.32	1/18/19	18:00	-13974	11.81	1/19/19	8:30	-13104	11.76
1/18/19	3:45	-14829	12.29	1/18/19	18:15	-13959	11.79	1/19/19	8:45	-13089	11.77
1/18/19	4:00	-14814	12.26	1/18/19	18:30	-13944	11.80	1/19/19	9:00	-13074	11.76
1/18/19	4:15	-14799	12.24	1/18/19	18:45	-13929	11.80	1/19/19	9:15	-13059	11.76
1/18/19	4:30	-14784	12.19	1/18/19	19:00	-13914	11.80	1/19/19	9:30	-13044	11.77
1/18/19	4:45	-14769	12.17	1/18/19	19:15	-13899	11.80	1/19/19	9:45	-13029	11.75
1/18/19	5:00	-14754	12.16	1/18/19	19:30	-13884	11.80	1/19/19	10:00	-13014	11.76
1/18/19	5:15	-14739	12.14	1/18/19	19:45	-13869	11.80	1/19/19	10:15	-12999	11.76
1/18/19	5:30	-14724	12.13	1/18/19	20:00	-13854	11.80	1/19/19	10:30	-12984	11.76
1/18/19	5:45	-14709	12.11	1/18/19	20:15	-13839	11.81	1/19/19	10:45	-12969	11.75

1/19/19	11:00	-12954	11.75	1/20/19	1:30	-12084	12.59	1/20/19	16:00	-11214	11.73
1/19/19	11:15	-12939	11.76	1/20/19	1:45	-12069	12.55	1/20/19	16:15	-11199	11.72
1/19/19	11:30	-12924	11.74	1/20/19	2:00	-12054	12.48	1/20/19	16:30	-11184	11.75
1/19/19	11:45	-12909	11.75	1/20/19	2:15	-12039	12.45	1/20/19	16:45	-11169	11.74
1/19/19	12:00	-12894	11.75	1/20/19	2:30	-12024	12.39	1/20/19	17:00	-11154	11.75
1/19/19	12:15	-12879	11.74	1/20/19	2:45	-12009	12.34	1/20/19	17:15	-11139	11.74
1/19/19	12:30	-12864	11.74	1/20/19	3:00	-11994	12.31	1/20/19	17:30	-11124	11.73
1/19/19	12:45	-12849	11.74	1/20/19	3:15	-11979	12.28	1/20/19	17:45	-11109	11.74
1/19/19	13:00	-12834	11.74	1/20/19	3:30	-11964	12.23	1/20/19	18:00	-11094	11.75
1/19/19	13:15	-12819	11.74	1/20/19	3:45	-11949	12.21	1/20/19	18:15	-11079	11.74
1/19/19	13:30	-12804	11.73	1/20/19	4:00	-11934	12.17	1/20/19	18:30	-11064	11.75
1/19/19	13:45	-12789	11.73	1/20/19	4:15	-11919	12.13	1/20/19	18:45	-11049	11.75
1/19/19	14:00	-12774	11.73	1/20/19	4:30	-11904	12.12	1/20/19	19:00	-11034	11.75
1/19/19	14:15	-12759	12.61	1/20/19	4:45	-11889	12.10	1/20/19	19:15	-11019	11.74
1/19/19	14:30	-12744	12.92	1/20/19	5:00	-11874	12.08	1/20/19	19:30	-11004	11.75
1/19/19	14:45	-12729	13.13	1/20/19	5:15	-11859	12.06	1/20/19	19:45	-10989	11.74
1/19/19	15:00	-12714	13.26	1/20/19	5:30	-11844	12.04	1/20/19	20:00	-10974	11.75
1/19/19	15:15	-12699	13.36	1/20/19	5:45	-11829	12.01	1/20/19	20:15	-10959	11.76
1/19/19	15:30	-12684	13.48	1/20/19	6:00	-11814	12.01	1/20/19	20:30	-10944	11.75
1/19/19	15:45	-12669	13.55	1/20/19	6:15	-11799	11.99	1/20/19	20:45	-10929	11.75
1/19/19	16:00	-12654	13.62	1/20/19	6:30	-11784	11.98	1/20/19	21:00	-10914	11.75
1/19/19	16:15	-12639	13.70	1/20/19	6:45	-11769	11.96	1/20/19	21:15	-10899	11.75
1/19/19	16:30	-12624	13.74	1/20/19	7:00	-11754	11.95	1/20/19	21:30	-10884	11.74
1/19/19	16:45	-12609	13.80	1/20/19	7:15	-11739	11.94	1/20/19	21:45	-10869	11.75
1/19/19	17:00	-12594	13.85	1/20/19	7:30	-11724	11.93	1/20/19	22:00	-10854	11.75
1/19/19	17:15	-12579	13.90	1/20/19	7:45	-11709	11.90	1/20/19	22:15	-10839	11.75
1/19/19	17:30	-12564	13.94	1/20/19	8:00	-11694	11.90	1/20/19	22:30	-10824	11.75
1/19/19	17:45	-12549	13.97	1/20/19	8:15	-11679	11.88	1/20/19	22:45	-10809	11.75
1/19/19	18:00	-12534	14.01	1/20/19	8:30	-11664	11.89	1/20/19	23:00	-10794	11.74
1/19/19	18:15	-12519	14.05	1/20/19	8:45	-11649	11.87	1/20/19	23:15	-10779	11.74
1/19/19	18:30	-12504	14.08	1/20/19	9:00	-11634	11.86	1/20/19	23:30	-10764	11.75
1/19/19	18:45	-12489	14.10	1/20/19	9:15	-11619	11.85	1/20/19	23:45	-10749	11.76
1/19/19	19:00	-12474	14.14	1/20/19	9:30	-11604	11.84	1/21/19	0:00	-10734	11.74
1/19/19	19:15	-12459	14.16	1/20/19	9:45	-11589	11.83	1/21/19	0:15	-10719	11.74
1/19/19	19:30	-12444	14.19	1/20/19	10:00	-11574	11.83	1/21/19	0:30	-10704	11.75
1/19/19	19:45	-12429	14.20	1/20/19	10:15	-11559	11.82	1/21/19	0:45	-10689	11.73
1/19/19	20:00	-12414	14.23	1/20/19	10:30	-11544	11.82	1/21/19	1:00	-10674	11.74
1/19/19	20:15	-12399	14.24	1/20/19	10:45	-11529	11.81	1/21/19	1:15	-10659	11.75
1/19/19	20:30	-12384	14.26	1/20/19	11:00	-11514	11.81	1/21/19	1:30	-10644	11.73
1/19/19	20:45	-12369	14.28	1/20/19	11:15	-11499	11.80	1/21/19	1:45	-10629	11.72
1/19/19	21:00	-12354	14.31	1/20/19	11:30	-11484	11.79	1/21/19	2:00	-10614	11.73
1/19/19	21:15	-12339	14.31	1/20/19	11:45	-11469	11.79	1/21/19	2:15	-10599	11.72
1/19/19	21:30	-12324	14.33	1/20/19	12:00	-11454	11.79	1/21/19	2:30	-10584	11.71
1/19/19	21:45	-12309	14.35	1/20/19	12:15	-11439	11.78	1/21/19	2:45	-10569	11.72
1/19/19	22:00	-12294	14.36	1/20/19	12:30	-11424	11.78	1/21/19	3:00	-10554	11.71
1/19/19	22:15	-12279	14.37	1/20/19	12:45	-11409	11.77	1/21/19	3:15	-10539	11.72
1/19/19	22:30	-12264	14.37	1/20/19	13:00	-11394	11.77	1/21/19	3:30	-10524	11.71
1/19/19	22:45	-12249	14.40	1/20/19	13:15	-11379	11.76	1/21/19	3:45	-10509	11.72
1/19/19	23:00	-12234	14.41	1/20/19	13:30	-11364	11.75	1/21/19	4:00	-10494	11.70
1/19/19	23:15	-12219	14.42	1/20/19	13:45	-11349	11.75	1/21/19	4:15	-10479	11.71
1/19/19	23:30	-12204	14.43	1/20/19	14:00	-11334	11.74	1/21/19	4:30	-10464	11.70
1/19/19	23:45	-12189	13.49	1/20/19	14:15	-11319	11.75	1/21/19	4:45	-10449	11.69
1/20/19	0:00	-12174	13.23	1/20/19	14:30	-11304	11.74	1/21/19	5:00	-10434	11.70
1/20/19	0:15	-12159	13.05	1/20/19	14:45	-11289	11.74	1/21/19	5:15	-10419	11.70
1/20/19	0:30	-12144	12.93	1/20/19	15:00	-11274	11.75	1/21/19	5:30	-10404	11.70
1/20/19	0:45	-12129	12.83	1/20/19	15:15	-11259	11.74	1/21/19	5:45	-10389	11.68
1/20/19	1:00	-12114	12.73	1/20/19	15:30	-11244	11.73	1/21/19	6:00	-10374	11.71
1/20/19	1:15	-12099	12.66	1/20/19	15:45	-11229	11.73	1/21/19	6:15	-10359	11.68

1/21/19	6:30	-10344	11.69	1/21/19	21:00	-9474	14.40	1/22/19	11:30	-8604	11.94
1/21/19	6:45	-10329	11.69	1/21/19	21:15	-9459	14.41	1/22/19	11:45	-8589	11.94
1/21/19	7:00	-10314	11.69	1/21/19	21:30	-9444	14.44	1/22/19	12:00	-8574	11.94
1/21/19	7:15	-10299	11.69	1/21/19	21:45	-9429	14.44	1/22/19	12:15	-8559	11.94
1/21/19	7:30	-10284	11.68	1/21/19	22:00	-9414	14.47	1/22/19	12:30	-8544	11.92
1/21/19	7:45	-10269	11.67	1/21/19	22:15	-9399	13.53	1/22/19	12:45	-8529	11.94
1/21/19	8:00	-10254	11.70	1/21/19	22:30	-9384	13.28	1/22/19	13:00	-8514	11.94
1/21/19	8:15	-10239	11.71	1/21/19	22:45	-9369	13.10	1/22/19	13:15	-8499	11.92
1/21/19	8:30	-10224	11.70	1/21/19	23:00	-9354	12.99	1/22/19	13:30	-8484	11.93
1/21/19	8:45	-10209	11.70	1/21/19	23:15	-9339	12.90	1/22/19	13:45	-8469	11.90
1/21/19	9:00	-10194	11.69	1/21/19	23:30	-9324	12.80	1/22/19	14:00	-8454	11.91
1/21/19	9:15	-10179	11.71	1/21/19	23:45	-9309	12.74	1/22/19	14:15	-8439	11.90
1/21/19	9:30	-10164	11.71	1/22/19	0:00	-9294	12.69	1/22/19	14:30	-8424	11.89
1/21/19	9:45	-10149	11.71	1/22/19	0:15	-9279	12.62	1/22/19	14:45	-8409	11.90
1/21/19	10:00	-10134	11.71	1/22/19	0:30	-9264	12.58	1/22/19	15:00	-8394	11.89
1/21/19	10:15	-10119	11.71	1/22/19	0:45	-9249	12.54	1/22/19	15:15	-8379	11.89
1/21/19	10:30	-10104	11.72	1/22/19	1:00	-9234	12.50	1/22/19	15:30	-8364	11.88
1/21/19	10:45	-10089	11.71	1/22/19	1:15	-9219	12.45	1/22/19	15:45	-8349	11.89
1/21/19	11:00	-10074	11.71	1/22/19	1:30	-9204	12.44	1/22/19	16:00	-8334	11.87
1/21/19	11:15	-10059	11.72	1/22/19	1:45	-9189	12.39	1/22/19	16:15	-8319	11.87
1/21/19	11:30	-10044	11.70	1/22/19	2:00	-9174	12.38	1/22/19	16:30	-8304	11.86
1/21/19	11:45	-10029	11.71	1/22/19	2:15	-9159	12.34	1/22/19	16:45	-8289	11.88
1/21/19	12:00	-10014	11.71	1/22/19	2:30	-9144	12.31	1/22/19	17:00	-8274	11.87
1/21/19	12:15	-9999	11.71	1/22/19	2:45	-9129	12.29	1/22/19	17:15	-8259	11.86
1/21/19	12:30	-9984	11.72	1/22/19	3:00	-9114	12.27	1/22/19	17:30	-8244	11.85
1/21/19	12:45	-9969	11.71	1/22/19	3:15	-9099	12.24	1/22/19	17:45	-8229	11.84
1/21/19	13:00	-9954	12.50	1/22/19	3:30	-9084	12.22	1/22/19	18:00	-8214	11.84
1/21/19	13:15	-9939	12.86	1/22/19	3:45	-9069	12.18	1/22/19	18:15	-8199	11.84
1/21/19	13:30	-9924	13.08	1/22/19	4:00	-9054	12.17	1/22/19	18:30	-8184	11.85
1/21/19	13:45	-9909	13.24	1/22/19	4:15	-9039	12.16	1/22/19	18:45	-8169	11.84
1/21/19	14:00	-9894	13.34	1/22/19	4:30	-9024	12.14	1/22/19	19:00	-8154	11.84
1/21/19	14:15	-9879	13.44	1/22/19	4:45	-9009	12.13	1/22/19	19:15	-8139	11.85
1/21/19	14:30	-9864	13.52	1/22/19	5:00	-8994	12.12	1/22/19	19:30	-8124	11.84
1/21/19	14:45	-9849	13.60	1/22/19	5:15	-8979	12.11	1/22/19	19:45	-8109	11.84
1/21/19	15:00	-9834	13.68	1/22/19	5:30	-8964	12.09	1/22/19	20:00	-8094	11.85
1/21/19	15:15	-9819	13.72	1/22/19	5:45	-8949	12.08	1/22/19	20:15	-8079	11.85
1/21/19	15:30	-9804	13.77	1/22/19	6:00	-8934	12.08	1/22/19	20:30	-8064	11.85
1/21/19	15:45	-9789	13.82	1/22/19	6:15	-8919	12.06	1/22/19	20:45	-8049	11.85
1/21/19	16:00	-9774	13.87	1/22/19	6:30	-8904	12.04	1/22/19	21:00	-8034	11.84
1/21/19	16:15	-9759	13.92	1/22/19	6:45	-8889	12.03	1/22/19	21:15	-8019	11.85
1/21/19	16:30	-9744	13.96	1/22/19	7:00	-8874	12.03	1/22/19	21:30	-8004	11.84
1/21/19	16:45	-9729	14.00	1/22/19	7:15	-8859	12.02	1/22/19	21:45	-7989	11.84
1/21/19	17:00	-9714	14.03	1/22/19	7:30	-8844	12.03	1/22/19	22:00	-7974	11.82
1/21/19	17:15	-9699	14.06	1/22/19	7:45	-8829	12.02	1/22/19	22:15	-7959	11.83
1/21/19	17:30	-9684	14.08	1/22/19	8:00	-8814	11.99	1/22/19	22:30	-7944	11.84
1/21/19	17:45	-9669	14.12	1/22/19	8:15	-8799	12.01	1/22/19	22:45	-7929	11.84
1/21/19	18:00	-9654	14.15	1/22/19	8:30	-8784	11.99	1/22/19	23:00	-7914	11.82
1/21/19	18:15	-9639	14.17	1/22/19	8:45	-8769	11.98	1/22/19	23:15	-7899	11.82
1/21/19	18:30	-9624	14.20	1/22/19	9:00	-8754	11.98	1/22/19	23:30	-7884	11.84
1/21/19	18:45	-9609	14.24	1/22/19	9:15	-8739	11.97	1/22/19	23:45	-7869	11.82
1/21/19	19:00	-9594	14.24	1/22/19	9:30	-8724	11.98	1/23/19	0:00	-7854	11.81
1/21/19	19:15	-9579	14.27	1/22/19	9:45	-8709	11.96	1/23/19	0:15	-7839	11.82
1/21/19	19:30	-9564	14.28	1/22/19	10:00	-8694	11.96	1/23/19	0:30	-7824	11.82
1/21/19	19:45	-9549	14.32	1/22/19	10:15	-8679	11.96	1/23/19	0:45	-7809	11.81
1/21/19	20:00	-9534	14.34	1/22/19	10:30	-8664	11.95	1/23/19	1:00	-7794	11.81
1/21/19	20:15	-9519	14.37	1/22/19	10:45	-8649	11.94	1/23/19	1:15	-7779	11.83
1/21/19	20:30	-9504	14.37	1/22/19	11:00	-8634	11.95	1/23/19	1:30	-7764	11.81
1/21/19	20:45	-9489	14.40	1/22/19	11:15	-8619	11.94	1/23/19	1:45	-7749	11.81

1/23/19	2:00	-7734	11.81	1/23/19	16:30	-6864	14.29	1/24/19	7:00	-5994	11.85
1/23/19	2:15	-7719	11.79	1/23/19	16:45	-6849	14.31	1/24/19	7:15	-5979	11.84
1/23/19	2:30	-7704	11.80	1/23/19	17:00	-6834	14.33	1/24/19	7:30	-5964	11.82
1/23/19	2:45	-7689	11.80	1/23/19	17:15	-6819	14.33	1/24/19	7:45	-5949	11.82
1/23/19	3:00	-7674	11.79	1/23/19	17:30	-6804	14.35	1/24/19	8:00	-5934	11.80
1/23/19	3:15	-7659	11.79	1/23/19	17:45	-6789	14.36	1/24/19	8:15	-5919	11.78
1/23/19	3:30	-7644	11.78	1/23/19	18:00	-6774	14.38	1/24/19	8:30	-5904	11.77
1/23/19	3:45	-7629	11.77	1/23/19	18:15	-6759	14.38	1/24/19	8:45	-5889	11.75
1/23/19	4:00	-7614	11.77	1/23/19	18:30	-6744	14.40	1/24/19	9:00	-5874	11.75
1/23/19	4:15	-7599	11.78	1/23/19	18:45	-6729	14.41	1/24/19	9:15	-5859	11.73
1/23/19	4:30	-7584	11.77	1/23/19	19:00	-6714	14.43	1/24/19	9:30	-5844	11.72
1/23/19	4:45	-7569	11.76	1/23/19	19:15	-6699	14.44	1/24/19	9:45	-5829	11.71
1/23/19	5:00	-7554	11.77	1/23/19	19:30	-6684	14.45	1/24/19	10:00	-5814	11.70
1/23/19	5:15	-7539	11.75	1/23/19	19:45	-6669	14.46	1/24/19	10:15	-5799	11.70
1/23/19	5:30	-7524	11.75	1/23/19	20:00	-6654	14.47	1/24/19	10:30	-5784	11.69
1/23/19	5:45	-7509	11.76	1/23/19	20:15	-6639	13.79	1/24/19	10:45	-5769	11.68
1/23/19	6:00	-7494	11.74	1/23/19	20:30	-6624	13.39	1/24/19	11:00	-5754	11.68
1/23/19	6:15	-7479	11.75	1/23/19	20:45	-6609	13.18	1/24/19	11:15	-5739	11.66
1/23/19	6:30	-7464	11.75	1/23/19	21:00	-6594	13.03	1/24/19	11:30	-5724	11.66
1/23/19	6:45	-7449	11.74	1/23/19	21:15	-6579	12.93	1/24/19	11:45	-5709	11.64
1/23/19	7:00	-7434	11.74	1/23/19	21:30	-6564	12.83	1/24/19	12:00	-5694	11.62
1/23/19	7:15	-7419	11.76	1/23/19	21:45	-6549	12.75	1/24/19	12:15	-5679	11.61
1/23/19	7:30	-7404	11.75	1/23/19	22:00	-6534	12.68	1/24/19	12:30	-5664	11.61
1/23/19	7:45	-7389	11.75	1/23/19	22:15	-6519	12.63	1/24/19	12:45	-5649	11.60
1/23/19	8:00	-7374	11.75	1/23/19	22:30	-6504	12.57	1/24/19	13:00	-5634	11.59
1/23/19	8:15	-7359	11.74	1/23/19	22:45	-6489	12.54	1/24/19	13:15	-5619	11.59
1/23/19	8:30	-7344	11.73	1/23/19	23:00	-6474	12.49	1/24/19	13:30	-5604	11.60
1/23/19	8:45	-7329	11.74	1/23/19	23:15	-6459	12.45	1/24/19	13:45	-5589	11.58
1/23/19	9:00	-7314	11.75	1/23/19	23:30	-6444	12.41	1/24/19	14:00	-5574	11.57
1/23/19	9:15	-7299	11.75	1/23/19	23:45	-6429	12.40	1/24/19	14:15	-5559	11.57
1/23/19	9:30	-7284	11.74	1/24/19	0:00	-6414	12.35	1/24/19	14:30	-5544	11.55
1/23/19	9:45	-7269	11.75	1/24/19	0:15	-6399	12.32	1/24/19	14:45	-5529	11.55
1/23/19	10:00	-7254	12.73	1/24/19	0:30	-6384	12.30	1/24/19	15:00	-5514	11.53
1/23/19	10:15	-7239	13.00	1/24/19	0:45	-6369	12.27	1/24/19	15:15	-5499	11.54
1/23/19	10:30	-7224	13.17	1/24/19	1:00	-6354	12.25	1/24/19	15:30	-5484	11.53
1/23/19	10:45	-7209	13.30	1/24/19	1:15	-6339	12.23	1/24/19	15:45	-5469	11.50
1/23/19	11:00	-7194	13.43	1/24/19	1:30	-6324	12.19	1/24/19	16:00	-5454	11.51
1/23/19	11:15	-7179	13.51	1/24/19	1:45	-6309	12.19	1/24/19	16:15	-5439	11.49
1/23/19	11:30	-7164	13.61	1/24/19	2:00	-6294	12.17	1/24/19	16:30	-5424	11.48
1/23/19	11:45	-7149	13.67	1/24/19	2:15	-6279	12.13	1/24/19	16:45	-5409	11.47
1/23/19	12:00	-7134	13.74	1/24/19	2:30	-6264	12.13	1/24/19	17:00	-5394	11.46
1/23/19	12:15	-7119	13.78	1/24/19	2:45	-6249	12.11	1/24/19	17:15	-5379	11.45
1/23/19	12:30	-7104	13.84	1/24/19	3:00	-6234	12.09	1/24/19	17:30	-5364	11.44
1/23/19	12:45	-7089	13.89	1/24/19	3:15	-6219	12.09	1/24/19	17:45	-5349	11.45
1/23/19	13:00	-7074	13.93	1/24/19	3:30	-6204	12.05	1/24/19	18:00	-5334	11.43
1/23/19	13:15	-7059	13.96	1/24/19	3:45	-6189	12.04	1/24/19	18:15	-5319	11.42
1/23/19	13:30	-7044	14.01	1/24/19	4:00	-6174	12.02	1/24/19	18:30	-5304	11.42
1/23/19	13:45	-7029	14.04	1/24/19	4:15	-6159	12.01	1/24/19	18:45	-5289	11.41
1/23/19	14:00	-7014	14.07	1/24/19	4:30	-6144	12.00	1/24/19	19:00	-5274	11.40
1/23/19	14:15	-6999	14.09	1/24/19	4:45	-6129	11.99	1/24/19	19:15	-5259	11.40
1/23/19	14:30	-6984	14.14	1/24/19	5:00	-6114	11.96	1/24/19	19:30	-5244	11.40
1/23/19	14:45	-6969	14.15	1/24/19	5:15	-6099	11.96	1/24/19	19:45	-5229	11.39
1/23/19	15:00	-6954	14.17	1/24/19	5:30	-6084	11.95	1/24/19	20:00	-5214	11.38
1/23/19	15:15	-6939	14.20	1/24/19	5:45	-6069	11.92	1/24/19	20:15	-5199	11.38
1/23/19	15:30	-6924	14.23	1/24/19	6:00	-6054	11.91	1/24/19	20:30	-5184	11.37
1/23/19	15:45	-6909	14.24	1/24/19	6:15	-6039	11.90	1/24/19	20:45	-5169	11.36
1/23/19	16:00	-6894	14.25	1/24/19	6:30	-6024	11.88	1/24/19	21:00	-5154	11.38
1/23/19	16:15	-6879	14.28	1/24/19	6:45	-6009	11.87	1/24/19	21:15	-5139	11.35

