*Preliminary Engineering Report*

*for*

# ***Water System Improvements Project***

## *Village of Wellsville, Allegany County, New York*

January 2017

HUNT 1861-034

Prepared by:
Hunt Engineers, Architects & Land Surveyors, PC
Airport Corporate Park
100 Hunt Center
Horseheads, NY 14845-1019
Phone (607) 358-1000, Fax (607) 358-1800

***Preliminary Engineering Report***

***For***

***Water System Improvements Project***
***Village of Wellsville, Allegany County, New York***

**HUNT 1861-034**

**January 2017**

## TABLE OF CONTENTS

## FIGURES

## TABLES

## APPENDICES

# I. Background and Introduction

The Village of Wellsville, located in the Genesee River Valley in the southern part of Allegany County, New York, currently owns and operates a public water system (herein referred to as the Water District) to serve the Village of Wellsville and several out of district users. Given the age and condition of the system as characterized by the percentage of unaccounted for water, the Village has expressed interest in completing a comprehensive evaluation of their water system, developing a water system asset management plan, and identifying and quantifying potential improvements with the intent to improve their current water system based on the findings.

The purpose of this report is to describe the existing system conditions and identify any shortcomings, evaluate various alternatives to address the shortcomings, and provide recommendations for improvements based on monetary and non-monetary factors.

# II. Project Planning

## A. Location

The Village of Wellsville is approximately 2.4 square miles in area and is primarily a rural community. New York State Route 417 bisects the Village in an easterly to westerly direction while New York State Route 19 bisects the Village in a northerly to southerly direction. Please refer to Appendix A for a Project Location Map.

## B. Environmental Resources Present

The following section describes, in brief, various environmental resources that have been located in or around the Water District. Please refer to Appendix B for associated mapping.

### 1. Agricultural Districts

Review of the Allegany County Agricultural District Mapping shows that the Village of Wellsville water system is not located within an agricultural district. The Village is located within proximity of Agricultural District 2 and 4. However, any proposed improvements to the existing water system would not impact existing agricultural lands.

### 2. Water Bodies

The Village of Wellsville is bisected by the Genesee River, a Class C water body, from which they receive their water supply. Several Class C streams, brooks, and creeks flow into the Genesee River within the Village limits.

Impacts from any proposed improvements to surface waters would be mitigated through erosion and sediment control practices during construction so as to protect the Village's water source.

### 3. Floodway and Floodplains

As demonstrated on the attached National Flood Insurance Program's Flood Insurance Rate Map (FIRM) of the Village of Wellsville, portions of the Village along the Genesee River and several creeks are within the 100 year floodplain. The Village's water treatment plant is located within the 100 year floodplain.

### 4. Wetlands

The New York State Department of Environmental Conservation (NYSDEC) mapping was reviewed regarding potential state designated wetlands in and around the Village of

Wellsville. As demonstrated in the attached mapping, there are no wetlands designated by New York State within the existing system service area.

Review of the United States Fish and Wildlife Service National Wetlands Inventory mapping shows several federally regulated freshwater emergent wetlands and forested shrub wetlands within the Village limits. The wetlands present are within the Genesee River corridor and are not encroached upon by existing water system infrastructure.

### 5. Subsurface Conditions

Utilizing the National Resources Conservation Service online soil survey tool, the predominant soil types throughout the Water District area include: Chenango Series, Mardin Series, and Valois Series. Soil drainage within the Water District is predominately characterized by moderately well-drained to well-drained with areas of poor drainage. Soil mapping of the Water District is attached along with descriptions of the various soil types.

Groundwater depth within the project area varies. The presence of groundwater throughout the water system area is influenced by the Genesee River that bisects the Village.

### 6. Endangered or Threatened Species

Review of the NYSDEC environmental resources mapping, which incorporates the New York National Heritage Program Information, shows the Water District to be free of rare plant and wildlife species, and other environmental resources considered by the NYSDEC.

The United States Fish and Wildlife Service's Information for Planning and Conservation (IPaC) database was reviewed to determine that one species of bat, the northern long-eared bat, is an endangered species that may occur or could potentially be affected by activities in the Village of Wellsville. Habitat for the species consists of hibernation in caves in the winter and then migration to wooded areas during the summer. The northern long-eared bat will roost underneath bark, in cavities or crevices of both live and dead trees. Any projects within the Village of Wellsville will need to be evaluated for their potential to impact this endangered species. Projects shall incorporate measures, such as ensuring that the species habitat is not destroyed, in order to prevent impacts to the northern long-eared bat. Given the bat's habitat, it is unlikely that improvements to the existing water system infrastructure will impact the bat, as existing infrastructure is located within paved roads and in areas that receive routine disturbance and maintenance.

### 7. Archeological Sensitivity

Review of Office of Parks, Recreation, and Historic Preservation (OPRHP) and State Historical Preservation Office (SHPO) archeological mapping shows the southern portion of the Water District to be in an archeologically sensitive zone. New improvements to be constructed within these areas will likely require further investigation to determine the sensitivity of the areas.

## C. Population Trends

The Village of Wellsville currently has an estimated population of 4,621 (2014 ACS 5-year population estimate). Using U.S. Census Data, the Village has experienced a notable decline in population since 1950. In 1950, the population was estimated to be 6,402 persons and has steadily declined to 4,679 persons, as recently documented in the 2010 U.S Census. This population trend can be graphically shown as follows:

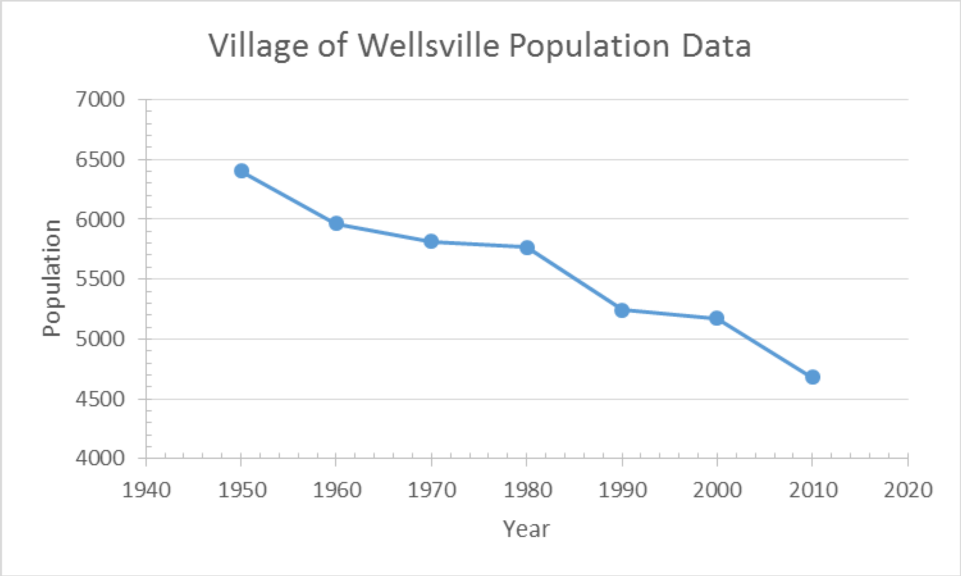


**Figure 1: Population data for the Village of Wellsville.**

Utilizing the downward trend, the projected population growth for the next two decades is 4,531 in 2020 and 4,296 in 2030.

The Village of Wellsville has a median household income (MHI) of $39,792, which is below the New York State MHI of $58,687.

**Table 1: Median Household Income.**

| **Place** | **Median Household Income (2010-2014 5-year ACS)** |
|---|---|
| Village of Wellsville | $39,792 |
| Allegany County | $42,726 |
| New York State | $58,687 |
| United States | $53,482 |

The Village's median income is approximately 25% lower than the United States median household income of $53,482 and 32% lower than the New York State median household income of $58,687.

A declining population coupled with an aging water system can result in one of the following outcomes:

1. Increased rates to compensate for the reduction in water consumption to provide necessary maintenance and upgrades to the water system.
2. Maintain relatively flat rates during the population decline resulting in a decrease in water revenue needed to complete maintenance and upgrades to the water system.

### D. Community Engagement

HUNT, in conjunction with the Village of Wellsville, shall host public information meetings to openly discuss the project with the residents of the Village and out of district users to address any questions or comments the public may have. The Village of Wellsville shall notify the public of the water system evaluation progression through newsletters or bulletins.

## III. Existing Water System

A hydraulic model of the existing water system was developed. Refer to Appendix C for the hydraulic model narrative.

### A. History

The Village of Wellsville water system was purchased in 1915 from the Wellsville Water Company. The water system was originally created and owned by the Wellsville Water Company until Village residents became dissatisfied with the company and the Village voted to purchase the company. This water system relied on a reservoir built on Crowner Creek and nine wells near the bank of the Genesee River. In 1916, a slow sand filtration plant was constructed, but did not perform as expected as the Genesee River was too muddy for the plant. A 3 million gallon open concrete reservoir was built in 1916 on Lee Place as part of the slow sand filter project. Due to the poor performance of the slow sand filter, it was abandoned and a new plant was constructed with a rapid sand mechanical filter in 1921. In 1929, a concrete intake dam was constructed that supplied water to a power house and the Village water treatment plant. In 1948, a 750,000 gallon steel tank reservoir was constructed to increase the Village’s storage capacity. In 1956, the U.S. Army Corps of engineers conducted a flood control project on the Genesee River through Wellsville, which was later redesigned to increase the flood control capacity. This required the Village to move their existing intake. Pollution of the river was discovered in 1981 that resulted in placement on the Superfund list with high priority due to the threat to the water supply. The company found to be at fault for polluting the river built a new intake, pump station, and transmission line upstream of the polluted section of the river. The new intake, pump station, and transmission line were dedicated to the Village and the existing infrastructure was kept as an emergency backup. The rapid sand filter plant was replaced in 1990 with a new treatment plant that is currently used. In 1997, the 750,000 gallon steel storage tank was removed from service and demolished due to structural damage. In 2001, two 2 million gallon concrete tanks were constructed and the open concrete tank was removed from service.

### B. Service Area

The water distribution system includes the entire Village of Wellsville. According to the Village’s annual water report, the system services approximately 5,700 people. The Village also serves a number of customers outside of the Village corporate limits that are within the Town of Wellsville. There are seven (7) areas within the Town that are served by the Village of Wellsville water system: the airport, along Morningside Drive, along George Street, along Riverside Drive, to Alfred State College along Tower Drive, along East State Street, and the extension along New York State Route 417. It should be noted that out of district water users cannot legally be served unless a water district is formed including the users outside of the Village, or individual agreements are established between the Village and each user. The Village currently has established agreements with the Town to serve these out of district areas.

## C. Water Supply, Demands and Unaccounted-for-Water

### 1. Genesee River

The primary water supply source for the Village of Wellsville consists of the Genesee River that flows up from Pennsylvania and the rural areas of New York to the south. The Genesee River bisects the Village of Wellsville in a northwesterly to southeasterly direction. Water is drawn from the river just south of the water treatment plant. The Village is permitted to withdraw 2.5 million gallons per day and in 2015, the Village withdrew a daily average of 741,276 gallons.

### 2. Water Treatment Facility

Raw water from the Genesee River is withdrawn from the intake just south of the treatment plant and then pumped to the Water Treatment Facility. As water enters the plant, a coagulant is added in order to aid in filtering the water and chlorine is added as a disinfectant. The Water Treatment Facility contains three filter units. The water enters the plant clarifier and is pumped to the top of the system. The water then filters down through the final set of filters. From the filter units, water is discharged to the plants 500,000 gallon clearwell for final treatment. Chlorine is injected into the water as it is pumped to the clearwell for final disinfection. Also added to the clearwell water is soda ash (for pH control) and fluoride. The volume of the clearwell of 500,000 gallons provides suitable contact time for the chlorine as well as provides adequate equalization volume to buffer between the plant to where the system booster pumps discharge the treated water into the system. It takes the water approximately four hours from the time it is discharged from the filter to the time it is pumped out from the clearwell by one of two (2) vertical turbine pumps. The vertical turbine pumps are 125 HP and discharge at a rate of 950 gpm. A smaller 60 HP pump also pumps from the clearwell and is operated in conjunction with one of the larger pumps if the water level in the clearwell is high.

### 3. Production

The Water Treatment Plant has a meter on the intake line from the Genesee River prior to the filter units and also has a meter on the discharge side of the vertical turbine pumps that draw treated water from the clearwell. The meter after the clearwell represents the water production for the Village of Wellsville.

Water production records were obtained from the Village of Wellsville and HUNT plotted the Water Treatment Plant’s discharge data to determine a maximum monthly production of approximately 25,000,000 gallons, as can be seen in the following figure. Note that in determining the maximum monthly demand, statistical outliers have been removed from consideration. For instance, there were significantly high water production levels that were likely attributed to flushing, breaks or other issues that were eliminated from the data. The Village had a maximum day of 1,543,300 gallons in 2015 and 1,784,400 gallons in 2016.

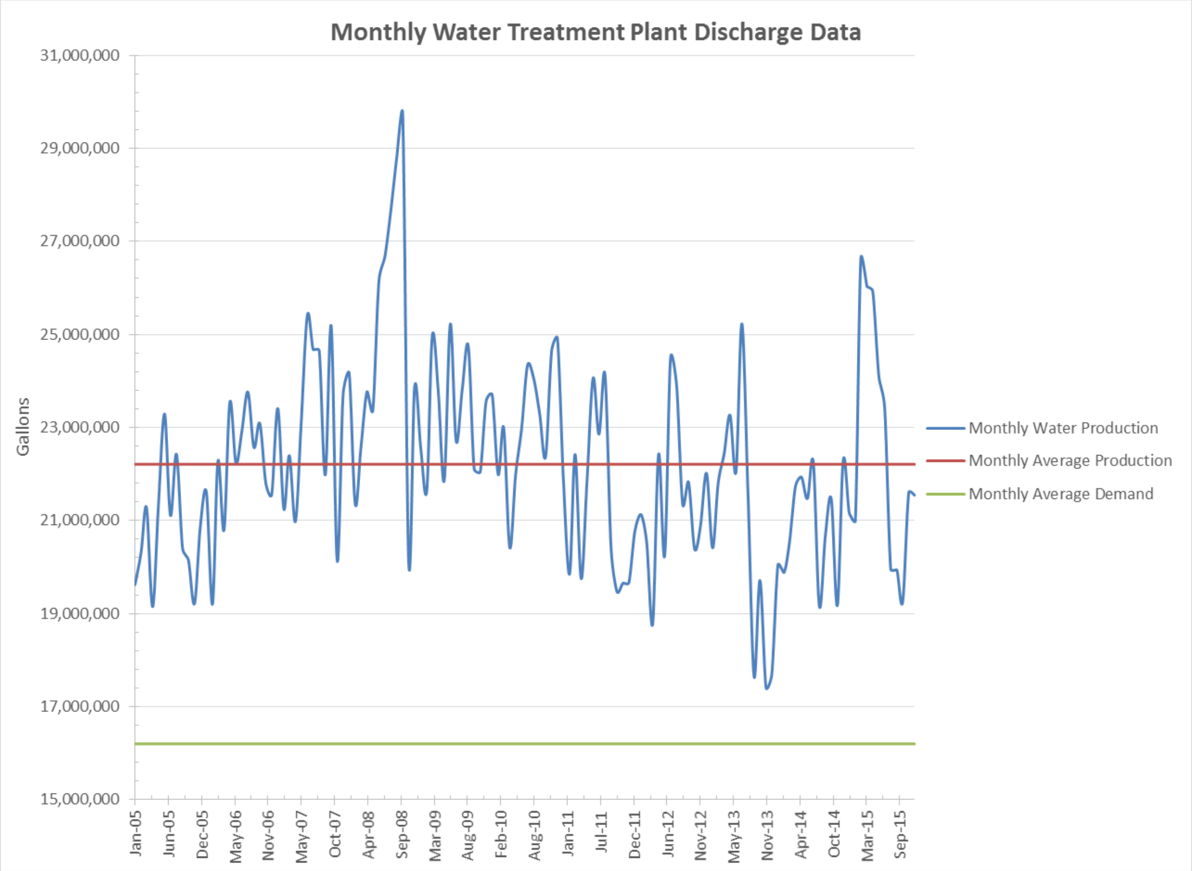


**Figure 2: Treatment plant discharge data from January 2005 to December 2015.**

Additionally, as can be seen from Figure 2, the system sees typical seasonal fluctuation. Water demand varies over time depending on weather conditions, and it is possible to distinguish seasonal and non-seasonal components of water use. In the residential sector, nearly all seasonal use is outdoor use. Non-seasonal use is assumed to be relatively constant throughout the days and months of the year, and in the residential sector it generally represents indoor use. Using the three winter months for calculating non-seasonal use is as follows:

$$\text{Nonseasonal Use} = \text{ Average Winter Season Consumption} = \frac{(V_{Dec.} + V_{Jan.} + V_{Feb.})}{3}$$

Where:
$V = \text{Total Volume of Water Consumed During the Month}$

$$\text{Nonseasonal Use} = \text{ Average Winter Season Consumption}$$
$$= \frac{(15{,}932{,}400 + 14{,}273{,}336 + 12{,}763{,}124)}{3}$$
$$\text{Nonseasonal Use} = \text{Average Winter Season Consumption}$$
$$= 14{,}323{,}000 \; gallons\ per\ month$$

## 4. Unaccounted for Water

Unaccounted for water is the difference in the total water consumption and the billed water production. Sources of unaccounted for water include leaks, unmetered water use, inaccurate meters, hydrant flushing, and street cleaning. The Environmental Protection Agency (EPA) has established an industry goal of 10 percent for unaccounted for water system losses.

Annual consumption and production rates were tabularized from 2005 to 2010 and are shown in the table below. The percentage of unaccounted for water for 2015 is calculated as follows:

$$\text{Unaccounted for water} = \frac{(\text{Total Production} - \text{Total Consumption})}{\text{Total Production}} \times 100\%$$

$$\text{Unaccounted for water} = \frac{(270{,}565{,}600 - 166{,}595{,}804)}{270{,}565{,}600} \times 100\%$$

$$\text{Unaccounted for water} = 38\%$$

**Table 2: Annual water production, consumption, and unaccounted for water.**

| Year | Produced (gallons) | Consumed (gallons) | Unaccounted (gallons) | Percent Unaccounted |
|---|---|---|---|---|
| 2005 | 249,196,600 | 195,420,984 | 53,775,616 | 22% |
| 2006 | 265,361,600 | 188,424,232 | 76,937,368 | 29% |
| 2007 | 276,882,300 | 217,754,768 | 59,127,532 | 21% |
| 2008 | 298,178,100 | 203,839,724 | 94,338,376 | 32% |
| 2009 | 279,011,250 | 196,217,305 | 82,793,945 | 30% |
| 2010 | 277,701,400 | 212,597,308 | 65,104,092 | 23% |
| 2011 | 255,952,000 | 214,040,959 | 41,911,041 | 16% |
| 2012 | 256,734,500 | 194,063,012 | 62,671,488 | 24% |
| 2013 | 251,286,800 | 177,561,561 | 73,725,239 | 29% |
| 2014 | 250,642,600 | 171,847,016 | 78,795,584 | 31% |
| 2015 | 270,565,600 | 166,596,804 | 103,968,796 | 38% |

Over the past ten years, the water system has an average of 27% unaccounted for water of the amount of water produced, and recently as high as 38% unaccounted for water in 2015. Due to the historically high percentage of unaccounted for water, the Village has taken measures to reduce the volume of unaccounted for water within their system. The production meters for the Water Treatment Facility were replaced in 2009. Since 2011, the Village has started to replace smaller meters in the water systems for residential and commercial properties. Between 2011 and 2015, the Village replaced 1,977 meters out of their 2,300 service connections, approximately 86% of the total meters in the system. The Village completed residential meter replacement in 2016.

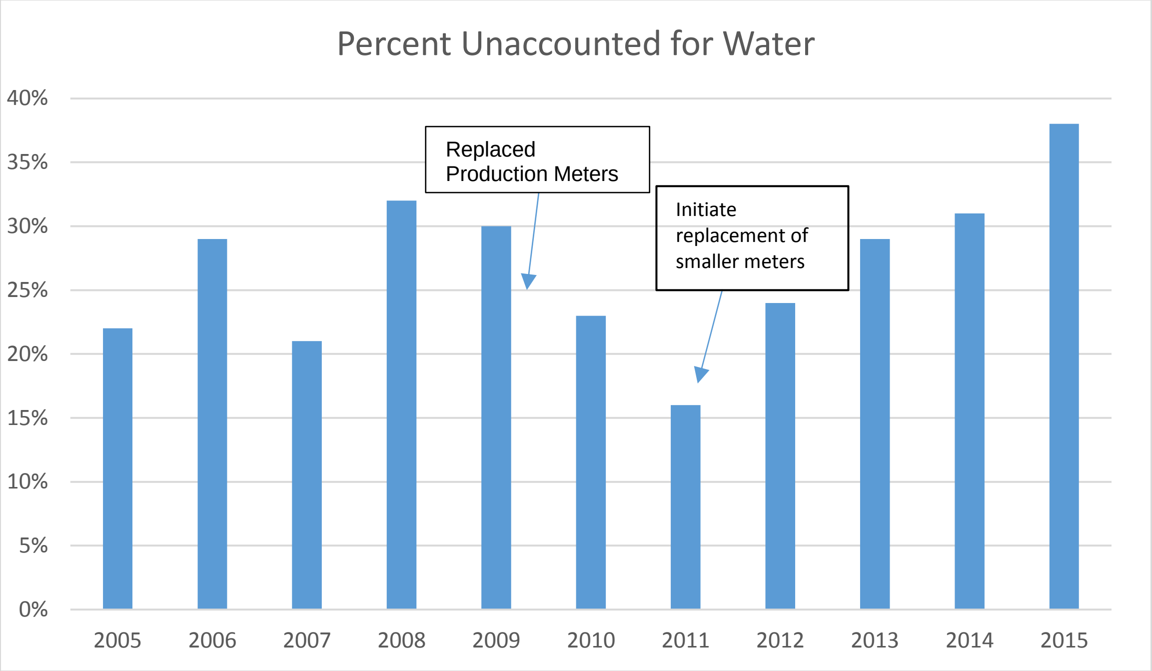


**Figure 3: Village of Wellsville unaccounted for water, 2005 – 2015.**

## D. Water Distribution and Transmission

### 1. General Nature of Distribution System

The water distribution system was originally installed in 1883 and was owned and operated by the Wellsville Water Company. The Village of Wellsville purchased the water system in 1915. The current Village of Wellsville's water distribution system consists of nearly 26 miles of distribution pipe and has 2,300 service connections, serving 5,700 people. The distribution system consists of water main ranging from 2 to 14 inches in diameter, composed of over 50% cast iron, nearly 30% ductile iron, and the remaining consists of cement asbestos, plastic, galvanized, PVC, copper and miscellaneous materials. The Village's water supply is the Genesee River.

The majority of the water system contains looped water main with the most notable exception being dead end water main, located at the northern portion of Riverside Drive, serving the Town of Scio. Smaller sections of dead end water main are located at the water system limits. The Volunteer Fire Department performs annual hydrant flushing of the whole system to maintain the chlorine residual. A known location of stagnation, leading to low chlorine residual, is the dead end located at East Windover Road. To maintain proper chlorine levels, the associated hydrant is blown off at least every other month.