1/24/19	21:30	-5124	11.36	1/25/19	12:00	-4254	13.83	1/26/19	2:30	-3384	11.54
1/24/19	21:45	-5109	11.35	1/25/19	12:15	-4239	13.84	1/26/19	2:45	-3369	11.54
1/24/19	22:00	-5094	11.36	1/25/19	12:30	-4224	13.86	1/26/19	3:00	-3354	11.52
1/24/19	22:15	-5079	11.35	1/25/19	12:45	-4209	13.88	1/26/19	3:15	-3339	11.52
1/24/19	22:30	-5064	11.34	1/25/19	13:00	-4194	13.89	1/26/19	3:30	-3324	11.52
1/24/19	22:45	-5049	11.35	1/25/19	13:15	-4179	13.90	1/26/19	3:45	-3309	11.51
1/24/19	23:00	-5034	11.34	1/25/19	13:30	-4164	13.91	1/26/19	4:00	-3294	11.52
1/24/19	23:15	-5019	11.33	1/25/19	13:45	-4149	13.95	1/26/19	4:15	-3279	11.50
1/24/19	23:30	-5004	11.34	1/25/19	14:00	-4134	13.96	1/26/19	4:30	-3264	11.50
1/24/19	23:45	-4989	11.34	1/25/19	14:15	-4119	13.97	1/26/19	4:45	-3249	11.50
1/25/19	0:00	-4974	11.33	1/25/19	14:30	-4104	13.98	1/26/19	5:00	-3234	11.51
1/25/19	0:15	-4959	11.34	1/25/19	14:45	-4089	13.83	1/26/19	5:15	-3219	11.49
1/25/19	0:30	-4944	11.34	1/25/19	15:00	-4074	12.97	1/26/19	5:30	-3204	11.48
1/25/19	0:45	-4929	11.34	1/25/19	15:15	-4059	12.75	1/26/19	5:45	-3189	11.46
1/25/19	1:00	-4914	11.33	1/25/19	15:30	-4044	12.60	1/26/19	6:00	-3174	11.48
1/25/19	1:15	-4899	11.32	1/25/19	15:45	-4029	12.48	1/26/19	6:15	-3159	11.46
1/25/19	1:30	-4884	11.33	1/25/19	16:00	-4014	12.39	1/26/19	6:30	-3144	11.46
1/25/19	1:45	-4869	11.33	1/25/19	16:15	-3999	12.31	1/26/19	6:45	-3129	11.47
1/25/19	2:00	-4854	11.33	1/25/19	16:30	-3984	12.22	1/26/19	7:00	-3114	11.46
1/25/19	2:15	-4839	11.31	1/25/19	16:45	-3969	12.17	1/26/19	7:15	-3099	11.46
1/25/19	2:30	-4824	11.32	1/25/19	17:00	-3954	12.12	1/26/19	7:30	-3084	11.44
1/25/19	2:45	-4809	11.31	1/25/19	17:15	-3939	12.08	1/26/19	7:45	-3069	11.45
1/25/19	3:00	-4794	11.32	1/25/19	17:30	-3924	12.04	1/26/19	8:00	-3054	11.45
1/25/19	3:15	-4779	11.31	1/25/19	17:45	-3909	12.00	1/26/19	8:15	-3039	11.43
1/25/19	3:30	-4764	11.33	1/25/19	18:00	-3894	11.98	1/26/19	8:30	-3024	11.45
1/25/19	3:45	-4749	11.31	1/25/19	18:15	-3879	11.93	1/26/19	8:45	-3009	11.43
1/25/19	4:00	-4734	11.30	1/25/19	18:30	-3864	11.92	1/26/19	9:00	-2994	11.44
1/25/19	4:15	-4719	11.30	1/25/19	18:45	-3849	11.88	1/26/19	9:15	-2979	11.43
1/25/19	4:30	-4704	11.30	1/25/19	19:00	-3834	11.87	1/26/19	9:30	-2964	11.43
1/25/19	4:45	-4689	11.30	1/25/19	19:15	-3819	11.82	1/26/19	9:45	-2949	11.43
1/25/19	5:00	-4674	11.31	1/25/19	19:30	-3804	11.83	1/26/19	10:00	-2934	11.42
1/25/19	5:15	-4659	11.29	1/25/19	19:45	-3789	11.79	1/26/19	10:15	-2919	11.42
1/25/19	5:30	-4644	12.11	1/25/19	20:00	-3774	11.78	1/26/19	10:30	-2904	11.43
1/25/19	5:45	-4629	12.45	1/25/19	20:15	-3759	11.76	1/26/19	10:45	-2889	11.42
1/25/19	6:00	-4614	12.66	1/25/19	20:30	-3744	11.74	1/26/19	11:00	-2874	11.41
1/25/19	6:15	-4599	12.82	1/25/19	20:45	-3729	11.72	1/26/19	11:15	-2859	11.41
1/25/19	6:30	-4584	12.92	1/25/19	21:00	-3714	11.72	1/26/19	11:30	-2844	11.41
1/25/19	6:45	-4569	13.03	1/25/19	21:15	-3699	11.70	1/26/19	11:45	-2829	11.41
1/25/19	7:00	-4554	13.10	1/25/19	21:30	-3684	11.69	1/26/19	12:00	-2814	11.41
1/25/19	7:15	-4539	13.19	1/25/19	21:45	-3669	11.68	1/26/19	12:15	-2799	11.40
1/25/19	7:30	-4524	13.24	1/25/19	22:00	-3654	11.66	1/26/19	12:30	-2784	11.41
1/25/19	7:45	-4509	13.30	1/25/19	22:15	-3639	11.63	1/26/19	12:45	-2769	11.39
1/25/19	8:00	-4494	13.36	1/25/19	22:30	-3624	11.64	1/26/19	13:00	-2754	11.40
1/25/19	8:15	-4479	13.41	1/25/19	22:45	-3609	11.63	1/26/19	13:15	-2739	11.39
1/25/19	8:30	-4464	13.45	1/25/19	23:00	-3594	11.61	1/26/19	13:30	-2724	11.41
1/25/19	8:45	-4449	13.48	1/25/19	23:15	-3579	11.60	1/26/19	13:45	-2709	11.40
1/25/19	9:00	-4434	13.51	1/25/19	23:30	-3564	11.60	1/26/19	14:00	-2694	11.40
1/25/19	9:15	-4419	13.56	1/25/19	23:45	-3549	11.60	1/26/19	14:15	-2679	11.39
1/25/19	9:30	-4404	13.59	1/26/19	0:00	-3534	11.59	1/26/19	14:30	-2664	11.39
1/25/19	9:45	-4389	13.63	1/26/19	0:15	-3519	11.59	1/26/19	14:45	-2649	11.40
1/25/19	10:00	-4374	13.65	1/26/19	0:30	-3504	11.59	1/26/19	15:00	-2634	11.38
1/25/19	10:15	-4359	13.68	1/26/19	0:45	-3489	11.58	1/26/19	15:15	-2619	11.38
1/25/19	10:30	-4344	13.71	1/26/19	1:00	-3474	11.57	1/26/19	15:30	-2604	11.38
1/25/19	10:45	-4329	13.72	1/26/19	1:15	-3459	11.57	1/26/19	15:45	-2589	11.38
1/25/19	11:00	-4314	13.74	1/26/19	1:30	-3444	11.56	1/26/19	16:00	-2574	11.38
1/25/19	11:15	-4299	13.76	1/26/19	1:45	-3429	11.55	1/26/19	16:15	-2559	11.39
1/25/19	11:30	-4284	13.78	1/26/19	2:00	-3414	11.54	1/26/19	16:30	-2544	11.39
1/25/19	11:45	-4269	13.81	1/26/19	2:15	-3399	11.55	1/26/19	16:45	-2529	11.38

1/26/19	17:00	-2514	11.37	1/27/19	7:30	-1644	13.07	1/27/19	22:00	-774	11.67
1/26/19	17:15	-2499	11.38	1/27/19	7:45	-1629	13.16	1/27/19	22:15	-759	11.66
1/26/19	17:30	-2484	11.37	1/27/19	8:00	-1614	13.20	1/27/19	22:30	-744	11.64
1/26/19	17:45	-2469	11.37	1/27/19	8:15	-1599	13.26	1/27/19	22:45	-729	11.63
1/26/19	18:00	-2454	11.36	1/27/19	8:30	-1584	13.32	1/27/19	23:00	-714	11.61
1/26/19	18:15	-2439	11.35	1/27/19	8:45	-1569	13.35	1/27/19	23:15	-699	11.61
1/26/19	18:30	-2424	11.36	1/27/19	9:00	-1554	13.40	1/27/19	23:30	-684	11.59
1/26/19	18:45	-2409	11.36	1/27/19	9:15	-1539	13.44	1/27/19	23:45	-669	11.58
1/26/19	19:00	-2394	11.35	1/27/19	9:30	-1524	13.47	1/28/19	0:00	-654	11.58
1/26/19	19:15	-2379	11.33	1/27/19	9:45	-1509	13.52	1/28/19	0:15	-639	11.56
1/26/19	19:30	-2364	11.32	1/27/19	10:00	-1494	13.53	1/28/19	0:30	-624	11.56
1/26/19	19:45	-2349	11.32	1/27/19	10:15	-1479	13.55	1/28/19	0:45	-609	11.55
1/26/19	20:00	-2334	11.32	1/27/19	10:30	-1464	13.59	1/28/19	1:00	-594	11.56
1/26/19	20:15	-2319	11.32	1/27/19	10:45	-1449	13.61	1/28/19	1:15	-579	11.54
1/26/19	20:30	-2304	11.32	1/27/19	11:00	-1434	13.64	1/28/19	1:30	-564	11.54
1/26/19	20:45	-2289	11.31	1/27/19	11:15	-1419	13.67	1/28/19	1:45	-549	11.55
1/26/19	21:00	-2274	11.31	1/27/19	11:30	-1404	13.69	1/28/19	2:00	-534	11.53
1/26/19	21:15	-2259	11.30	1/27/19	11:45	-1389	13.70	1/28/19	2:15	-519	11.53
1/26/19	21:30	-2244	11.31	1/27/19	12:00	-1374	13.73	1/28/19	2:30	-504	11.53
1/26/19	21:45	-2229	11.30	1/27/19	12:15	-1359	13.76	1/28/19	2:45	-489	11.52
1/26/19	22:00	-2214	11.31	1/27/19	12:30	-1344	13.77	1/28/19	3:00	-474	11.51
1/26/19	22:15	-2199	11.30	1/27/19	12:45	-1329	13.79	1/28/19	3:15	-459	11.49
1/26/19	22:30	-2184	11.30	1/27/19	13:00	-1314	13.80	1/28/19	3:30	-444	11.50
1/26/19	22:45	-2169	11.30	1/27/19	13:15	-1299	13.82	1/28/19	3:45	-429	11.48
1/26/19	23:00	-2154	11.29	1/27/19	13:30	-1284	13.82	1/28/19	4:00	-414	11.48
1/26/19	23:15	-2139	11.28	1/27/19	13:45	-1269	13.86	1/28/19	4:15	-399	11.49
1/26/19	23:30	-2124	11.29	1/27/19	14:00	-1254	13.86	1/28/19	4:30	-384	11.48
1/26/19	23:45	-2109	11.28	1/27/19	14:15	-1239	13.88	1/28/19	4:45	-369	11.49
1/27/19	0:00	-2094	11.29	1/27/19	14:30	-1224	13.90	1/28/19	5:00	-354	11.47
1/27/19	0:15	-2079	11.28	1/27/19	14:45	-1209	13.90	1/28/19	5:15	-339	11.48
1/27/19	0:30	-2064	11.28	1/27/19	15:00	-1194	13.92	1/28/19	5:30	-324	11.48
1/27/19	0:45	-2049	11.28	1/27/19	15:15	-1179	13.86	1/28/19	5:45	-309	11.47
1/27/19	1:00	-2034	11.27	1/27/19	15:30	-1164	12.93	1/28/19	6:00	-294	11.46
1/27/19	1:15	-2019	11.27	1/27/19	15:45	-1149	12.69	1/28/19	6:15	-279	11.47
1/27/19	1:30	-2004	11.28	1/27/19	16:00	-1134	12.53	1/28/19	6:30	-264	11.46
1/27/19	1:45	-1989	11.26	1/27/19	16:15	-1119	12.42	1/28/19	6:45	-249	11.47
1/27/19	2:00	-1974	11.26	1/27/19	16:30	-1104	12.36	1/28/19	7:00	-234	11.45
1/27/19	2:15	-1959	11.26	1/27/19	16:45	-1089	12.27	1/28/19	7:15	-219	11.46
1/27/19	2:30	-1944	11.27	1/27/19	17:00	-1074	12.20	1/28/19	7:30	-204	11.45
1/27/19	2:45	-1929	11.26	1/27/19	17:15	-1059	12.14	1/28/19	7:45	-189	11.45
1/27/19	3:00	-1914	11.26	1/27/19	17:30	-1044	12.08	1/28/19	8:00	-174	11.46
1/27/19	3:15	-1899	11.24	1/27/19	17:45	-1029	12.02	1/28/19	8:15	-159	11.45
1/27/19	3:30	-1884	11.26	1/27/19	18:00	-1014	12.05	1/28/19	8:30	-144	11.46
1/27/19	3:45	-1869	11.24	1/27/19	18:15	-999	12.02	1/28/19	8:45	-129	11.45
1/27/19	4:00	-1854	11.24	1/27/19	18:30	-984	11.92	1/28/19	9:02	-112	11.45
1/27/19	4:15	-1839	11.25	1/27/19	18:45	-969	11.86	1/28/19	9:30	-84	11.45
1/27/19	4:30	-1824	11.24	1/27/19	19:00	-954	11.85	1/28/19	10:00	-54	11.44
1/27/19	4:45	-1809	11.23	1/27/19	19:15	-939	11.81	1/28/19	10:30	-24	11.43
1/27/19	5:00	-1794	11.24	1/27/19	19:30	-924	11.79	1/28/19	10:54	0	11.48
1/27/19	5:15	-1779	11.23	1/27/19	19:45	-909	11.80	1/28/19	10:56	2	11.62
1/27/19	5:30	-1764	11.23	1/27/19	20:00	-894	11.80	1/28/19	10:58	4	11.80
1/27/19	5:45	-1749	11.22	1/27/19	20:15	-879	11.77	1/28/19	11:00	6	11.97
1/27/19	6:00	-1734	12.20	1/27/19	20:30	-864	11.74	1/28/19	11:02	8	12.10
1/27/19	6:15	-1719	12.48	1/27/19	20:45	-849	11.73	1/28/19	11:04	10	12.20
1/27/19	6:30	-1704	12.64	1/27/19	21:00	-834	11.72	1/28/19	11:06	12	12.30
1/27/19	6:45	-1689	12.77	1/27/19	21:15	-819	11.71	1/28/19	11:08	14	12.39
1/27/19	7:00	-1674	12.89	1/27/19	21:30	-804	11.69	1/28/19	11:10	16	12.48
1/27/19	7:15	-1659	12.99	1/27/19	21:45	-789	11.68	1/28/19	11:12	18	12.54

1/28/19	11:14	20	12.62	1/28/19	23:45	771	16.30	1/29/19	14:15	1641	19.31
1/28/19	11:18	24	12.75	1/29/19	0:00	786	16.31	1/29/19	14:30	1656	19.33
1/28/19	11:22	28	12.85	1/29/19	0:15	801	16.34	1/29/19	14:45	1671	19.35
1/28/19	11:26	32	12.97	1/29/19	0:30	816	16.33	1/29/19	15:00	1686	19.37
1/28/19	11:30	36	13.07	1/29/19	0:45	831	16.36	1/29/19	15:15	1701	19.38
1/28/19	11:34	40	13.15	1/29/19	1:00	846	16.39	1/29/19	15:30	1716	19.41
1/28/19	11:38	44	13.24	1/29/19	1:15	861	16.39	1/29/19	15:45	1731	19.42
1/28/19	11:42	48	13.32	1/29/19	1:30	876	16.39	1/29/19	16:00	1746	19.44
1/28/19	11:46	52	13.39	1/29/19	1:45	891	16.41	1/29/19	16:15	1761	19.46
1/28/19	11:50	56	13.47	1/29/19	2:00	906	16.42	1/29/19	16:30	1776	19.48
1/28/19	11:54	60	13.54	1/29/19	2:15	921	16.44	1/29/19	16:45	1791	19.49
1/28/19	12:00	66	13.64	1/29/19	2:30	936	16.45	1/29/19	17:00	1806	19.52
1/28/19	12:14	80	13.83	1/29/19	2:45	951	16.45	1/29/19	17:15	1821	18.63
1/28/19	12:30	96	14.03	1/29/19	3:00	966	16.49	1/29/19	17:30	1836	18.39
1/28/19	12:44	110	14.19	1/29/19	3:15	981	16.48	1/29/19	17:45	1851	18.22
1/28/19	13:00	126	14.33	1/29/19	3:30	996	16.49	1/29/19	18:00	1866	18.10
1/28/19	13:14	140	14.45	1/29/19	3:45	1011	16.51	1/29/19	18:15	1881	18.02
1/28/19	13:30	156	14.58	1/29/19	4:00	1026	16.52	1/29/19	18:30	1896	17.94
1/28/19	13:44	170	14.69	1/29/19	4:15	1041	16.54	1/29/19	18:45	1911	17.88
1/28/19	14:00	186	14.79	1/29/19	4:30	1056	16.54	1/29/19	19:00	1926	17.83
1/28/19	14:14	200	14.87	1/29/19	4:45	1071	16.55	1/29/19	19:15	1941	17.77
1/28/19	14:30	216	14.96	1/29/19	5:00	1086	16.54	1/29/19	19:30	1956	17.73
1/28/19	14:44	230	15.04	1/29/19	5:15	1101	16.56	1/29/19	19:45	1971	17.70
1/28/19	15:00	246	15.12	1/29/19	5:30	1116	16.57	1/29/19	20:00	1986	17.66
1/28/19	15:14	260	15.17	1/29/19	5:45	1131	16.57	1/29/19	20:15	2001	17.62
1/28/19	15:24	270	15.23	1/29/19	6:00	1146	16.60	1/29/19	20:30	2016	17.60
1/28/19	15:45	291	15.29	1/29/19	6:15	1161	16.60	1/29/19	20:45	2031	17.58
1/28/19	16:00	306	15.35	1/29/19	6:30	1176	16.61	1/29/19	21:00	2046	17.55
1/28/19	16:15	321	15.40	1/29/19	6:45	1191	16.61	1/29/19	21:15	2061	17.53
1/28/19	16:30	336	15.46	1/29/19	7:00	1206	16.64	1/29/19	21:30	2076	17.51
1/28/19	16:45	351	15.52	1/29/19	7:15	1221	16.64	1/29/19	21:45	2091	17.49
1/28/19	17:00	366	15.57	1/29/19	7:30	1236	17.09	1/29/19	22:00	2106	17.47
1/28/19	17:15	381	15.60	1/29/19	7:45	1251	17.69	1/29/19	22:15	2121	17.46
1/28/19	17:30	396	15.65	1/29/19	8:00	1266	17.94	1/29/19	22:30	2136	17.45
1/28/19	17:45	411	15.69	1/29/19	8:15	1281	18.09	1/29/19	22:45	2151	17.43
1/28/19	18:00	426	15.73	1/29/19	8:30	1296	18.22	1/29/19	23:00	2166	17.41
1/28/19	18:15	441	15.77	1/29/19	8:45	1311	18.32	1/29/19	23:15	2181	17.41
1/28/19	18:30	456	15.80	1/29/19	9:00	1326	18.42	1/29/19	23:30	2196	17.39
1/28/19	18:45	471	15.83	1/29/19	9:15	1341	18.51	1/29/19	23:45	2211	17.37
1/28/19	19:00	486	15.87	1/29/19	9:30	1356	18.57	1/30/19	0:00	2226	17.37
1/28/19	19:15	501	15.90	1/29/19	9:45	1371	18.64	1/30/19	0:15	2241	17.37
1/28/19	19:30	516	15.94	1/29/19	10:00	1386	18.71	1/30/19	0:30	2256	17.36
1/28/19	19:45	531	15.96	1/29/19	10:15	1401	18.77	1/30/19	0:45	2271	17.35
1/28/19	20:00	546	15.99	1/29/19	10:30	1416	18.82	1/30/19	1:00	2286	17.34
1/28/19	20:15	561	16.02	1/29/19	10:45	1431	18.87	1/30/19	1:15	2301	17.32
1/28/19	20:30	576	16.03	1/29/19	11:00	1446	18.91	1/30/19	1:30	2316	17.32
1/28/19	20:45	591	16.07	1/29/19	11:15	1461	18.95	1/30/19	1:45	2331	17.32
1/28/19	21:00	606	16.09	1/29/19	11:30	1476	18.99	1/30/19	2:00	2346	17.33
1/28/19	21:15	621	16.12	1/29/19	11:45	1491	19.03	1/30/19	2:15	2361	17.31
1/28/19	21:30	636	16.13	1/29/19	12:00	1506	19.06	1/30/19	2:30	2376	17.31
1/28/19	21:45	651	16.16	1/29/19	12:15	1521	19.09	1/30/19	2:45	2391	17.30
1/28/19	22:00	666	16.18	1/29/19	12:30	1536	19.12	1/30/19	3:00	2406	17.30
1/28/19	22:15	681	16.20	1/29/19	12:45	1551	19.15	1/30/19	3:15	2421	17.30
1/28/19	22:30	696	16.23	1/29/19	13:00	1566	19.20	1/30/19	3:30	2436	17.29
1/28/19	22:45	711	16.23	1/29/19	13:15	1581	19.21	1/30/19	3:45	2451	17.29
1/28/19	23:00	726	16.25	1/29/19	13:30	1596	19.24	1/30/19	4:00	2466	17.29
1/28/19	23:15	741	16.25	1/29/19	13:45	1611	19.26	1/30/19	4:15	2481	17.29
1/28/19	23:30	756	16.28	1/29/19	14:00	1626	19.28	1/30/19	4:30	2496	17.30

1/30/19	4:45	2511	17.29	1/30/19	19:45	3411	17.32	1/31/19	10:20	4286	19.11
1/30/19	5:00	2526	17.28	1/30/19	20:00	3426	17.35	1/31/19	10:30	4296	19.16
1/30/19	5:15	2541	17.29	1/30/19	20:15	3441	17.35	1/31/19	10:40	4306	19.22
1/30/19	5:30	2556	17.28	1/30/19	20:30	3456	17.38	1/31/19	10:50	4316	19.27
1/30/19	5:45	2571	17.29	1/30/19	20:45	3471	17.38	1/31/19	10:52	4318	19.28
1/30/19	6:00	2586	17.29	1/30/19	21:00	3486	17.38	1/31/19	10:54	4320	19.28
1/30/19	6:15	2601	17.29	1/30/19	21:15	3501	17.38	1/31/19	10:56	4322	19.15
1/30/19	6:30	2616	17.27	1/30/19	21:30	3516	17.40	1/31/19	10:58	4324	18.95
1/30/19	6:45	2631	17.27	1/30/19	21:45	3531	17.40	1/31/19	11:00	4326	18.82
1/30/19	7:00	2646	17.28	1/30/19	22:00	3546	17.39	1/31/19	11:02	4328	18.69
1/30/19	7:15	2661	17.28	1/30/19	22:15	3561	17.40	1/31/19	11:04	4330	18.59
1/30/19	7:30	2676	17.27	1/30/19	22:30	3576	17.40	1/31/19	11:06	4332	18.49
1/30/19	7:45	2691	17.29	1/30/19	22:45	3591	17.40	1/31/19	11:08	4334	18.43
1/30/19	8:00	2706	17.29	1/30/19	23:00	3606	17.41	1/31/19	11:10	4336	18.34
1/30/19	8:15	2721	17.28	1/30/19	23:15	3621	17.40	1/31/19	11:12	4338	18.29
1/30/19	8:30	2736	17.28	1/30/19	23:30	3636	17.41	1/31/19	11:14	4340	18.21
1/30/19	8:45	2751	17.28	1/30/19	23:45	3651	17.41	1/31/19	11:18	4344	18.11
1/30/19	9:00	2766	17.28	1/31/19	0:00	3666	17.40	1/31/19	11:22	4348	18.01
1/30/19	9:15	2781	17.28	1/31/19	0:15	3681	17.39	1/31/19	11:26	4352	17.92
1/30/19	10:00	2826	17.32	1/31/19	0:30	3696	17.41	1/31/19	11:30	4356	17.83
1/30/19	10:15	2841	17.30	1/31/19	0:45	3711	17.40	1/31/19	11:40	4366	17.65
1/30/19	10:30	2856	17.31	1/31/19	1:00	3726	17.41	1/31/19	11:50	4376	17.48
1/30/19	10:45	2871	17.31	1/31/19	1:15	3741	17.40	1/31/19	12:00	4386	17.36
1/30/19	11:00	2886	17.31	1/31/19	1:30	3756	17.41	1/31/19	12:10	4396	17.25
1/30/19	11:15	2901	17.30	1/31/19	1:45	3771	17.41	1/31/19	12:20	4406	17.14
1/30/19	11:30	2916	17.30	1/31/19	2:00	3786	17.41	1/31/19	12:30	4416	17.04
1/30/19	11:45	2931	17.30	1/31/19	2:15	3801	17.40	1/31/19	12:40	4426	16.94
1/30/19	12:00	2946	17.31	1/31/19	2:30	3816	17.41	1/31/19	12:50	4436	16.88
1/30/19	12:15	2961	17.31	1/31/19	2:45	3831	17.41	1/31/19	13:00	4446	16.81
1/30/19	12:30	2976	17.30	1/31/19	3:00	3846	17.41	1/31/19	13:10	4456	16.75
1/30/19	12:45	2991	17.30	1/31/19	3:15	3861	17.42	1/31/19	13:20	4466	16.68
1/30/19	13:00	3006	17.30	1/31/19	3:30	3876	17.40	1/31/19	13:30	4476	16.62
1/30/19	13:15	3021	17.30	1/31/19	3:45	3891	17.41	1/31/19	14:00	4506	16.47
1/30/19	13:30	3036	17.30	1/31/19	4:00	3906	17.41	1/31/19	14:30	4536	16.32
1/30/19	13:45	3051	17.31	1/31/19	4:15	3921	17.42	1/31/19	15:00	4566	16.21
1/30/19	14:00	3066	17.30	1/31/19	4:30	3936	17.41	1/31/19	15:30	4596	16.12
1/30/19	14:15	3081	17.31	1/31/19	4:45	3951	17.42	1/31/19	16:00	4626	16.03
1/30/19	14:30	3096	17.32	1/31/19	5:00	3966	17.42	1/31/19	16:30	4656	15.97
1/30/19	14:45	3111	17.32	1/31/19	5:15	3981	17.42	1/31/19	17:00	4686	15.90
1/30/19	15:00	3126	17.33	1/31/19	5:30	3996	17.42	1/31/19	17:30	4716	15.84
1/30/19	15:15	3141	17.32	1/31/19	5:45	4011	17.42	1/31/19	18:00	4746	15.78
1/30/19	15:30	3156	17.32	1/31/19	6:00	4026	17.41	1/31/19	18:26	4772	15.74
1/30/19	15:45	3171	17.33	1/31/19	6:15	4041	17.42	1/31/19	18:28	4774	15.73
1/30/19	16:00	3186	17.33	1/31/19	6:30	4056	17.43	1/31/19	18:30	4776	15.73
1/30/19	16:15	3201	17.34	1/31/19	6:45	4071	17.43	1/31/19	18:32	4778	15.38
1/30/19	16:30	3216	17.34	1/31/19	7:00	4086	17.43	1/31/19	18:34	4780	15.11
1/30/19	16:45	3231	17.35	1/31/19	7:15	4101	17.44	1/31/19	18:36	4782	15.00
1/30/19	17:00	3246	17.35	1/31/19	7:30	4116	17.44	1/31/19	18:38	4784	14.91
1/30/19	17:15	3261	17.36	1/31/19	7:45	4131	17.43	1/31/19	18:40	4786	14.84
1/30/19	17:30	3276	17.35	1/31/19	8:00	4146	17.45	1/31/19	18:42	4788	14.78
1/30/19	17:45	3291	17.37	1/31/19	8:15	4161	17.44	1/31/19	18:44	4790	14.75
1/30/19	18:00	3306	17.38	1/31/19	8:30	4176	17.44	1/31/19	18:46	4792	14.69
1/30/19	18:15	3321	17.36	1/31/19	8:45	4191	17.44	1/31/19	18:48	4794	14.65
1/30/19	18:30	3336	17.38	1/31/19	9:00	4206	17.45	1/31/19	18:50	4796	14.62
1/30/19	18:45	3351	17.39	1/31/19	9:15	4221	18.42	1/31/19	18:52	4798	14.57
1/30/19	19:00	3366	17.38	1/31/19	9:30	4236	18.66	1/31/19	18:54	4800	14.55
1/30/19	19:15	3381	17.37	1/31/19	10:00	4266	18.97	1/31/19	18:56	4802	14.51
1/30/19	19:30	3396	17.33	1/31/19	10:10	4276	19.04	1/31/19	18:58	4804	14.48

1/31/19	19:00	4806	14.46
1/31/19	19:10	4816	14.32
1/31/19	19:20	4826	14.22
1/31/19	19:30	4836	14.12
1/31/19	19:40	4846	14.03
1/31/19	19:50	4856	13.96
1/31/19	20:00	4866	13.90
1/31/19	20:30	4896	13.71
1/31/19	21:00	4926	13.56
1/31/19	21:30	4956	13.43
1/31/19	22:00	4986	13.33
1/31/19	22:30	5016	13.23
1/31/19	23:00	5046	13.14
1/31/19	23:30	5076	13.05
2/1/19	0:00	5106	12.97
2/1/19	0:30	5136	12.90
2/1/19	1:00	5166	12.85
2/1/19	1:30	5196	12.78
2/1/19	2:00	5226	12.73
2/1/19	2:30	5256	12.67
2/1/19	3:00	5286	12.63
2/1/19	3:30	5316	12.58
2/1/19	4:00	5346	12.54
2/1/19	4:30	5376	12.50
2/1/19	5:00	5406	12.48
2/1/19	5:30	5436	12.44
2/1/19	6:00	5466	12.40
2/1/19	6:30	5496	12.38
2/1/19	7:00	5526	12.36
2/1/19	7:30	5556	12.33
2/1/19	8:00	5586	12.30
2/1/19	8:30	5616	12.29
2/1/19	9:00	5646	12.25
2/1/19	9:30	5676	12.24

Sanding Well

Date	**Time**	**Minutes**	**WL**
1/17/19	10:45	-15849	10.07
1/17/19	11:00	-15834	10.07
1/17/19	11:15	-15819	10.07
1/17/19	11:30	-15804	10.06
1/17/19	11:45	-15789	10.06
1/17/19	12:00	-15774	10.06
1/17/19	12:15	-15759	10.05
1/17/19	12:30	-15744	10.05
1/17/19	12:45	-15729	10.05
1/17/19	13:00	-15714	10.05
1/17/19	13:15	-15699	10.05
1/17/19	13:30	-15684	10.03
1/17/19	13:45	-15669	10.03
1/17/19	14:00	-15654	10.03
1/17/19	14:15	-15639	10.04
1/17/19	14:30	-15624	10.04
1/17/19	14:45	-15609	10.03
1/17/19	15:00	-15594	10.03
1/17/19	15:15	-15579	12.94
1/17/19	15:30	-15564	16.03
1/17/19	15:45	-15549	17.80
1/17/19	16:00	-15534	18.77
1/17/19	16:15	-15519	19.32
1/17/19	16:30	-15504	19.66
1/17/19	16:45	-15489	19.86
1/17/19	17:00	-15474	20.02
1/17/19	17:15	-15459	20.11
1/17/19	17:30	-15444	20.20
1/17/19	17:45	-15429	20.28
1/17/19	18:00	-15414	20.33
1/17/19	18:15	-15399	20.36
1/17/19	18:30	-15384	20.42
1/17/19	18:45	-15369	20.45
1/17/19	19:00	-15354	20.49
1/17/19	19:15	-15339	20.52
1/17/19	19:30	-15324	20.54
1/17/19	19:45	-15309	20.57
1/17/19	20:00	-15294	20.60
1/17/19	20:15	-15279	20.61
1/17/19	20:30	-15264	20.63
1/17/19	20:45	-15249	20.64
1/17/19	21:00	-15234	20.66
1/17/19	21:15	-15219	20.69
1/17/19	21:30	-15204	20.69
1/17/19	21:45	-15189	20.70
1/17/19	22:00	-15174	20.71
1/17/19	22:15	-15159	20.71
1/17/19	22:30	-15144	20.71
1/17/19	22:45	-15129	20.72
1/17/19	23:00	-15114	20.72
1/17/19	23:15	-15099	20.72
1/17/19	23:30	-15084	20.73
1/17/19	23:45	-15069	20.73
1/18/19	0:00	-15054	20.74
1/18/19	0:15	-15039	20.74
1/18/19	0:30	-15024	16.58
1/18/19	0:45	-15009	13.23
1/18/19	1:00	-14994	11.77
1/18/19	1:15	-14979	11.29
1/18/19	1:30	-14964	11.14
1/18/19	1:45	-14949	11.05
1/18/19	2:00	-14934	10.97
1/18/19	2:15	-14919	10.90
1/18/19	2:30	-14904	10.83
1/18/19	2:45	-14889	10.79
1/18/19	3:00	-14874	10.73
1/18/19	3:15	-14859	10.71
1/18/19	3:30	-14844	10.66
1/18/19	3:45	-14829	10.62
1/18/19	4:00	-14814	10.58
1/18/19	4:15	-14799	10.56
1/18/19	4:30	-14784	10.53
1/18/19	4:45	-14769	10.51
1/18/19	5:00	-14754	10.49
1/18/19	5:15	-14739	10.47
1/18/19	5:30	-14724	10.44
1/18/19	5:45	-14709	10.42
1/18/19	6:00	-14694	10.42
1/18/19	6:15	-14679	10.39
1/18/19	6:30	-14664	10.38
1/18/19	6:45	-14649	10.37
1/18/19	7:00	-14634	10.36
1/18/19	7:15	-14619	10.34
1/18/19	7:30	-14604	10.33
1/18/19	7:45	-14589	10.31
1/18/19	8:00	-14574	10.31
1/18/19	8:15	-14559	10.30
1/18/19	8:30	-14544	10.29
1/18/19	8:45	-14529	10.28
1/18/19	9:00	-14514	10.27
1/18/19	9:15	-14499	10.27
1/18/19	9:30	-14484	10.25
1/18/19	9:45	-14469	10.25
1/18/19	10:00	-14454	10.25
1/18/19	10:15	-14439	10.24
1/18/19	10:30	-14424	10.23
1/18/19	10:45	-14409	10.21
1/18/19	11:00	-14394	10.22
1/18/19	11:15	-14379	10.21
1/18/19	11:30	-14364	10.20
1/18/19	11:45	-14349	10.20
1/18/19	12:00	-14334	10.19
1/18/19	12:15	-14319	10.18
1/18/19	12:30	-14304	10.17
1/18/19	12:45	-14289	10.17
1/18/19	13:00	-14274	10.15
1/18/19	13:15	-14259	10.16
1/18/19	13:30	-14244	10.15
1/18/19	13:45	-14229	10.16
1/18/19	14:00	-14214	10.14
1/18/19	14:15	-14199	10.15
1/18/19	14:30	-14184	10.15
1/18/19	14:45	-14169	10.14
1/18/19	15:00	-14154	10.14
1/18/19	15:15	-14139	10.15
1/18/19	15:30	-14124	10.13
1/18/19	15:45	-14109	10.13
1/18/19	16:00	-14094	10.13
1/18/19	16:15	-14079	10.14
1/18/19	16:30	-14064	10.13
1/18/19	16:45	-14049	10.13
1/18/19	17:00	-14034	10.12
1/18/19	17:15	-14019	10.13
1/18/19	17:30	-14004	10.12
1/18/19	17:45	-13989	10.13
1/18/19	18:00	-13974	10.14
1/18/19	18:15	-13959	10.13
1/18/19	18:30	-13944	10.15
1/18/19	18:45	-13929	10.13
1/18/19	19:00	-13914	10.13
1/18/19	19:15	-13899	10.14
1/18/19	19:30	-13884	10.14
1/18/19	19:45	-13869	10.14
1/18/19	20:00	-13854	10.14
1/18/19	20:15	-13839	10.13
1/18/19	20:30	-13824	10.13
1/18/19	20:45	-13809	10.13

1/18/19	21:00	-13794	10.14	1/19/19	11:30	-12924	10.08	1/20/19	2:00	-12054	10.82
1/18/19	21:15	-13779	10.14	1/19/19	11:45	-12909	10.09	1/20/19	2:15	-12039	10.77
1/18/19	21:30	-13764	10.15	1/19/19	12:00	-12894	10.09	1/20/19	2:30	-12024	10.72
1/18/19	21:45	-13749	10.14	1/19/19	12:15	-12879	10.08	1/20/19	2:45	-12009	10.67
1/18/19	22:00	-13734	10.15	1/19/19	12:30	-12864	10.08	1/20/19	3:00	-11994	10.64
1/18/19	22:15	-13719	10.14	1/19/19	12:45	-12849	10.08	1/20/19	3:15	-11979	10.61
1/18/19	22:30	-13704	10.14	1/19/19	13:00	-12834	10.08	1/20/19	3:30	-11964	10.57
1/18/19	22:45	-13689	10.15	1/19/19	13:15	-12819	10.07	1/20/19	3:45	-11949	10.54
1/18/19	23:00	-13674	10.14	1/19/19	13:30	-12804	10.07	1/20/19	4:00	-11934	10.51
1/18/19	23:15	-13659	10.13	1/19/19	13:45	-12789	10.06	1/20/19	4:15	-11919	10.48
1/18/19	23:30	-13644	10.13	1/19/19	14:00	-12774	10.06	1/20/19	4:30	-11904	10.46
1/18/19	23:45	-13629	10.13	1/19/19	14:15	-12759	12.86	1/20/19	4:45	-11889	10.43
1/19/19	0:00	-13614	10.13	1/19/19	14:30	-12744	16.01	1/20/19	5:00	-11874	10.42
1/19/19	0:15	-13599	10.13	1/19/19	14:45	-12729	17.79	1/20/19	5:15	-11859	10.40
1/19/19	0:30	-13584	10.12	1/19/19	15:00	-12714	18.80	1/20/19	5:30	-11844	10.37
1/19/19	0:45	-13569	10.11	1/19/19	15:15	-12699	19.37	1/20/19	5:45	-11829	10.35
1/19/19	1:00	-13554	10.12	1/19/19	15:30	-12684	19.71	1/20/19	6:00	-11814	10.34
1/19/19	1:15	-13539	10.11	1/19/19	15:45	-12669	19.91	1/20/19	6:15	-11799	10.33
1/19/19	1:30	-13524	10.11	1/19/19	16:00	-12654	20.06	1/20/19	6:30	-11784	10.31
1/19/19	1:45	-13509	10.10	1/19/19	16:15	-12639	20.16	1/20/19	6:45	-11769	10.29
1/19/19	2:00	-13494	10.11	1/19/19	16:30	-12624	20.22	1/20/19	7:00	-11754	10.27
1/19/19	2:15	-13479	10.10	1/19/19	16:45	-12609	20.29	1/20/19	7:15	-11739	10.27
1/19/19	2:30	-13464	10.10	1/19/19	17:00	-12594	20.34	1/20/19	7:30	-11724	10.26
1/19/19	2:45	-13449	10.09	1/19/19	17:15	-12579	20.39	1/20/19	7:45	-11709	10.24
1/19/19	3:00	-13434	10.08	1/19/19	17:30	-12564	20.43	1/20/19	8:00	-11694	10.23
1/19/19	3:15	-13419	10.09	1/19/19	17:45	-12549	20.45	1/20/19	8:15	-11679	10.22
1/19/19	3:30	-13404	10.08	1/19/19	18:00	-12534	20.49	1/20/19	8:30	-11664	10.22
1/19/19	3:45	-13389	10.10	1/19/19	18:15	-12519	20.51	1/20/19	8:45	-11649	10.21
1/19/19	4:00	-13374	10.08	1/19/19	18:30	-12504	20.55	1/20/19	9:00	-11634	10.20
1/19/19	4:15	-13359	10.08	1/19/19	18:45	-12489	20.57	1/20/19	9:15	-11619	10.18
1/19/19	4:30	-13344	10.08	1/19/19	19:00	-12474	20.60	1/20/19	9:30	-11604	10.18
1/19/19	4:45	-13329	10.08	1/19/19	19:15	-12459	20.61	1/20/19	9:45	-11589	10.17
1/19/19	5:00	-13314	10.08	1/19/19	19:30	-12444	20.64	1/20/19	10:00	-11574	10.18
1/19/19	5:15	-13299	10.08	1/19/19	19:45	-12429	20.66	1/20/19	10:15	-11559	10.16
1/19/19	5:30	-13284	10.08	1/19/19	20:00	-12414	20.68	1/20/19	10:30	-11544	10.16
1/19/19	5:45	-13269	10.08	1/19/19	20:15	-12399	20.68	1/20/19	10:45	-11529	10.16
1/19/19	6:00	-13254	10.07	1/19/19	20:30	-12384	20.71	1/20/19	11:00	-11514	10.14
1/19/19	6:15	-13239	10.09	1/19/19	20:45	-12369	20.71	1/20/19	11:15	-11499	10.13
1/19/19	6:30	-13224	10.08	1/19/19	21:00	-12354	20.74	1/20/19	11:30	-11484	10.12
1/19/19	6:45	-13209	10.08	1/19/19	21:15	-12339	20.74	1/20/19	11:45	-11469	10.14
1/19/19	7:00	-13194	10.08	1/19/19	21:30	-12324	20.75	1/20/19	12:00	-11454	10.11
1/19/19	7:15	-13179	10.08	1/19/19	21:45	-12309	20.76	1/20/19	12:15	-11439	10.12
1/19/19	7:30	-13164	10.09	1/19/19	22:00	-12294	20.76	1/20/19	12:30	-11424	10.11
1/19/19	7:45	-13149	10.09	1/19/19	22:15	-12279	20.77	1/20/19	12:45	-11409	10.11
1/19/19	8:00	-13134	10.09	1/19/19	22:30	-12264	20.78	1/20/19	13:00	-11394	10.10
1/19/19	8:15	-13119	10.09	1/19/19	22:45	-12249	20.79	1/20/19	13:15	-11379	10.09
1/19/19	8:30	-13104	10.10	1/19/19	23:00	-12234	20.80	1/20/19	13:30	-11364	10.08
1/19/19	8:45	-13089	10.10	1/19/19	23:15	-12219	20.80	1/20/19	13:45	-11349	10.08
1/19/19	9:00	-13074	10.10	1/19/19	23:30	-12204	20.80	1/20/19	14:00	-11334	10.08
1/19/19	9:15	-13059	10.10	1/19/19	23:45	-12189	16.24	1/20/19	14:15	-11319	10.08
1/19/19	9:30	-13044	10.11	1/20/19	0:00	-12174	13.09	1/20/19	14:30	-11304	10.07
1/19/19	9:45	-13029	10.09	1/20/19	0:15	-12159	11.76	1/20/19	14:45	-11289	10.07
1/19/19	10:00	-13014	10.10	1/20/19	0:30	-12144	11.33	1/20/19	15:00	-11274	10.08
1/19/19	10:15	-12999	10.10	1/20/19	0:45	-12129	11.18	1/20/19	15:15	-11259	10.08
1/19/19	10:30	-12984	10.10	1/20/19	1:00	-12114	11.07	1/20/19	15:30	-11244	10.08
1/19/19	10:45	-12969	10.09	1/20/19	1:15	-12099	11.00	1/20/19	15:45	-11229	10.07
1/19/19	11:00	-12954	10.08	1/20/19	1:30	-12084	10.93	1/20/19	16:00	-11214	10.07
1/19/19	11:15	-12939	10.10	1/20/19	1:45	-12069	10.88	1/20/19	16:15	-11199	10.06