As investigated in the previous section, the Village sees cycles of high and low unaccounted for water. While some of the difference between the years of high and low unaccounted for water percentages is attributed to meter replacement, the cycles of high and low unaccounted for water speaks to the fragility of the water system and the frequent occurrence of watermain breaks. The high frequency of breaks within the water system is likely attributed to the types of pipe material, such as cast iron and transite asbestos, and tanbark subbase. Cast iron and transite asbestos pipe becomes brittle as it ages and thus more susceptible to leaks. In addition, the Village of Wellsville has various roads that have subsoils consisting of tanbark, a waste material from tanning processes where the bark from trees is used. Several tanneries were located within the Village limits and tanbark was placed onto the roads so that in some locations the tanbark is greater than eight (8) feet deep. At this depth, the tanbark is located below the watermains. Refer to Appendix D for a map of the known locations of roads with subsurface tanbark. Historically, the Village has had issues with settlement in their roadways due to tanbark underneath that has resulted in pavement up to three (3) or four (4) feet thick in order to deal with settling of the road. Settlement of tanbark also affects the watermains as it causes the pipe to bend and flex. When coupled with older watermains consisting of brittle pipe materials such as cast iron and transite asbestos, the possibility of leaks is high. In addition, tanbark has the potential to be corrosive, as is typical of decaying organics, and can cause deterioration of the watermains.

Fire hydrant testing was not completed as part of this water system analysis. However, fire flows conducted by the Insurance Services Office (ISO) provide insight as to the condition of the interior of the water main. ISO completed an evaluation in 1997. Results are provided in Appendix E.

### 2. Size and Types of Water Main

As noted below in the following table and pie chart, the distribution system consists of approximately 44% cast iron water main and approximately 33% ductile iron water main. Cast iron water main is generally less resistant to scaling or tuberculation, while ductile iron water main is lined and retains a smooth interior for extended periods of time.

Use of ductile iron water main began in the early 1970's. Therefore, only those improvements after such time utilized ductile iron pipe. Even though the system has relatively large diameter water main, given the size and demands, tuberculation within cast iron pipe will consistently decrease observed flow rates within said cast iron pipes.

**Table 3: Water distribution system material and length.**

| Pipe Material | Abbreviation | Length (ft) | Length (mi) | Percent (%) |
|---|---|---|---|---|
| Cast Iron | CI | 91324 | 17.30 | 44% |
| Ductile Iron | DI | 68866 | 13.04 | 33% |
| Transite Asbestos | TA | 18441 | 3.49 | 9% |
| Plastic/HDPE | PL | 10758 | 2.04 | 5% |
| Galvanized | GAL | 5451 | 1.03 | 3% |
| Copper | CU | 861 | 0.16 | 0.4% |
| Miscellaneous | MISC. | 13266 | 2.51 | 6% |
| **Total** | | **208967** | **39.58** | 100% |

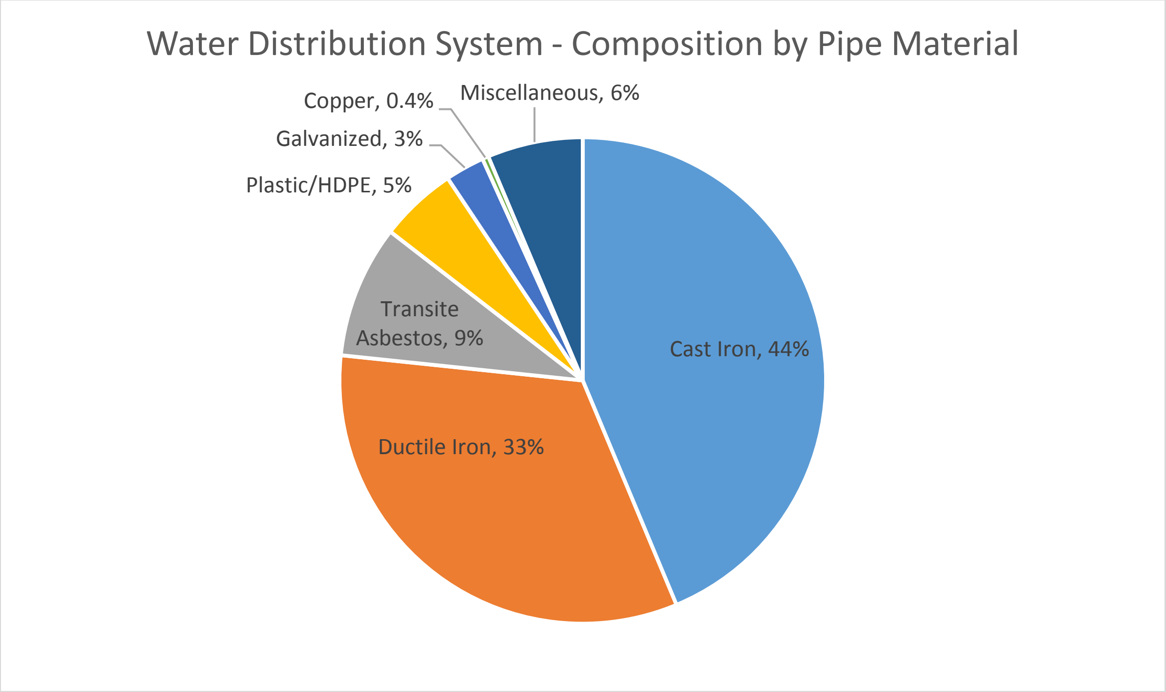


**Figure 4: Water distribution system, pipe material.**

As demonstrated below in Table 4 and Figure 4, the greatest percentage of system piping is 6-inch pipe, at 41%. The next greatest percentage is 37% of 8-inch pipe. The remaining network consists of 1 & 2-inch, 4-inch, 10-inch, 12-inch, and 14-inch pipe.

**Table 4: Water distribution system, pipe diameter.**

| **Pipe Type** | **Length (ft)** | **Length (mi)** | **Percent (%)** |
|---|---|---|---|
| 1 & 2 inch | 9307 | 1.76 | 4% |
| 4 inch | 2347 | 0.44 | 1% |
| 6 inch | 85716 | 16.23 | 41% |
| 8 inch | 76749 | 14.54 | 37% |
| 10 inch | 20866 | 3.95 | 10% |
| 12 inch | 10170 | 1.93 | 5% |
| 14 inch | 3606 | 0.68 | 2% |
| Unknown | 206 | 0.04 | 0% |
| **Total Length** | **208967** | **39.58** | **100%** |

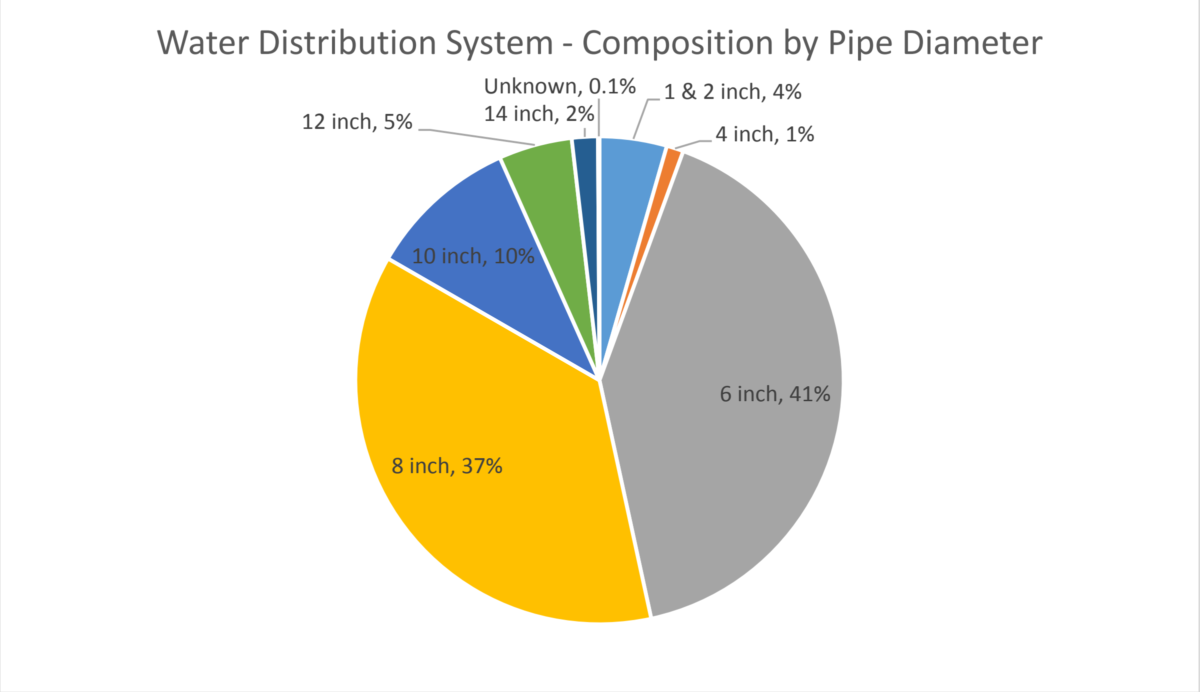


**Figure 5: Water distribution system, composition by pipe diameter.**

### 3. Water Services

The Wellsville Water System has approximately 2,300 service connections. Service piping and taps in the system are primarily copper with a variety of fittings based on installation date. The Village currently replaces service connections with ¾ inch copper and composite fittings as needed, to respond to leaks or perform preventative maintenance.

### 4. Valves

In-line distribution piping isolation valves within the system were last exercised 6 years ago and are reported to be working properly by the Water Department, with the exception of the valve on Fair St. on the east line of the District, which has failed in the closed position.

### 5. Hydrants

The Village provided records of the flow at 84 hydrants in the district in the recent past. The maximum flow measured was 1,550 gpm at Embser Sons Funeral Home parking lot, 34 West State Street. Flow at or below 500 gpm was measured at six (6) of the hydrants: 290 Farnum, 25 Hamilton, Pleasant, 45 North Broad, 329 Scott, and 54 Stevens. These hydrants are spread throughout the distribution system, see map in Appendix F.

Fire flows conducted by the Insurance Services Office (ISO) in 1997 provide insight as to the condition of the interior of the water main. Results are provided in Appendix E. ISO completed fifteen (15) fire hydrant tests and identified a needed fire flow at each hydrant. Eight (8) of the fire hydrants flushed by ISO yielded the required fire flow requirements. The following table summarizes the fire hydrant test location, flow required and flow achieved ($Q_{20}$ Flow):

**Table 5: Fire flows measured by Insurance Services Office, 1997.**

| Fire Flow Test Location | Needed Flow | Flow Provided | Percent of Needed Flow Provided |
|---|---|---|---|
| W. State St. 1st hydrant east of South Brooklyn St. | 3,500 gpm | 5,800 gpm | 166% |
| South Brooklyn St. opposite Lunn Court | 3,000 gpm | 3,700 gpm | 123% |
| Chenault Ave. at Water Treatment Plant | 2,250 gpm | 1,500 gpm | 67% |
| South Brooklyn St. at Otis Eastern Pipe Yard | 1,500 gpm | 1,000 gpm | 67% |
| Stevens St. 2nd hydrant east of Highland Ave | 750 gpm | 1,100 gpm | 147% |
| Riverwalk Plaza 2nd hydrant south of Bolivar Rd. | 2,250 gpm | 1,300 gpm | 58% |
| Route 417 @ Nursing Home | 1,500 gpm | 1,100 gpm | 73% |
| Route 19 2nd hydrant north of Vassler Rd. | 500 gpm | 900 gpm | 180% |
| North Mains St. and E. Pearl St. | 3,500 gpm | 3,900 gpm | 100% |
| Central Ave west of Loder St. | 3,000 gpm | 4,300 gpm | 143% |
| Oconnor St. west of Scott St. | 2,250 gpm | 900 gpm | 40% |
| North Main St. 1st hydrant north of East State St. | 3,000 gpm | 3,500 gpm | 117% |
| South Main St. north of Dyke Creek | 2,500 gpm | 2,500 gpm | 100% |
| School St. opposite Fair St. | 4,500 gpm | 2,200 gpm | 49% |
| South Main St. opposite Orchard Place | 500 gpm | 450 gpm | 90% |

The following locations achieved measured flows less than the needed hydrant flow, based on property insurance premium calculations only. The South Brooklyn Street at Otis Eastern Pipe Yard flow measurement is 67% of the required flow, and the ISO report states that three hydrants on the property are unusable. The area located on the northern part of the distribution system and west of the Genesee River had two hydrant flow measurements taken at terminating points that showed results below the needed flow. This area of the system is composed of ductile iron. Use of ductile iron water main began in the early 1970's. Therefore, only those improvements after such time utilized ductile iron pipe. Due to the relative youth of these pipes and the standard cement-mortar linings of ductile iron pipe, tuberculation is unlikely the cause of reduced flow. It is more likely the lack of achieving the required flow is due to the terminus location and the high required fire flow demand, based on the nature of these commercial institutions. These included Riverwalk Plaza, measured to be 58% of the required flow, and the nearby Route 417 at the Nursing Home achieved 73% of the required flow. Another terminating point measured was Oconnor Street west of Scott Avenue located at the northeastern edge of the water district. This area has ductile iron piping. The School Street hydrant opposite Fair Street had the lowest percentage of needed flow at only 49%. This is in part due to the high need of 4,500 gpm, based on the nearby facilities. The volume of flow of 2,200 gpm is consistent to flow rates throughout the distribution system. The lowest flow measured in the system is the South Main Street hydrant opposite Orchard Place, measuring only 450 gpm. This low rate is concerning as this location is part of a looped system of ductile iron pipe at the southern side of the distribution system and east of the Genesee River. The distribution loop bounded by Main Street, South Franklin Street, and Rauber Street should be investigated further to identify if the low measurement is representative of this area, or simply a poor measurement or hydrant.

## E. Finished Water Storage

The finished water storage currently has a capacity of 4,500,000 gallons from the two concrete tanks and the water treatment plant clearwell. The two (2) 2 million gallon AWWA D110-95 wire-wound concrete water storage tanks were constructed at the location of the previous water storage tank and reservoir on property owned by the Village. These tanks have an inside diameter of 130.5 feet with a total water depth of 20 feet. The water level within the tank is monitored to within one-tenth of an inch, with a pressure sensor located in a concrete vault and radio telemetry. The most recent water tank inspection was performed on August 27, 2014 by Robotic Observation Ventures, Appendix G. The inspection was performed using a robotically operated vehicle with topside real time monitoring and recording. The inspection found the roof to be in good condition, some biofilm cover on all below water surfaces, and wall surfaces to be in good condition. The floor has 90% heavy sediment on bottom of tank, and the inflow and outflow floor penetrator pipes are located within catch basins set into the floor, and the inside of pipes appear in relatively good condition. The concluding opinion is that no immediate attention is required at this time.

Based upon the following sections from the Recommended Standards for Water Works, 2012 Edition, (RSWW) a conservative approach to estimate the minimum required volume of a water storage tank involves the addition of the recommended emergency storage volume (comprised of the fire storage and the average daily consumption volume) and the equalization storage volume. The flow contribution from water supply sources with standby power can reduce the associated storage requirement. The required storage volume is calculated as follows:

Required Storage = Fire Protection Volume + Average Daily Demand
+ Pump Equalization – Supply from Sources with Emergency Generator

Using the criteria above, the current minimum storage required for the Village's water distribution system is estimated as follows:

Fire Protection Volume:

As per the 1997 Hydrant Flow Data Summary from the Insurance Services Office, Appendix D, the Village will need to be capable of providing fire flows of 500 to 4,500 gpm. The highest fire flows (4,500 gpm) required are at a hydrant located on School Street, opposite Fair Street. As per Section 604 of the Fire Suppression Rating Schedule, a fire flow duration of two (2) hours is recommended.

Therefore, the storage volume required based upon fire protection is:

Fire Flow Storage = 4,500 gpm x 2 hr. x 60 min/hr.
Fire Flow Storage = 540,000 gallons

Average Daily Demand

From consumption data provided by the Town, the total consumption was 163,788,812 gallons for 2015. Thus, the daily average demand for the water system is 448,736 gallons.

Pump Equalization:

The amount of equalization volume depends upon demand rates and available production rates. When supplying a constant supply rate into a system over an extended period, the required amount of equalization storage will typically range from 15 to 30 percent (%) of the maximum daily use. Therefore, the associated equalization storage volume is:

Equalization = 20% x Average Daily Demand
Equalization = 0.20 x 448,736 gpd
Equalization = 89,747 gallons

Water Supply from Sources with Emergency Generators:

Required storage volumes can be reduced by the volume that a water supply having a backup power supply can provide during the required 2-hour fire flow period. Emergency power supply is available for the existing pumps, therefore, reduction of the required fire flow can be realized. The volume reduction that would be supplied by the largest pump is calculated as follows:

Volume Reduction = Pump Discharge x (2 hours x 60 minutes/hour)
Volume Reduction = 250 gpm x (2hours x 60 minutes/hour)
Volume Reduction = 30,000 gallons

Given the estimated storage and supply volumes calculated above, the required storage volume as determined by the RSWW is estimated as:

Water Storage Capacity = 540,000 gallon + 448,736 gallons + 89,747 gallons
-30,000 gallons
Water Storage Capacity = 1,048,483 gallons

The Village has a combined water storage capacity of 4,500,000 gallons; therefore, the Village has a surplus of approximately 3,400,000 gallons. The existing system storage capacity exceeds the minimum required storage capacity of the system to meet average daily demand and required fire protection volume. The tanks are suitably sized for continued use, with ample capacity for growth, and are in good condition.

## F. System Operations

### 1. System Pressures

Water systems are characterized by flows and pressure recorded during static conditions and under various operating conditions (i.e. fire flows). Topography and water levels within the water storage tank dictate system pressures throughout the Village's water distribution while water piping configuration/condition impact working or residual pressures and flows.

The ground elevations within the lower service area range from 1,486 feet to 1,675 feet and observe a static pressure, created by the water storage tank (overflow elevation of 1,740) ranging from 28 psi to 110 psi ±. During working conditions the normal residual pressures range from 23 psi to 105 psi ± (without the pumps operational). Over 90 percent of the system contains static pressures ranging from 70 psi to 100 psi. Refer to Static Pressure Mapping found in Appendix H.

The Recommended Standards for Water Works requires the working system pressure to be greater than 35 psi and above 20 psi at all times. There are two primary locations where the system pressure falls below 35 psi including at the northeastern terminus of Scott Avenue and at the end of Windover West. Windover West is located close to the tank and therefore the pressures remain buffered and do not fall below 20 psi at any time. However, during a fire flow event (fire flows in the in the downtown area or in the northeastern portion of the system will result in residual pressures at the northern end of Scott Road to fall below 20 psi, often to near 0 psi.

Pressure fluctuation also occurs during pump operations. However, operation of the finished water pumps, pressures increase especially around the location of the water treatment plant and areas where the pump discharge piping interconnects with the distribution system. The table below describes the pressure fluctuations:

**Table 6: Pressure fluctuations for pumps on and off.**

| Location | Pumps Off | Pumps On* |
|---|---|---|
| W. State Street at High School | 104 psi | 116 psi |
| Pump Discharge on E. State Street | 97 psi | 119 psi |

* Worst case pump operational scenario includes simultaneous operation of 125 Hp and 60 Hp pumps.

Rapid pressure fluctuation in the system associated with pump station operation can lead to water hammer as well as damage to the system over time.

### 2. Available Fire Flows

The water model was utilized to identify available fire flows within the water system. As demonstrated in the Fire Flow Mapping located in Appendix I (for fire flows with the finished water pumps off), the available fire flows within the distribution system range from approximately 500 gpm to over 3,500 gpm. These elevated fire flows are directly attributed to the extensive system looping, larger diameter watermain utilized in many areas of the system and elevated system pressures. The available flows are largely meet the requirements of the ISO standards as outlined in the ISO test report found in Appendix E. There are several locations where adequate fire flow is not achieved including Scott Avenue (Northeastern most portion of the system), School Street and Rte 417/E. Dyke Street (Southeastern Portion of the System, and South Brooklyn Street (Southeast portion of the system). As demonstrated areas of inadequate flow are located in the extremities of the system, the furthest away from the water source and tankage.

## G. Out of District Users

The Village of Wellsville water system serves the Town of Scio, located outside of the water district. The Town of Scio uses very little water on a routine basis. The Town of Scio is located to the northwest of Wellsville, along Riverside Drive, NY 19. The cement asbestos water main originates at a valve on Coates Street, just west of the intersection with Oconnor Street. The water main follows the southwest border of Dresser Rand where it meets Vossler Road, heads west and follows Riverside Drive to Scio. The extension includes seven (7) valves and is approximately 0.85 miles long. Out of district users within the Town of Wellsville include Sinclair Water District, Riverside Water District, Bolivar Road, George Street, Morningside Street, Alfred State College, and East State Street.

## H. Equivalent Dwelling Units

HUNT took an inventory of existing facilities and structures within the Wellsville service area from available information, including tax records and water billings. Provided water billings records were analyzed for monthly periods ranging from March 2015 to March 2016 to determine total consumption as well as identify the average daily single family residential water usage. The average single family residential water usage shall characterize an Equivalent Dwelling Unit (EDU).

The Equivalent Dwelling Unit (EDU) concept relates all water system usage proportionately to the equivalent of a typical single-family residence. The use of EDUs standardizes the way the total estimated service charge is calculated to provide comparable results and consistency in review of the project by funding agencies.

As previously described, one EDU is an average value for the water usage expected from one single-family house in the Wellsville community. An analysis of the residential usage for the existing water service area provided an average daily demand of nearly 119 gallons per day per single family residence. The total water consumed throughout the system was characterized as follows:

**Table 7: Characterization of Wellsville Water District Users, March 2015-2016**

**Wellsville Water Billed March 2015 through March 2016**

**Equivalent Dwelling Unit where 1 EDU = 119 gallons/day**

| User Class | Number of Customers | Units Billed (Units/month) | Volume Water Consumed (Gallons/day) | EDU |
|---|---|---|---|---|
| Commercial | 455 | 8,102 | 202,019 | 1,712 |
| Industrial | 4 | 1,901 | 47,391 | 402 |
| Other Sales | 8 | 53 | 1,331 | 11 |
| Public St Light | 2 | 3 | 77 | 1 |
| Residential | 1,587 | 7,567 | 188,659 | 1,587 |
| Unclassified | 146 | 623 | 15,545 | 132 |
| Total | 2,202 | 18,250 | 455,022 | 3,845 |

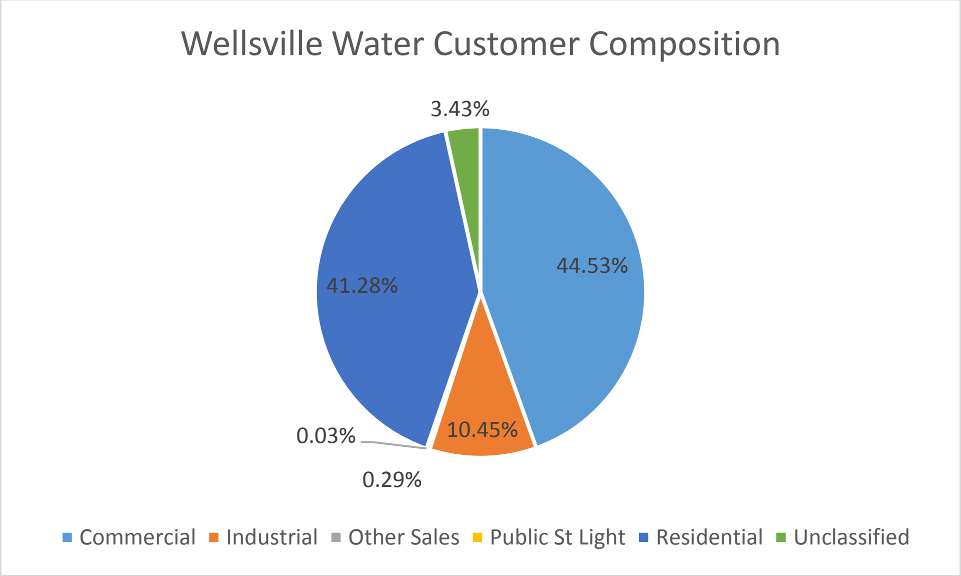


**Figure 6: Composition of Wellsville Water Customer, March 2015-2016**

From analysis of the aforementioned billing records, there were approximately 1,587 residential users (EDUs) along with 1,712 commercial EDUs, and 402 industrial EDUs. There were 11 other sales to Dyke Hose Co, Wellsville Fire Training Ground, Duke Hose Co., DPW, Water & Light Garage, Firehall, Police, and Municipal Building. The Unclassified sales were 132 EDUs and include clients with insufficient information to classify. Therefore, the total number of EDUs in the water service area is 3,845.

## IV. Regulatory Compliance

HUNT assessed regulatory compliance of each of the components within the Village of Wellsville water system.

### A. Water Source and Treatment

The Recommended Standards for Water Works, 2012 edition, (RSWW) requires that the water source be adequate to meet the maximum projected water demand of the service and provide reasonable surplus for anticipated growth. The Village of Wellsville water treatment plant is rated for a withdrawal rate of 2.5 million gallons a day and in 2016 pumped an, average of 713,967 gallons per day with a maximum day of 1,784,400 gallons. With a maximum day of 1,784,400 gallons, the plant has an excess treatment capacity of 715,600 gallons which provides for a sufficient surplus for growth as the excess capacity is equivalent to the Village’s average day consumption volume.

Additionally, the RSWW indicates treatment of surface water shall include filtration preceded by appropriate pretreatment as determined by the reviewing authority, the Allegany County Department of Health. The water treatment plant currently treats water by adding a coagulant and disinfects with chlorine gas prior to treatment by the filter units. Water is passed through the clarifier portion of the filter where the majority of particles are removed and then through the mixed-media filter. After the water is filtered, the water is discharged to the clearwell where the water is again disinfected with chlorine gas and soda ash (for pH control) and fluoride are added. According to the Allegany County Department of Health 2015 Sanitary Survey, refer to Appendix J, the Village’s treatment process does not have any deficiencies or violations.

### B. Pumps

Recommended Standards for Water Works requires that a booster pump station shall contain not less than two pumps with capacity such that the maximum day demand can be met with the largest pump out of service. The District's booster pump station currently has three (3) pumps that are operated manually: two (2) 125 HP pumps and one (1) 60 HP pump. The 125 HP pumps are operated such that they alternate every day while the 60 HP pump is operated if the level in the clearwell is high. The treatment plant provides an adequate number of pumps to discharge treated water into the distribution system and with one pump out of service, the remaining pump has a capacity of approximately 875 gpm or 682,500 gallons per day which exceeds the maximum daily demand of 448,736 gallons. In addition, the Allegany County Department of Health 2015 Sanitary Survey indicated that no deficiencies were for the pumps and pump controls.

### C. Water Storage Tanks

The concrete water storage tanks are compliant with the Recommended Standards for Water Works (RSWW) for finished water storage. The tanks are concrete structures located above ground and are protected from contamination with suitable watertight roof and sidewalls, overflow drains provided and brought down to an elevation of 12 to 24 inches above ground surface, and appropriate venting. Additionally the tanks have sufficient capacity to meet the average daily consumption within the system and the required fire flow volume.

The RSWW requires protection from trespassers with fencing and locks on access manholes to prevent trespassing, vandalism, and sabotage. While the tanks are provided with locks on access manholes and ladders, the tanks are not protected by fencing. In order to be compliant with regulatory standards, fencing should be provided around both of the water storage tanks in order to deter trespassing.

## V. Asset Management

Asset management is the key to maintaining an even rate structure over time as well as ensuring financial self-sufficiency to the greatest extent possible. The basis for developing an asset management plan is to develop a fiscal plan that provides for a sustainable system. There needs to be a budget in place to operate the system on the day-to-day basis. In addition, the budget needs to detail the resources necessary to anticipate the repair, rehabilitation, and replacement of the elements in the system to minimize or avoid disruption in delivery. The revenue necessary to perform this needs to be planned in order to provide a balance for the community. This provides an ongoing operation, repair, rehabilitation, and replacement plan for optimum delivery of water service, and moves the community away from operating and maintaining the water system in a reactive nature. Asset management includes both a maintenance and replacement plan for short term assets (ie. pumps, chlorination equipment, etc.) and a capital plan with loans and grants utilized for capital projects and long term assets (ie. water storage tanks, wells, etc.).

In addition, funding agencies are beginning to look at whether a municipality utilizes an asset management program when evaluating a municipality's need for funding. It is anticipated that there will be less funding available for maintenance and repairs that could have been completed under an asset management plan. This means funding agencies may not recognize projects involving the maintenance or replacement of short term assets as a funding priority since the municipality should be planning for the maintenance and replacement of these short term assets within its budget.

### A. Physical Inventory of Assets

The asset management plan looks at both short term assets and long term assets. Short term assets are assets having an expected useful life of less than 20 years. Short term assets are assets such as pumps, disinfection equipment, meters, valves, etc., while long term assets are wells, tanks, piping, etc. The physical inventory of the water system consists of two (2) surface water supply pumps, three (3) mixed media filter units, one (1) 500,000 gallon clearwell, three (3) vertical turbine pumps, two (2) booster pump in the distribution system, two (2) concrete water storage tanks, nearly 40 miles of watermain, 283 hydrants, 369 isolation valves, meters and associated fixtures, hardware and plumbing. The inventory of the water system assets takes into account the expected useful life for an asset and the remaining life left of the asset before replacement. Refer to Appendix K for the asset management worksheets. The replacement value for the water system is approximately $51,361,265.

### B. Asset Management Plan

The asset management plan looks at both short term and long term assets. As previously discussed, short term assets are assets such as pumps, disinfection equipment, meters, valves, etc. that have an expected life of 20 years or less while long term assets are storage tanks, distribution piping, etc. that have a longer expected useful life. An asset management plan addresses the amount of money that should be set aside each year to plan for the maintenance of water system assets. The annual asset management budget was established through identifying the short lived assets within the Village water system, identifying the replacement costs associated with the respective asset and amortizing the cost over its expected life. For example, the two (2) 125 HP vertical turbine pumps at the water treatment plant that pump out of the treated water clearwell were installed in 1990 and have been in operation for 27 years. The expected useful life of a pump is 15 to 20 years, but preventative maintenance measures and alternating between pumps can extend the life of the pump, such is the case for the vertical turbine pumps at the water treatment plant. Assuming the pumps have an adjusted useful life of 35 years, the pumps may require replacement in 8 years. Replacement of the 125 HP booster pump plus installation and testing costs is estimated to be approximately $62,000. Therefore, assuming the pump’s anticipated remaining useful life is 8 years, nearly $7,750 per year should be budgeted to allow for replacement of this pump in year 2025. In the amortized annual cost for replacement of short term assets, the replacement cost of long term assets were not included. Typically, long term assets are replaced through a capital project and as such have been excluded from the amortized asset management annual replacement cost. The current inventory value of the Village of Wellsville water system is approximately $51,361,265. If all elements of the water system were to be replaced at the end of its design life, the necessary annual investment by the Village for replacement of short term assets would need to be approximately $98,456.

## VI. Financial Status of Existing Facilities

### A. Existing Water Rate

#### 1. Historic Water Rates

HUNT reviewed the Village of Wellsville water billing rate structure through review of Annual Water Quality Reports. In 2003, the Village converted from a charge based on gallons metered to a unit billing based on one unit equals 748 gallons. The Village has used the following rate structures since 1999:

**Table 8: Village of Wellsville Water Rate Structure, 1999-2002.**

| | Village |
|---|---|
| Customer Meter Charge per month | $13.00 |
| 1,000-2,200 gallons | $0.68 |
| Greater than 2,200 gallons | $4.68 |

**Table 9: Village of Wellsville Water Rate Structure, 2003-2010.**

| | Village |
|---|---|
| Customer Meter Charge per month | $14.00 |
| 1 to 3 units (per unit) | $0.54 |
| 4 to 50 units (per unit) | $3.68 |
| 51 to 100 units (per unit) | $2.54 |
| 101 to 150 units (per unit) | $2.27 |
| over 150 units (per unit) | $1.32 |

**Table 10: Village of Wellsville Water Rate Structure, 2011-2015.**

| | Village |
|---|---|
| Customer Meter Charge per month | $15.25 |
| 1 to 3 units (per unit) | $0.54 |
| 4 to 50 units (per unit) | $3.68 |
| 51 to 100 units (per unit) | $2.54 |
| 101 to 150 units (per unit) | $2.27 |
| over 150 units (per unit) | $1.32 |

### 2. Current Water Rate

The current rate for water consumption is comprised of a monthly billing structure based on number of units and location of property. The total Water Fund revenues were estimated to be $1,140,000 in the 2014-2015 Annual Budget. This is about $30,000 higher than estimated in 2013-2014. The budget and rate structure are located in Appendix E, and is summarized as follows where 1 unit equals 748 gallons:

**Table 11: Village of Wellsville Water Rate Structure, 2015-2016.**

| | Village | Town |
|---|---|---|
| Customer Meter Charge per month | $16.00 | $24.00 |
| 1 to 3 units (per unit) | $0.57 | $0.86 |
| 4 to 50 units (per unit) | $3.83 | $5.75 |
| 51 to 100 units (per unit) | $2.64 | $3.96 |
| 101 to 150 units (per unit) | $2.37 | $3.56 |
| over 150 units (per unit) | $1.38 | $2.07 |
| Meter usage fee | $2.00 | $3.00 |

Additional water charges are applied for account change over, water turn on/off, meter replacement, flow testing if meter is in working order, freeze-ups on the customer side, new service connection fees, and street opening.

## B. Water Fund Revenues

HUNT reviewed the Village of Wellsville Annual Budget Reports from 2012 through 2016 and identified a consistent budget for the water fund. The water fund consists of revenues generated from water sales, unmetered water sales, service charges, sale of used equipment, and penalty on water sales. The following figure presents the actual total departmental income for the water fund, with the exception of 2015-2016 which presents the approved budget:

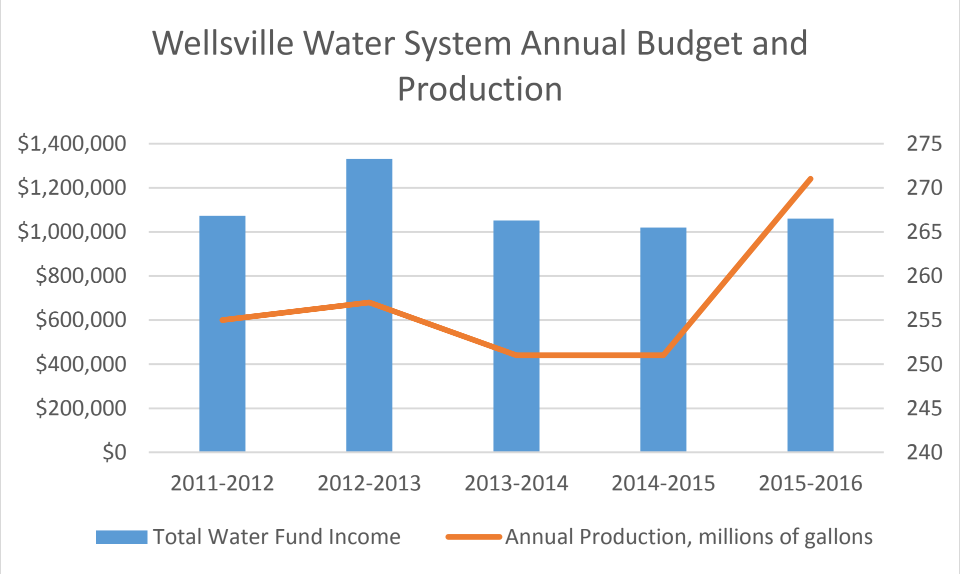


**Figure 7: Village of Wellsville Total Water Fund Income, 2011-2016.**

The data shows an increase in the water fund income in 2012-2013, this was due to the unanticipated $275,916 in service charges associated with replacement of meters which began in 2011. The increase in annual production in 2016 is likely a result of leaks in the system.

## C. Current Water Debt

The 2014-2015 Village of Wellsville Budget currently holds water debt, including:

**Table 12: Village of Wellsville Water Fund Bond Expense, 2014-2015.**

| Water Fund Serial Bond | Expense |
|---|---|
| Principal WTPC PIB | $150,000 |
| Reservoir (New Bond) | $40,000 |
| Meters (New Bond) | $50,000 |
| Reservoir Interest (New Bond) | $47,325 |
| Interest WTPC PIB | $25,500 |
| Meters (New Bond) | $2,998 |
| **Total Bond Expense** | **$315,823** |

## D. Proposed Water Rate with Asset Management

As previously indicated, the 2016 Village water budget anticipated $1,030,000 in revenues and $1,100,000 in appropriations. Historically, the Village has seen revenues ranging from $1,019,152 to $1,330,406 in the past five years. Refer to Appendix L for a copy of the Village's water budget.

The robustness of the water system is largely required due to the larger water users within the system, including: Wellsville Central School – High School and Elementary School, Jones Memorial Hospital, Manor Hills, Argentieri Brothers Laundry, LC Whitford, Tops Markets and K-Mart. Therefore, development of a rate should be conducted with the mindset that the larger users should pay higher costs than the typical residential users. This notion is accommodated through setting of minimum rates and corresponding water volumes. For instance, the average residential water user utilizes on average 119 gallons per day and thus 43,435 gallons per year. By increasing the base rate, the lower usage users, such as residential users, will be impacted whereas increasing the incremental cost of water beyond the minimum volumes will minimize the impact to the small user and place a higher degree of burden on the larger users.

A spreadsheet was developed to allow for incorporation of various minimum demand charges and associated volumes as well as unit costs for water utilized beyond the minimum volume. The rate structure can be adjusted dependent on which users the Village would like to place a higher degree of burden on. Adjustments to the base meter fee and the first three (3) units charge will have the greatest impact on residential users as it will result in a significant increase in their annual operation and maintenance water bill. The average single family home has an annual water use of 43,435 gallons which results in an annual operation and maintenance water bill of $321.04. Smaller commercial users within the system that utilize approximately 349,000 gallons per year have an annual operation and maintenance water bill of $1,887.25. Large commercial users within the system that utilize approximately 5.4 million gallons annually have an annual operation and maintenance water bill of $13,036.80.

Incorporating the amortized replacement cost for short lived assets will add $98,456 to the annual budget and bring the total expenditures to $1,198,456. However, this value is reduced in that the current budget includes a reserve for equipment of $25,000. As such, the anticipated total expenditures are $1,173,456. Depending on where the burden of the water use is to be placed, a new rate structure can be developed by two methods: increasing the minimum monthly water use charge for 1 to 3 units, or adjusting the total rate structure to lessen the impact on residential users. For instance if the base per unit charge for 1 to 3 units is increased to $2.89, this results in a revenue of approximately $1,180,000 and the following charges to the users:

**Table 13: O&M costs with proposed rate structure increase to base meter charge only.**

| User | Existing O&M Cost | Proposed O&M Cost | Percent Difference |
|---|---|---|---|
| Residential (43,435 gal annual use) | $321.04 | $404.56 | 26.0% |
| Commercial (349,316 gal annual use) | $1,887.25 | $1,970.77 | 4.4% |
| Commercial (5,484,336 gal annual use) | $13,036.80 | $13,120.32 | 0.6% |

As can be seen in the table above, a change in the water rate for 1 to 3 units has a significant impact on the residential users in the system and a very minor impact to large users. The other method to consider is adjusting the entire rate structure so as to place a larger burden on the larger water users within the system and minimize the increase to residential users. Refer to the following table for the proposed water rate.

**Table 14: Proposed rate structure with revisions to entire rate structure.**

| | |
|---|---|
| Meter Charge per month | $16.00 |
| 1 to 3 units (per unit) | $1.00 |
| 4 to 50 units (per unit) | $4.39 |
| 51 to 100 units (per unit) | $3.57 |
| 101 to 150 units (per unit) | $3.23 |
| over 150 units (per unit) | $2.49 |
| Meter usage fee | $2.00 |

Utilizing the rate structure above results in the following annual charges to the water users:

**Table 15: O&M costs with proposed rate structure increase to entire rate.**

| User | Existing O&M Cost | Proposed O&M Cost | Percent Difference |
|---|---|---|---|
| Residential (43,435 gal annual use) | $321.04 | $348.88 | 8.7% |
| Commercial (349,316 gal annual use) | $1,887.25 | $2,144.09 | 13.6% |
| Commercial (5,484,336 gal annual use) | $13,036.80 | $20,582.64 | 57.9% |

The water rate was adjusted so as to minimize the impact to the residential users. The monthly meter charge and meter usage fee were not changed as the Village indicated that they anticipated to maintain these monthly meter rates.

## E. Rate Implementation

The significant increase associated with management of short lived assets should begin immediately understanding that several system components require replacement within the next couple of years. Implementation of these rate changes over a period of time will further place the Village behind schedule with maintaining assets and ensuring financial solvency for years to come. Therefore, it is recommended that the rate be established and implemented in its entirety. Subsequent to the implementation of the new rate, the funds gathered for asset management should be placed into accounts specifically marked for such improvements.

## F. Rate Maintenance

The replacement costs associated with short lived assets were estimated using 2017 prices. In 15-20 years, these prices will be outdated; therefore, a mechanism needs to be developed to allow the rates to stay current.

The Village’s cost increases each year including salaried positions, cost of fuel, vehicles, chemicals, and other materials. Therefore, the rates should be increased to reflect these cost increases. Rates should also automatically increase by the cost of living each year (Consumer Price Index). At a minimum, the rate should increase by 1.5% to 2% each year. This subtle increase will minimize impacts to large increases over time.

## VII. Leak Detection and Meter Testing

### A. Review of System Leak Repairs

The Village provided Leak Repair Reports between December 2012 and March 2016, Appendix M. During this time period, there were a total of 21 repairs made to the water system. There were 14 water main leaks, of which 13 were to cast iron watermain and the remaining leak from transite asbestos pipe. The water main leaks were visually estimated to produce between 20 and 80 gallons per minute (gpm) of unaccounted for water.

Leaks to water service laterals comprised 29% of the total repairs during this time period. The six service lateral leaks were estimated to produce 7-20 gpm of unaccounted for water. The service laterals were replaced with ¾" copper line and composite fittings. One water meter leak was repaired at 100 Chamberlain, this leak was estimated to produce 40 gpm.

Based on review of repair reports, leaks were repaired within 12 hours of discovery. The following table shows unaccounted for water from leaks based on the provided estimates, and where an estimate was not made, the assumption that water main line leaks produce between 20-30 gpm, water service laterals produce 10-20 gpm, and water meter leaks produce 40 gpm was made. All leaks were assumed to be ongoing for 12 hours.

**Table 16: Wellsville Water System, Estimated Volume of Leaks, 2013 – 2016.**

| Year | Water Main gallons | Service Lateral gallons | Water Meter gallons | Total Leak gallons |
|---|---|---|---|---|
| 2013 | 115,200 | | 28,800 | 144,000 |
| 2014 | 43,200 | 43,200 | | 86,400 |
| 2015 | 252,000 | 12,240 | | 264,240 |
| 2016 | 43,200 | 50,000 | | 93,200 |

The average volume of water estimated to be leaked during a year is calculated to be 147,000 gallons per year or 403 gallons per day. The following calculation identifies the remaining unaccounted for water in 2015:

$$\text{Remaining Unaccounted for water} = \frac{(\text{Total Production} - (\text{Total Consumption} + \text{System Leak Repairs}))}{\text{Total Production}} \times 100\%$$

$$\text{Remaining Unaccounted for water} = \frac{(270{,}565{,}600 - (166{,}595{,}804 + 264{,}240)}{270{,}565{,}600} \times 100\%$$

$$\text{Remaining Unaccounted for water} = 38\%$$

### B. Leak Detection Survey

New York Leak Detection, Inc. (NYLD) performed a leak detection survey of the Village of Wellsville in April of 2016. NYLD performed testing on all hydrants throughout the entire system, as well as testing valves and curb boxes as needed. The report generated from this testing is found in Appendix N. Surface acoustic testing was utilized for leak locations. Continuity was performed on areas containing transite asbestos pipe, accessible services were scanned in areas with plastic mains. Based on the above testing, Leakage Control Reports were generated for the following areas:

**Table 17: Village of Wellsville, NYLD Leak Detection Summary, 2016.**

| Street Address | Leak Appears to Be On | Estimation of Leak GPD |
|---|---|---|
| 25 Hamilton Street | Service | 15,000 |
| 252 Farnum Street | Service | 7,000 |
| South Main Street | Water main | 40,000 |
| 540 North Main Street | Service | 12,000 |
| 47 Chestnut Street | Service | 8,000 |
| 60 Maple Avenue | Service | 20,000 |
| 47 Elm Street | Service | 6,000 |
| 313 N. Main Street | Service | 10,000 |
| 38 Rauber Street | Service | 20,000 |
| 131 Miller Street | Service | 8,000 |
| **Total** | | **146,000** |

The total volume estimated to be leaking during this survey was 146,000 gallons per day, or 53,290,000 gallons per year. The Village of Wellsville addressed these leaks upon notification. Including the NYLD findings, the following calculation identifies the remaining unaccounted for water in 2015:

$$\text{Remaining Unaccounted for water} = \frac{(\text{Total Production} - (\text{Total Consumption} + \text{System Leak Repairs} + \text{Leak Detection Survey}))}{\text{Total Production}} \times 100\%$$

$$\text{Remaining Unaccounted for water} = \frac{(270{,}565{,}600 - (166{,}595{,}804 + 264{,}240 + \ 53{,}290{,}000)}{270{,}565{,}600} \times 100\%$$

$$\text{Remaining Unaccounted for water} = \ 19\ \%$$

### C. Meter Testing

The Village of Wellsville obtained services from Cold Spring Environmental to perform water plant flow meter testing in May 2016, Appendix O. The following meters and chart recorders at the water treatment plant were evaluated: Treated Water Flow Meter, Clearwell Inlet Flow Meter, Treated Water Chart Recorder, and Clearwell Inlet Chart Recorder. The measured flow rate was less than or equal to 1% in all cases. No adjustments were recommended due to the accuracy of the instrumentation.

The Village requested testing and calibration for flow and accuracy of larger size meters within the water system. The planned meter calibration testing took place in June 2016 at the following locations: Wellsville Central School – High School and Elementary School, Jones Memorial Hospital, Manor Hills, and Argentieri Brothers. The following locations have larger meters, but were not tested at this time: LC Whitford, Tops Markets and K-Mart.

**Table 18: Village of Wellsville, large meter flow testing, 2016.**

| Site Location | Model | Installed Meter CF | Portable Meter CF | Percent Difference |
|---|---|---|---|---|
| High School | Sensus 4"-6" | 28 | 28 | ≤1 % |
| Elementary School | Sensus 4”-6" | 44 | 45 | ≤1 % |
| Argentieri Laundry | Rockwell 4" | 2 | 45 | >100% |
| Jones Memorial Hospital | Rockwell 4" | 35 | 135 | >100% |
| Manor Care Center | Spectrum 260, 2" | 34 | 34 | ≤1 % |
| Manor Care Center (behind WWTP) | Rockwell 2"-3" | 15 | 15 | ≤1 % |

The above table shows that the larger meters located at Argentieri Laundry and the Hospital are functioning with little accuracy and replacement should be considered.