1/20/19	16:30	-11184	10.07	1/21/19	7:00	-10314	10.02	1/21/19	21:30	-9444	20.82
1/20/19	16:45	-11169	10.07	1/21/19	7:15	-10299	10.01	1/21/19	21:45	-9429	20.83
1/20/19	17:00	-11154	10.08	1/21/19	7:30	-10284	10.01	1/21/19	22:00	-9414	20.85
1/20/19	17:15	-11139	10.07	1/21/19	7:45	-10269	10.02	1/21/19	22:15	-9399	16.20
1/20/19	17:30	-11124	10.08	1/21/19	8:00	-10254	10.02	1/21/19	22:30	-9384	13.09
1/20/19	17:45	-11109	10.08	1/21/19	8:15	-10239	10.04	1/21/19	22:45	-9369	11.78
1/20/19	18:00	-11094	10.08	1/21/19	8:30	-10224	10.02	1/21/19	23:00	-9354	11.39
1/20/19	18:15	-11079	10.09	1/21/19	8:45	-10209	10.03	1/21/19	23:15	-9339	11.23
1/20/19	18:30	-11064	10.08	1/21/19	9:00	-10194	10.03	1/21/19	23:30	-9324	11.13
1/20/19	18:45	-11049	10.09	1/21/19	9:15	-10179	10.03	1/21/19	23:45	-9309	11.08
1/20/19	19:00	-11034	10.08	1/21/19	9:30	-10164	10.02	1/22/19	0:00	-9294	11.02
1/20/19	19:15	-11019	10.09	1/21/19	9:45	-10149	10.03	1/22/19	0:15	-9279	10.95
1/20/19	19:30	-11004	10.10	1/21/19	10:00	-10134	10.03	1/22/19	0:30	-9264	10.91
1/20/19	19:45	-10989	10.08	1/21/19	10:15	-10119	10.04	1/22/19	0:45	-9249	10.87
1/20/19	20:00	-10974	10.08	1/21/19	10:30	-10104	10.04	1/22/19	1:00	-9234	10.83
1/20/19	20:15	-10959	10.08	1/21/19	10:45	-10089	10.04	1/22/19	1:15	-9219	10.77
1/20/19	20:30	-10944	10.09	1/21/19	11:00	-10074	10.05	1/22/19	1:30	-9204	10.76
1/20/19	20:45	-10929	10.09	1/21/19	11:15	-10059	10.05	1/22/19	1:45	-9189	10.73
1/20/19	21:00	-10914	10.09	1/21/19	11:30	-10044	10.04	1/22/19	2:00	-9174	10.69
1/20/19	21:15	-10899	10.09	1/21/19	11:45	-10029	10.03	1/22/19	2:15	-9159	10.66
1/20/19	21:30	-10884	10.07	1/21/19	12:00	-10014	10.04	1/22/19	2:30	-9144	10.64
1/20/19	21:45	-10869	10.10	1/21/19	12:15	-9999	10.05	1/22/19	2:45	-9129	10.62
1/20/19	22:00	-10854	10.09	1/21/19	12:30	-9984	10.07	1/22/19	3:00	-9114	10.60
1/20/19	22:15	-10839	10.08	1/21/19	12:45	-9969	10.03	1/22/19	3:15	-9099	10.56
1/20/19	22:30	-10824	10.09	1/21/19	13:00	-9954	11.97	1/22/19	3:30	-9084	10.55
1/20/19	22:45	-10809	10.09	1/21/19	13:15	-9939	15.50	1/22/19	3:45	-9069	10.52
1/20/19	23:00	-10794	10.08	1/21/19	13:30	-9924	17.49	1/22/19	4:00	-9054	10.51
1/20/19	23:15	-10779	10.08	1/21/19	13:45	-9909	18.64	1/22/19	4:15	-9039	10.49
1/20/19	23:30	-10764	10.08	1/21/19	14:00	-9894	19.26	1/22/19	4:30	-9024	10.47
1/20/19	23:45	-10749	10.08	1/21/19	14:15	-9879	19.64	1/22/19	4:45	-9009	10.46
1/21/19	0:00	-10734	10.07	1/21/19	14:30	-9864	19.85	1/22/19	5:00	-8994	10.44
1/21/19	0:15	-10719	10.07	1/21/19	14:45	-9849	19.99	1/22/19	5:15	-8979	10.43
1/21/19	0:30	-10704	10.07	1/21/19	15:00	-9834	20.10	1/22/19	5:30	-8964	10.41
1/21/19	0:45	-10689	10.06	1/21/19	15:15	-9819	20.16	1/22/19	5:45	-8949	10.41
1/21/19	1:00	-10674	10.06	1/21/19	15:30	-9804	20.23	1/22/19	6:00	-8934	10.39
1/21/19	1:15	-10659	10.08	1/21/19	15:45	-9789	20.28	1/22/19	6:15	-8919	10.38
1/21/19	1:30	-10644	10.06	1/21/19	16:00	-9774	20.32	1/22/19	6:30	-8904	10.36
1/21/19	1:45	-10629	10.07	1/21/19	16:15	-9759	20.38	1/22/19	6:45	-8889	10.36
1/21/19	2:00	-10614	10.06	1/21/19	16:30	-9744	20.40	1/22/19	7:00	-8874	10.35
1/21/19	2:15	-10599	10.06	1/21/19	16:45	-9729	20.43	1/22/19	7:15	-8859	10.35
1/21/19	2:30	-10584	10.03	1/21/19	17:00	-9714	20.48	1/22/19	7:30	-8844	10.35
1/21/19	2:45	-10569	10.05	1/21/19	17:15	-9699	20.51	1/22/19	7:45	-8829	10.34
1/21/19	3:00	-10554	10.05	1/21/19	17:30	-9684	20.53	1/22/19	8:00	-8814	10.32
1/21/19	3:15	-10539	10.05	1/21/19	17:45	-9669	20.55	1/22/19	8:15	-8799	10.32
1/21/19	3:30	-10524	10.04	1/21/19	18:00	-9654	20.60	1/22/19	8:30	-8784	10.31
1/21/19	3:45	-10509	10.06	1/21/19	18:15	-9639	20.62	1/22/19	8:45	-8769	10.30
1/21/19	4:00	-10494	10.04	1/21/19	18:30	-9624	20.64	1/22/19	9:00	-8754	10.29
1/21/19	4:15	-10479	10.05	1/21/19	18:45	-9609	20.67	1/22/19	9:15	-8739	10.29
1/21/19	4:30	-10464	10.03	1/21/19	19:00	-9594	20.67	1/22/19	9:30	-8724	10.28
1/21/19	4:45	-10449	10.03	1/21/19	19:15	-9579	20.70	1/22/19	9:45	-8709	10.29
1/21/19	5:00	-10434	10.03	1/21/19	19:30	-9564	20.70	1/22/19	10:00	-8694	10.27
1/21/19	5:15	-10419	10.03	1/21/19	19:45	-9549	20.73	1/22/19	10:15	-8679	10.27
1/21/19	5:30	-10404	10.03	1/21/19	20:00	-9534	20.76	1/22/19	10:30	-8664	10.26
1/21/19	5:45	-10389	10.03	1/21/19	20:15	-9519	20.78	1/22/19	10:45	-8649	10.25
1/21/19	6:00	-10374	10.03	1/21/19	20:30	-9504	20.78	1/22/19	11:00	-8634	10.26
1/21/19	6:15	-10359	10.02	1/21/19	20:45	-9489	20.78	1/22/19	11:15	-8619	10.25
1/21/19	6:30	-10344	10.03	1/21/19	21:00	-9474	20.79	1/22/19	11:30	-8604	10.24
1/21/19	6:45	-10329	10.02	1/21/19	21:15	-9459	20.81	1/22/19	11:45	-8589	10.25

1/22/19	12:00	-8574	10.25	1/23/19	2:30	-7704	10.11	1/23/19	17:00	-6834	20.82
1/22/19	12:15	-8559	10.24	1/23/19	2:45	-7689	10.10	1/23/19	17:15	-6819	20.83
1/22/19	12:30	-8544	10.23	1/23/19	3:00	-7674	10.10	1/23/19	17:30	-6804	20.84
1/22/19	12:45	-8529	10.25	1/23/19	3:15	-7659	10.10	1/23/19	17:45	-6789	20.84
1/22/19	13:00	-8514	10.24	1/23/19	3:30	-7644	10.08	1/23/19	18:00	-6774	20.85
1/22/19	13:15	-8499	10.23	1/23/19	3:45	-7629	10.09	1/23/19	18:15	-6759	20.85
1/22/19	13:30	-8484	10.22	1/23/19	4:00	-7614	10.08	1/23/19	18:30	-6744	20.86
1/22/19	13:45	-8469	10.22	1/23/19	4:15	-7599	10.09	1/23/19	18:45	-6729	20.88
1/22/19	14:00	-8454	10.22	1/23/19	4:30	-7584	10.08	1/23/19	19:00	-6714	20.90
1/22/19	14:15	-8439	10.21	1/23/19	4:45	-7569	10.08	1/23/19	19:15	-6699	20.91
1/22/19	14:30	-8424	10.20	1/23/19	5:00	-7554	10.08	1/23/19	19:30	-6684	20.91
1/22/19	14:45	-8409	10.20	1/23/19	5:15	-7539	10.06	1/23/19	19:45	-6669	20.91
1/22/19	15:00	-8394	10.21	1/23/19	5:30	-7524	10.06	1/23/19	20:00	-6654	20.90
1/22/19	15:15	-8379	10.21	1/23/19	5:45	-7509	10.06	1/23/19	20:15	-6639	19.07
1/22/19	15:30	-8364	10.20	1/23/19	6:00	-7494	10.06	1/23/19	20:30	-6624	14.55
1/22/19	15:45	-8349	10.20	1/23/19	6:15	-7479	10.06	1/23/19	20:45	-6609	12.33
1/22/19	16:00	-8334	10.19	1/23/19	6:30	-7464	10.05	1/23/19	21:00	-6594	11.51
1/22/19	16:15	-8319	10.19	1/23/19	6:45	-7449	10.06	1/23/19	21:15	-6579	11.27
1/22/19	16:30	-8304	10.19	1/23/19	7:00	-7434	10.06	1/23/19	21:30	-6564	11.16
1/22/19	16:45	-8289	10.18	1/23/19	7:15	-7419	10.07	1/23/19	21:45	-6549	11.07
1/22/19	17:00	-8274	10.18	1/23/19	7:30	-7404	10.06	1/23/19	22:00	-6534	10.99
1/22/19	17:15	-8259	10.18	1/23/19	7:45	-7389	10.05	1/23/19	22:15	-6519	10.94
1/22/19	17:30	-8244	10.18	1/23/19	8:00	-7374	10.05	1/23/19	22:30	-6504	10.87
1/22/19	17:45	-8229	10.17	1/23/19	8:15	-7359	10.05	1/23/19	22:45	-6489	10.84
1/22/19	18:00	-8214	10.17	1/23/19	8:30	-7344	10.05	1/23/19	23:00	-6474	10.80
1/22/19	18:15	-8199	10.17	1/23/19	8:45	-7329	10.06	1/23/19	23:15	-6459	10.76
1/22/19	18:30	-8184	10.16	1/23/19	9:00	-7314	10.06	1/23/19	23:30	-6444	10.71
1/22/19	18:45	-8169	10.16	1/23/19	9:15	-7299	10.06	1/23/19	23:45	-6429	10.70
1/22/19	19:00	-8154	10.15	1/23/19	9:30	-7284	10.05	1/24/19	0:00	-6414	10.65
1/22/19	19:15	-8139	10.16	1/23/19	9:45	-7269	10.06	1/24/19	0:15	-6399	10.63
1/22/19	19:30	-8124	10.15	1/23/19	10:00	-7254	13.81	1/24/19	0:30	-6384	10.61
1/22/19	19:45	-8109	10.16	1/23/19	10:15	-7239	16.54	1/24/19	0:45	-6369	10.58
1/22/19	20:00	-8094	10.16	1/23/19	10:30	-7224	18.10	1/24/19	1:00	-6354	10.55
1/22/19	20:15	-8079	10.16	1/23/19	10:45	-7209	18.97	1/24/19	1:15	-6339	10.53
1/22/19	20:30	-8064	10.16	1/23/19	11:00	-7194	19.48	1/24/19	1:30	-6324	10.51
1/22/19	20:45	-8049	10.15	1/23/19	11:15	-7179	19.76	1/24/19	1:45	-6309	10.50
1/22/19	21:00	-8034	10.15	1/23/19	11:30	-7164	19.95	1/24/19	2:00	-6294	10.47
1/22/19	21:15	-8019	10.15	1/23/19	11:45	-7149	20.08	1/24/19	2:15	-6279	10.45
1/22/19	21:30	-8004	10.15	1/23/19	12:00	-7134	20.16	1/24/19	2:30	-6264	10.44
1/22/19	21:45	-7989	10.15	1/23/19	12:15	-7119	20.22	1/24/19	2:45	-6249	10.42
1/22/19	22:00	-7974	10.14	1/23/19	12:30	-7104	20.30	1/24/19	3:00	-6234	10.41
1/22/19	22:15	-7959	10.14	1/23/19	12:45	-7089	20.35	1/24/19	3:15	-6219	10.40
1/22/19	22:30	-7944	10.14	1/23/19	13:00	-7074	20.39	1/24/19	3:30	-6204	10.38
1/22/19	22:45	-7929	10.14	1/23/19	13:15	-7059	20.43	1/24/19	3:45	-6189	10.35
1/22/19	23:00	-7914	10.13	1/23/19	13:30	-7044	20.48	1/24/19	4:00	-6174	10.34
1/22/19	23:15	-7899	10.13	1/23/19	13:45	-7029	20.53	1/24/19	4:15	-6159	10.32
1/22/19	23:30	-7884	10.13	1/23/19	14:00	-7014	20.56	1/24/19	4:30	-6144	10.30
1/22/19	23:45	-7869	10.13	1/23/19	14:15	-6999	20.59	1/24/19	4:45	-6129	10.30
1/23/19	0:00	-7854	10.12	1/23/19	14:30	-6984	20.62	1/24/19	5:00	-6114	10.28
1/23/19	0:15	-7839	10.12	1/23/19	14:45	-6969	20.66	1/24/19	5:15	-6099	10.27
1/23/19	0:30	-7824	10.12	1/23/19	15:00	-6954	20.68	1/24/19	5:30	-6084	10.25
1/23/19	0:45	-7809	10.12	1/23/19	15:15	-6939	20.71	1/24/19	5:45	-6069	10.23
1/23/19	1:00	-7794	10.12	1/23/19	15:30	-6924	20.73	1/24/19	6:00	-6054	10.21
1/23/19	1:15	-7779	10.13	1/23/19	15:45	-6909	20.76	1/24/19	6:15	-6039	10.21
1/23/19	1:30	-7764	10.13	1/23/19	16:00	-6894	20.76	1/24/19	6:30	-6024	10.19
1/23/19	1:45	-7749	10.12	1/23/19	16:15	-6879	20.77	1/24/19	6:45	-6009	10.19
1/23/19	2:00	-7734	10.11	1/23/19	16:30	-6864	20.79	1/24/19	7:00	-5994	10.17
1/23/19	2:15	-7719	10.11	1/23/19	16:45	-6849	20.81	1/24/19	7:15	-5979	10.15

1/24/19	7:30	-5964	10.15	1/24/19	22:00	-5094	9.70	1/25/19	12:30	-4224	20.32
1/24/19	7:45	-5949	10.13	1/24/19	22:15	-5079	9.70	1/25/19	12:45	-4209	20.35
1/24/19	8:00	-5934	10.11	1/24/19	22:30	-5064	9.69	1/25/19	13:00	-4194	20.36
1/24/19	8:15	-5919	10.10	1/24/19	22:45	-5049	9.70	1/25/19	13:15	-4179	20.38
1/24/19	8:30	-5904	10.10	1/24/19	23:00	-5034	9.69	1/25/19	13:30	-4164	20.40
1/24/19	8:45	-5889	10.08	1/24/19	23:15	-5019	9.68	1/25/19	13:45	-4149	20.40
1/24/19	9:00	-5874	10.08	1/24/19	23:30	-5004	9.69	1/25/19	14:00	-4134	20.41
1/24/19	9:15	-5859	10.06	1/24/19	23:45	-4989	9.68	1/25/19	14:15	-4119	20.42
1/24/19	9:30	-5844	10.04	1/25/19	0:00	-4974	9.68	1/25/19	14:30	-4104	20.43
1/24/19	9:45	-5829	10.05	1/25/19	0:15	-4959	9.68	1/25/19	14:45	-4089	20.12
1/24/19	10:00	-5814	10.02	1/25/19	0:30	-4944	9.68	1/25/19	15:00	-4074	14.94
1/24/19	10:15	-5799	10.01	1/25/19	0:45	-4929	9.68	1/25/19	15:15	-4059	12.26
1/24/19	10:30	-5784	10.01	1/25/19	1:00	-4914	9.67	1/25/19	15:30	-4044	11.19
1/24/19	10:45	-5769	10.01	1/25/19	1:15	-4899	9.67	1/25/19	15:45	-4029	10.87
1/24/19	11:00	-5754	10.01	1/25/19	1:30	-4884	9.67	1/25/19	16:00	-4014	10.76
1/24/19	11:15	-5739	10.00	1/25/19	1:45	-4869	9.67	1/25/19	16:15	-3999	10.67
1/24/19	11:30	-5724	9.99	1/25/19	2:00	-4854	9.68	1/25/19	16:30	-3984	10.59
1/24/19	11:45	-5709	9.99	1/25/19	2:15	-4839	9.66	1/25/19	16:45	-3969	10.54
1/24/19	12:00	-5694	9.96	1/25/19	2:30	-4824	9.67	1/25/19	17:00	-3954	10.48
1/24/19	12:15	-5679	9.95	1/25/19	2:45	-4809	9.66	1/25/19	17:15	-3939	10.43
1/24/19	12:30	-5664	9.94	1/25/19	3:00	-4794	9.66	1/25/19	17:30	-3924	10.38
1/24/19	12:45	-5649	9.93	1/25/19	3:15	-4779	9.66	1/25/19	17:45	-3909	10.35
1/24/19	13:00	-5634	9.92	1/25/19	3:30	-4764	9.66	1/25/19	18:00	-3894	10.31
1/24/19	13:15	-5619	9.93	1/25/19	3:45	-4749	9.65	1/25/19	18:15	-3879	10.28
1/24/19	13:30	-5604	9.93	1/25/19	4:00	-4734	9.64	1/25/19	18:30	-3864	10.27
1/24/19	13:45	-5589	9.92	1/25/19	4:15	-4719	9.65	1/25/19	18:45	-3849	10.23
1/24/19	14:00	-5574	9.91	1/25/19	4:30	-4704	9.65	1/25/19	19:00	-3834	10.20
1/24/19	14:15	-5559	9.91	1/25/19	4:45	-4689	9.64	1/25/19	19:15	-3819	10.17
1/24/19	14:30	-5544	9.89	1/25/19	5:00	-4674	9.64	1/25/19	19:30	-3804	10.16
1/24/19	14:45	-5529	9.88	1/25/19	5:15	-4659	9.64	1/25/19	19:45	-3789	10.14
1/24/19	15:00	-5514	9.88	1/25/19	5:30	-4644	11.96	1/25/19	20:00	-3774	10.12
1/24/19	15:15	-5499	9.87	1/25/19	5:45	-4629	15.33	1/25/19	20:15	-3759	10.10
1/24/19	15:30	-5484	9.86	1/25/19	6:00	-4614	17.23	1/25/19	20:30	-3744	10.09
1/24/19	15:45	-5469	9.84	1/25/19	6:15	-4599	18.32	1/25/19	20:45	-3729	10.06
1/24/19	16:00	-5454	9.83	1/25/19	6:30	-4584	18.92	1/25/19	21:00	-3714	10.05
1/24/19	16:15	-5439	9.82	1/25/19	6:45	-4569	19.27	1/25/19	21:15	-3699	10.04
1/24/19	16:30	-5424	9.82	1/25/19	7:00	-4554	19.50	1/25/19	21:30	-3684	10.02
1/24/19	16:45	-5409	9.81	1/25/19	7:15	-4539	19.64	1/25/19	21:45	-3669	10.02
1/24/19	17:00	-5394	9.80	1/25/19	7:30	-4524	19.74	1/25/19	22:00	-3654	10.01
1/24/19	17:15	-5379	9.79	1/25/19	7:45	-4509	19.82	1/25/19	22:15	-3639	9.98
1/24/19	17:30	-5364	9.77	1/25/19	8:00	-4494	19.88	1/25/19	22:30	-3624	9.99
1/24/19	17:45	-5349	9.78	1/25/19	8:15	-4479	19.92	1/25/19	22:45	-3609	9.97
1/24/19	18:00	-5334	9.76	1/25/19	8:30	-4464	19.98	1/25/19	23:00	-3594	9.96
1/24/19	18:15	-5319	9.77	1/25/19	8:45	-4449	20.03	1/25/19	23:15	-3579	9.95
1/24/19	18:30	-5304	9.76	1/25/19	9:00	-4434	20.05	1/25/19	23:30	-3564	9.95
1/24/19	18:45	-5289	9.76	1/25/19	9:15	-4419	20.09	1/25/19	23:45	-3549	9.94
1/24/19	19:00	-5274	9.75	1/25/19	9:30	-4404	20.11	1/26/19	0:00	-3534	9.93
1/24/19	19:15	-5259	9.74	1/25/19	9:45	-4389	20.16	1/26/19	0:15	-3519	9.92
1/24/19	19:30	-5244	9.74	1/25/19	10:00	-4374	20.17	1/26/19	0:30	-3504	9.92
1/24/19	19:45	-5229	9.74	1/25/19	10:15	-4359	20.19	1/26/19	0:45	-3489	9.91
1/24/19	20:00	-5214	9.72	1/25/19	10:30	-4344	20.21	1/26/19	1:00	-3474	9.91
1/24/19	20:15	-5199	9.72	1/25/19	10:45	-4329	20.24	1/26/19	1:15	-3459	9.90
1/24/19	20:30	-5184	9.72	1/25/19	11:00	-4314	20.25	1/26/19	1:30	-3444	9.90
1/24/19	20:45	-5169	9.70	1/25/19	11:15	-4299	20.28	1/26/19	1:45	-3429	9.89
1/24/19	21:00	-5154	9.71	1/25/19	11:30	-4284	20.29	1/26/19	2:00	-3414	9.90
1/24/19	21:15	-5139	9.71	1/25/19	11:45	-4269	20.31	1/26/19	2:15	-3399	9.89
1/24/19	21:30	-5124	9.71	1/25/19	12:00	-4254	20.32	1/26/19	2:30	-3384	9.88
1/24/19	21:45	-5109	9.70	1/25/19	12:15	-4239	20.33	1/26/19	2:45	-3369	9.87