### 1. Argenteiri Laundry Meter Reports

Argenteiri is a commercial laundry facility located at 50 West Hanover Street, it is operated from 7:00 a.m. to 5:00 p.m., or 10 hours per day. The laundry has four 90 lb washers, 5 450-500 lb washers, and one 800 lb washer. The monthly water bill records for the period of March 2015 through March 2016 supplied by the Village show a typical seasonal trend, an average billed volume of 539 Units or 13,431 gallons per day, and a maximum billed volume of 855 Units or 21,318 gallons per day:

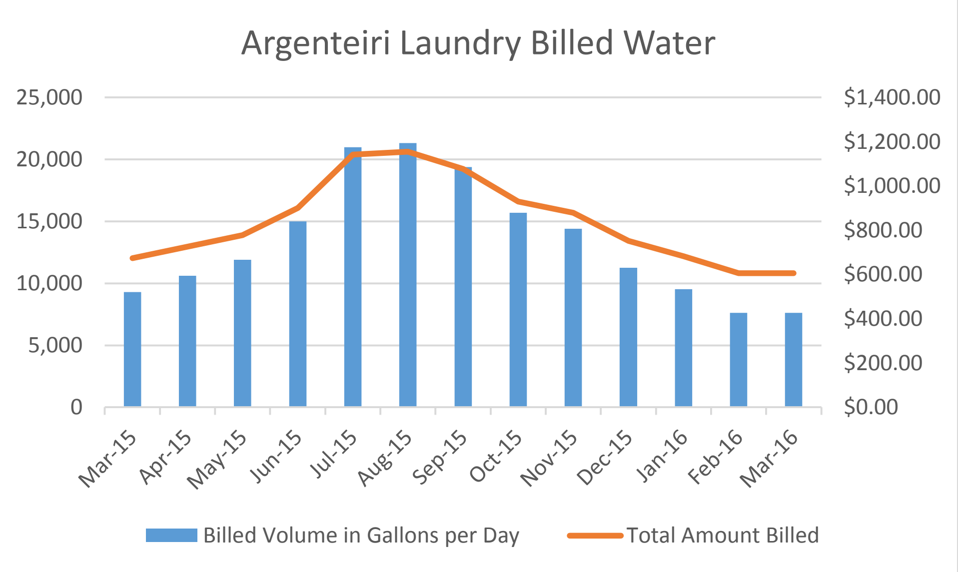


**Figure 8: Village billing for Argenteiri Laundry**

The Cold Spring Environmental Report measured a large discrepancy in the measured flow rate between the installed meter and the portable test meter. The installed meter measured 2 cubic feet during the 15 minute test, while the calibrated portable meter measured 45 cubic feet during the same time period. The difference between the two meters and converted to gallons per day, assuming a ten hour work day, results in a potential unmeasured flow of:

$$Flow\ in\ gpd = \left(Flow\ in \frac{ft^3}{15\ minutes}\right) x \left(7.48 \frac{gallons}{ft^3}\right) x \left(60 \frac{min}{hour}\right) x\ (10 \frac{hour}{day})$$

$$Potential\ Unmeasured\ Flow = \ Calibrated\ Meter\ Flow - Installed\ Meter\ Flow$$

$$Potential\ Unmeasured\ Flow = \ 13{,}464\ gpd - 598\ gpd = \ 12{,}866\ gallons\ per\ day$$

Based on literature review of the design average daily flow rate for a laundry can be derived based on *NYSDEC Design Standards for Intermediate Sized Wastewater Treatment Systems, 2014* published values of 580 gpd per machine. There are 10 industrial laundry machines at the facility, they wash an equivalent of approximately 38 traditional laundry machines, based on weight calculations. Therefore the design average daily flow rate is as follows:

$$580\ gpd/machine\ x\ 38\ machines = 22{,}040\ gpd$$

Comparing the design average flow rate of 22,040 gpd to the average billed rate of 13,431 gpd yields a discrepancy of 8,609 gpd, or a lost revenue of approximately $476 per month. Based on the $19,200 cost for material and installation to replace a meter of this size, it would take 40 months to recuperate the expense.

### 2. Jones Memorial Hospital Meter Reports

Jones Memorial Hospital is a 70 bed facility located at 191 North Main Street. The monthly water bill records for the period of March 2015 through March 2016 supplied by the Village show a step change in December 2015. The average billed volume of 509 Units or 12,695 gallons per day, and a maximum billed volume of 827 Units or 20,620 gallons per day:

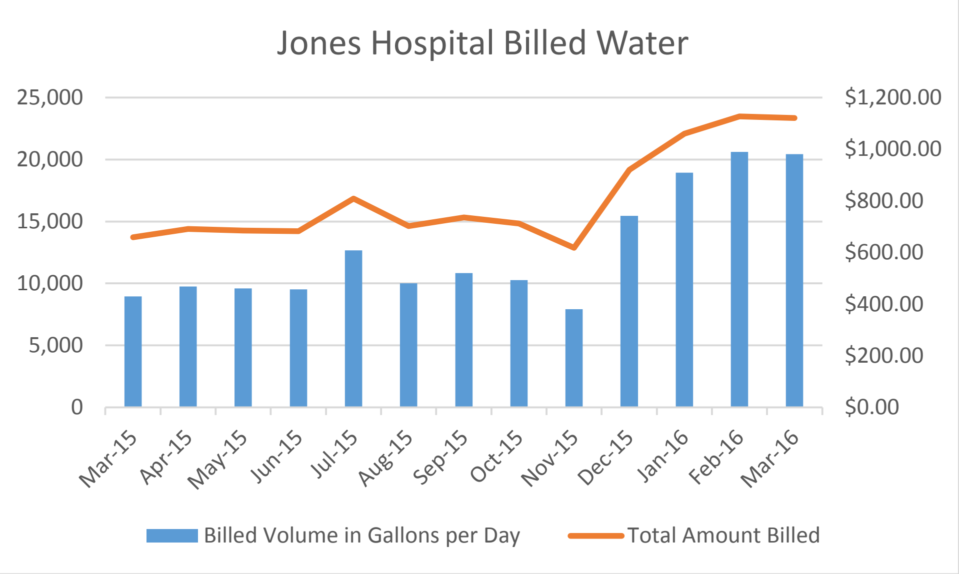


**Figure 9: Village billing for Jones Hospital**

The Cold Spring Environmental Report measured a large discrepancy in the measured flow rate between the installed meter and the portable test meter. The installed meter measured 35 cubic feet during the 15 minute test, while the calibrated portable meter measured 135 cubic feet during the same time period. The difference between the two meters and converted to gallons per day, assuming a 16 hour work day, results in a potential unmeasured flow of:

$$Flow\ in\ gpd = \left(Flow\ in \frac{ft^3}{15\ minutes}\right) x \left(7.48 \frac{gallons}{ft^3}\right) x \left(60 \frac{min}{hour}\right) x\ (10 \frac{hour}{day})$$

$$Potential\ Unmeasured\ Flow = \ Calibrated\ Meter\ Flow - Installed\ Meter\ Flow$$

$$Potential\ Unmeasured\ Flow = \ 64{,}627\ gpd - 16{,}755\ gpd = \ 47{,}872\ gallons\ per\ day$$

Based on literature review of the design average daily flow rate for a laundry can be derived based on *NYSDEC Design Standards for Intermediate Sized Wastewater Treatment Systems, 2014* published values of 175 gpd per hospital bed. There are 70 beds, therefore the design average daily flow rate is as follows:

$$175\ gpd/bed\ x\ 70\ beds = 12{,}250\ gpd$$

This design average flow rate is based on a modern hospital, a correction factor of 20% shall be added to account for the age of the hospital. Therefore the design average flow rate is 14,700 gpd.

For reference, the design average flow rate was compared to the water usage at the newly constructed Corning Hospital. This hospital utilizes approximately 10,000 gpd for a 60 bed facility. Scaling this water consumption to a 70 bed facility such as Jones Memorial Hospital results in an anticipated flow rate of 11,667 gallons per day. Again a correction factor of 20% shall be added to account for the age of the hospital, yielding a comparison of 14,000 gpd. Which is nearly identical to the above value calculated from the NYS Design Standards.

Comparing this corrected design average flow rate of 14,700 gpd to the average billed rate of 12,695 gpd yields a discrepancy of 2,005 gpd or a lost revenue of approximately $111 per month. Based on the cost for material and installation to replace a meter of this size, $9,600, it would take over seven years to recuperate the expense of meter replacement.

The potential combined error from these two faulty meters could lead to 10,614 gallons per day, or 3,874,110 gallons per year of unaccounted for water. Including the Cold Spring Meter Testing findings, the following calculation identifies the remaining unaccounted for water in 2015:

$$\text{Remaining Unaccounted for water} = \frac{(\text{Total Production} - (\text{Total Consumption} + \text{System Leak Repairs} + \text{Leak Detection Survey } + \text{Meter Leaks }))}{\text{Total Production}} \times 100\%$$

$$\text{Remaining Unaccounted for water} = \frac{(270{,}565{,}600 - (166{,}595{,}804 + 264{,}240 + \ 53{,}290{,}000\ + 3{,}874{,}110)}{270{,}565{,}600} \times 100\%$$

$$\text{Remaining Unaccounted for water} = \ 17\ \%$$

## VIII. Need for the Project

### A. Health, Sanitation, and Security

When utilizing a surface water source, referenced standards recommend a source protection plan be enacted for continued protection of the watershed from potential sources of contamination. The Village of Wellsville has proactively demonstrated a strong interest in protecting the source water, Genesee River, for the treatment plant. The 1974 intake and pump station, located adjacent to the treatment plant, was delegated to an emergency backup when the old Sinclair Refining Co. landfill was identified as a superfund site. The current intake weir and intake structure, built in 1981, includes a pump station and transmission line and are located upstream of the refinery site. In 2006, The Wellsville Water Treatment Plant received the National Rural Water Association's environmental cleanup project award for improvements to the community dumpsite along the back of River Road.

The NYSDEC published the Waterbody Inventory/Priority Waterbodies List Report for the Genesee River Basin in March 2003. The rivers within the Genesee River Watershed are generally satisfactory. Much of the water quality concerns in the watershed are associated with urban and industrial sources in the northern part of the watershed. Wellsville is located in the southern part of the watershed in the Genesee/Cryder Creek Watershed. This portion of the Genesee River is assessed as having no known impacts; all evaluated uses are considered to be fully supported including: water supply, public bathing, recreation, aquatic life, and fish consumption. A Source Water Assessment by the NYSDOH, conducted in 2005, found some elevated susceptibility to contamination due to agricultural activity in the watershed. However, it is important to note that this report estimates the potential for untreated drinking water sources to be impacted by contamination and do not address the quality of treated finished potable tap water. This level of susceptibility is also typical of many water supplies that experience no impacts to water supply use, and reflects the need to protect the source.

### B. Aging Infrastructure

The Wellsville Water District has infrastructure limitations and deficiencies in terms of the high percentage of unaccounted for water. Over the past ten years, the water system has an average of 26% unaccounted for water of the amount of water produced, and recently as high as 38% unaccounted for water in 2015. The Village has proactively begun meter replacement, hydrant flow assessments, and repair and replacement of aging pipes.

Nearly 10% of the distribution piping is transite asbestos pipe. Health concerns arise in the event of an asbestos-cement pipe break, as repair of the break must be implemented according to OSHA standards and protocols. Asbestos can become airborne if the pipe is not handled properly.

### C. Reasonable Growth

The Village of Wellsville demonstrates a steady decrease in population, as noted previously in Section II. C. Population Trends. The Village of Wellsville has the highest population in Allegany County. Downtown Wellsville retains much of its early 20th Century charm, with most of its building in fair condition and a low vacancy rate of only 4%. The Village of Wellsville has a median household income of $39,972; 52.74% of individuals qualify as low to moderate income. The Village of Wellsville is anticipated to experience continued, yet mild, downward trend.

The existing water system treats just under one million gallons of water daily; its capacity is more than two million gallons a day if the plant were operated around the clock. The Village has sufficient water to not only meet the needs of current industrial, commercial and residential users, but to also allow for substantial expansion of the distribution system. The 2002 Village of Wellsville Comprehensive Plan prioritized expanding water and sewer services in the following areas: 1) Morningside, 2) Route 417 west to L.C. Whitford property, 3) Route 417 west to airport and industrial park, 4) Route 417 east to Duffy Hollow Road, and 5) Route 19 south to mobile home parks. The desire to expand water services must be balanced with the economics, and will require purposeful planning and identification of funding. The current water system is designed appropriately, based on the anticipated steady population and projected water use. Decreasing unaccounted for water, in the current water supply system, will improve the percent of billed water and decrease the production needs.

## IX. Proposed Water System Improvement Alternatives

The existing issues within the water system are largely related to the high percentage of unaccounted for water. As previously discussed, the water system has an average of 27% unaccounted for water over the past 10 years and recently has had unaccounted for water percentages as high as 38% in 2015. The Village has taken measures to reduce the volume of unaccounted for water within their system and started replacing smaller meters within the water system in 2011 and completed meter replacement in 2016. While the Village initially saw a decrease in the amount of unaccounted for water in 2011, the percentage of unaccounted for water has continued to rise since 2012 and a decrease in unaccounted for water has not been realized. The Village has known problems with subsurface tanbark, transite asbestos pipe, and leaks. Refer to Appendix F for mapping of potential problem areas within the distribution system.

Several areas of improvement exist to reduce unaccounted for water and the high frequency of leaks experienced by the Village each year: metering replacement for larger users in the system, addition of pump controls at the treatment plant, and replacement of critical areas of the distribution system.

### A. Metering

The Village has completed replacement of smaller meters in the system and has several large commercial meters in the system that have not been replaced. As detailed previously, the larger meters in the system are Wellsville Central School – High School and Elementary School, Jones Memorial Hospital, Manor Hills, Argentieri Brothers, LC Whitford, Tops Markets and K-Mart. Regulatory agencies recommend that commercial meters be tested annually or at a minimum be tested every 2 years for inaccuracies. Five of these large meters were tested and two of the meters were found to be inaccurate. Inaccuracies in the meters can result in a higher unaccounted for water percentage and inaccuracies represent lost revenue for the Village. While the large water users only encompass approximately 7% of the monthly water billings, the Village still has the expense of treating, pumping, and storing water and larger users cause more wear and tear on the system as they require a larger demand of water than residential users. The following alternatives are: 1) Do nothing, 2) Replace inaccurate meters, 3) Replace all commercial meters.

#### 1. Do Nothing

The large water users encompasses approximately 22% of the monthly water billings. In addition, while two meters are not accurate they do register a portion of the monthly flows for each facility. Additionally, the Village could enter into a large user contract with each facility for a set usage amount each month.

#### 2. Inaccurate Meter Replacement

Meters typically have a life expectancy of 20 to 25 years for residential meters that are recommended to be replaced every 1,500,000 to 2,000,000 gallons. Commercial meters see a much larger water use than residential meters and typically require replacement earlier than residential meters. Based on billing records for these larger meters, meters such as the schools experience annual water use upwards of 1,500,000 gallons. As such, large commercial meters should be tested every two years at a minimum to ensure that meters remain accurate.

As indicated by the calibration testing, two of the larger meters are currently inaccurate and should be replaced. The Village has standardized on Badger meters and the cost to replace the two meters with a 4" Badger FS meter is $19,200. The Village has purchased both meters and has installed a new meter at Jones Memorial Hospital. The Village is in the process of replacing the meter at Argentieri Brothers Laundry.

### 3. Meter Replacement

While the previous option evaluates the cost to replace the existing inaccurate meters, consideration should be given to replacing all of the commercial meters. Based on the annual water use and age of the meters, replacement of the meters should be planned as it is anticipated that the meters will likely need to be replaced in the next 5 to 7 years. Additionally, the advantage to replacing the existing meters with newer meters is that most new meters are re-buildable. It is understood that the Dresser Rand meter has been recently replaced and the remaining nine number of large meters are aging and have significant volumes of flow pass through them and therefore it would be recommended to replace all of the aging large meters. The construction cost to replace all nine large commercial meters in the system is approximately $72,641. Refer to Appendix P for the detailed cost estimate for meter replacement.

## B. Water Treatment Plant Controls and Pump Improvements

### 1. Pump Controls

As previously described, raw water is pumped to the plant using a combination of four submersible pumps at the intake. This raw water is filtered and discharges into a buried 500,000 gallon clearwell from which three finished water pumps withdrawal water and convey it into the distribution system. Given the manual operation of the finished water pumps maintaining water levels in the clearwell often requires turning pumps on and off. For instance, if a 125 HP pump is pumping into the system and the clearwell water level is rising, the operator will engange the 60 HP pump. Likewise if the water level is dropping, the 60 HP pump can be taken off-line. This type of operation not only requires additional attention from the operator but also impacts system pressures as discussed previously in this report. There is a noticeable number of breaks that originate in close proximity to the plant and become less frequent as the distance away from the plant increases. As the distance from the plant increases, pressures stabilize. Hence, there is a strong connection between the operation of the plant and leaks that may occur in close proximity to the facility. As such, balancing of flow rates through the use of a control system and variable speed drives will allow for reduced the frequency of multiple finished water pumps operating simultaneously.

Secondly, the filter plant is approaching 27 years old and the existing control panels and interior components are archaic. Many of the parts and PLCs are no longer available or practically serviceable. Therefore, improvement of the controls to better manage system pressures will also aid in replacement of parts that have simply exceeded their useful life.

### 2. Pumps

#### a. Raw Water

There are four submersible style raw water pumps including two (2) 15 HP pumps and two (2) 25 HP pumps with variable speed drives. These pumps are original to the facility and at 27 years old have significantly exceeded their useful life. Typically, submersible style pumps that are operated for a portion of the day will commonly last 10-15 years. While there is redundancy at the plant, these pumps should be heavily considered for replacement along with the associated variable speed drives. Given technology improvements in the past 27 years, high efficiency submersible style pumps can replace the existing Meyers submersible style pumps to reduce operational costs.

#### b. Finished Water

The finished water pumps and motors are vertical turbine style pumps that have been properly maintained (windings, oil, etc). These motors, while 27 years old, are in acceptable shape and have adequate remaining useful life to not warrant immediate replacement. However, as indicated above, the pumps warrant additional controls to interface with the operation of the raw water pumps. This type of interface will require variable speed drives to be added to the pumps to allow for balancing of the water level within the clear well during operation of said pumps. This improvement will require the installation of three variable speed drives on the two (2) 125 HP finished water pumps and the 60 HP finished water pump.

### 3. Construction Cost

The cost to complete this work shall include removal and replacement of the four (4) finished water pumps, removal of existing variable speed drives and replacement, removal of existing pump control systems, installation of a new control panel designed to interface with raw water and finished water pumps, and installation of the three finished water pump variable speed drives. The construction costs to complete this work is $302,510. Refer to Appendix P for a detailed cost breakdown.

## C. Distribution System

As indicated on the potential problem areas map (Appendix F), the Village distribution system is subject to leaks. These leaks can be attributed to several factors in this area: fluctuations in pressures, underlying tanbark, and pipe material. The following sections outline improvements for the distribution system.

### 1. Subsurface Tanbark

A clustering of leak locations are relatively centralized near the water treatment plant. Review of tanbark location mapping shows that this area has tanbark underlying many of the roadways and the water treatment plant itself is known to be built upon tanbark. Village reports indicate that in areas of known tanbark under the road such as West State Street, the pavement is 3 to 4 feet thick and tanbark is located upwards of 8 feet in depth. Tanbark also settles unevenly which causes shifts in the watermain and the pipe to pull apart at its joint resulting in a leak. Additionally, pressures near the water treatment plant see pressure fluctuation as pumps are turned on and off and can see pressures ranging from 104 to 119 psi. This constant pressure fluctuation puts strain on the distribution system and coupled with brittle watermains such as cast iron pipe, increases the likelihood of leaks. Tanbark also has the potential to damage watermains as with any decaying organic, it is likely corrosive.

### a. Watermain Replacement

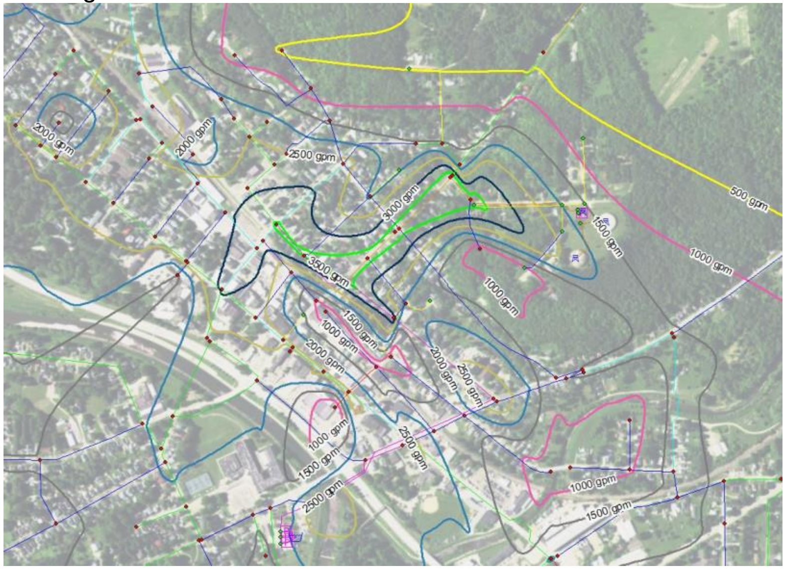
Due to the corrosive quality of tanbark as well as its tendency to unevenly settle, watermain should be replaced in the following locations where tanbark is known to occur: Madison Street, Brooklyn Avenue, Early Street, South Main Street, West State Street and Stevens Street. These watermains shall be replaced with ductile iron pipe which will further improve the system as the majority of the streets listed above are cast iron watermain that likely has tuberculation due to its age, thus decreasing the interior diameter of the pipe and restricting flows. Ductile iron pipe is also cement lined and has less friction than cast iron pipe. Newer technologies such as gripper ring gaskets shall be used at the joints to aid in not allowing pipe joints to pull apart when there is a shift in the watermain. Due to the organics in the soil from the tanbark, pipe shall be encased in polyethylene wrap in order to provide corrosion protection. Additionally, sizes of pipe will be increased during watermain replacement where appropriate so as to increase flows.

The following sections illustrate and describe the improvements at each street location.

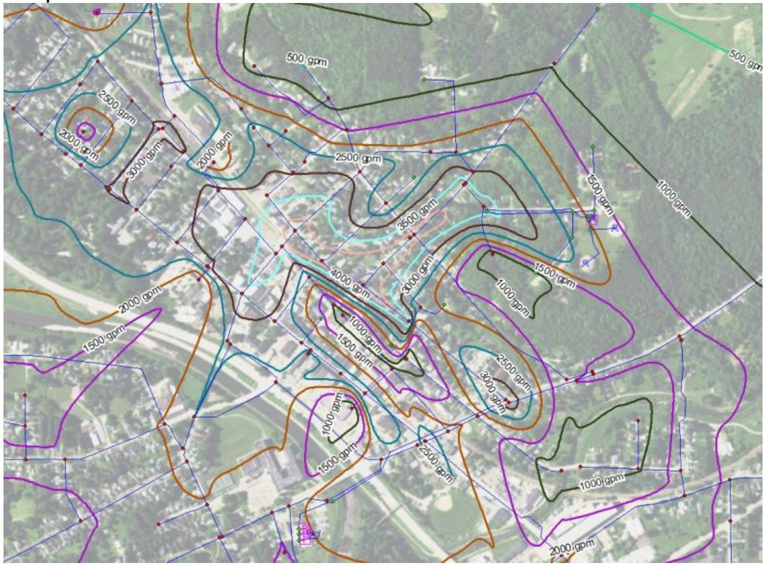
#### i. Madison Street

Watermain replacement at Madison Street involves replacement of cast iron pipe with ductile iron pipe and as can be seen in the images below results in a 500 gpm increase to flows in the downtown area. Additionally, Madison Street contains the distribution piping coming from the water storage tanks. While there is no history of known leaks in this waterline, it is a high priority due to the lack of multiple mains coming from the storage tanks. A break in this watermain has the potential to drain the tanks which could cause significant water damage and affect the Village's ability to provide fire protection. This watermain should be given high priority for replacement due to the threat to health, safety, and property in the event of a significant break

Existing Conditions



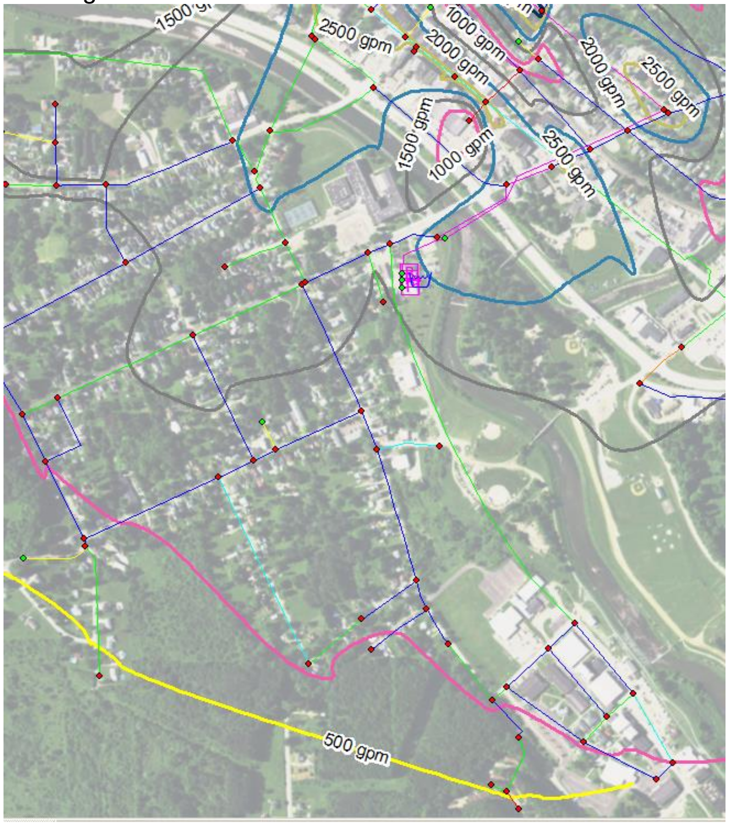
Proposed Conditions



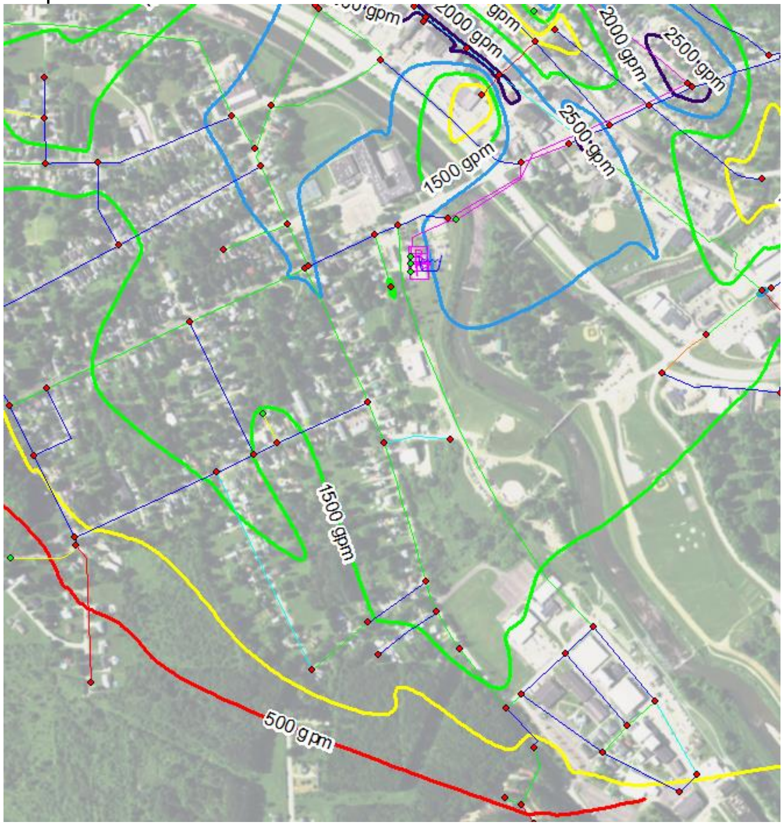
### ii. Brooklyn Avenue

Watermain replacement at Brooklyn Avenue involves replacement of 6” cast iron pipe with 8” ductile iron pipe. As can be seen below, while the pipe replacement does not create a significant change in the central part of the Village adjacent to the Genesee River this increase in pipe size has a 500 gpm increase to the southeastern portion of the water system as higher flows are extended further into this area.

Existing Conditions



Proposed Conditions



### iii. Early Street

Watermain replacement at Early Street involves replacement of 6” cast iron pipe with 8” ductile iron pipe. As can be seen below, this increase in pipe size has a 500 gpm to the area and also extends higher flows to the extents of the distribution system.

Existing Conditions

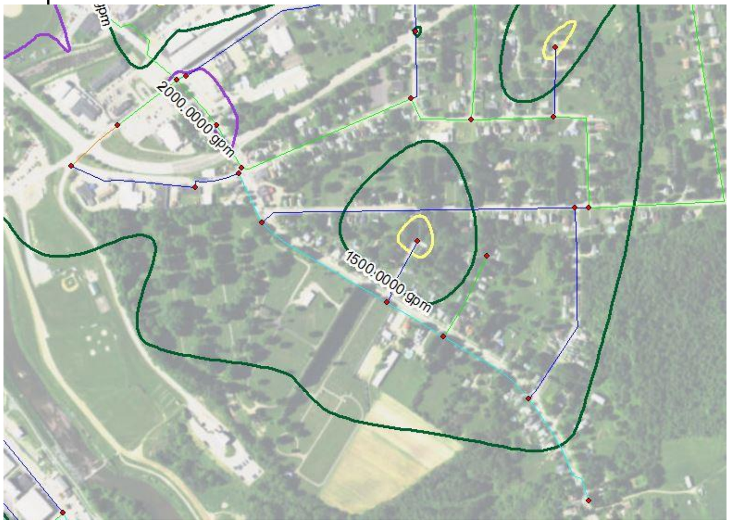
Proposed Conditions

### iv. South Main Street

Watermain replacement at South Main Street involves replacement of 10” cast iron pipe with 10” ductile iron pipe. As can be seen below, the change in pipe material resulted in an increase of 500 gpm to an area that has insufficient fire flows. With a 10” ductile iron pipe, sufficient fire flows are met. Due to this increase in fire flows, this watermain replacement is given priority for health and safety reasons.

Existing Conditions

Proposed Conditions

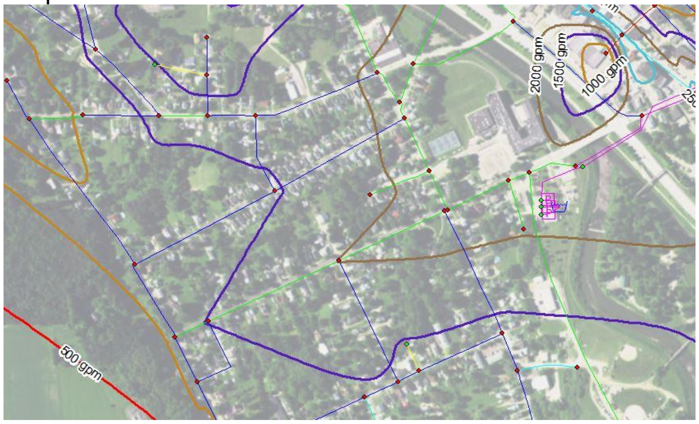


### v. West State Street

Watermain replacement at West State Street has two options: replace the entire length of the watermain or replace the section of West State Street to the east of Brooklyn Avenue. Full replacement of the watermain would involve replacement of 6” cast iron with 8” ductile iron pipe to the east of Brooklyn Avenue and replacement of 8” ductile iron installed in the 1970s with 8” ductile iron pipe. Partial replacement of the watermain involves replacement of just the 6” cast iron pipe to the east of Brooklyn Avenue with 8” ductile iron pipe. As can be seen below, this increase in pipe size and material for the section east of Brooklyn Avenue extends higher flows to the extents of the distribution system. This watermain replacement is given priority due to its location adjacent to the water treatment plant where water is discharged into the distribution system and as this section sees a frequency in pipe breaks.

Existing Conditions

Proposed Conditions



### vi. Stevens Street

Watermain replacement at Stevens Street involves replacement of 6” cast iron pipe with 8” ductile iron pipe. As can be seen below, the change in pipe material and size results in an increase of 500 gpm to areas at the extents of the water distribution system.

Existing Conditions

Proposed Conditions

### b. Replacement Priority

Given health and safety issues, the watermains with the highest priority are Madison Street, West State Street, and South Main Street. Replacing watermains at these three locations will provide sufficient fire flows to areas with previously insufficient flows, and protect the water system's ability to serve users by replacing watermain to the storage tanks and in front of the water treatment plant.

### c. Construction Cost

The table below gives the watermain replacement construction cost for each street. For a detailed cost estimate of each street, refer to Appendix P. The total project construction cost is $3,476,853 (with replacement of West State Street only to the east of Brooklyn Avenue).

**Table 19: Watermain replacement construction cost for locations with tanbark.**

| Street | Watermain Replacement Cost |
|---|---|
| Madison Street | $698,281 |
| Brooklyn Avenue | $793,299 |
| Early Street | $520,580 |
| South Main Street | $669,736 |
| West State Street (full) | $672,184 |
| West State Street (partial) | $218,561 |
| Stevens Street | $576,396 |

## 2. Transite Asbestos Pipe

Approximately 9% of the water distribution system is composed of transite asbestos pipe. Based on the age of the watermains and the documented expected useful life of 70 years for transite asbestos pipe, it is anticipated that the transite pipe has a remaining useful life of 15 to 20 years. Over time, transite asbestos pipe gradual degrades in the form of corrosion by calcium leaching due to internal conveyed water and external groundwater. Leaching leads to pipe softening and loss of mechanical strength. Thus, as the water distribution system ages, the number of pipe failures increases. In addition, asbestos pipe poses health and safety risks. The water is currently tested and while no adverse impacts have been found, required testing of the water points to the potential for future regulations. As such, it is recommended that a plan be in place for replacement of transite pipe beyond its remaining useful life. The areas of the water system containing transite asbestos pipe can be separated into 6 different sections: Fairview and John Street, King Street, State Route 19 within the Town of Wellsville, Trapping Brook Road, Meadowbrook Court, and Witter Avenue.

### a. Village of Wellsville – Construction Cost

The distribution system for the Village contains approximately 3,500 feet of transite asbestos. If all of the transite asbestos were to be replaced in 15 years, the Village would need to replace approximately 230 feet per year. The Village has 5 sections containing transite asbestos and should establish a goal of completing a street every 2 years. The remaining streets requiring replacement include; Fairview/John Street, King Street, Trapping Brook Street, Meadowbrook Court, Witter Ave.

The table below gives the watermain replacement construction cost for each street section. For a detailed cost estimate of each street section, refer to Appendix P. The total project construction cost for the Village is $713,228.

**Table 20: Transite asbestos pipe replacement costs for the Village of Wellsville.**

| Village of Wellsville Street | Watermain Replacement Cost |
|---|---|
| Fairview and John Street | $225,289 |
| King Street | $96,533 |
| Trapping Brook Street | $114,294 |
| Meadowbrook Court | $165,384 |
| Witter Avenue | $111,728 |

### b. Town of Wellsville – Construction Cost

The Town of Wellsville contains distribution piping along State Route 19 that consists of approximately 5,100 linear feet of 8" transite asbestos pipe. If all of the transite asbestos were to be replaced in 15 years, the Town would need to replace approximately 340 feet per year. It is recommended that the Town plan to replace the north end of State Route 19 in 5 to 7 years. This section is a priority as it replaces a large section of transite asbestos and is a primary transmission main. The construction cost to replace the transite asbestos pipe within the Town is $878,488.

## 3. Water System Looping

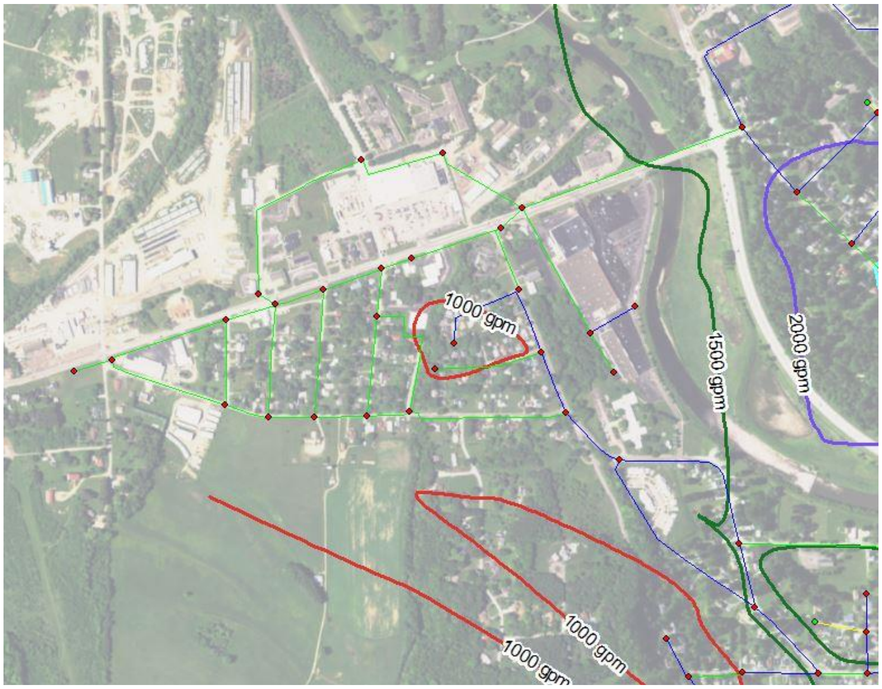
The existing water system has extensive looping with the exception of a few areas. Dead end watermain are primarily near obstructions such as a stream, State Road or railroad, and as such implementation of these loops would be expensive. Furthermore, these areas are not strategically placed that would likely result in significant hydraulic gains or improvements to water quality. Many of these areas are located in in close proximity to sufficient water usage to allow for adequate turnover. Three areas where looping was identified include the intersection of Bolivar Road & North Highland Ave, Madison Street & the Railroad, and South Broad Street & Dyke Creek.

Other watermain looping was identified but implementation is limited due to excessive cost versus overall benefit. For instance, looping of watermain along East State Street with that along Route 417 would likely aid in providing a supply of water to the Southeastern portion of the distribution system, however, the watermain along East State Street is smaller distribution piping versus larger diameter transmission pipe. Looping this watermain would provide little hydraulic benefit to the Southeastern portion of the distribution system. Similarly, looping of the extreme southern portion of the system was contemplated, however, the terminus points have significant separation distance (i.e. 3,000 + feet) and a river crossing would need to be incorporated. Furthermore, the watermain in the southwest portion of the system is of poor quality and looping would result in reversal of flow direction and poor water quality for a notable period of time.

### a. Bolivar Road Loop

Watermain along N. Highland is not looped with watermain along Bolivar Road. As a result low fire flows occur in the vicinity of Crowner Ave, which is near the proposed loop. The existing fire flows in this area are summarized by the graphic below. As depicted, the fire flows in the Crowner Ave location approach 500 gpm.

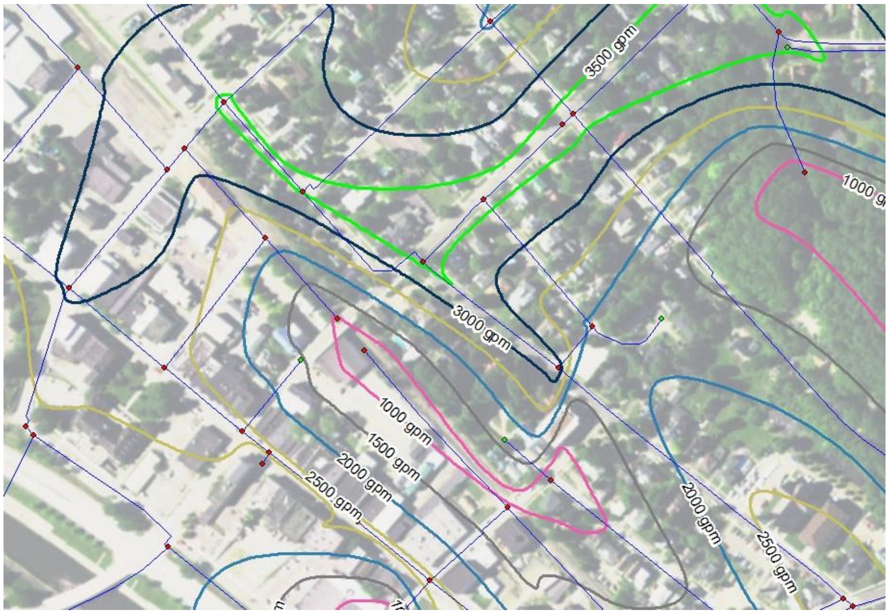
Completion of this loop will obviously have a positive impact on fire flows in the area as a result of maintaining pressures and providing additional supply capacity. The model predicted fire flows subsequent to the installation of 8-inch diameter watermain between N. Highland and Florida Ave, along Bolivar Road, is shown below. This improvement adds nearly 500 gpm to the fire flows experienced along Crowner while providing slightly less benefit to the other surrounding streets.



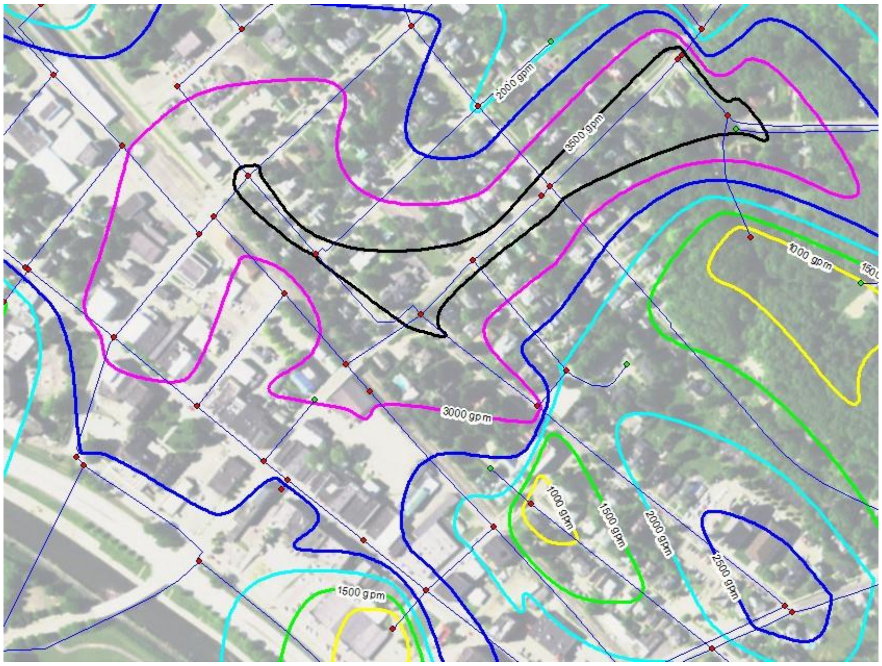
Looping the existing 8 inch diameter watermain along N. Highland with the 8 inch diameter watermain along Bolivar Road/Florida Ave would require the installation of nearly 820 feet. The cost to complete this work is complicated by the State Road and is anticipated to have a construction cost of $109,495. Refer to Appendix P for a detailed construction cost.

### b. Madison Street at Railroad

The 6-inch diameter watermain extending along the western side of the existing railroad was never interconnected with the 6 inch diameter watermain on the opposite side of the road. Fire Flows are already elevated in this area and interconnection of this watermain would require extension beneath a railroad underpass. The existing fire flows in this area are highlighted by the following graphic. Fire flows in this area range from 1000 gpm to 3000 gpm as shown below.



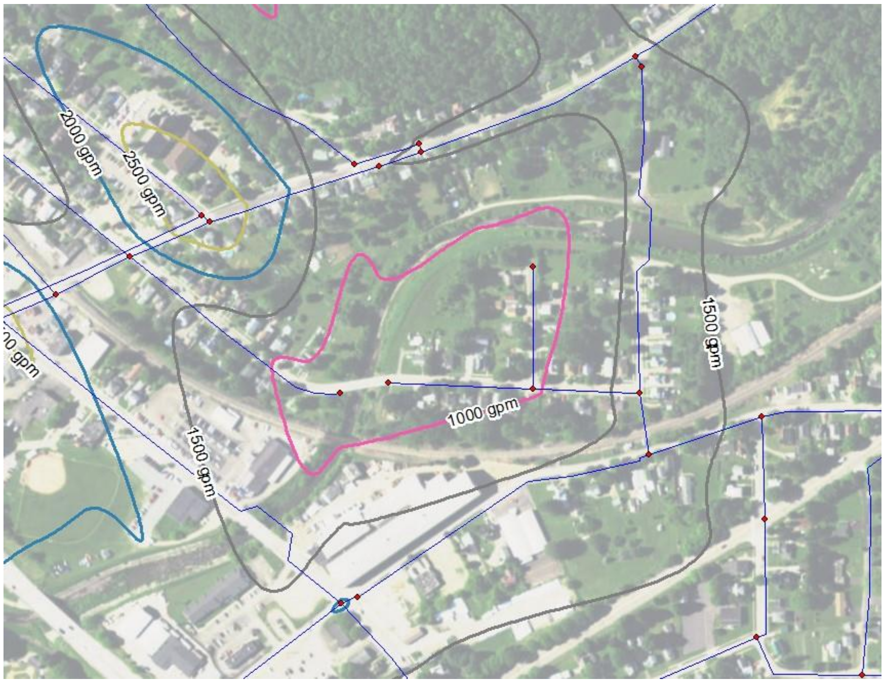
Installation of a 6-inch diameter watermain would add in the conveyance of water to the downtown area through the additional looping. This watermain would have to be installed using directional drilling methods due to the railroad underpass. Installation of the watermain would aid in the redistribution of higher fire flows such that fire flows in the area approached 3000 gpm as shown below. Improvement of the fire flows would be in areas behind the North Main street development and would not significantly impact fire flows along North Main Street.