1/26/19	3:00	-3354	9.87	1/26/19	17:30	-2484	9.71	1/27/19	8:00	-1614	19.69
1/26/19	3:15	-3339	9.87	1/26/19	17:45	-2469	9.70	1/27/19	8:15	-1599	19.76
1/26/19	3:30	-3324	9.86	1/26/19	18:00	-2454	9.70	1/27/19	8:30	-1584	19.81
1/26/19	3:45	-3309	9.86	1/26/19	18:15	-2439	9.69	1/27/19	8:45	-1569	19.87
1/26/19	4:00	-3294	9.86	1/26/19	18:30	-2424	9.69	1/27/19	9:00	-1554	19.91
1/26/19	4:15	-3279	9.85	1/26/19	18:45	-2409	9.70	1/27/19	9:15	-1539	19.95
1/26/19	4:30	-3264	9.85	1/26/19	19:00	-2394	9.70	1/27/19	9:30	-1524	19.98
1/26/19	4:45	-3249	9.83	1/26/19	19:15	-2379	9.68	1/27/19	9:45	-1509	20.00
1/26/19	5:00	-3234	9.84	1/26/19	19:30	-2364	9.67	1/27/19	10:00	-1494	20.03
1/26/19	5:15	-3219	9.83	1/26/19	19:45	-2349	9.68	1/27/19	10:15	-1479	20.04
1/26/19	5:30	-3204	9.83	1/26/19	20:00	-2334	9.67	1/27/19	10:30	-1464	20.09
1/26/19	5:45	-3189	9.81	1/26/19	20:15	-2319	9.67	1/27/19	10:45	-1449	20.11
1/26/19	6:00	-3174	9.81	1/26/19	20:30	-2304	9.66	1/27/19	11:00	-1434	20.13
1/26/19	6:15	-3159	9.80	1/26/19	20:45	-2289	9.65	1/27/19	11:15	-1419	20.15
1/26/19	6:30	-3144	9.80	1/26/19	21:00	-2274	9.66	1/27/19	11:30	-1404	20.18
1/26/19	6:45	-3129	9.81	1/26/19	21:15	-2259	9.65	1/27/19	11:45	-1389	20.19
1/26/19	7:00	-3114	9.81	1/26/19	21:30	-2244	9.65	1/27/19	12:00	-1374	20.20
1/26/19	7:15	-3099	9.80	1/26/19	21:45	-2229	9.64	1/27/19	12:15	-1359	20.22
1/26/19	7:30	-3084	9.80	1/26/19	22:00	-2214	9.65	1/27/19	12:30	-1344	20.22
1/26/19	7:45	-3069	9.80	1/26/19	22:15	-2199	9.65	1/27/19	12:45	-1329	20.24
1/26/19	8:00	-3054	9.79	1/26/19	22:30	-2184	9.64	1/27/19	13:00	-1314	20.25
1/26/19	8:15	-3039	9.79	1/26/19	22:45	-2169	9.63	1/27/19	13:15	-1299	20.26
1/26/19	8:30	-3024	9.78	1/26/19	23:00	-2154	9.64	1/27/19	13:30	-1284	20.27
1/26/19	8:45	-3009	9.78	1/26/19	23:15	-2139	9.63	1/27/19	13:45	-1269	20.28
1/26/19	9:00	-2994	9.78	1/26/19	23:30	-2124	9.64	1/27/19	14:00	-1254	20.29
1/26/19	9:15	-2979	9.78	1/26/19	23:45	-2109	9.63	1/27/19	14:15	-1239	20.31
1/26/19	9:30	-2964	9.78	1/27/19	0:00	-2094	9.63	1/27/19	14:30	-1224	20.33
1/26/19	9:45	-2949	9.77	1/27/19	0:15	-2079	9.62	1/27/19	14:45	-1209	20.31
1/26/19	10:00	-2934	9.77	1/27/19	0:30	-2064	9.62	1/27/19	15:00	-1194	20.33
1/26/19	10:15	-2919	9.77	1/27/19	0:45	-2049	9.62	1/27/19	15:15	-1179	20.18
1/26/19	10:30	-2904	9.77	1/27/19	1:00	-2034	9.61	1/27/19	15:30	-1164	14.96
1/26/19	10:45	-2889	9.76	1/27/19	1:15	-2019	9.61	1/27/19	15:45	-1149	12.22
1/26/19	11:00	-2874	9.75	1/27/19	1:30	-2004	9.61	1/27/19	16:00	-1134	11.12
1/26/19	11:15	-2859	9.75	1/27/19	1:45	-1989	9.60	1/27/19	16:15	-1119	10.81
1/26/19	11:30	-2844	9.76	1/27/19	2:00	-1974	9.61	1/27/19	16:30	-1104	10.71
1/26/19	11:45	-2829	9.75	1/27/19	2:15	-1959	9.59	1/27/19	16:45	-1089	10.63
1/26/19	12:00	-2814	9.75	1/27/19	2:30	-1944	9.60	1/27/19	17:00	-1074	10.55
1/26/19	12:15	-2799	9.74	1/27/19	2:45	-1929	9.60	1/27/19	17:15	-1059	10.49
1/26/19	12:30	-2784	9.75	1/27/19	3:00	-1914	9.60	1/27/19	17:30	-1044	10.44
1/26/19	12:45	-2769	9.74	1/27/19	3:15	-1899	9.59	1/27/19	17:45	-1029	10.37
1/26/19	13:00	-2754	9.75	1/27/19	3:30	-1884	9.59	1/27/19	18:00	-1014	10.40
1/26/19	13:15	-2739	9.76	1/27/19	3:45	-1869	9.58	1/27/19	18:15	-999	10.37
1/26/19	13:30	-2724	9.75	1/27/19	4:00	-1854	9.58	1/27/19	18:30	-984	10.26
1/26/19	13:45	-2709	9.74	1/27/19	4:15	-1839	9.58	1/27/19	18:45	-969	10.20
1/26/19	14:00	-2694	9.74	1/27/19	4:30	-1824	9.59	1/27/19	19:00	-954	10.19
1/26/19	14:15	-2679	9.74	1/27/19	4:45	-1809	9.58	1/27/19	19:15	-939	10.16
1/26/19	14:30	-2664	9.73	1/27/19	5:00	-1794	9.57	1/27/19	19:30	-924	10.15
1/26/19	14:45	-2649	9.73	1/27/19	5:15	-1779	9.58	1/27/19	19:45	-909	10.15
1/26/19	15:00	-2634	9.73	1/27/19	5:30	-1764	9.58	1/27/19	20:00	-894	10.13
1/26/19	15:15	-2619	9.73	1/27/19	5:45	-1749	9.57	1/27/19	20:15	-879	10.12
1/26/19	15:30	-2604	9.73	1/27/19	6:00	-1734	13.14	1/27/19	20:30	-864	10.10
1/26/19	15:45	-2589	9.72	1/27/19	6:15	-1719	15.97	1/27/19	20:45	-849	10.08
1/26/19	16:00	-2574	9.72	1/27/19	6:30	-1704	17.55	1/27/19	21:00	-834	10.06
1/26/19	16:15	-2559	9.72	1/27/19	6:45	-1689	18.45	1/27/19	21:15	-819	10.05
1/26/19	16:30	-2544	9.72	1/27/19	7:00	-1674	18.96	1/27/19	21:30	-804	10.03
1/26/19	16:45	-2529	9.72	1/27/19	7:15	-1659	19.27	1/27/19	21:45	-789	10.02
1/26/19	17:00	-2514	9.71	1/27/19	7:30	-1644	19.46	1/27/19	22:00	-774	10.00
1/26/19	17:15	-2499	9.70	1/27/19	7:45	-1629	19.60	1/27/19	22:15	-759	10.00

1/27/19	22:30	-744	9.99	1/28/19	11:26	32	11.06	1/29/19	0:30	816	14.51
1/27/19	22:45	-729	9.97	1/28/19	11:30	36	11.17	1/29/19	0:45	831	14.52
1/27/19	23:00	-714	9.96	1/28/19	11:34	40	11.27	1/29/19	1:00	846	14.53
1/27/19	23:15	-699	9.95	1/28/19	11:38	44	11.38	1/29/19	1:15	861	14.55
1/27/19	23:30	-684	9.94	1/28/19	11:42	48	11.47	1/29/19	1:30	876	14.57
1/27/19	23:45	-669	9.93	1/28/19	11:46	52	11.54	1/29/19	1:45	891	14.58
1/28/19	0:00	-654	9.91	1/28/19	11:50	56	11.62	1/29/19	2:00	906	14.58
1/28/19	0:15	-639	9.90	1/28/19	11:54	60	11.69	1/29/19	2:15	921	14.61
1/28/19	0:30	-624	9.91	1/28/19	12:00	66	11.80	1/29/19	2:30	936	14.61
1/28/19	0:45	-609	9.89	1/28/19	12:14	80	11.99	1/29/19	2:45	951	14.64
1/28/19	1:00	-594	9.89	1/28/19	12:30	96	12.20	1/29/19	3:00	966	14.64
1/28/19	1:15	-579	9.89	1/28/19	12:44	110	12.36	1/29/19	3:15	981	14.65
1/28/19	1:30	-564	9.88	1/28/19	13:00	126	12.50	1/29/19	3:30	996	14.67
1/28/19	1:45	-549	9.88	1/28/19	13:14	140	12.62	1/29/19	3:45	1011	14.68
1/28/19	2:00	-534	9.86	1/28/19	13:30	156	12.75	1/29/19	4:00	1026	14.69
1/28/19	2:15	-519	9.87	1/28/19	13:44	170	12.87	1/29/19	4:15	1041	14.70
1/28/19	2:30	-504	9.86	1/28/19	14:00	186	12.94	1/29/19	4:30	1056	14.72
1/28/19	2:45	-489	9.86	1/28/19	14:14	200	13.04	1/29/19	4:45	1071	14.72
1/28/19	3:00	-474	9.85	1/28/19	14:30	216	13.14	1/29/19	5:00	1086	14.72
1/28/19	3:15	-459	9.84	1/28/19	14:44	230	13.21	1/29/19	5:15	1101	14.75
1/28/19	3:30	-444	9.83	1/28/19	15:00	246	13.28	1/29/19	5:30	1116	14.74
1/28/19	3:45	-429	9.83	1/28/19	15:14	260	13.35	1/29/19	5:45	1131	14.75
1/28/19	4:00	-414	9.83	1/28/19	15:24	270	13.39	1/29/19	6:00	1146	14.77
1/28/19	4:15	-399	9.83	1/28/19	15:45	291	13.47	1/29/19	6:15	1161	14.77
1/28/19	4:30	-384	9.82	1/28/19	16:00	306	13.54	1/29/19	6:30	1176	14.79
1/28/19	4:45	-369	9.83	1/28/19	16:15	321	13.59	1/29/19	6:45	1191	14.79
1/28/19	5:00	-354	9.81	1/28/19	16:30	336	13.65	1/29/19	7:00	1206	14.81
1/28/19	5:15	-339	9.82	1/28/19	16:45	351	13.69	1/29/19	7:15	1221	14.81
1/28/19	5:30	-324	9.82	1/28/19	17:00	366	13.74	1/29/19	7:30	1236	15.32
1/28/19	5:45	-309	9.81	1/28/19	17:15	381	13.80	1/29/19	7:45	1251	19.32
1/28/19	6:00	-294	9.81	1/28/19	17:30	396	13.83	1/29/19	8:00	1266	21.62
1/28/19	6:15	-279	9.82	1/28/19	17:45	411	13.88	1/29/19	8:15	1281	22.87
1/28/19	6:30	-264	9.81	1/28/19	18:00	426	13.91	1/29/19	8:30	1296	23.57
1/28/19	6:45	-249	9.81	1/28/19	18:15	441	13.95	1/29/19	8:45	1311	23.97
1/28/19	7:00	-234	9.81	1/28/19	18:30	456	13.98	1/29/19	9:00	1326	24.22
1/28/19	7:15	-219	9.81	1/28/19	18:45	471	14.01	1/29/19	9:15	1341	24.38
1/28/19	7:30	-204	9.80	1/28/19	19:00	486	14.05	1/29/19	9:30	1356	24.48
1/28/19	7:45	-189	9.80	1/28/19	19:15	501	14.08	1/29/19	9:45	1371	24.56
1/28/19	8:00	-174	9.81	1/28/19	19:30	516	14.11	1/29/19	10:00	1386	24.64
1/28/19	8:15	-159	9.79	1/28/19	19:45	531	14.15	1/29/19	10:15	1401	24.71
1/28/19	8:30	-144	9.81	1/28/19	20:00	546	14.17	1/29/19	10:30	1416	24.76
1/28/19	9:02	-112	9.81	1/28/19	20:15	561	14.20	1/29/19	10:45	1431	24.82
1/28/19	9:30	-84	9.81	1/28/19	20:30	576	14.22	1/29/19	11:00	1446	24.84
1/28/19	10:00	-54	9.80	1/28/19	20:45	591	14.25	1/29/19	11:15	1461	24.88
1/28/19	10:30	-24	9.80	1/28/19	21:00	606	14.27	1/29/19	11:30	1476	24.92
1/28/19	10:54	0	9.86	1/28/19	21:15	621	14.30	1/29/19	11:45	1491	24.95
1/28/19	10:56	2	9.86	1/28/19	21:30	636	14.31	1/29/19	12:00	1506	24.97
1/28/19	10:58	4	9.92	1/28/19	21:45	651	14.34	1/29/19	12:15	1521	25.00
1/28/19	11:00	6	10.00	1/28/19	22:00	666	14.35	1/29/19	12:30	1536	25.02
1/28/19	11:02	8	10.08	1/28/19	22:15	681	14.36	1/29/19	12:45	1551	25.04
1/28/19	11:04	10	10.18	1/28/19	22:30	696	14.39	1/29/19	13:00	1566	25.08
1/28/19	11:06	12	10.28	1/28/19	22:45	711	14.40	1/29/19	13:15	1581	25.11
1/28/19	11:08	14	10.37	1/28/19	23:00	726	14.42	1/29/19	13:30	1596	25.12
1/28/19	11:10	16	10.45	1/28/19	23:15	741	14.43	1/29/19	13:45	1611	25.14
1/28/19	11:12	18	10.54	1/28/19	23:30	756	14.45	1/29/19	14:00	1626	25.16
1/28/19	11:14	20	10.63	1/28/19	23:45	771	14.47	1/29/19	14:15	1641	25.17
1/28/19	11:18	24	10.77	1/29/19	0:00	786	14.49	1/29/19	14:30	1656	25.18
1/28/19	11:22	28	10.92	1/29/19	0:15	801	14.51	1/29/19	14:45	1671	25.21

1/29/19	15:00	1686	25.22	1/30/19	5:30	2556	15.45	1/30/19	20:30	3456	15.51
1/29/19	15:15	1701	25.24	1/30/19	5:45	2571	15.44	1/30/19	20:45	3471	15.53
1/29/19	15:30	1716	25.27	1/30/19	6:00	2586	15.44	1/30/19	21:00	3486	15.53
1/29/19	15:45	1731	25.27	1/30/19	6:15	2601	15.45	1/30/19	21:15	3501	15.54
1/29/19	16:00	1746	25.29	1/30/19	6:30	2616	15.44	1/30/19	21:30	3516	15.54
1/29/19	16:15	1761	25.30	1/30/19	6:45	2631	15.44	1/30/19	21:45	3531	15.54
1/29/19	16:30	1776	25.31	1/30/19	7:00	2646	15.43	1/30/19	22:00	3546	15.55
1/29/19	16:45	1791	25.32	1/30/19	7:15	2661	15.44	1/30/19	22:15	3561	15.54
1/29/19	17:00	1806	25.33	1/30/19	7:30	2676	15.43	1/30/19	22:30	3576	15.54
1/29/19	17:15	1821	21.18	1/30/19	7:45	2691	15.44	1/30/19	22:45	3591	15.55
1/29/19	17:30	1836	18.00	1/30/19	8:00	2706	15.44	1/30/19	23:00	3606	15.54
1/29/19	17:45	1851	16.71	1/30/19	8:15	2721	15.43	1/30/19	23:15	3621	15.55
1/29/19	18:00	1866	16.33	1/30/19	8:30	2736	15.44	1/30/19	23:30	3636	15.56
1/29/19	18:15	1881	16.20	1/30/19	8:45	2751	15.44	1/30/19	23:45	3651	15.55
1/29/19	18:30	1896	16.12	1/30/19	9:00	2766	15.44	1/31/19	0:00	3666	15.54
1/29/19	18:45	1911	16.04	1/30/19	9:15	2781	15.44	1/31/19	0:15	3681	15.54
1/29/19	19:00	1926	15.99	1/30/19	10:00	2826	15.46	1/31/19	0:30	3696	15.55
1/29/19	19:15	1941	15.94	1/30/19	10:15	2841	15.44	1/31/19	0:45	3711	15.55
1/29/19	19:30	1956	15.89	1/30/19	10:30	2856	15.46	1/31/19	1:00	3726	15.55
1/29/19	19:45	1971	15.85	1/30/19	10:45	2871	15.44	1/31/19	1:15	3741	15.56
1/29/19	20:00	1986	15.81	1/30/19	11:00	2886	15.46	1/31/19	1:30	3756	15.56
1/29/19	20:15	2001	15.79	1/30/19	11:15	2901	15.45	1/31/19	1:45	3771	15.54
1/29/19	20:30	2016	15.76	1/30/19	11:30	2916	15.45	1/31/19	2:00	3786	15.55
1/29/19	20:45	2031	15.72	1/30/19	11:45	2931	15.45	1/31/19	2:15	3801	15.55
1/29/19	21:00	2046	15.70	1/30/19	12:00	2946	15.46	1/31/19	2:30	3816	15.54
1/29/19	21:15	2061	15.68	1/30/19	12:15	2961	15.46	1/31/19	2:45	3831	15.56
1/29/19	21:30	2076	15.66	1/30/19	12:30	2976	15.45	1/31/19	3:00	3846	15.57
1/29/19	21:45	2091	15.63	1/30/19	12:45	2991	15.45	1/31/19	3:15	3861	15.56
1/29/19	22:00	2106	15.63	1/30/19	13:00	3006	15.45	1/31/19	3:30	3876	15.55
1/29/19	22:15	2121	15.60	1/30/19	13:15	3021	15.45	1/31/19	3:45	3891	15.56
1/29/19	22:30	2136	15.59	1/30/19	13:30	3036	15.45	1/31/19	4:00	3906	15.56
1/29/19	22:45	2151	15.58	1/30/19	13:45	3051	15.45	1/31/19	4:15	3921	15.55
1/29/19	23:00	2166	15.56	1/30/19	14:00	3066	15.45	1/31/19	4:30	3936	15.54
1/29/19	23:15	2181	15.55	1/30/19	14:15	3081	15.44	1/31/19	4:45	3951	15.56
1/29/19	23:30	2196	15.53	1/30/19	14:30	3096	15.46	1/31/19	5:00	3966	15.56
1/29/19	23:45	2211	15.54	1/30/19	14:45	3111	15.44	1/31/19	5:15	3981	15.56
1/30/19	0:00	2226	15.54	1/30/19	15:00	3126	15.46	1/31/19	5:30	3996	15.56
1/30/19	0:15	2241	15.52	1/30/19	15:15	3141	15.45	1/31/19	5:45	4011	15.57
1/30/19	0:30	2256	15.52	1/30/19	15:30	3156	15.46	1/31/19	6:00	4026	15.57
1/30/19	0:45	2271	15.51	1/30/19	15:45	3171	15.47	1/31/19	6:15	4041	15.57
1/30/19	1:00	2286	15.50	1/30/19	16:00	3186	15.49	1/31/19	6:30	4056	15.57
1/30/19	1:15	2301	15.49	1/30/19	16:15	3201	15.49	1/31/19	6:45	4071	15.58
1/30/19	1:30	2316	15.48	1/30/19	16:30	3216	15.49	1/31/19	7:00	4086	15.57
1/30/19	1:45	2331	15.48	1/30/19	16:45	3231	15.50	1/31/19	7:15	4101	15.57
1/30/19	2:00	2346	15.48	1/30/19	17:00	3246	15.49	1/31/19	7:30	4116	15.59
1/30/19	2:15	2361	15.46	1/30/19	17:15	3261	15.50	1/31/19	7:45	4131	15.58
1/30/19	2:30	2376	15.47	1/30/19	17:30	3276	15.51	1/31/19	8:00	4146	15.59
1/30/19	2:45	2391	15.47	1/30/19	17:45	3291	15.50	1/31/19	8:15	4161	15.59
1/30/19	3:00	2406	15.47	1/30/19	18:00	3306	15.51	1/31/19	8:30	4176	15.59
1/30/19	3:15	2421	15.45	1/30/19	18:15	3321	15.51	1/31/19	8:45	4191	15.59
1/30/19	3:30	2436	15.45	1/30/19	18:30	3336	15.53	1/31/19	9:00	4206	15.60
1/30/19	3:45	2451	15.44	1/30/19	18:45	3351	15.52	1/31/19	9:15	4221	19.28
1/30/19	4:00	2466	15.44	1/30/19	19:00	3366	15.53	1/31/19	9:30	4236	21.92
1/30/19	4:15	2481	15.45	1/30/19	19:15	3381	15.53	1/31/19	10:00	4266	24.08
1/30/19	4:30	2496	15.44	1/30/19	19:30	3396	15.49	1/31/19	10:10	4276	24.41
1/30/19	4:45	2511	15.45	1/30/19	19:45	3411	15.47	1/31/19	10:20	4286	24.65
1/30/19	5:00	2526	15.45	1/30/19	20:00	3426	15.49	1/31/19	10:30	4296	24.82
1/30/19	5:15	2541	15.44	1/30/19	20:15	3441	15.50	1/31/19	10:40	4306	24.93