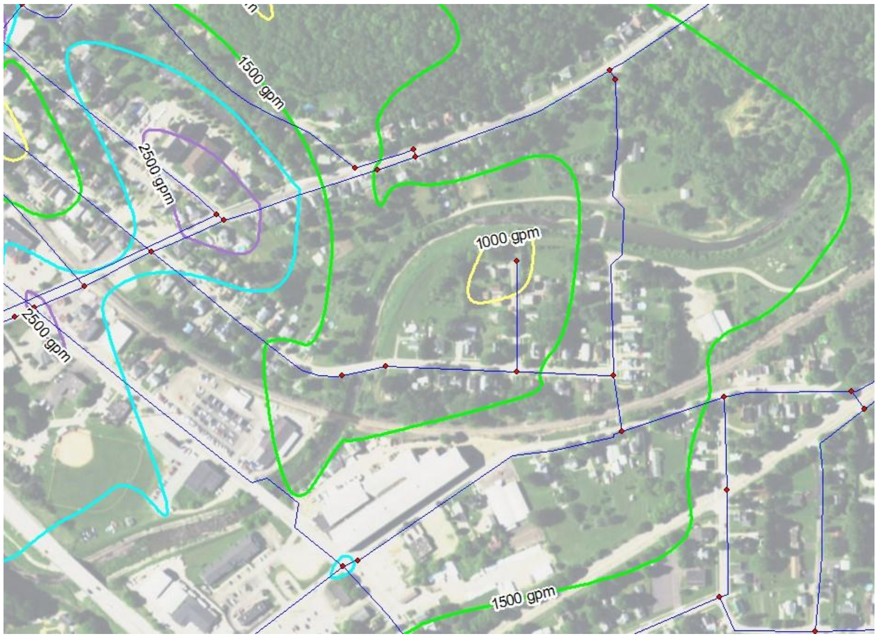
The construction costs associated with looping this watermain is estimated to be $137,344. Refer to Appendix P for a detailed construction cost.

### c. South Broad Street at Dyke Creek

Watermain along South Broad Street was terminated at the stream bank and not installed across Dyke Creek. As such there are two dead-end 6-inch diameter watermain along South Broad Street that limit the fire flow capabilities in this area to around 900 gpm as shown below. This fire flow is sufficient to meet the current residential fire flow requirements.



Understanding that limited fire flows exist throughout the southeastern portion of the distribution system, providing looping of the watermain along South Broad Street was investigated. Installing a 6 inch diameter watermain beneath Dyke Creek through directional drilling would have a construction cost of approximately $54,482. Installation of a 6-inch diameter watermain to loop the existing dead end piping would provide limited benefit to the surrounding area. While fire flows along South Broad Street would increase to nearly 1,300 gpm from 900 gpm, the increased benefit remains localized and does not improve supply capacity to the greater southeastern distribution system. This is demonstrated in the model predicted fire flows graphically depicted below.



The construction costs associated with looping this watermain is estimated to be $54,482.25. Refer to Appendix P for a detailed construction cost.

### 4. Southeastern Distribution System Fire Flow Improvements

The southeast portion of the distribution system, extends a significant distance away from the heart of the distribution system and its inherent looping. As such this area is effectively a dead end resulting in low fire flows and poor residual pressures during fire flow events elsewhere in the system. While these poor hydraulic conditions do not impact domestic usage and day to day consumption, they unacceptable fire flows for approximately 70 homes as well as resulting in relatively low fire flows in and around the High School.

#### a. Improvement Options

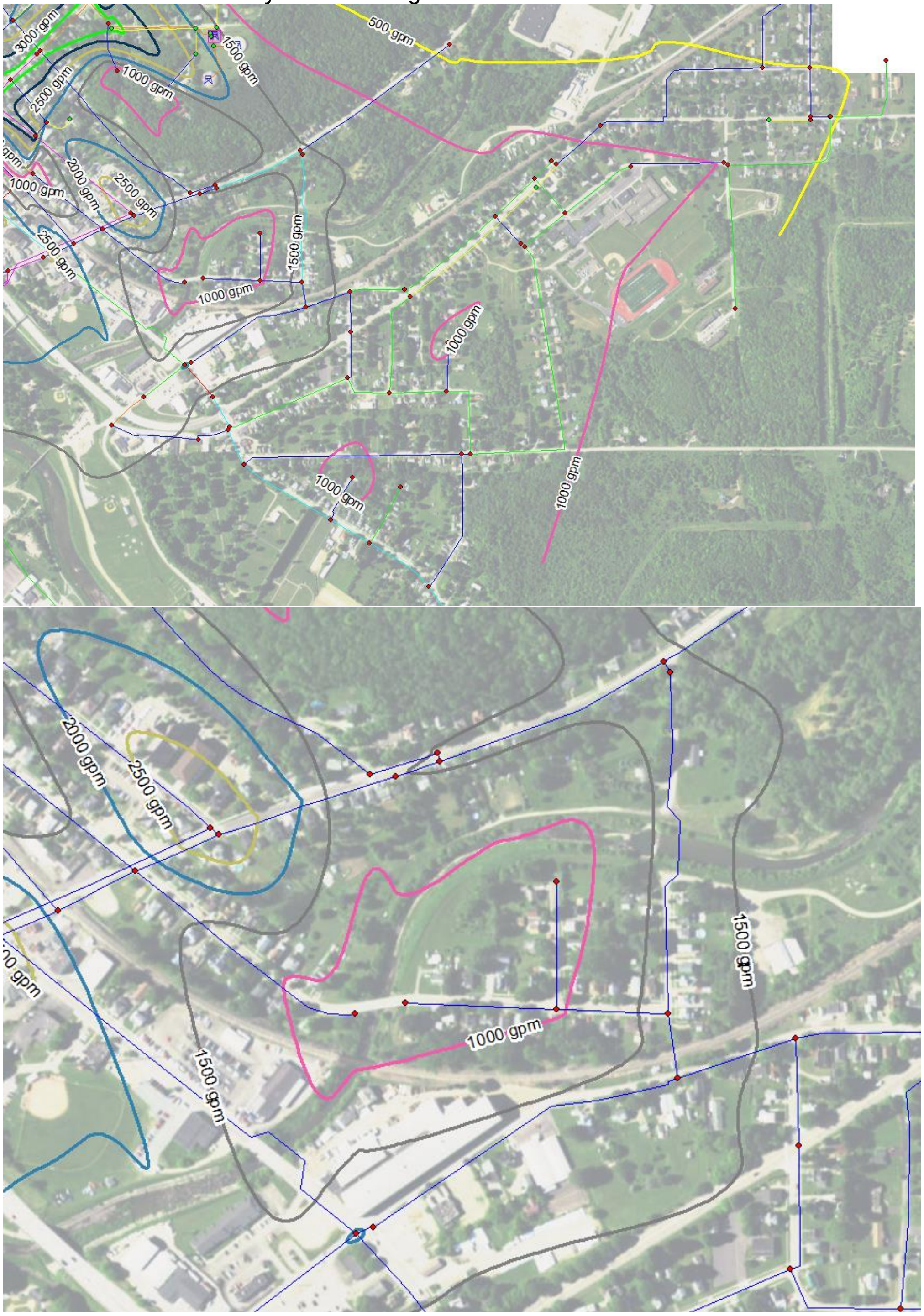
##### i. Looping

Looping of the watermain was investigated between the 8 inch diameter watermain located along Merriam Heights and Rauber Hill Road, it resulted in a maximum fire flow increase of less than 100 gpm. While looping in this end of the system may slightly improve water quality, the need for additional large volumes of supply is necessary to provide elevated fire flows and maintain residual pressures. Therefore, looping will not

##### ii. Supply Watermain Upgrades

This area is supplied with water from multiple areas, however, given the pipe age and condition, significant friction losses are incurred such that low fire flows are realized. Calibration of the water model has identified appreciable attack on the watermain such that fire flows approaching 500 gpm are only available. This area is supplied water from South Main Street and watermain extending from Scott Ave. along Miller Street. Given there is a large 10 inch diameter watermain that already exists on Miller Street, upgrades to the watermain along Scott Ave and Dyke Street would provide a large diameter conduit from the tank transmission main to this area. Another potential connection is from the existing waterline that dead ends in front of the fire training grounds that could connect to the northern end of Miller Street. As shown below, the fire flows during current conditions, with the finished water pumps off, are only approximately 1000 gpm near the High School and below 500 gpm along Sunnydale Ave and Cresent Drive.

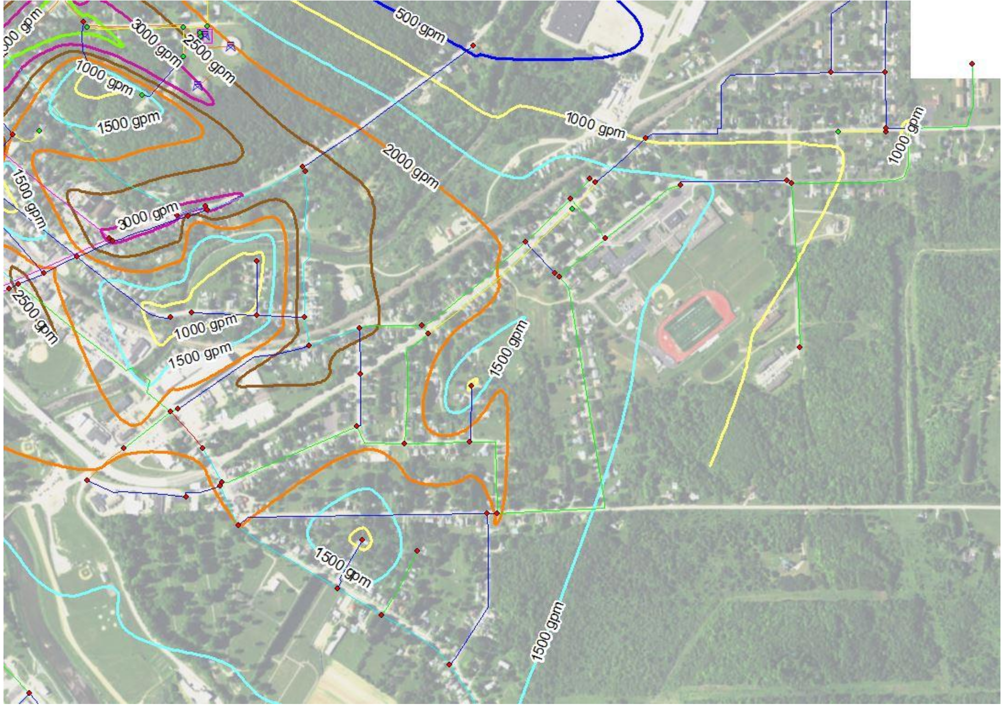
Southeast Distribution System Existing Fire Flows

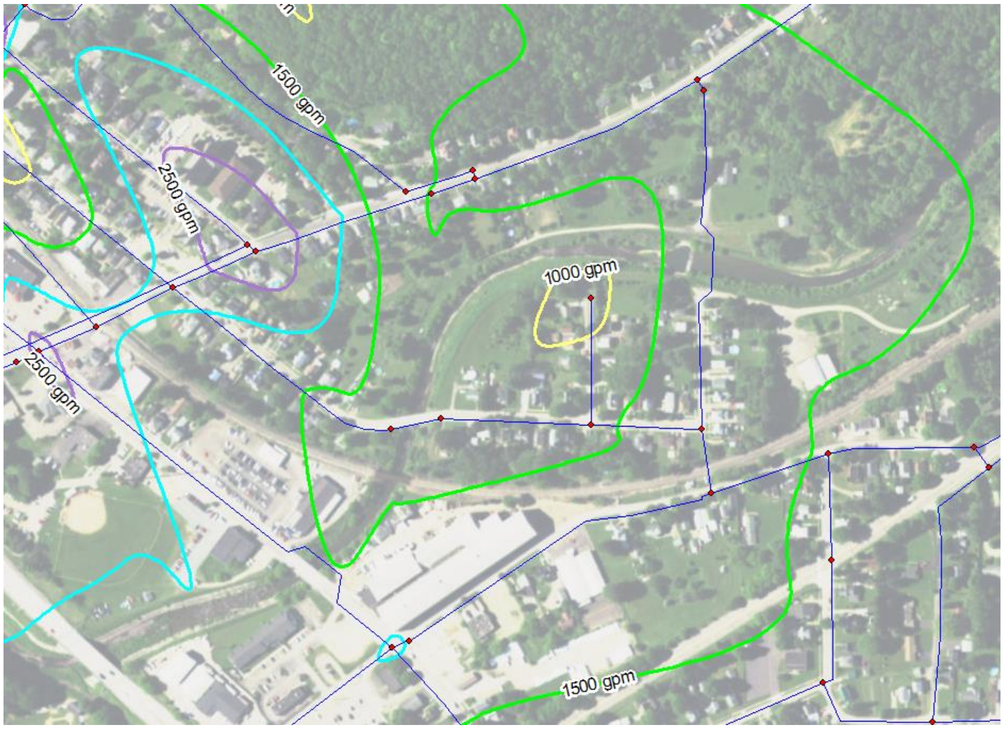


### 1. Scott Ave

Increasing the Scott Ave and Dyke Street watermain to match the existing 10 inch diameter watermain along Miller Street will provide increased fire flows to the impacted area. Model predicted fire flows, as shown below, range from nearly 1,500 to 2000 gpm near the high school to 1000 gpm in the extreme ends of the distribution system (i.e. Sunnydale Ave & Crescent Drive).

Southeast Distribution System – Scott Ave Proposed Fire Flows

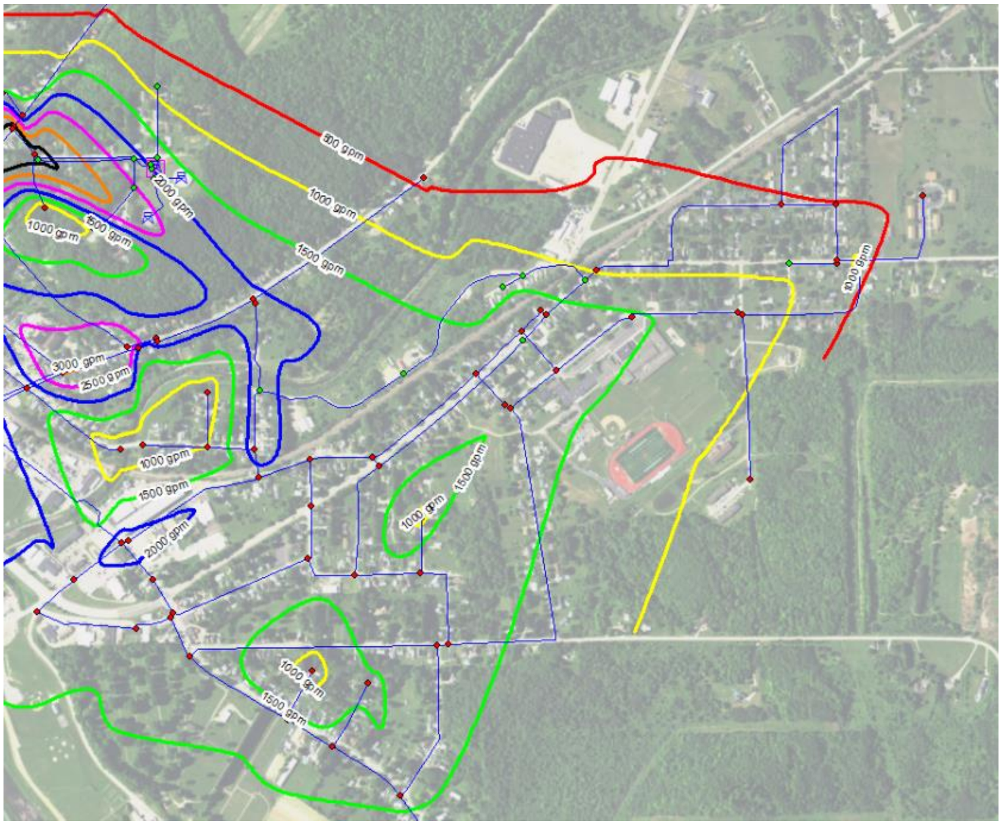




### 2. Miller Street

Connecting the 8 inch ductile pipe near the fire training facility with the 10 inch watermain along Miller Street results in very little change in the model predicted fire flows as shown below. This indicates that the hydraulic shortcoming is located between Miller Street and the fire flow water supply (i.e. water storage tank). Therefore, additional improvements would have to occur such as replacement of the watermain along Scott Road from a 6 inch to a 10 inch diameter in addition to increasing the watermain size along East State Street to 10 inch to establish a large diameter transmission pipe from the near tank to Miller Street.

Southeast Distribution System – Miller Street Proposed Fire Flows



### b. Construction Cost

Given that further improvements would be required for an interconnection at Miller Street to the fire training grounds in order to improve fire flows, it is recommended that the option for Scott Avenue be pursued instead. The upgrade of the watermain along Scott Ave and Dyke Street will result in the installation of nearly 3,030 feet of 10 inch diameter watermain. The construction cost of the proposed improvements is for Scott Avenue is $431,667.74 and for East Dyke and Miller is $151,824.07 for a total project construction cost of $583,491.81. Refer to Appendix P for a detailed construction cost.

## X. Proposed Project (Recommended Alternative)

### A. Preliminary Project

The Village of Wellsville's water system is characterized by approximately 40 miles of distribution piping with associated isolation valves and hydrants, four raw water supply pumps, three booster pumps in the treatment plant, two booster pumps in the distribution system, two water storage tanks, and a treatment building and adjacent clearwell. The water system has been well maintained over the years, however, there is room for improvement as is evident through the reoccurring high volume of unaccounted for water, changing subsurface conditions resulting from buried tanbark, and future potential regulatory requirements for asbestos piping. Recognizing the need to improve the water system, the Village of Wellsville should attempt to secure funding to aid in the improvements outlined above. Hunt Engineers, Architects & Land Surveyors, PC has investigated various alternatives for improving each component of the water system to correct existing health and safety issues and aid in lowering unaccounted for water including watermain replacement, system looping, control modifications and metering.

### B. Permit Requirements

Several components of the proposed project will require permits for construction. Modifications and improvements to the water system will require approval from the Allegany Department of Health. Any work done within the right-of-way of a state or county road will require a utility work permit.

### C. Project Cost Estimate

The following is an estimate of the construction costs for the proposed improvements project for the Village of Wellsville water system.

| **Improvement** | **Subtotal Cost** |
|---|---|
| WTP Pumps & Controls | $ 302,510 |
| Meter Replacement | $ 72,641 |
| Madison St. Transmission Replacement | $ 698,281 |
| West State Street Watermain Replacement | $ 218,561 |
| Subtotal | $1,291,993 |
| Engineering (8%) | $ 103,360 |
| Construction Observation (7%) | $ 90,440 |
| Administrative/Financial (3%) | $ 38,760 |
| Legal (2%) | $ 25,840 |
| **Total Project Cost** | **$1,550,393** |

### D. Existing Cost to Customers

The average water use per dwelling unit is 43,435 gallons per year. Therefore, a single EDU is estimated to use 119 gallons per day. Utilizing the existing Village of Wellsville water rate structure, the annual operation and maintenance water cost is $321.04 per EDU. Users are also billed for remaining water debt. The Village has a total outstanding water debt of $315,823. The annual water debt charge per EDU is calculated as follows:

$$\text{Annual Cost per EDU} = \frac{\text{Total Water Debt}}{\text{Total Number of EDUs}}$$

$$\text{Annual Cost per EDU} = \frac{\$315{,}823}{3{,}845}$$

$$\text{Annual Cost per EDU} = \$82.14 \text{ per EDU}$$

$$\text{Total Cost per EDU} = \$321.04 + \$82.14$$

$$\text{Total Cost per EDU} = \$403.18$$

Thus, the existing cost of water per EDU is $403.18.

## E. Annual Operating Budget

### 1. Project Debt Service

Debt service is greatly dependent upon the rate of return and average interest rate utilized. Common municipal funding consists of return periods of approximately 30 years with varying interest rates. However, without attempting to speculate, a 4.5% interest rate is a safe, conservative estimate of a reasonable interest rate that could be obtained with such financing.

Therefore, the resulting debt service from the previously described project is as follows:

$$\text{Annual Payment} = \frac{\text{Present Worth}}{\left[\frac{(1 + \text{interest rate})^{\#\text{ of years}} - 1}{\text{interest rate} * (1 + \text{interest rate})^{\#\text{ of years}}}\right]}$$

$$\text{Annual Payment} = \frac{\$1{,}550{,}393}{\left[\frac{(1 + 0.045)^{30} - 1}{0.045 * (1 + 0.045)^{30}}\right]}$$

$$\text{Annual Payment} = \$95{,}181.02$$

$$\text{Annual Debt Service per EDU} = \frac{\text{Annual Payment}}{\text{Total EDUs}}$$

$$\text{Annual Debt Service per EDU} = \frac{\$95{,}181.02}{3{,}845}$$

$$\text{Annual Debt Service per EDU} = \$\ 24.75 \text{ per year}$$

### 2. Operation and Maintenance Costs

Operation and maintenance costs are based on the day-to-day requirements to keep the system operational. These items include the following:

- Pumping costs
- Chemicals for disinfection
- Billing
- General maintenance of the system

The total operation and maintenance costs for proposed water system improvements are not expected to increase with the proposed improvements.

### 3. Short-Lived Asset Reserve

Refer to Appendix K for a table of short-lived assets for the water system. The table includes all of the water system's assets with expected remaining useful life and estimated replacement cost for each asset. The assets are categorized based life expectancy as either short-lived assets are or long-term assets. Based on the assets within the system, it is recommended that an annual deposit of $98,456 be placed into the short-lived asset reserve to fund replacement and maintenance of short-lived assets. The existing Village budget (refer to Appendix L) sets aside $25,000 for short-lived assets. Subtracting the amount the Village currently budgets for short-lived assets from the recommended annual deposits, the Village should set aside an additional $73,456 per year. The annual cost per EDU is as follows:

$$\text{Annual Reserve per EDU} = \frac{\text{Reserve Deposit}}{\text{Total EDUs}}$$

$$\text{Annual Reserve per EDU} = \frac{\$73{,}456}{3{,}845}$$

$$\text{Annual Reserve per EDU} = \$19.10$$

### 4. Total Financial Impact per EDU

As calculated above, the existing rate and cost of water per EDU is $403.18. The approximate increase in debt service associated with the proposed project is $24.75. The annual reserve for short-lived assets is $19.10. Consequently, the approximate total annual financial impact per EDU is $447.03.

The NYS Controller's threshold for water is $966 per year for a single family residence in 2017. The total annual financial cost per EDU is well below the NYS Controller's threshold.

## F. Review of Funding Opportunities

HUNT reviewed the current funding opportunities available to minimize the new burden to users in the water district for design and construction of the proposed project. The following grants and loans are recommended for consideration and future applications.

1. Office of Community Renewal, Community Development Block Grant
   This Public Infrastructure Grant funds up to $600,000, of which 18% of the award may be requested for program delivery, administration, and engineering costs combined. The remaining 82% must be used for construction costs. The Village of Wellsville has a low to moderate income (LMI) of 52.74%, greater than the 51% of necessary LMI project beneficiaries. Wellsville can apply for CDBG grant assistance; the application is due end of July through the NYS CFA application process.

2. United States Department of Agriculture, Rural Development Water & Waste Disposal Loan & Grant Program
   The USDA RD requires population of less than 10,000, and the median household income (MHI) must be below $45,506 to qualify for RD Poverty Category Reduced Interest Rate Loan and Grant Program. The Village of Wellsville meets the population requirement with 4,679, per the 2010 Census. The Village has a MHI of $29,177, per the 2010 Census used by USDA; well below the $45,506 limit to qualify for the Poverty Category Reduced Interest Rate Loan and Grant Program. The Poverty Category confers eligibility for the lowest interest rate offered by RD, and possibly grant assistance. The acceptance of application for this funding is continuous.