1/31/19	10:50	4316	25.02	1/31/19	19:30	4836	12.47
1/31/19	10:52	4318	25.03	1/31/19	19:40	4846	12.35
1/31/19	10:54	4320	25.04	1/31/19	19:50	4856	12.26
1/31/19	10:56	4322	25.06	1/31/19	20:00	4866	12.19
1/31/19	10:58	4324	25.06	1/31/19	20:30	4896	12.01
1/31/19	11:00	4326	25.05	1/31/19	21:00	4926	11.86
1/31/19	11:02	4328	25.02	1/31/19	21:30	4956	11.73
1/31/19	11:04	4330	25.00	1/31/19	22:00	4986	11.61
1/31/19	11:06	4332	24.95	1/31/19	22:30	5016	11.52
1/31/19	11:08	4334	24.91	1/31/19	23:00	5046	11.44
1/31/19	11:10	4336	24.87	1/31/19	23:30	5076	11.34
1/31/19	11:12	4338	24.83	2/1/19	0:00	5106	11.27
1/31/19	11:14	4340	24.77	2/1/19	0:30	5136	11.19
1/31/19	11:18	4344	24.68	2/1/19	1:00	5166	11.15
1/31/19	11:22	4348	24.58	2/1/19	1:30	5196	11.09
1/31/19	11:26	4352	24.49	2/1/19	2:00	5226	11.04
1/31/19	11:30	4356	24.39	2/1/19	2:30	5256	10.98
1/31/19	11:40	4366	24.18	2/1/19	3:00	5286	10.93
1/31/19	11:50	4376	23.98	2/1/19	3:30	5316	10.88
1/31/19	12:00	4386	23.82	2/1/19	4:00	5346	10.85
1/31/19	12:10	4396	23.68	2/1/19	4:30	5376	10.81
1/31/19	12:20	4406	23.54	2/1/19	5:00	5406	10.78
1/31/19	12:30	4416	23.42	2/1/19	5:30	5436	10.75
1/31/19	12:40	4426	23.31	2/1/19	6:00	5466	10.72
1/31/19	12:50	4436	23.23	2/1/19	6:30	5496	10.69
1/31/19	13:00	4446	23.14	2/1/19	7:00	5526	10.65
1/31/19	13:10	4456	23.06	2/1/19	7:30	5556	10.64
1/31/19	13:20	4466	22.99	2/1/19	8:00	5586	10.62
1/31/19	13:30	4476	22.93	2/1/19	8:30	5616	10.59
1/31/19	14:00	4506	22.75	2/1/19	9:00	5646	10.58
1/31/19	14:30	4536	22.60	2/1/19	9:30	5676	10.55
1/31/19	15:00	4566	22.46				
1/31/19	15:30	4596	22.37				
1/31/19	16:00	4626	22.28				
1/31/19	16:30	4656	22.20				
1/31/19	17:00	4686	22.12				
1/31/19	17:30	4716	22.06				
1/31/19	18:00	4746	22.01				
1/31/19	18:26	4772	21.95				
1/31/19	18:28	4774	21.95				
1/31/19	18:30	4776	21.94				
1/31/19	18:32	4778	21.36				
1/31/19	18:34	4780	20.53				
1/31/19	18:36	4782	19.73				
1/31/19	18:38	4784	19.00				
1/31/19	18:40	4786	18.31				
1/31/19	18:42	4788	17.67				
1/31/19	18:44	4790	17.11				
1/31/19	18:46	4792	16.56				
1/31/19	18:48	4794	16.08				
1/31/19	18:50	4796	15.65				
1/31/19	18:52	4798	15.24				
1/31/19	18:54	4800	14.87				
1/31/19	18:56	4802	14.54				
1/31/19	18:58	4804	14.24				
1/31/19	19:00	4806	14.00				
1/31/19	19:10	4816	13.09				
1/31/19	19:20	4826	12.67				

APPENDIX C
Lab Reports

ENDYNE Inc.
Environmental Laboratories

Laboratory Report

Hydrosource Associates, Inc	201114
50 Winter St	
Ashland, NH 03217	
Atten: Christine Rowell	

PROJECT: Well 3 - Keene Valley Part 5
WORK ORDER: **1901-02208**
DATE RECEIVED: January 31, 2019
DATE REPORTED: February 28, 2019
SAMPLER: Loring S

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody located at the end of this report.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

This NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory.

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Christina A Lafountain
Laboratory Director Plattsburgh, NY

Laboratory Report

CLIENT: Hydrosource Associates, Inc
PROJECT: Well 3 - Keene Valley Part 5

WORK ORDER: **1901-02208**
DATE RECEIVED: 1/31/19

001 Site: Well 3 - Keene Valley Date Sampled: 1/31/19 Time: 9:00

Parameter	Result	Units	Method	Analysis Date/Time		Lab/Tech	NELAC	Qual.
Organochlorine Pesticides	See Attached		EPA 505	2/5/19	18:19	SNSUB	A	SMB
CARBAMATES	See Attached		EPA 531.1	2/6/19	15:59	SNSUB	A	SMB
Chlorinated Acids	See Attached		EPA 515.4	2/4/19	20:37	SNSUB	A	SMB
EDB	See Attached		EPA 504.1	2/4/19	21:35	SNSUB	A	SMB
Table 12, Radiological						SN		
Asbestos	See Attached	MFL	EPA 100.2	2/4/19	13:04	SNSUB	A	E1,EMSL
Table 8D						N		
Enterococcus	<1.0	MPN/100mL	Enterolert	1/31/19	16:19	N CL	A	
Fecal Coliform	<1.0	MPN/100mL	SM 9223 Quantitray	1/31/19	14:16	N CL	A	
Total Coliform Ecoli MPN		CFU/100mL	SM9223-Quantitray	1/31/19	14:26	N CL	A	
Total Coliform MPN	<1.0	MPN/100mL	SM9223-Quantitray	1/31/19	14:26	N CL	U	
E coli MPN	<1.0	MPN/100mL	SM 9223B (Colilert)	1/31/19	14:26	N CL	A	
Uranium, Total	< 1.0	ug/L	EPA 200.8	2/8/19		W SJM	A	
Alkalinity,at pH4.5	53	mg/L	SM 18-22 2320B	2/11/19		N AAS	A	
Chloride	21	mg/L	SM21-22 4500-Cl-E	2/6/19		N JGM	A	
Color, Apparent	< 5	CoPt@pH8.14	SM18-22 2120B	2/1/19	15:15	N AAS	A	
Corrosivity Package			Various			N	A	
Corrosivity @ 20 C	-0.34		SM 18-22 2330	2/21/19		N CAL	A	
Cyanide	< 0.004	mg/L	EPA 335.4, R.1	2/5/19		N JGM	A	
Fluoride	< 0.08	mg/L	SM 18-22 4500F-D	2/12/19		N CAL	A	
Nitrate as N	0.19	mg/L	EPA 353.2, R.2	1/31/19	16:29	N JGM	A	
Table 8C, NY						N		
Nitrite as N	< 0.02	mg/L	EPA 353.2, R.2	1/31/19	16:29	N JGM	A	
Odor	None Detected	TON@68.3C	SM 18-22 2150B	1/31/19	11:40	N AAS	A	
pH	8.1	SU @ 20C	SM20 4500H+ B	1/31/19	16:00	N PLM	U	
Solids, Total Dissolved	86.0	mg/L	SM18-22 2540C	2/5/19	13:00	N CL	A	
Sulfate	< 10	mg/L	ASTM D516-02,07	2/6/19		N JGM	A	
Turbidity	0.25	NTU	EPA 180.1, R.2	2/5/19	10:24	N CL	A	E
Metals Digestion HNO3-HCl	Digested		EPA 200.7/200.8	2/6/19		W SJM	A	
Antimony, Total	< 0.0004	mg/L	EPA 200.8	2/8/19		W SJM	A	
Arsenic, Total	< 0.0010	mg/L	EPA 200.8	2/8/19		W SJM	A	
Barium, Total	< 0.020	mg/L	EPA 200.8	2/8/19		W SJM	A	
Beryllium, Total	< 0.0003	mg/L	EPA 200.8	2/8/19		W SJM	A	
Cadmium, Total	< 0.0020	mg/L	EPA 200.8	2/8/19		W SJM	A	
Calcium, Total	20.0	mg/L	SM20-22 3500-Ca B	2/15/19	14:26	N CL	A	
Chromium, Total	< 0.0050	mg/L	EPA 200.8	2/8/19		W SJM	A	
Hardness, as CaCO3	60.0	mg/L	SM20 2340C	2/15/19	14:26	N CL	A	
Iron, Total	0.025	mg/L	EPA 200.7	2/7/19		W FAA	A	
Manganese, Total	< 0.010	mg/L	EPA 200.8	2/8/19		W SJM	A	
Mercury, Total	< 0.00020	mg/L	EPA 200.8	2/8/19		W SJM	A	
Nickel, Total	< 0.0005	mg/L	EPA 200.8	2/11/19		W SJM	A	
Selenium, Total	< 0.0020	mg/L	EPA 200.8	2/8/19		W SJM	A	
Silver, Total	< 0.010	mg/L	EPA 200.8	2/8/19		W SJM	A	
Sodium, Total	10	mg/L	EPA 200.7	2/7/19		W FAA	A	
Thallium, Total	< 0.0003	mg/L	EPA 200.8	2/13/19		W MGT	A	
Zinc, Total	< 0.020	mg/L	EPA 200.8	2/8/19		W SJM	A	
Gross Alpha	1.43 +/- 1.21	pCi/L	EPA 900.0	2/19/19		SNSUB	A	SPA
Gross Beta	0.365 +/-0.729	pCi/L	EPA 900.0	2/19/19		SNSUB		SPA
Radium 226	0.189 +/-0.327	pCi/L	EPA 903.1	2/20/19		SNSUB	A	SPA
Radium-228	0.481 +/-0.345	pCi/L	EPA 904.0	2/15/19		SNSUB	A	SPA
VOC Potable Water			EPA 524.2	2/4/19		W EEP		
Dichlorodifluoromethane	< 0.5	ug/L	EPA 524.2	2/4/19		W EEP	A	
Chloromethane	< 0.5	ug/L	EPA 524.2	2/4/19		W EEP	A	
Vinyl chloride	< 0.5	ug/L	EPA 524.2	2/4/19		W EEP	A	

Laboratory Report

CLIENT: Hydrosource Associates, Inc
PROJECT: Well 3 - Keene Valley Part 5

WORK ORDER: **1901-02208**
DATE RECEIVED: 1/31/19

Bromomethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Chloroethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Trichlorofluoromethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,1-Dichloroethene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Methylene chloride	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Methyl-t-butyl ether (MTBE)	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
trans-1,2-Dichloroethene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,1-Dichloroethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
2,2-Dichloropropane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
cis-1,2-Dichloroethene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Bromochloromethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Chloroform	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,1,1-Trichloroethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Carbon tetrachloride	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,1-Dichloropropene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Benzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,2-Dichloroethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Trichloroethene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,2-Dichloropropane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Dibromomethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Bromodichloromethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
cis-1,3-Dichloropropene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Toluene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
trans-1,3-Dichloropropene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,1,2-Trichloroethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Tetrachloroethene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,3-Dichloropropane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Dibromochloromethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Chlorobenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Ethylbenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,1,1,2-Tetrachloroethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Xylenes, Total	< 1.0	ug/L	EPA 524.2	2/4/19	W EEP	A
Styrene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Bromoform	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Isopropylbenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,1,2,2-Tetrachloroethane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Bromobenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
n-Propylbenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,2,3-Trichloropropane	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
2-Chlorotoluene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,3,5-Trimethylbenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
4-Chlorotoluene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
t-Butylbenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,2,4-Trimethylbenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
s-Butylbenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
4-Isopropyltoluene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,3-Dichlorobenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,4-Dichlorobenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
n-Butylbenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,2-Dichlorobenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,2,4-Trichlorobenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Hexachlorobutadiene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Naphthalene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
1,2,3-Trichlorobenzene	< 0.5	ug/L	EPA 524.2	2/4/19	W EEP	A
Surr. 1 (4-Bromofluorobenzene)	81	%	EPA 524.2	2/4/19	W EEP	A
Surr. 2 (1,2-Dichlorobenzene d4)	74	%	EPA 524.2	2/4/19	W EEP	A
SEMI-VOLATILE ORGANICS			EPA 525.2	2/12/19	W EEP	
525.2 Extraction	Completed		EPA 525.2	2/11/19	W ITR	A

Laboratory Report

CLIENT: Hydrosource Associates, Inc
PROJECT: Well 3 - Keene Valley Part 5

WORK ORDER: **1901-02208**
DATE RECEIVED: 1/31/19

Hexachlorocyclopentadiene	< 0.1	ug/L	EPA 525.2	2/12/19	W EEP	A	J
Propachlor	< 1.0	ug/L	EPA 525.2	2/12/19	W EEP	A	
Hexachlorobenzene	< 0.1	ug/L	EPA 525.2	2/12/19	W EEP	A	
Simazine	< 0.07	ug/L	EPA 525.2	2/12/19	W EEP	A	J
Atrazine	< 0.1	ug/L	EPA 525.2	2/12/19	W EEP	A	
Metribuzin	< 2.0	ug/L	EPA 525.2	2/12/19	W EEP	A	
Alachlor	< 0.2	ug/L	EPA 525.2	2/12/19	W EEP	A	
Metolachlor	< 1.0	ug/L	EPA 525.2	2/12/19	W EEP	A	
Butachlor	< 1.0	ug/L	EPA 525.2	2/12/19	W EEP	A	
Bis(2-ethylhexyl)adipate	< 0.6	ug/L	EPA 525.2	2/12/19	W EEP	A	
Bis(2-ethylhexyl)phthalate	< 0.6	ug/L	EPA 525.2	2/12/19	W EEP	A	
Benzo(a)pyrene	< 0.02	ug/L	EPA 525.2	2/12/19	W EEP	A	
Surrogate 1	90	%	EPA 525.2	2/12/19	W EEP	A	
Surrogate 2	118	%	EPA 525.2	2/12/19	W EEP	A	
Surrogate 3	108	%	EPA 525.2	2/12/19	W EEP	A	
HALOACETIC ACIDS			EPA 552.2	2/13/19	W EEP		
552 Extraction	Complete		EPA 552.2	2/7/19	W ITR	A	
Monochloroacetic Acid	< 2.0	ug/L	EPA 552.2	2/13/19	W EEP	A	
Monobromoacetic Acid	< 1.0	ug/L	EPA 552.2	2/13/19	W EEP	A	
Dichloroacetic Acid	< 1.0	ug/L	EPA 552.2	2/13/19	W EEP	A	
Trichloroacetic Acid	< 1.0	ug/L	EPA 552.2	2/13/19	W EEP	A	
Dibromoacetic Acid	< 1.0	ug/L	EPA 552.2	2/13/19	W EEP	A	
Total Haloacetic Acids	< 6.0	ug/L	EPA 552.2	2/13/19	W EEP	A	
Surrogate-DBPA	117	%	EPA 552.2	2/13/19	W EEP	A	

Report Summary of Qualifiers and Notes

E: Sample was analyzed past Method specified holding time.

Samples received in this project required pH. The EPA hold time for this analysis is 15 minutes and should be performed at the time of collection. Analysis was performed as soon as possible upon arrival at the laboratory.

E1: Sample was received past Method specified holding time at the subcontract lab due to a snowfall/ weather event in Buffalo NY.

EMSL: This analysis was subcontracted to EMSL Laboratories, ELAP#11606. A copy of the results report has been attached for your reference.

SMB: Analysis performed by subcontracted laboratory, Microbac Laboratory Inc. Dayville, CT, VT/NH/NY 11549. Results are presented here for your convenience. Refer to the complete subcontracted report, which has been appended to this report, for detailed information regarding this result.

J: Reported value has a higher level of uncertainty. The reported value was above the Method Detection Limit but below the lowest point in the calibration. A value above the MDL has a 99% confidence that the concentration of the parameter in the sample is greater than zero.

SPA: Analysis performed by subcontracted laboratory, Pace Analytical, with the following state assigned laboratory ID numbers; VT0282, NY10888, NH2974. Refer to the complete subcontracted report appended to this report, for detailed information regarding this result.

Endyne, Inc. - Plattsburgh Lab

LAB USE ONLY
Due Date: 04 Mar 19

315 New York Road
Plattsburgh, NY 12903
Phone (518)563-1720
Fax (518)563-0052
info@endynelabs.com
ELAP #11892

Client: HydroSource Associates | Account #: 201114 | SAMPLE SUPPLY INFORMATION

Email Address: fbickford@teamhydrosource.com | Sample Source: Well, Spring, Surface, Waste, Other

Contact Person: | Project Name: New Source Well | PWS # | SPDES#

Phone: (603) 968-3733 | Collection Address: Trail End Lane

Mailing Address: 50 Winter Street | Quote #

City Ashland State: NH Zip: 03217 | PO # | City: Keene Valley State: NY Zip:

Fax: Fax or MAIL (+ $3 ea) | Page 1 of 1 | Collector's Name: Loring Scharible

SAMPLE MATRIX CODES

DW=drinking water; WW=waste water; MW=monitoring well; HW=hazardous waste; SW=Surface Water; SD=solid; SO=soil; SL=sludge

Compliance? Y / N
Mtg / Daycare / Other
Check / Repeat
BWO Samples?

TURNAROUND TIME REQUESTED

Standard X

RUSH (Charges Apply)

Lab Manager RUSH Approval:

Sample ID / Collection Site	Date/Time	Chlorine Residual by Client at Collection	Sample Matrix	Grab or Composite	Bottle Type / Vol	Preservation	Analysis Requested: TCMPN, FCMPN, ENT MPN	Asbestos	8B & 8D Metals, U	N/N, Cl-, F-, SO4-, Turb, Color, Odor	Rad 226/228, Gross Alpha & Beta	EPA 524	EPA 504	EPA 505	EPA 515	EPA 525	EPA 531	Lab Use Only Sample #
Well 3 - Keene Valley	1/31/19 900	N/A	DW	G	150, ST	4C	X											001
		N/A	DW	G	1L, P	4C		X										001
		N/A	DW	G	500, P	*1			X									001
		N/A	DW	G	500, P	4C				X								001
		N/A	DW	G	3x 1L, P	*1					X							001
		N/A	DW	G	2x VOA, G	HCl						X						001
		N/A	DW	G	2x VOA, G	4C							X					001
		N/A	DW	G	2x VOA, G	4C								X				001
		N/A	DW	G	3x VOA, G	Thio									X			001
		N/A	DW	G	2x 1L, G	HCl										X		001
		N/A	DW	G	2x VOA, G	KDC											X	001

Client Instructions/Comments/Special Requirements:

* Please run Total Hardness, as well as Corrosivity (Langelier Index) testing for these samples. POCs ran by EPA 524. Please also run HAA5.

Samples that the Endyne, Inc Labs are not ELAP accredited for will be subcontracted to a NYS accredited lab. Initials LS

SAMPLE RECEIPT (Lab Use Only)	Date	Time	Sample Relinquished By (SIGN HERE)	Samples Received By
On Ice (Y) N N/A	31Jan19	1025		
Temperature 7.5° C				
Seal Intact Y N (N/A)				
# of Containers 29				

Lab Notes: *1: Metals and Radiologicals preserved to pH <2 with HNO3 @ lab.

1901-02208

1901-02208

Hydrosource Associates, Inc
Well 3 - Keene Valley Part 5

OFFICE USE ONLY

Analysis Fee $_2423.00 + 30.00 Ship Fees_

Terms are net 30 days with an open, up to date account

Payment Method ☐ Cash ☐ Check ☐ MC/Visa ☐ Money Order Check, MO, Receipt # _____

EMSL Analytical, Inc.
490 Rowley Road Depew, NY 14043
Phone/Fax: (716) 651-0030 / (716) 651-0394
http://www.EMSL.com / buffalolab@emsl.com

EMSL Order ID: 141900352
Customer ID: CHAM50
Customer PO:
Project ID:

Attn: Chris Lafountain
Endyne, Inc.
315 New York Avenue
Suite 85
Plattsburgh, NY 12903
Proj: 1901-02208-001

Phone: (518) 563-1720
Fax: (518) 563-0052
Received: 02/04/2019
Analyzed: 02/07/2019

Test Report: Determination of Asbestos Structures >10µm in Drinking Water Performed by the 100.2 Method (EPA 600/R-94/134)

Sample ID Client / EMSL	Sample Filtration Date/Time	Original Sample Vol. Filtered (ml)	Effective Filter Area (mm²)	Area Analyzed (mm²)	ASBESTOS Asbestos Types	Fibers Detected	Analytical Sensitivity	Concentration	Confidence Limits
								MFL (million fibers per liter)	
1901-02208-001 141900352-0001	2/4/2019 01:04 PM	150	1288	0.0524	None Detected	ND	0.16	<0.16	0.00 - 0.60

Collection Date/Time: 01/31/2019 09:00

Sample received after 48 hour holding time. Analyzed at client's request.

Analyst(s)
Tom Hanes (1)

Rhonda McGee

Rhonda McGee, Laboratory Manager
or Other Approved Signatory

Any questions please contact Rhonda McGee.

Initial report from: 02/11/2019 08:03:02

MICROBAC®

Microbac Laboratories, Inc. - Dayville

CERTIFICATE OF ANALYSIS

D9B0022

Endyne, Inc. - Plattsburgh

Chris Lafountain
315 New York Road
Plattsburgh, NY 12903

Project Name: 1901-02208

Project / PO Number: 1901-02208
Received: 02/01/2019
Reported: 02/08/2019

Analytical Testing Parameters

Client Sample ID: 1901-02208-001
Sample Matrix: Drinking Water
Lab Sample ID: D9B0022-01
Collected By: Customer
Collection Date: 01/31/2019 9:00

Herbicides - GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 515.3, Rv 1.0								
2,4-D [2C]	<0.100	70 MCL	0.100	ug/L		02/04/19 1000	02/04/19 2037	CDT
Dalapon [2C]	<1.00	200 MCL	1.00	ug/L		02/04/19 1000	02/04/19 2037	CDT
Dicamba [2C]	<0.100		0.100	ug/L		02/04/19 1000	02/04/19 2037	CDT
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP) [2C]	<0.200	7 MCL	0.200	ug/L		02/04/19 1000	02/04/19 2037	CDT
Pentachlorophenol [2C]	<0.0400	1 MCL	0.0400	ug/L		02/04/19 1000	02/04/19 2037	CDT
Picloram [2C]	<0.100	500 MCL	0.100	ug/L		02/04/19 1000	02/04/19 2037	CDT
2,4,5-TP (Silvex) [2C]	<0.200	50 MCL	0.200	ug/L		02/04/19 1000	02/04/19 2037	CDT
Surrogate: 2,4-Dichloropenylacetic acid [2C]	98.3	Limit: 70-130		% Rec		02/04/19 1000	02/04/19 2037	CDT

Pesticides and Polychlorinated Biphenyls (PCBs) - GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 505, Rv 2.1								
Alachlor [2C]	<0.200	2 MCL	0.200	ug/L		02/05/19 1200	02/05/19 1819	CDT
Aldrin [2C]	<0.0500		0.0500	ug/L		02/05/19 1200	02/05/19 1819	CDT
gamma-BHC (Lindane) [2C]	<0.0200	0.2 MCL	0.0200	ug/L		02/05/19 1200	02/05/19 1819	CDT
Chlordane (tech.) [2C]	<0.200	2 MCL	0.200	ug/L		02/05/19 1200	02/05/19 1819	CDT
Dieldrin [2C]	<0.0200	0.2 MCL	0.0200	ug/L		02/05/19 1200	02/05/19 1819	CDT
Endrin [2C]	<0.0100	2 MCL	0.0100	ug/L		02/05/19 1200	02/05/19 1819	CDT
Heptachlor [2C]	<0.0200	0.400 MCL	0.0200	ug/L		02/05/19 1200	02/05/19 1819	CDT
Heptachlor epoxide [2C]	<0.0200	0.2 MCL	0.0200	ug/L		02/05/19 1200	02/05/19 1819	CDT
Hexachlorobenzene [2C]	<0.0500	1 MCL	0.0500	ug/L		02/05/19 1200	02/05/19 1819	CDT
Hexachlorocyclopentadiene [2C]	<0.100	50 MCL	0.100	ug/L		02/05/19 1200	02/05/19 1819	CDT
Methoxychlor [2C]	<0.0500	40 MCL	0.0500	ug/L		02/05/19 1200	02/05/19 1819	CDT
Toxaphene [2C]	<1.00	3 MCL	1.00	ug/L		02/05/19 1200	02/05/19 1819	CDT
Aroclor-1016 (PCB-1016) [2C]	<0.0800		0.0800	ug/L		02/05/19 1200	02/05/19 1819	CDT
Aroclor-1221 (PCB-1221) [2C]	<20.0		20.0	ug/L		02/05/19 1200	02/05/19 1819	CDT
Aroclor-1232 (PCB-1232) [2C]	<0.500		0.500	ug/L		02/05/19 1200	02/05/19 1819	CDT
Aroclor-1242 (PCB-1242) [2C]	<0.300		0.300	ug/L		02/05/19 1200	02/05/19 1819	CDT
Aroclor-1248 (PCB-1248) [2C]	<0.100		0.100	ug/L		02/05/19 1200	02/05/19 1819	CDT
Aroclor-1254 (PCB-1254) [2C]	<0.100		0.100	ug/L		02/05/19 1200	02/05/19 1819	CDT
Aroclor-1260 (PCB-1260) [2C]	<0.100		0.100	ug/L		02/05/19 1200	02/05/19 1819	CDT
Surrogate: 2,4,5,6-Tetrachloro-m-xylene [2C]	80.5	Limit: 70-130		% Rec		02/05/19 1200	02/05/19 1819	CDT

MICROBAC®

Microbac Laboratories, Inc. - Dayville

CERTIFICATE OF ANALYSIS

D9B0022

Client Sample ID:	1901-02208-001		
Sample Matrix:	Drinking Water	**Collected By:**	Customer
Lab Sample ID:	D9B0022-01	**Collection Date:**	01/31/2019 9:00

Semi-Volatile Organic Compounds - GC/ECD	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 504.1, Rv 1.1								
1,2-Dibromo-3-chloropropane (DBCP) [2C]	<0.0100	0.200 MCL	0.0100	ug/L		02/04/19 1400	02/04/19 2135	CDT
1,2-Dibromoethane (Ethylene dibromide, EDB) [2C]	<0.0100	0.0500 MCL	0.0100	ug/L		02/04/19 1400	02/04/19 2135	CDT
Surrogate: 2,4,5,6-Tetrachloro-m-xylene [2C]	120	Limit: 70-130		% Rec		02/04/19 1400	02/04/19 2135	CDT

Semi-Volatile Organic Compounds - HPLC	Result	Limit(s)	RL	Units	Note	Prepared	Analyzed	Analyst
Method: EPA 531.2, Rv 1.0								
Aldicarb sulfone	<0.800		0.800	ug/L		02/06/19 0846	02/06/19 1559	RSD
Aldicarb sulfoxide	<0.500		0.500	ug/L		02/06/19 0846	02/06/19 1559	RSD
Aldicarb (Temik)	<0.500		0.500	ug/L		02/06/19 0846	02/06/19 1559	RSD
Carbaryl (Sevin)	<0.500		0.500	ug/L		02/06/19 0846	02/06/19 1559	RSD
Carbofuran (Furaden)	<0.900	40 MCL	0.900	ug/L		02/06/19 0846	02/06/19 1559	RSD
3-Hydroxycarbofuran	<0.500		0.500	ug/L		02/06/19 0846	02/06/19 1559	RSD
Methomyl (Lannate)	<0.500		0.500	ug/L		02/06/19 0846	02/06/19 1559	RSD
Oxamyl	<2.00	200 MCL	2.00	ug/L		02/06/19 0846	02/06/19 1559	RSD
Surrogate: 4-Bromo-3,5-dimethylphenyl-N-methylcarbamate	103	Limit: 70-130		% Rec		02/06/19 0846	02/06/19 1559	RSD

*Results in **bold** have exceeded a limit defined for this project. Limits are provided for reference but as regulatory limits change frequently, Microbac Laboratories, Inc. advises the recipient of this report to confirm such limits and units of concentration with the appropriate Federal, state or local authorities before acting on the data.*

Definitions

MCL: US EPA Maximum Contaminant Level

RL: Reporting Limit

Project Requested Certification(s)

Microbac Laboratories, Inc. - Dayville

11549 New York State Department of Health

Report Comments

Samples were received in proper condition and the reported results conform to applicable accreditation standard unless otherwise noted.

The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included.

Reviewed and Approved By:

Ronald L. Warila

Director

Reported: 02/08/2019 10:20

Endyne, Inc.

D 9 B 0 0 2 2

Endyne - Plattsburgh

ONLY

Ramsey

315 New York Road
Plattsburgh, NY 12903
Phone (518)563-1720

Fax (5
info@e
ELAP #11892

Client:	Endyne, Inc	Bill To: Endyne, Inc	**SAMPLE SUPPLY INFORMATION**
Email Address:	EndyneP@yahoo.com	315 New York Rd	Other Pertinent Sample Information:
Contact Person:	Chris Lafountain	Plattsburgh, NY 12903	
Phone:	518-563-1720		** New York State Sample. Please report to NYS MDL **
Mailing Address:	315 New York Road	Quote #	
City Plattsburgh	State: NY Zip: 12903	PO #	
Fax:	518-563-0052	Page 1 of 1	SPDES or PWS Number:

SAMPLE MATRIX CODES
DW=drinking water SW=Surface Water
WW=waste water SD=solid
MW=monitoring well SO=soil
HW=hazardous waste SL=sludge

Compliance? (Y) / N

TURNAROUND TIME REQUESTED
Standard **XXXXX**
RUSH
Special

Sample ID / Collection Site	Date/Time	Chlorine Residual by Client at Collection	Sample Matrix	Grab or Composite	Bottle Type / Vol	Preservation	Analysis Requested: EPA 504	EPA 505	EPA 515	EPA 531	Lab Use Only Sample #
1901-02208-001	31Jan19@0900		DW	G	2xVOA	Thio	X				
			DW	G	2xVOA	↓		X			
			DW	G	3xVOA	↓			X		
			DW	G	2xVOA	↓				X	

Client Instructions/Comments/Special Requirements: E-mail Results to EndyneP@yahoo.com

PLEASE REPORT BY NYS ACCREDITED METHOD, WITHIN CALIBRATION RANGE, AS PER NYS ELAP

SAMPLE RECEIPT (Lab Use Only)	Date	Time	Sample Relinquished By (SIGN HERE)	Samples Received By
On Ice (Y) N N/A	31Jan19	1630		UPS
Temperature C				
Seal Intact Y N (N/A)				
# of Containers 9	2-1-19	1100		

Lab Notes:

WO# 1901-02208

OFFICE USE ONLY
Analysis Fee $_ (A/R) ☐ Cash ☐ Check ☐ MC/Visa ☐ Money Order Check, MO, Receipt # _____

3.1°C

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

February 27, 2019

Chris Lafountain
Endyne, Inc. - NY
315 New York Road
Plattsburgh, NY 12901

RE: Project: 1901-02208
Pace Project No.: 30279005

Dear Chris Lafountain:
Enclosed are the analytical results for sample(s) received by the laboratory on February 06, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Laura M. Pirilla
laura.pirilla@pacelabs.com
(724)850-5616
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: 1901-02208
Pace Project No.: 30279005

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: 1901-02208
Pace Project No.: 30279005

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30279005001	**1901-02208-001**	Drinking Water	01/31/19 09:00	02/06/19 10:20

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: 1901-02208
Pace Project No.: 30279005

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30279005001	**1901-02208-001**	EPA 900.0	NEG	2	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 1901-02208
Pace Project No.: 30279005

Method: **EPA 900.0**
Description: 900.0 Gross Alpha/Beta
Client: Endyne Inc. NY
Date: February 27, 2019

General Information:
1 sample was analyzed for EPA 900.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 1901-02208
Pace Project No.: 30279005

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Endyne Inc. NY
Date: February 27, 2019

General Information:
1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 1901-02208
Pace Project No.: 30279005

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Endyne Inc. NY
Date: February 27, 2019

General Information:
1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 1901-02208
Pace Project No.: 30279005

Sample: 1901-02208-001 **Lab ID: 30279005001** Collected: 01/31/19 09:00 Received: 02/06/19 10:20 Matrix: Drinking Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 900.0	**1.43 ± 1.21 (1.98) C:NA T:NA**	pCi/L	02/19/19 07:59	12587-46-1	
Gross Beta	EPA 900.0	**0.365 ± 0.729 (1.59) C:NA T:NA**	pCi/L	02/19/19 07:59	12587-47-2	
Radium-226	EPA 903.1	**0.189 ± 0.327 (0.585) C:NA T:85%**	pCi/L	02/20/19 20:58	13982-63-3	
Radium-228	EPA 904.0	**0.481 ± 0.345 (0.695) C:76% T:84%**	pCi/L	02/15/19 10:53	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 1901-02208
Pace Project No.: 30279005

QC Batch: 329787 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30279005001

METHOD BLANK: 1605456 Matrix: Water
Associated Lab Samples: 30279005001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.306 ± 0.309 (0.636) C:80% T:92%	pCi/L	02/15/19 10:53	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 1901-02208
Pace Project No.: 30279005

QC Batch: 329786 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30279005001

METHOD BLANK: 1605455 Matrix: Water
Associated Lab Samples: 30279005001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.106 ± 0.255 (0.492) C:NA T:96%	pCi/L	02/20/19 20:58	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 1901-02208
Pace Project No.: 30279005

QC Batch: 329828 Analysis Method: EPA 900.0
QC Batch Method: EPA 900.0 Analysis Description: 900.0 Gross Alpha/Beta
Associated Lab Samples: 30279005001

METHOD BLANK: 1605603 Matrix: Water
Associated Lab Samples: 30279005001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Gross Alpha	-0.043 ± 0.362 (1.15) C:NA T:NA	pCi/L	02/19/19 08:14	
Gross Beta	0.064 ± 0.781 (1.91) C:NA T:NA	pCi/L	02/19/19 08:14	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: 1901-02208
Pace Project No.: 30279005

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

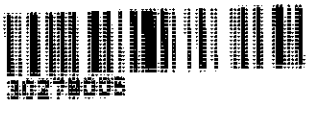
LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

Endyne, Inc. - Subcontract COC

Sample Sent to: Test America

WO# : 30279005



Page 13 of 15

Pittsburgh Lab Sample Condition Upon Receipt

Face Analytical

Client Name: Endyne

Project # # 30279005

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label OVB

LIMS Login OVB

Tracking #: 1Z 160 694 03 9108 1068

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Thermometer Used NA Type of Ice: Wet Blue (None)

Cooler Temperature Observed Temp _____ °C Correction Factor: _____ °C Final Temp: _____ °C

Temp should be above freezing to 6°C

Comments:	Yes	No	N/A	pH paper Lot# 10D29R1 / Date and Initials of person examining contents: 02/06/19 OVB
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:		✓		4.
Sample Labels match COC: -Includes date/time/ID Matrix: DW	✓			5.
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used: -Pace Containers Used:	✓	✓		10.
Containers Intact:	✓			11.
Orthophosphate field filtered			✓	12.
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.
Organic Samples checked for dechlorination:			✓	14.
Filtered volume received for Dissolved tests			✓	15.
All containers have been checked for preservation. All containers needing preservation are found to be in compliance with EPA recommendation. exceptions: VOA, coliform, TOC, O&G, Phenolics	✓			16. pH<2 Initial when completed OVB Date/time of preservation Lot # of added preservative
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present:		✓		18.
Trip Blank Custody Seals Present			✓	
Rad Aqueous Samples Screened > 0.5 mrem/hr		✓		Initial when completed: OVB Date: 02/06/19

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

ANALYSIS FOR WATERBORNE PARTICULATES

CH Diagnostic and Consulting Service, Inc.
512 5th Street, Berthoud, CO 80513
P: (970) 532-2078 F: (970) 532-3358

Invoice 20190037

Customer 20081741
Hydro Source Associates, Inc.
P.O. Box 609
Ashland, NH 03217

Laboratory Information
Federal Express; 2/1/2019; 1320 Hrs; 6.2°C; Wound
Results submitted by:

Sample Identification: Keene Valley, NY, Well 3

Sample Information: SOURCE: Drilled Well; 150' deep; 200' from surface water; Unchlorinated; pH 8.1; 46°F

Sample Date & Time: 1/30/2019 10:25 AM —» 1/31/2019 08:25 AM **Sampler:** Loring Schaible

Amount: 3179.4 L (840 gal) **Filter Color:** Off white **Filter Type:** Polypropylene wound cartridge

Date/Time Eluted: 2/1/2019 03:32 PM **Centrifugate:** <0.001 mL/100 L

RESULTS OF MICROSCOPIC PARTICULATE ANALYSIS

Amount of sample assayed: 640 L

Amorphous Debris	clay (1-2 µm), silt (2-50 µm), inorganic precipitate
Algae	ND
Diatoms	ND
Plant debris	ND
Rotifers	ND
Nematodes	ND
Pollen (pine)	17/100 Gal
Ameba	ND
Ciliates	ND
Colorless Flagellates	ND
Crustaceans	ND
Other Arthropods	ND
Other	ND

Giardia and Coccidia are none detected (ND) by MPA unless reported under "Other".

This sample was analyzed for particulates following the Environmental Protection Agency Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA). 1992. USEPA, Port Orchard, WA, EPA 910/9-92-029. All limitations stated in the methods apply. If HV capsule or foam filter was received, method was modified by filtering sample through a Pall Envirochek™ HV capsule or IDEXX Filta-Max™ filter at the sample site. If *Giardia* and *Cryptosporidium* Analysis was also performed, particulate extraction was modified.

COMMENTS: Score: 0-Low Risk per EPA Consensus Method referenced above.

Ground Water Risk Factor Table

From: E.P.A. Consensuses Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA)

Table 1. Numerical range of each primary bio-indicator (Particulate) counted per 100 gallons water.

Indicators of surface water [1]	EH [3]	H	M	R	NS
Giardia [2]	>30	16-30	6-15	1-5	<1
Coccidia [2]	>30	16-30	6-15	1-5	<1
Diatoms [4]	>150	41-149	11-40	1-10	<1
Other Algae [4]	>300	96-299	21-95	1-20	<1
Insects/Larvae	>100	31-99	16-30	1-15	<1
Rotifers	>150	61-149	21-60	1-20	<1
Plant Debris [4]	>200	71-200	26-70	1-25	<1

1. According to EPA "Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources", March, 1991 ed.

2. If Giardia cysts or coccidian are found in any sample, irrespective of volume, score as above.

3. Key= EH – extremely heavy M – moderate NS – not significant
H – heavy R – rare

4. Chlorophyll containing

Table 2. Relative surface water risk factors associated with scoring of primary bio-indicators (particulate) present during MPA of subsurface water sources.

Indicators of surface water [1]	Relative Risk Factor [3]				
	EH [2]	H	M	R	NS
Giardia	40	30	25	20	0
Coccidia	35	30	25	20	0
Diatoms	16	13	11	6	0
Other Algae	14	12	9	4	0
Insects/Larvae	9	7	5	3	0
Rotifers	4	3	2	1	0
Plant Debris	3	2	1	0	0

1. According to EPA "Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources", March, 1991 ed.

2. Refer to Table 1 for range of indicators counted per 100 gallons.
Key= EH – extremely heavy M – moderate NS – not significant
H – heavy R – rare

3. Risk of surface water contamination
≥20 – high risk
10-19 – moderate risk
≤9 – low risk

APPENDIX B

APA SHORELINE RESTRICTIONS

SHORELINE RESTRICTIONS

This is a supplement to the Citizen's Guide, which provides basic information about Adirondack Park Agency regulations.

Pursuant to §806 of the Adirondack Park Agency Act, the following restrictions apply regardless of whether an Agency permit is required for a new land use or development or subdivision.[1] Additional restrictions may also apply to the shoreline of rivers included in the New York State Wild, Scenic, and Recreational River System.

STRUCTURE SETBACKS
(these setbacks do not apply to docks and boathouses; see below)

Any new structure[2] exceeding 100 square feet in size must comply with the following minimum setback distances from the mean high water mark (the average annual high water level) of any lake or pond or any river or stream navigable by boat, including canoe:

Hamlet	***50 feet***	***Rural Use***	***75 feet***
Moderate Intensity Use	***50 feet***	***Resource Management***	***100 feet***
Low Intensity Use	***75 feet***		

Structures that are only partially located within the setback, as well as individual structures that are attached to each other, are measured in their entirety for the purpose of implementing these restrictions.[3] The setback is measured horizontally along the shortest line between any point of the structure and any point on the shoreline at the mean high water mark. The Agency will locate the mean high water mark upon request of any landowner contemplating development.

Structures that lawfully exist within a shoreline setback area may be replaced or rebuilt in the same location or immediate vicinity. Effective December 31, 2008, the following changes to the dimensions of a lawfully existing structure within the setback area require a variance, whether the changes occur through expansion or replacement: (i) location of the structure any closer to the mean high water mark; (ii) any increase in height; (iii) any increase in footprint; or (iv) any increase in width. However, an increase of up to two feet in height of a single family dwelling or mobile home[4], an increase of up to 250 square feet of footprint to the rear (non-shoreline side) of a single family dwelling or mobile home, and/or the addition of a stoop no larger than 25 square feet providing access to the rear or side of a single family dwelling or mobile home does

1 The shoreline restrictions of APA Act §806 are incorporated in the Agency-approved local zoning program for the Towns of Arietta, Bolton, Caroga, Chester, Chesterfield, Colton, Day, Edinburg, Hague, Horicon, Indian Lake, Johnsburg, Newcomb, Queensbury, Westport, and Willsboro, and the Town and Village of Lake George. Advice on requirements and variance procedures may be obtained from the local code enforcement officer.

2 The term structure includes decks, stairways, porches, sheds, fences, picnic shelters, cabins, lean-tos, etc. Motor vehicles and trailers that are registered with the DMV, have a current inspection sticker, and are not connected to an in-ground wastewater treatment system are generally not considered structures subject to the setback requirements.

3 Structures may be considered attached for Agency purposes if they are less than ten feet apart or structurally integrated. However, stairways, patios, walkways, docks, and boathouses are considered individual structures for replacement purposes, regardless of their attachment to other structures. Please contact the Agency for more information.

4 For the purpose of implementing 9 NYCRR ' 575.5, the height of buildings with roof ridgeline(s) is measured at the highest point of the highest roof ridgeline. The height of buildings without roof ridgeline(s) is measured at the highest point of the structure.

not require a variance. There are minor expansions allowed for other types of lawfully existing shoreline structures, as well; please contact the Agency for more information.

No variance is required for any replacement or expansion undertaken outside the shoreline setback area.

DOCKS AND BOATHOUSES

A structure that constitutes a dock or boathouse pursuant to the definitions referenced below is not subject to the shoreline setback requirements.

> **Dock** is defined under §570.3(j) of Agency regulations. In general, a dock is a floating or fixed structure that is no more than eight feet in width, including at its attachment to a shoreline or boathouse, and could be used for securing and/or loading or unloading water craft and/or for swimming or water recreation. A structure that meets this definition is considered a dock below the mean high water mark and a boardwalk, deck, or other structure upland of the mean high water mark. Docks that are hoisted or suspended above water level for storage must conform to additional parameters.
>
> **Boathouse** is defined under §570.3(c) of Agency regulations. In general, a boathouse is a covered structure with direct access to a body of water that is used only for the storage of boats and associated equipment, does not contain sanitary plumbing of any kind, does not exceed a single story in that the roof rafters rest on the top plate of the first floor wall, and has a footprint of 1200 square feet or less and a height of fifteen feet or less. The footprint of a boathouse is measured at the exterior walls, or at the perimeter of the roof if the roof is flat or there are no exterior walls. The height of a boathouse is measured from the surface of the floor serving the boat berths to the highest point of the structure. A structure within the Lake George Park may be a boathouse even if it does not meet this definition, provided the structure is in compliance with a permit from the Lake George Park Commission.

MINIMUM LOT WIDTHS

Any subdivision creating a new parcel on which a new principal building will be constructed must comply with the following lot widths, as measured along the shoreline at the mean high water mark. This standard applies even when no Agency permit is required for the subdivision.

Hamlet	***50 feet***	***Rural Use***	***150 feet***
Moderate Intensity Use	***100 feet***	***Resource Management***	***200 feet***
Low Intensity Use	***125 feet***		

Additional shoreline lot width may be required for (i) providing deeded or contractual access to water bodies and (ii) the creation of lots in designated Scenic and Recreational River areas.

SEWAGE SYSTEM SETBACKS

Any new leaching facility (including a seepage pit, drainage field, outhouse, or pit privy) receiving any form of household effluent must be set back at least 100 feet from any water body, including an intermittent stream with a defined bed and bank. The setback is measured horizontally along the shortest distance from the mean high water mark to the closest point of the leaching facility. New York State Department of Health standards also require that the absorption field (leaching facility) of any new on-site sewage disposal system be installed at least 100 feet from the source of any water supply system.

Alteration or replacement of a lawfully existing leaching facility located within 100 feet of a water body must occur in conformance with the setback requirements to the greatest extent possible, with the leaching facility located no closer to the mean high water mark, and must provide enhanced treatment.