3. New York State Environmental Facilities Corporation, Drinking Water State Revolving Fund Hardship Grant / Loan Program
   The NYS EFC DWSRF Grant / Loan program provides up to $2M or 75% of project costs, whichever is less. Hardship financing requires projects have MHI less than $46,602 to qualify. The Village of Waverly's MHI is $38,269, per the 2013 Census used by EFC. The Village of Waverly meets the hardship requirements. Applications for DWSRF begin with listing on the Intended Use Plan; listings take place prior to August.

4. New York State Environmental Facilities Corporation, NYS Water Grants – Drinking Water
   NYS Water Grants fund projects up to $3M or 60% of total eligible project costs. The Village of Wellsville Water System Improvement Project is eligible for funding under this program. The application requires inclusion of Engineering Report, Proof of District Formation, SEQR, and SHPO. Water Grant applications are anticipated to be due in late June, 2017.

## XI. Conclusions and Recommendations

The Village of Wellsville's water system is characterized by approximately 40 miles of distribution piping with associated isolation valves and hydrants, four raw water supply pumps, three booster pumps in the treatment plant, two booster pumps in the distribution system, two water storage tanks, and a treatment building and adjacent clearwell. The water system has been well maintained over the years, however, there is room for improvement as is evident through the reoccurring high volume of unaccounted for water, changing subsurface conditions resulting from buried tanbark, and future potential regulatory requirements for asbestos piping. Recognizing the need to improve the water system, the Village of Wellsville should attempt to secure funding to aid in the improvements outlined above. Hunt Engineers, Architects & Land Surveyors, PC has investigated various alternatives for improving each component of the water system to correct existing health and safety issues and aid in lowering unaccounted for water including watermain replacement, system looping, control modifications and metering.

### Metering

As identified, several large meters were found to be inaccurately reading flow rates. This is due to the overall age of the meter and the large volumes of flow that pass through said meters. Including the meters that were unable to be tested as part of this report, it is known that a measureable quantity of unaccounted for water is being lost through large meter inaccuracies. Therefore, it recommended that the large diameter meters for the large users be replaced.

### WTP Control & Pump Improvements

Raw water pumps and pump controls at the water treatment plant have surpassed their expected useful life and should be replaced. The treatment plant is the sole water supply of the community and limited redundancy exists, therefore, it is imperative that these improvements be completed. Furthermore, the lack of communication and control between the finished water pumps results in inefficient operation of the finished water pumps and also noticeable pressure fluctuations within the water system. These repeated pressure fluctuations are widespread and have resulted in numerous breaks in the central area of the Village surrounding the water treatment plant. The addition of controls and variable speed drives will aid in minimizing these pressure fluctuations through more efficient operation of the pumps. It is recommended that the Village immediately pursue control and pumps improvements at the water treatment plant.

### Watermain Looping

While it is always desirable to eliminate dead end watermain in the system, the cost of eliminate these watermain should be weighed with the associated benefits, Currently, no significant adverse water quality issues have been encountered due to sufficient turnover, therefore, improved flows and pressures is the only additional benefit for completing such improvements.

Of the looping opportunities investigated including; Bolivar Road, Madison Street (at RR tracks) and S. Broad Street at Dyke Creek, none provided regional benefit associated with elimination of the dead end watermain. Local fire protection was enhanced but the existing fire protection provided appears adequate for the need. Therefore, none of the looping improvement projects investigated shall be considered a priority project.

**Watermain Replacement in Areas of Tanbark Fill**

There are multiple streets whose construction over the years included significant use of tanbark. This tanbark is organic in nature, consequently decaying over time, causing corrosion to iron piping and allowing movement of the soils surrounding the pipe. It is this movement that has contributed to countless breaks over the years on the pipes buried in this soil containing tanbark. This soil, coupled with the aforementioned pressure fluctuations, has resulted in numerous breaks along West State Street and resulted in closure of the Wellsville School on multiple occasions.

Furthermore, the only transmission main from the water supply to the Village's two (2) 2-MG water storage tanks is buried in soil containing tanbark. As a result, a break of this 14 inch diameter watermain could result in the loss of water for the community and damage to physical structures/infrastructure.

While there are a number of streets containing tanbark, there are two that should be considered priorities for improvement including the 14 inch diameter transmission main along Madison Street and the replacement of the watermain along the eastern portion of West State Street (i.e. between the River and Brooklyn Ave. The remainder of the streets should be completed as funds become available. These streets include, in this order: South Main Street, Brooklyn, Stevens, and Early.

**Transite Pipe Recommendation**

It is understood that the transite asbestos pipe in the distribution system has a remaining useful life of 15 to 20 years and a plan should be set in place for replacement of this pipe. The distribution system for the Village contains approximately 3,500 feet of transite asbestos. If all of the transite asbestos were to be replaced in 15 years, the Village would need to replace approximately 230 feet per year. The Village contains 5 streets containing transite asbestos. The Village should plan to replace a street with the goal of completing a street every 2 years. The streets requiring replacement; Fairview/John Street, King Street, Trapping Brook Street, Meadowbrook Court, Witter Ave. It is recommended that the Town plan to replace the north end of State Route 19 in 5 to 7 years. This section is given priority as it replaces a large section of transite asbestos and is a primary transmission main.

Therefore, the proposed immediate improvement recommendations are summarized as follows:

| **Improvement** | **Subtotal Cost** |
|---|---|
| WTP Pumps & Controls | $ 302,510 |
| Meter Replacement | $ 72,641 |
| Madison St. Transmission Replacement | $ 698,281 |
| West State Street Watermain Replacement | $ 218,561 |
| Subtotal | $1,291,993 |
| Engineering (8%) | $ 103,360 |
| Construction Observation (7%) | $ 90,440 |
| Administrative/Financial (3%) | $ 38,760 |
| Legal (2%) | $ 25,840 |
| **Total Project Cost** | **$1,550,393** |

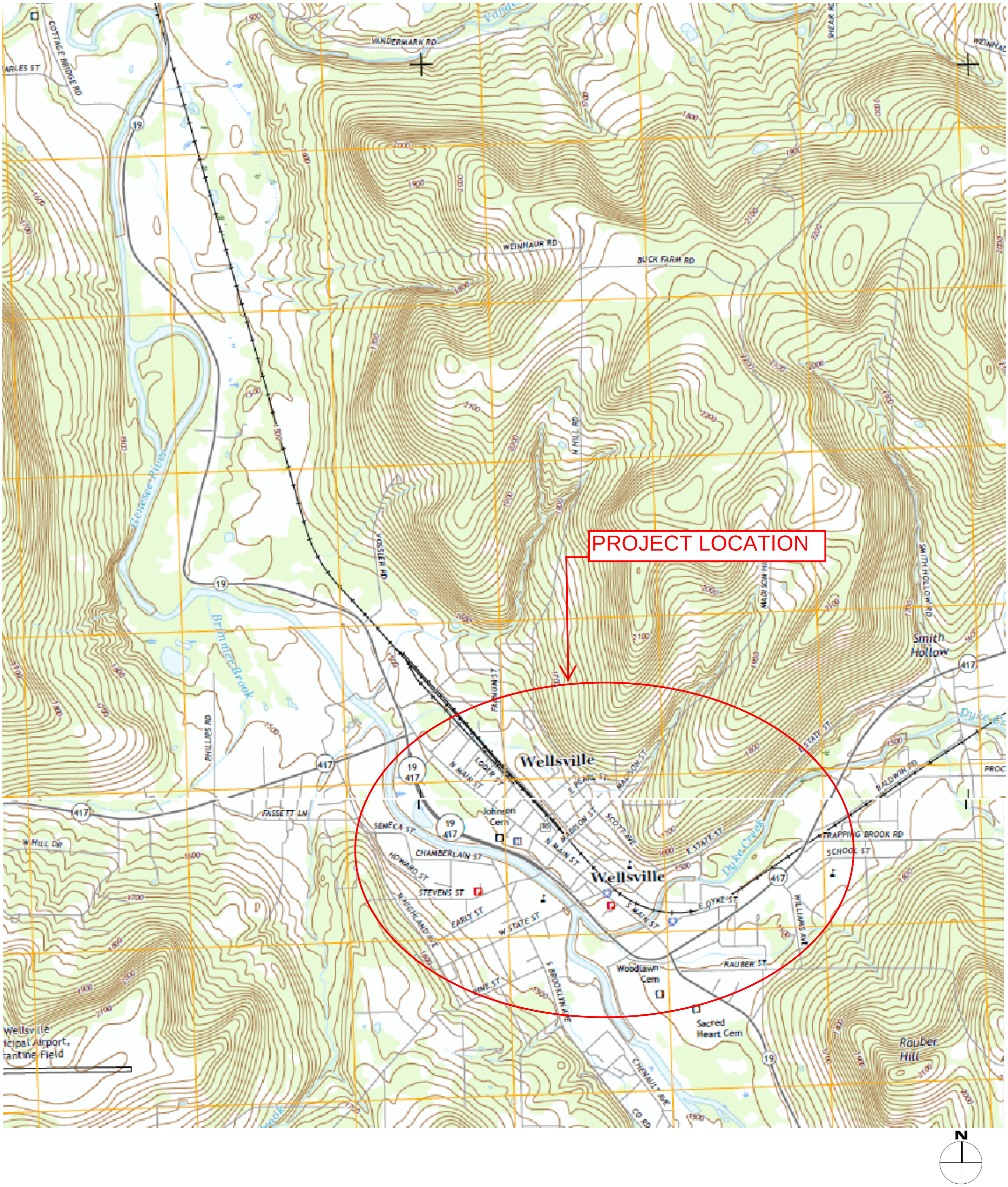
The secondary project, as monies become available and in approximately 7 years, should include the completion of:

- South Street watermain replacement,
- North Main Street watermain replacement, and
- Scott Road watermain Replacement.

The subsequent phases of the improvement project should be complete as monies become available and include;

- Brooklyn Street,
- School Street,
- Stevens Street,
- Meadowbrook Court,
- Witter Ave
- Fairview/Johns Street
- King Street
- Early Street

# APPENDIX A
# PROJECT LOCATION MAPPING



PROJECT LOCATION

HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

AIRPORT CORP. PARK
100 HUNT CENTER
HORSEHEADS, NY 14845
607 · 358 · 1000
FAX · 358 · 1800

HORSEHEADS, NY ROCHESTER, NY TOWANDA, PA

# PROJECT LOCATION

VILLAGE OF WELLSVILLE
WATER SYSTEM IMPROVEMENT PROJECT
VILLAGE OF WELLSVILLE, ALLEGANY COUNTY, NEW YORK

1

1861-034

HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 358 1000
FAX 358 1800

HORSEHEADS, NY ROCHESTER, NY TOWANDA, PA

# WATER MODEL NETWORK MAP

HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 • 358 • 1000
FAX • 358 • 1800

HORSEHEADS, NY
ROCHESTER, NY
TOWANDA, PA

# DISTRIBUTION PIPING SIZE MAP

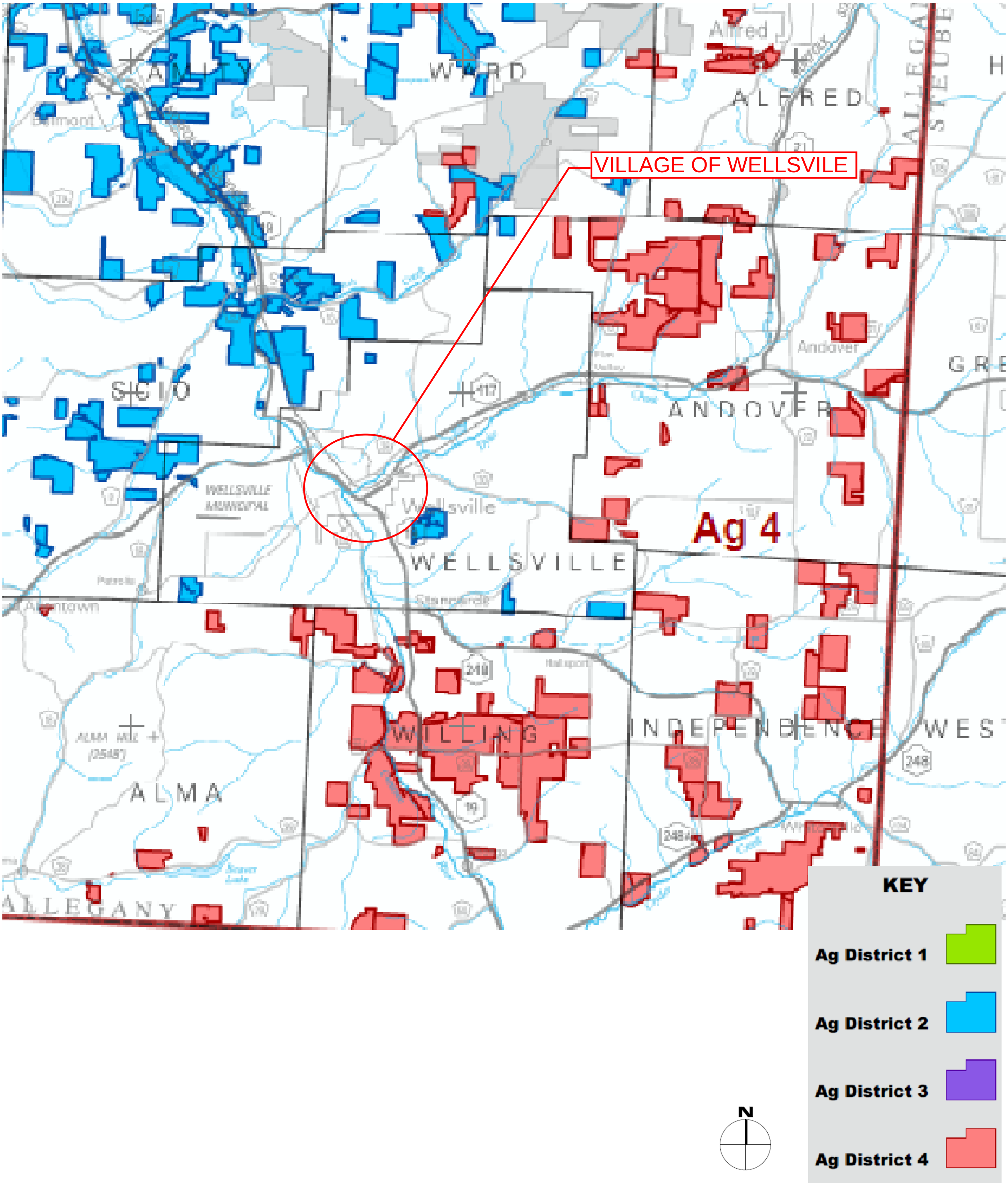
HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 • 358 • 1000
FAX • 358 • 1800

HORSEHEADS, NY ROCHESTER, NY TOWANDA, PA

# DISTRIBUTION PIPING MATERIAL MAP

# APPENDIX B
## ENVIRONMENTAL RESOURCES



HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

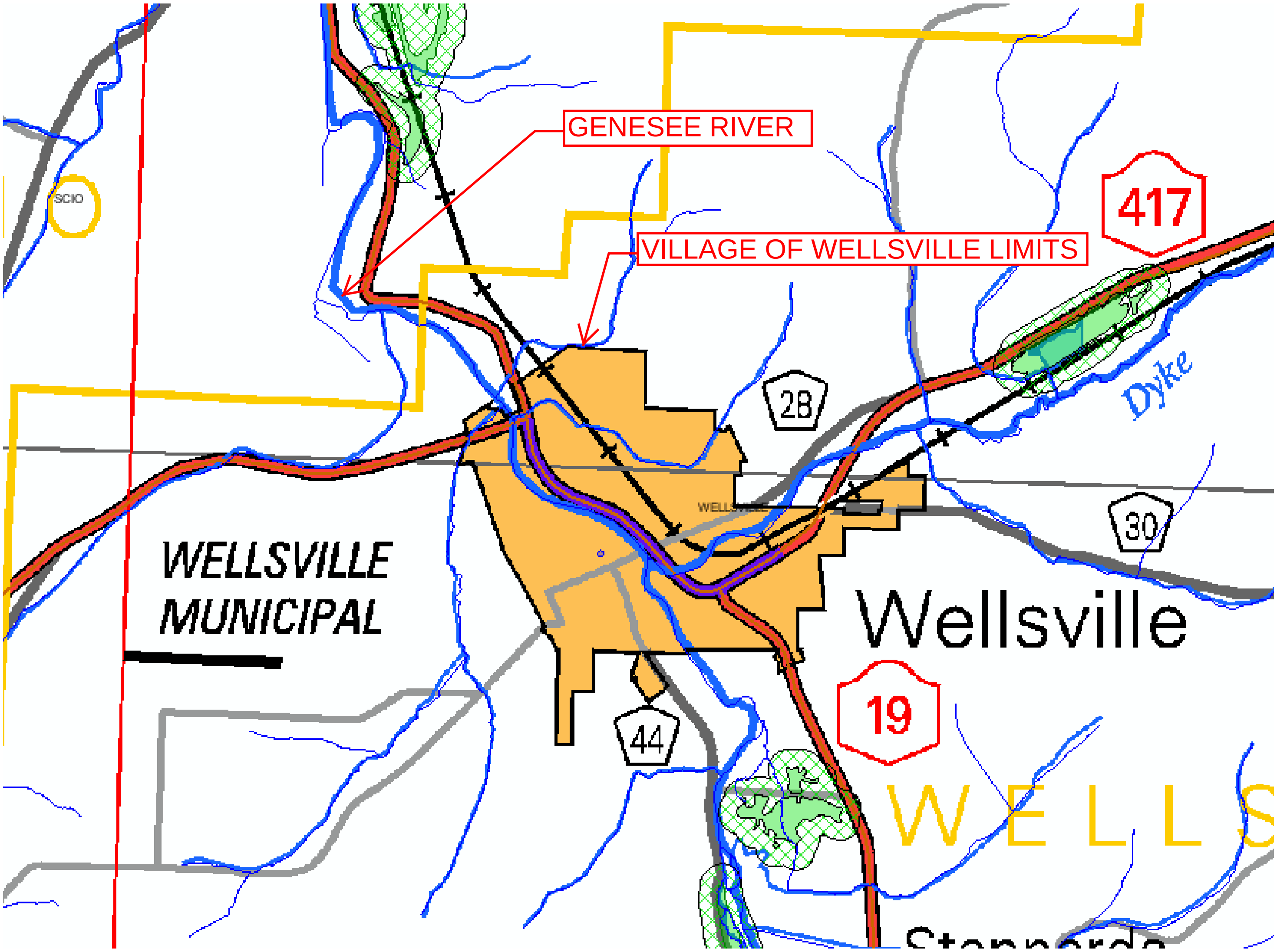
AIRPORT CORP. PARK
100 HUNT CENTER
HORSEHEADS, NY 14845
607 • 358 • 1000
FAX • 358 • 1800

HORSEHEADS, NY ROCHESTER, NY TOWANDA, PA

# AGRICULTURAL DISTRICTS

WATER SYSTEM IMPROVEMENTS PROJECT
VILLAGE OF WELLSVILLE
ALLEGANY COUNTY, NEW YORK

1861-034



LEGEND:

- 〰 Classified Water Bodies
- ★ Unique Geological Features
- 🟦 Classified Water Bodies
- 🟩 State-Regulated Freshwater Wetlands
- ▨ Wetland Checkzone ?
- 🟧 Rare Plants and Rare Animals
- 🟪 Significant Natural Communities
- ▨ Natural Communities Vicinity ?
- ▨ Background Map
- 〰 Adirondack Park Boundary
- ☐ Counties

N

**HUNT**
ENGINEERS/ARCHITECTS/SURVEYORS

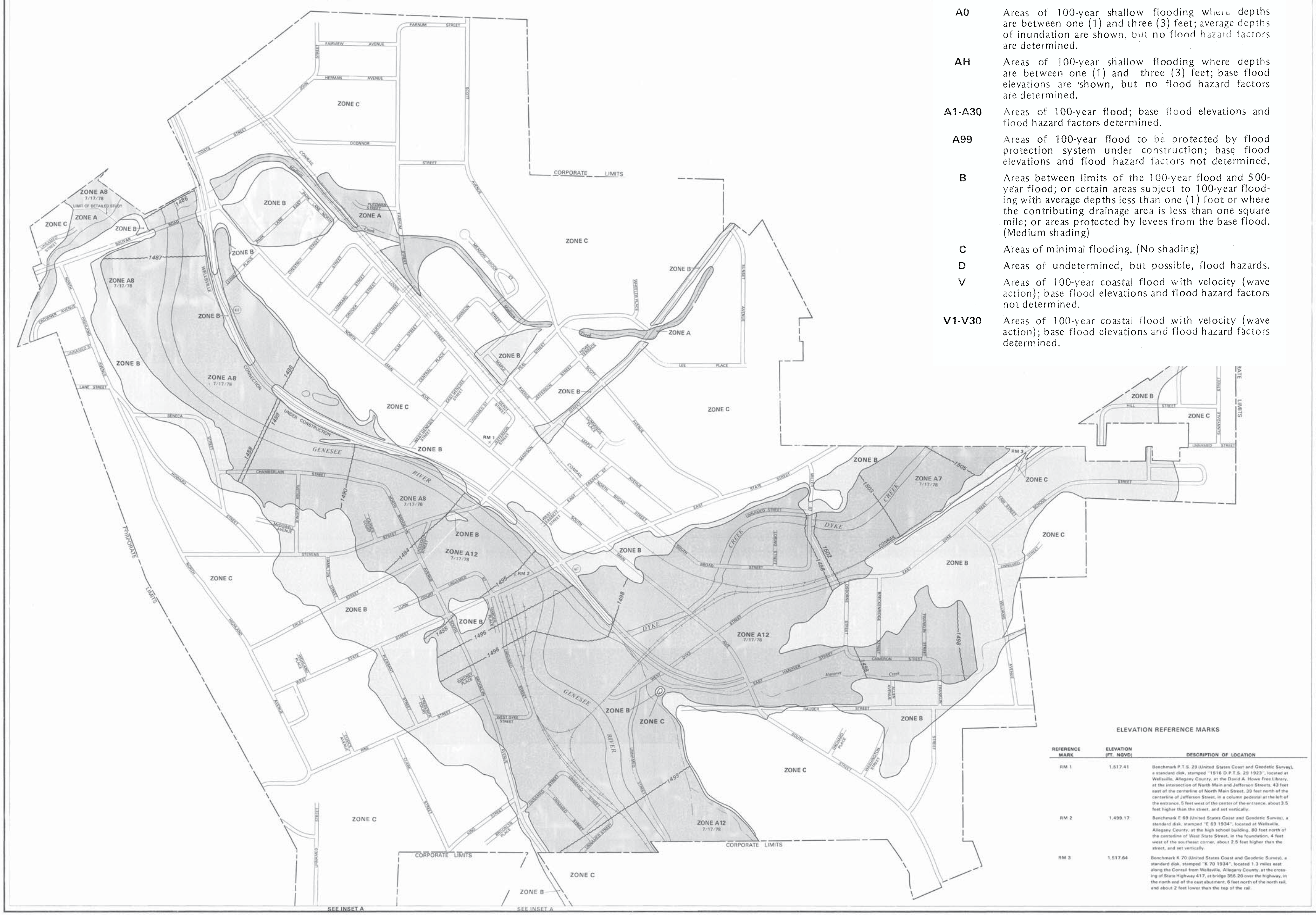
AIRPORT CORP. PARK
100 HUNT CENTER
HORSEHEADS, NY 14845
607 • 358 • 1000
FAX • 358 • 1800

HORSEHEADS, NY ROCHESTER, NY TOWANDA, PA

# NYSDEC RESOURCE MAP

WATER SYSTEM IMPROVEMENTS PROJECT
VILLAGE OF WELLSVILLE
ALLEGANY COUNTY, NEW YORK

1861-034



# *EXPLANATION OF ZONE DESIGNATIONS

| ZONE | EXPLANATION |
|---|---|
| A | Areas of 100-year flood; base flood elevations and flood hazard factors not determined. |
| A0 | Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined. |
| AH | Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined. |
| A1-A30 | Areas of 100-year flood; base flood elevations and flood hazard factors determined. |
| A99 | Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined. |
| B | Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading) |
| C | Areas of minimal flooding. (No shading) |
| D | Areas of undetermined, but possible, flood hazards. |
| V | Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined. |
| V1-V30 | Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined. |

## ELEVATION REFERENCE MARKS

| REFERENCE MARK | ELEVATION (FT. NGVD) | DESCRIPTION OF LOCATION |
|---|---|---|
| RM 1 | 1,517.41 | Benchmark P.T.S. 29 (United States Coast and Geodetic Survey), a standard disk, stamped "1516 D P.T.S. 29 1923", located at Wellsville, Allegany County, at the David A. Howe Free Library, at the intersection of North Main and Jefferson Streets, 43 feet east of the centerline of North Main Street, 39 feet north of the centerline of Jefferson Street, in a column pedestal at the left of the entrance, 5 feet west of the center of the entrance, about 3.5 feet higher than the street, and set vertically. |
| RM 2 | 1,499.17 | Benchmark E 69 (United States Coast and Geodetic Survey), a standard disk, stamped "E 69 1934", located at Wellsville, Allegany County, at the high school building, 80 feet north of the centerline of West State Street, in the foundation, 4 feet west of the southeast corner, about 2.5 feet higher than the street, and set vertically. |
| RM 3 | 1,517.64 | Benchmark K 70 (United States Coast and Geodetic Survey), a standard disk, stamped "K 70 1934", located 1.3 miles east along the Conrail from Wellsville, Allegany County, at the crossing of State Highway 417, at bridge 356.20 over the highway, in the north end of the east abutment, 6 feet north of the north rail, and about 2 feet lower than the top of the rail. |

## KEY TO MAP

| | |
|---|---|
| 500-Year Flood Boundary | ZONE B |
| 100-Year Flood Boundary | |
| Zone Designations* With Date of Identification e.g., 12/2/74 | ZONE A2 DATE<br>ZONE A1 DATE |
| 100-Year Flood Boundary | ZONE B |
| 500-Year Flood Boundary | |
| Base Flood Elevation Line With Elevation In Feet** | ~~~513~~~ |
| Base Flood Elevation in Feet Where Uniform Within Zone** | (EL 987) |
| Elevation Reference Mark | RM7 × |
| River Mile | • M1.5 |

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE EXPLANATION

A Areas of 100-year flood; base flood elevations and flood hazard factors not determined.