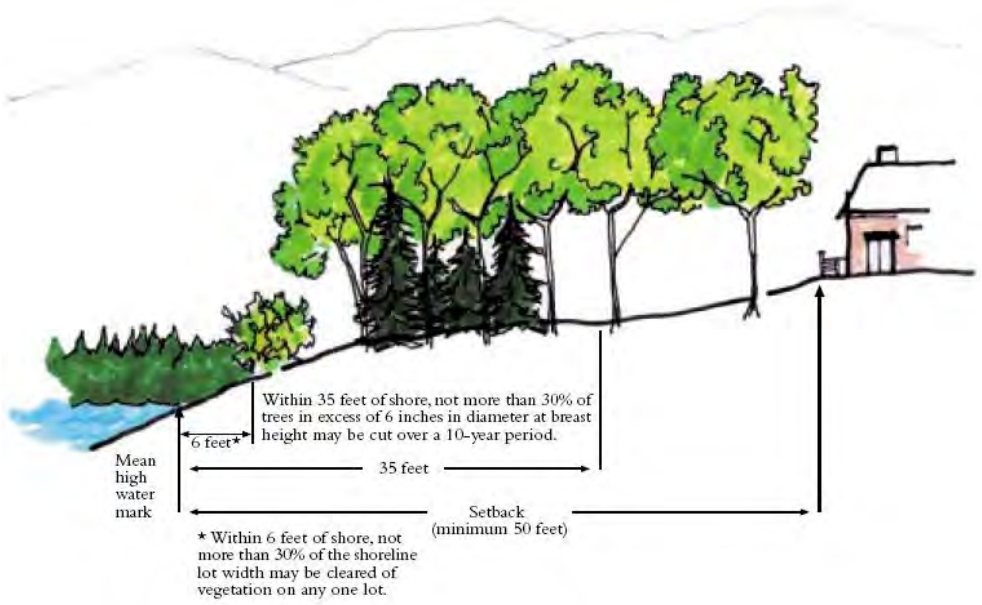
Upon the expansion of any structure to allow for an actual or potential increase in occupancy, the leaching facility serving the structure must be located at least 100 feet from all water bodies.

SHORELINE CUTTING RESTRICTIONS

Except to allow for the removal of diseased vegetation and rotten or damaged trees, all vegetative cutting on a parcel with shoreline on a lake, pond, or navigable river or stream must comply with the following restrictions:

(a) Within 35 feet of the mean high-water mark, no more than 30 percent of the trees in excess of six inches diameter at breast height (4½ feet above ground) may be cut over any 10-year period.

(b) Within 6 feet of the mean high-water mark, no more than 30 percent of any vegetation may be removed.



This flyer is intended to provide general information regarding Agency jurisdiction. Other provisions or restrictions may apply if an Agency permit or variance is required or if the property has previously been subject to Agency review.

Please contact the Agency with any questions at 518-891-4050. For a binding written response as to whether a specific proposal requires Agency review, please submit a Jurisdictional Inquiry Form (JIF). The JIF form is available on the Agency website at www.apa.ny.gov/Forms/jiform.pdf.

APPENDIX C

ENVIRONMENTAL FACT SHEETS & RESOURCES

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Clinton County, New York

Local office

New York Ecological Services Field Office

(607) 753-9334
(607) 753-9699

3817 Luker Road
Cortland, NY 13045-9385

http://www.fws.gov/northeast/nyfo/es/section7.htm

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. 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.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Indiana Bat Myotis sodalis — Endangered
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/5949

Northern Long-eared Bat Myotis septentrionalis — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9045

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird

species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence

across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

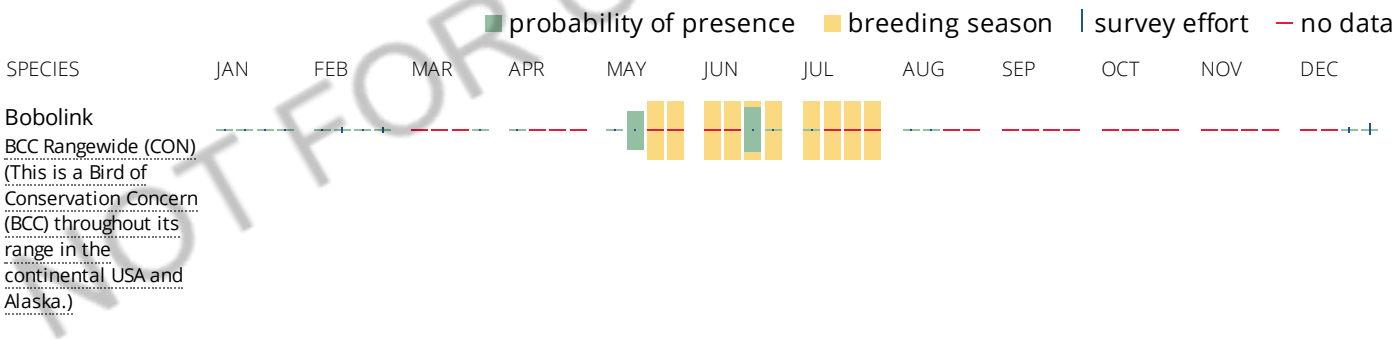
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1E
- PFO1F

FRESHWATER POND

- PUBHx

RIVERINE

- R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this

inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Northern Long-Eared Bat

Myotis septentrionalis

The northern long-eared bat is federally listed as a threatened species under the Endangered Species Act. ***Endangered*** species are animals and plants that are in danger of becoming extinct. ***Threatened*** species are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's Endangered Species Program.

Photo by Steve Taylor, University of Illinois

This northern long-eared bat, observed during an Illinois mine survey, shows visible symptoms of white-nose syndrome.

What is the northern long-eared bat?

Appearance: The northern long-eared bat is a medium-sized bat with a body length of 3 to 3.7 inches and a wingspan of 9 to 10 inches. Their fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. As its name suggests, this bat is distinguished by its long ears, particularly as compared to other bats in its genus, *Myotis*.

Winter Habitat: Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. Within hibernacula, surveyors find them hibernating most often in small crevices or cracks, often with only the nose and ears visible.

Summer Habitat: During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). Males and non-reproductive females may also roost in cooler places, like caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. They rarely roost in human structures like barns and sheds.

Reproduction: Breeding begins in late summer or early fall when males begin to swarm near hibernacula. After copulation, females store sperm during hibernation until spring. In spring, females emerge from their hibernacula, ovulate and the stored sperm fertilizes an egg. This strategy is called delayed fertilization.

After fertilization, pregnant bats migrate to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies of females and young generally have 30 to 60 bats at the beginning of the summer, although larger maternity colonies have also been observed. Numbers of bats in roosts typically decrease from the time of pregnancy to post-lactation. Most bats within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth. Maximum lifespan for the northern long-eared bat is estimated to be up to 18.5 years.

Feeding Habits: Like most bats, northern long-eared bats emerge at dusk to feed. They primarily fly through the understory of forested areas feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation or by gleaning motionless insects from vegetation.

Range: The northern long-eared bat's range includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. The species' range includes 37 States and the District of Columbia: Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming.

Why is the northern long-eared bat in trouble?

White-nose Syndrome: No other threat is as severe and immediate as

this. If this disease had not emerged, it is unlikely that northern long-eared bat populations would be experiencing such dramatic declines. Since symptoms were first observed in New York in 2006, white-nose syndrome has spread rapidly from the Northeast to the Midwest and Southeast; an area that includes the core of the northern long-eared bat's range, where it was most common before this disease. Numbers of northern long-eared bats (from hibernacula counts) have declined by up to 99 percent in the Northeast. Although there is uncertainty about the rate that white-nose syndrome will spread throughout the species' range, it is expected to continue to spread throughout the United States in the foreseeable future.

Other Sources of Mortality:
Although no significant population declines have been observed due to the sources of mortality listed below, they may now be important factors affecting this bat's viability until we find ways to address WNS.

Impacts to Hibernacula: Gates or other structures intended to exclude people from caves and mines not only restrict bat flight and movement, but also change airflow and microclimates. A change of even a few degrees can make a cave unsuitable for hibernating bats. Also, cave-dwelling bats are vulnerable to human disturbance while hibernating. Arousal during hibernation causes bats to use up their energy stores, which may lead to bats not surviving through winter.

Loss or Degradation of Summer Habitat: Highway construction, commercial development, surface mining, and wind facility construction permanently remove habitat and are activities prevalent in many areas of this bat's range. Many forest management activities benefit bats by keeping areas forested rather than converted to other uses. But, depending on type and timing, some forest management activities can cause mortality and temporarily remove or degrade roosting and foraging habitat.

Wind Farm Operation: Wind turbines kill bats, and, depending on the species, in very large numbers. Mortality from windmills has been documented for northern long-eared bats, although a small number have been found to date. However, there are many wind projects within a large portion of the bat's range and many more are planned.

What Is Being Done to Help the Northern Long-Eared Bat?

Disease Management: Actions have been taken to try to reduce or slow the spread of white-nose syndrome through human transmission of the fungus into caves (e.g. cave and mine closures and advisories; national decontamination protocols). A national plan was prepared by the Service and other state and federal agencies that details actions needed to investigate and manage white-nose syndrome. Many state and federal agencies, universities and non-governmental organizations are researching this disease to try to control its spread and address its affect. See www.whitenosesyndrome.org/ for more.

Addressing Wind Turbine Mortality: The Service and others are working to minimize bat mortality from wind turbines on several fronts. We fund and conduct research to determine why bats are susceptible to turbines, how to operate turbines to minimize mortality and where important bird and bat migration routes are located. The Service, state natural resource agencies, and the wind energy industry are developing a Midwest Wind Energy Habitat Conservation Plan, which will provide wind farms a mechanism to continue operating legally while minimizing and mitigating listed bat mortality.

Listing: The northern long-eared bat is listed as a threatened species under the federal Endangered Species Act. Listing a species affords it the protections of the Act and also increases the priority of the species for funds, grants, and recovery opportunities.

Hibernacula Protection: Many federal and state natural resource agencies and conservation organizations have protected caves and mines that are important hibernacula for cave-dwelling bats.

What Can I Do?

Do Not Disturb Hibernating Bats: To protect bats and their habitats, comply with all cave and mine closures, advisories, and regulations. In areas without a cave and mine closure policy, follow approved decontamination protocols (see http://whitenosesyndrome.org/topics/decontamination). Under no circumstances should clothing, footwear, or equipment that was used in a white-nose syndrome affected state or region be used in unaffected states or regions.

Leave Dead and Dying Trees Standing: Like most eastern bats, the northern long-eared bat roosts in trees during summer. Where possible and not a safety hazard, leave dead or dying trees on your property. Northern long-eared bats and many other animals use these trees.

Install a Bat Box: Dead and dying trees are usually not left standing, so trees suitable for roosting may be in short supply and bat boxes may provide additional roost sites. Bat boxes are especially needed from April to August when females look for safe and quiet places to give birth and raise their pups.

Support Sustainability: Support efforts in your community, county and state to ensure that sustainability is a development goal. Only through sustainable living will we provide rare and declining species, like the northern long-eared bat, the habitat and resources they need to survive alongside us.

Spread the Word: Understanding the important ecological role that bats play is a key to conserving the northern long-eared and other bats. Helping people learn more about the northern long-eared bat and other endangered species can lead to more effective recovery efforts. For more information, visit www.fws.gov/midwest/nleb and www.whitenosesyndrome.org

Join and Volunteer: Join a conservation group; many have local chapters. Volunteer at a local nature center, zoo, or national wildlife refuge. Many state natural resource agencies benefit greatly from citizen involvement in monitoring wildlife. Check your state agency websites and get involved in citizen science efforts in your area.

Indiana Bat
(Myotis sodalis)

Photo by Rich Fields

Indiana bats eat up to half their body weight in insects each night.

The Indiana bat is an endangered species. Endangered species are animals and plants that are in danger of becoming extinct. Threatened species are those that are likely to become endangered in the foreseeable future. Identifying, protecting, and restoring endangered and threatened species are primary objectives of the U.S. Fish and Wildlife Service's endangered species program.

What is the Indiana Bat?

Description

The scientific name of the Indiana bat is *Myotis sodalis* and it is an accurate description of the species. Myotis means "mouse ear" and refers to the relatively small, mouse-like ears of the bats in this group. Sodalis is the Latin word for "companion." The Indiana bat is a very social species; large numbers cluster together during hibernation. The species is called the Indiana bat because the first specimen described to science in 1928 was based on a specimen found in southern Indiana's Wyandotte Cave in 1904.

The Indiana bat is quite small, weighing only one-quarter of an ounce (about the weight of three pennies). In flight, it has a wingspan of 9 to 11 inches. The fur is dark-brown to black. The Indiana bat is similar in appearance to many other related species. Biologists can distinguish it from similar species by comparing characteristics such as the structure of the foot and color variations in the fur.

Habitat

Indiana bats hibernate during winter in caves or, occasionally, in abandoned mines. For hibernation, they require cool, humid caves with stable temperatures, under 50° F but above freezing. Very few caves within the range of the species have these conditions.

Hibernation is an adaptation for survival during the cold winter months when no insects are available for bats to eat. Bats must store energy in the form of fat before hibernating. During the six months of hibernation the stored fat is their only source of energy. If bats are disturbed or cave temperatures increase, more energy is needed and hibernating bats may starve.

After hibernation, Indiana bats migrate to their summer habitat in wooded areas where they usually roost under loose tree bark on dead or dying trees. During summer, males roost alone or in small groups, while females roost in larger groups of up to 100 bats or more. Indiana bats also forage in or along the edges of forested areas.

Reproduction

Indiana bats mate during fall before they enter caves to hibernate. Females store the sperm through winter and become pregnant in spring soon after they emerge from the caves.

After migrating to their summer areas, females roost under the peeling bark of dead and dying trees in groups of up to 100 or more. Such groups are called maternity colonies. Each female in the colony gives birth to only one pup per year. Young bats are nursed by the mother, who leaves the roost tree only to forage for food. The young stay with the maternity colony throughout their first summer.

Feeding Habits

Indiana bats eat a variety of flying insects found along rivers or lakes and in uplands. Like all insect-eating bats, they benefit people by consuming insects that are considered pests or otherwise harmful to humans. Their role in insect control is not insignificant – Indiana bats eat up to half their body weight in insects each night.

Range

Indiana bats are found over most of the eastern half of the United States. Almost half of all Indiana bats (207,000

in 2005) hibernate in caves in southern Indiana. In 2005, other states which supported populations of over 40,000 included Missouri (65,000), Kentucky (62,000), Illinois (43,000) and New York (42,000). Other states within the current range of the Indiana bat include Alabama, Arkansas, Connecticut, Iowa, Maryland, Michigan, New Jersey, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Vermont, Virginia, West Virginia. The 2005 population estimate is about 457,000 Indiana bats, half as many as when the species was listed as endangered in 1967.

Why is the Indiana Bat Endangered?

Human Disturbance

Indiana bats, because they hibernate in large numbers in only a few caves, are extremely vulnerable to disturbance. During hibernation, they cluster in groups of up to 500 per square foot. Since the largest hibernation caves support from 20,000 to 50,000 bats, it is easy to see how a large part of the total population can be affected by a single event. Episodes of large numbers of Indiana bat deaths have occurred due to human disturbance during hibernation.

Cave Commercialization and Improper Gating

The commercialization of caves – allowing visitors to tour caves during hibernation – drives bats away. Changes in the structure of caves, such as blocking an entrance, can change the temperature in a cave. A change of even a few degrees can make a cave unsuitable for hibernating bats. Some caves are fitted with gates to keep people out, but improper gating that prevents access by bats or alters air flow, temperature, or humidity can also be harmful. Properly constructed gates are beneficial because they keep people from disturbing hibernating bats while maintaining temperature and other requirements and allowing access for bats.

Summer Habitat Loss or Degradation

Indiana bats use trees as roosting and foraging sites during summer months. Loss and fragmentation of forested habitats can affect bat populations.

Pesticides and Environmental Contaminants

Insect-eating bats may seem to have an unlimited food supply, but in local areas, insects may not be plentiful because of pesticide use. This can also affect the quality of the bats' food supply. Many scientists believe that population declines occurring today might be due, in part, to pesticides and environmental contaminants. Bats may be affected by eating contaminated insects, drinking contaminated water, or absorbing the chemicals while feeding in areas that have been recently treated.

What is Being Done to Prevent Extinction of the Indiana Bat?

Listing

Prompted by declining populations caused by disturbance of bats during hibernation and modification of hibernacula, the Indiana bat was listed in 1967 as "in danger of extinction" under the Endangered Species Preservation Act of 1966. It is listed as "endangered" under the current Endangered Species Act of 1973. Listing under the Endangered Species Act protects the Indiana bat from take (harming, harassing, killing) and requires Federal agencies to work to conserve it.

Recovery Plan

The Endangered Species Act requires that recovery plans be prepared for all listed species. The U.S. Fish and Wildlife Service developed a recovery plan for the Indiana bat in 1983 and is now revising that Plan. The recovery plan describes actions needed to help the bat recover.

Habitat Protection

Public lands like National Wildlife Refuges, military areas, and U.S. Forest Service lands are managed for Indiana bats by protecting forests. This means ensuring that there are the size and species of trees needed by Indiana bats for roosting; and providing a supply of dead and dying trees that can be used as roost sites. In addition, caves used for hibernation are managed to maintain suitable conditions for hibernation and eliminate disturbance.

Education and Outreach

Understanding the important role played by Indiana bats is a key to conserving the species. Helping people learn more about the Indiana bat and other endangered species can lead to more effective recovery efforts.

U.S. Fish & Wildlife Service
1 Federal Drive
Fort Snelling, Minnesota 55111
612/713-5350
http://www.fws.gov/midwest/endangered

December 2006

APPENDIX D

ENGINEERING REPORT CERTIFICATION

Appendix C: Engineering Report Certification
(required for EFC financial assistance)

Engineering Report Certification

To Be Provided by the Professional Engineer Preparing the Report

During the preparation of this Engineering Report, I have studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is being sought from the New York State Clean Water State Revolving Fund. In my professional opinion, I have recommended for selection, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of constructing the project or activity, the cost of operating and maintaining the project or activity over the life of the project or activity, and the cost of replacing the project and activity.

Title of Engineering Report: Town of Keene Water District #2 Well Field Evaluation

Date of Report: 08/29/2020

Professional Engineer's Name: Gregory Swart

Signature:

Date:
08/29/2020

APPENDIX E

SMART GROWTH ASSESSMENT

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

Smart Growth Assessment Form

This form should be completed by the applicant's project engineer or other design professional.[1]

Applicant Information

Applicant: Town of Keene Project No.: 4893

Project Name: Water District #2 Well Field Evaluation

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

Project Summary: (provide a short project summary in plain language including the location of the area the project serves)

The project outlines the different proposed alternatives to supply the Town with a redundant investigate existing treatment processes to ensure the longevity of the disinfection process.

Section 1 – Screening Questions

1. Prior Approvals

1A. Has the project been previously approved for Environmental Facilities Corporation (EFC) financial assistance? ☐ Yes ☑ No

1B. If so, what was the project number(s) for the prior approval(s)? Project No.:

Is the scope of the project substantially the same as that which was approved? ☐ Yes ☐ No

IF THE PROJECT WAS PREVIOUSLY APPROVED BY EFC'S BOARD AND THE SCOPE OF THE PROJECT HAS NOT MATERIALLY CHANGED, THE PROJECT IS **NOT** SUBJECT TO SMART GROWTH REVIEW. SKIP TO SIGNATURE BLOCK.

2. New or Expanded Infrastructure

2A. Does the project add new wastewater collection/new water mains or a new wastewater treatment system/water treatment plant? ☐ Yes ☑ No

Note: A new infrastructure project adds wastewater collection/water mains or a wastewater treatment/water treatment plant where none existed previously

2B. Will the project result in either: ☐ Yes ☑ No

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

OR

An increase 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?

Note: An expanded infrastructure project results in an increase of the SPDES permitted flow capacity for the wastewater treatment system, or an increase of the permitted water withdrawal or the permitted flow capacity for the water treatment system.

[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.

IF THE ANSWER IS "NO" TO BOTH "2A" and "2B" ON THE PREVIOUS PAGE, THE PROJECT IS NOT SUBJECT TO FURTHER SMART GROWTH REVIEW. SKIP TO SIGNATURE BLOCK.

3. Court or Administrative Consent Orders

3A. Is the project expressly required by a court or administrative consent order? ☐ Yes ☐ No

3B. If so, have you previously submitted the order to EFC or DOH? If not, please attach. ☐ Yes ☐ No

Section 2 – Additional Information Needed for Relevant Smart Growth Criteria

EFC has determined that the following smart growth criteria are relevant for EFC-funded projects and that projects must meet each of these criteria to the extent practicable:

1. Uses or Improves Existing Infrastructure

1A. Does the project use or improve existing infrastructure? ☐ Yes ☐ No

Please describe:

2. Serves a Municipal Center

Projects must serve an area in either 2A, 2B or 2C to the extent practicable.

2A. Does the project serve an area **limited** to one or more of the following municipal centers?

i. A City or incorporated Village ☐Yes ☐No

ii. A central business district ☐Yes ☐No

iii. A main street ☐Yes ☐No

iv. A downtown area ☐Yes ☐No

v. A Brownfield Opportunity Area ☐Yes ☐No
(for more information, go to www.dos.ny.gov & search "Brownfield")

vi. A downtown area of a Local Waterfront Revitalization Program Area ☐Yes ☐No
(for more information, go to www.dos.ny.gov and search "Waterfront Revitalization")

vii. An area of transit-oriented development ☐Yes ☐No

viii. An Environmental Justice Area ☐Yes ☐No
(for more information, go to www.dec.ny.gov/public/899.html)

ix. A Hardship/Poverty Area ☐Yes ☐No
Note: Projects that primarily serve census tracts and block numbering areas with a poverty rate of at least twenty percent according to the latest census data

Please describe all selections:

2B. If the project serves an area located outside of a municipal center, does it serve an area located adjacent to a municipal center which has clearly defined borders, designated for concentrated development in a municipal or regional comprehensive plan and exhibit strong land use, transportation, infrastructure and economic connections to an existing municipal center? ☐Yes ☐No

Please describe:

2C. If the project is not located in a municipal center as defined above, is the area designated by a comprehensive plan and identified in zoning ordinance as a future municipal center? ☐Yes ☐No

Please describe and reference applicable plans:

3. Resiliency Criteria

3A. Was there consideration of future physical climate risk due to sea-level rise, storm surge, and/or flooding during the planning of this project? ☐Yes ☐No

Please describe:

Signature Block: By entering your name in the box 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 Keene	Phone Number: 518-576-4444
Gregory Swart	
(Name & Title of Project Engineer or Design Professional or Authorized Municipal Representative)	
(Signature)	(Date) 08/29/2020