A0 Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.

AH Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.

A1-A30 Areas of 100-year flood; base flood elevations and flood hazard factors determined.

A99 Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.

B Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)

C Areas of minimal flooding. (No shading)

D Areas of undetermined, but possible, flood hazards.

V Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.

V1-V30 Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

### NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
NOVEMBER 9, 1973

FLOOD INSURANCE RATE MAP EFFECTIVE:
JULY 17, 1978

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

N

APPROXIMATE SCALE

400 FEET 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

# FIRM
## FLOOD INSURANCE RATE MAP

VILLAGE OF
**WELLSVILLE, NEW YORK**
ALLEGANY COUNTY

PAGE 1 OF 1

**COMMUNITY-PANEL NUMBER**
**360036 0001 B**

**EFFECTIVE DATE:**
JULY 17, 1978

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

LEGEND:

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

N

**HUNT**
ENGINEERS/ARCHITECTS/SURVEYORS

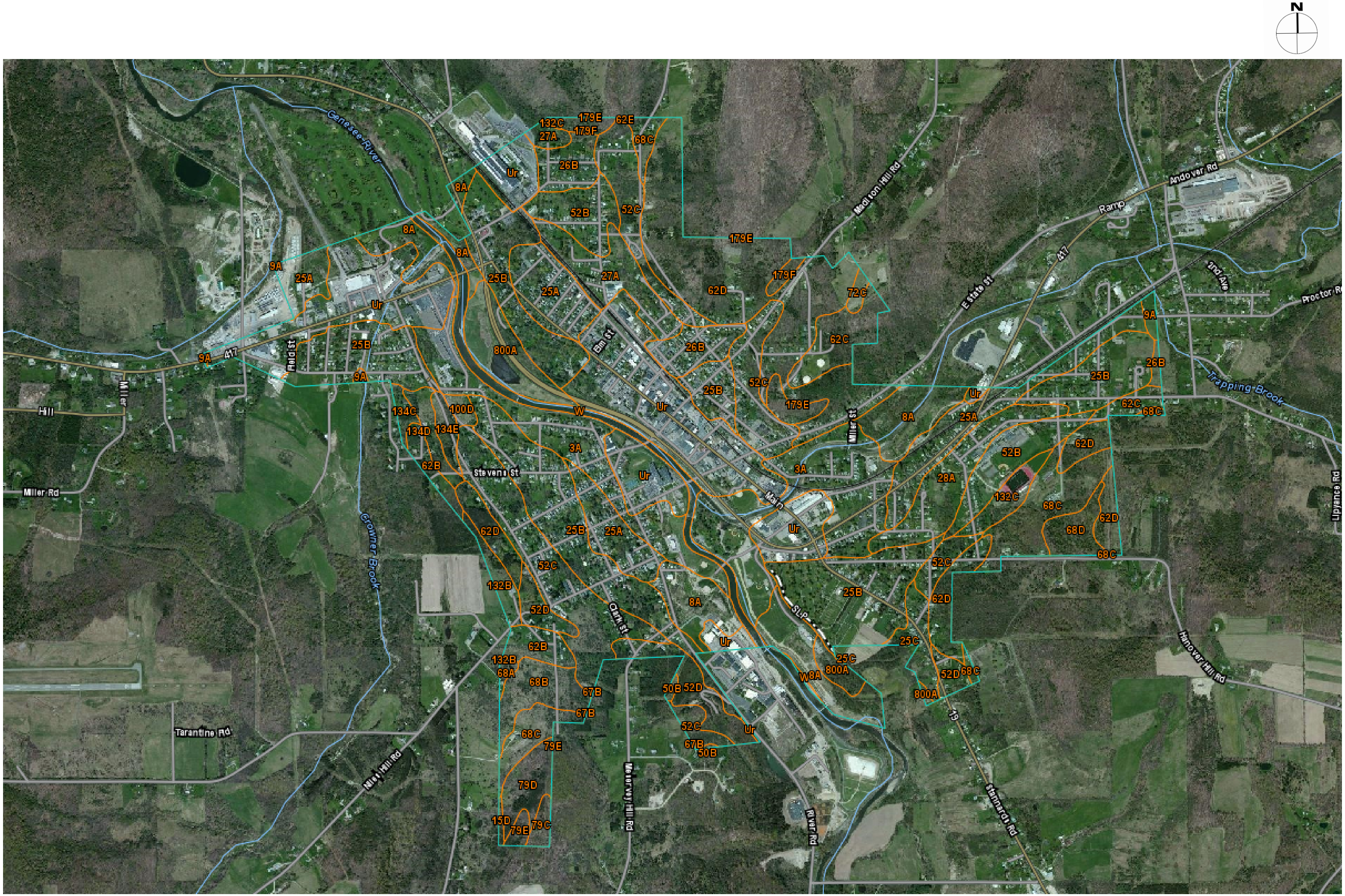
AIRPORT CORP. PARK
100 HUNT CENTER
HORSEHEADS, NY 14845
607 · 358 · 1000
FAX · 358 · 1800

HORSEHEADS, NY ROCHESTER, NY TOWANDA, PA

# US FISH & WILDLIFE WETLANDS MAP

WATER SYSTEM IMPROVEMENTS PROJECT
VILLAGE OF WELLSVILLE
ALLEGANY COUNTY, NEW YORK

1861-034



DRAWN BY :
ABW

CHECKED BY :
TKS

DATE :
MAY 2016

SCALE :
NOT TO SCALE

REVISION :

"Unauthorized Alteration Or Addition To Plans Bearing A Licensed Engineer's Or Architects Seal, Is A Violation Of Section 7209 Of The New York State Education Law."

Copyright: 2016

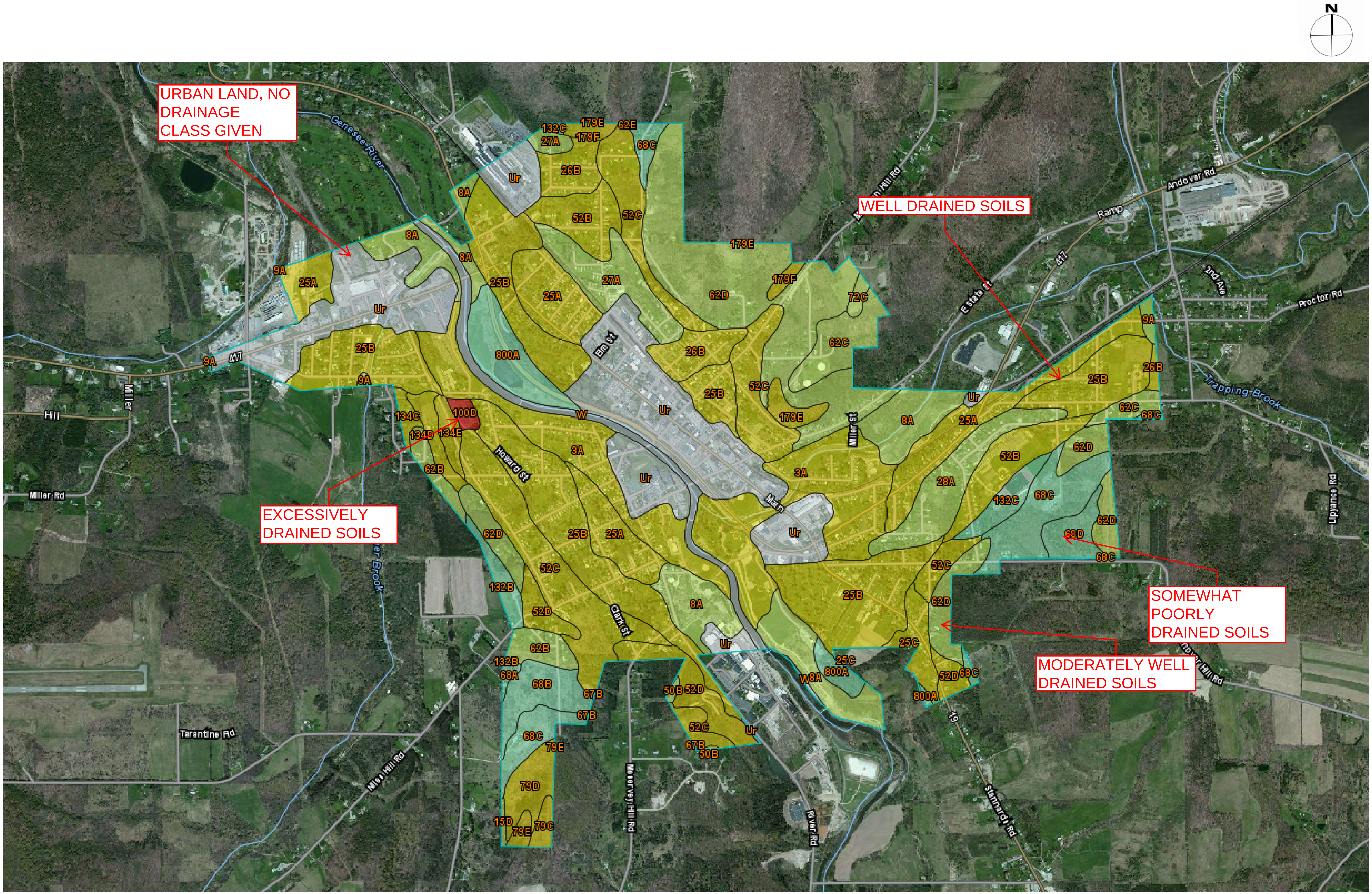
HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 • 358 • 1000
FAX • 358 • 1800

HORSEHEADS, NY ROCHESTER, NY TOWANDA, PA

# SOILS MAP
# WATER SYSTEM IMPROVEMENTS PROJECT
# VILLAGE OF WELLSVILLE
# ALLEGANY COUNTY, NEW YORK

PROJECT NO:
1861-034



URBAN LAND, NO DRAINAGE CLASS GIVEN

WELL DRAINED SOILS

EXCESSIVELY DRAINED SOILS

SOMEWHAT POORLY DRAINED SOILS

MODERATELY WELL DRAINED SOILS

DRAWN BY : ABW

CHECKED BY : TKS

DATE : MAY 2016

SCALE : NOT TO SCALE

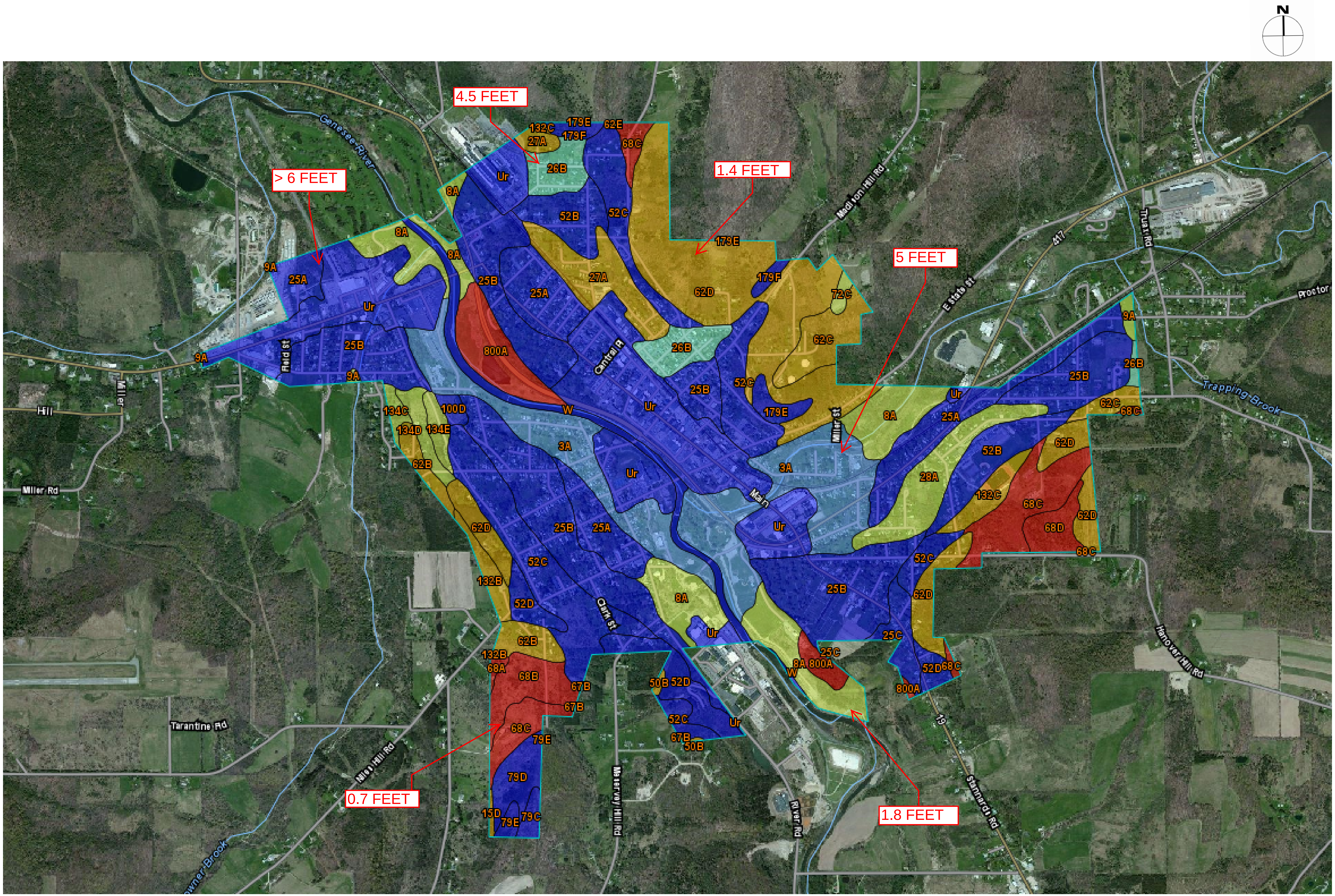
REVISION :

"Unauthorized Alteration Or Addition To Plans Bearing A Licensed Engineer's Or Architects Seal, Is A Violation Of Section 7209 Of The New York State Education Law."

HUNT
ENGINEERS/ARCHITECTS/SURVEYORS
AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 • 358 • 1000
FAX • 358 • 1800
HORSEHEADS, NY ROCHESTER, NY TOWANDA, PA

# SOIL DRAINAGE CLASS MAP
WATER SYSTEM IMPROVEMENTS PROJECT
VILLAGE OF WELLSVILLE
ALLEGANY COUNTY, NEW YORK

PROJECT NO: 1861-034



DRAWN BY :
ABW

CHECKED BY :
TKS

DATE :
MAY 2016

SCALE :
NOT TO SCALE

REVISION :

"Unauthorized Alteration Or Addition To Plans Bearing A Licensed Engineer's Or Architects Seal, Is A Violation Of Section 7209 Of The New York State Education Law."

Copyright: 2016

HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

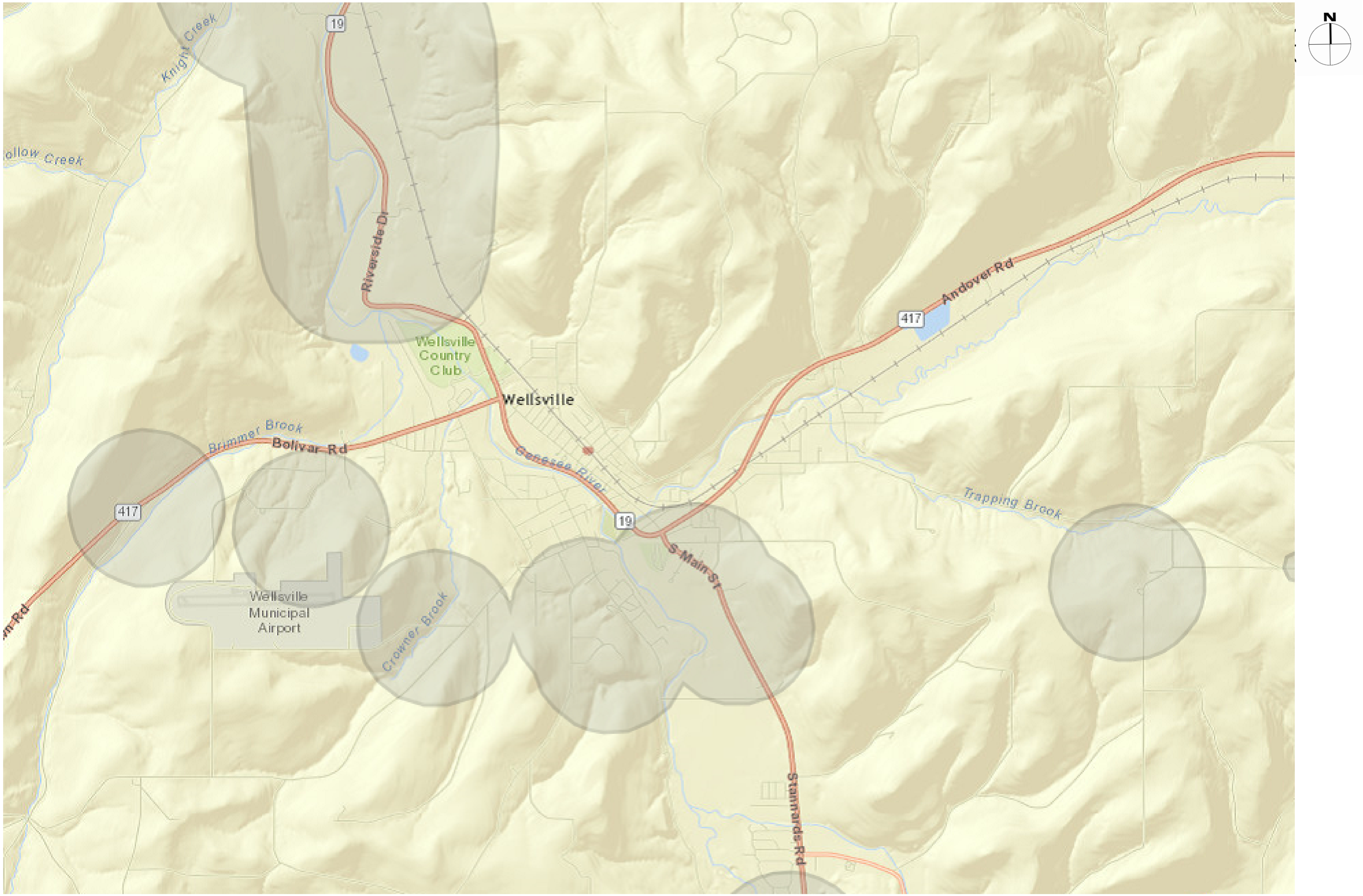
AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 • 358 • 1000
FAX • 358 • 1800

HORSEHEADS, NY
ROCHESTER, NY
TOWANDA, PA

# DEPTH TO WATER TABLE

WATER SYSTEM IMPROVEMENTS PROJECT
VILLAGE OF WELLSVILLE
ALLEGANY COUNTY, NEW YORK

PROJECT NO:
1861-034



DRAWN BY :
ABW

CHECKED BY :
TKS

DATE :
MAY 2016

SCALE :
NOT TO SCALE

REVISION :

"Unauthorized Alteration Or Addition To Plans Bearing A Licensed Engineer's Or Architects Seal, Is A Violation Of Section 7209 Of The New York State Education Law."

AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 • 358 • 1000
FAX • 358 • 1800

HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

HORSEHEADS, NY
ROCHESTER, NY
TOWANDA, PA

## ARCHEOLOGICAL SENSITIVE AREAS

WATER SYSTEM IMPROVEMENTS PROJECT
VILLAGE OF WELLSVILLE
ALLEGANY COUNTY, NEW YORK

PROJECT NO:
1861-034

# APPENDIX C
# HYDRAULIC MODEL NARRATIVE & INPUT DATA

*Town of Genoa, Cayuga County, New York*

**Water System Hydraulic Modelling**

**HUNT 1861-064**

**January 2017**

# I. Hydraulic Water Model Development

In order to understand the operation of the Village of Wellsville water system along with the desire to identify system operational shortcomings and identify potential improvement scenarios, a hydraulic water model was developed. The water system was modeled with Innovyze's InfoWater Suite. InfoWater utilizes an enhanced version of the EPANET analysis engine as developed and distributed by the U.S. Environmental Protection Agency, Risk Reduction Engineering Laboratory (EPANET 2000). This software utilizes gradient algorithms and is used to simulate the distribution network with its various loops, elevations, user demands, fittings, pipes of various sizes, age and composition, water storage tanks, water sources and pumping stations. Refer to Appendix A for the hydraulic model network mapping.

Accordingly, various data is required to develop a model of the water systems. A description of the required data utilized in the development of the Village’s hydraulic model is presented below. Refer to Appendix C for a complete catalog of the InfoWater input data.

## A. Links

Links within the hydraulic model simulate the various watermain found throughout the distribution system. These links convey the flow as it moves from one node to another within the hydraulic model. The model simulates the pipe as a single entity including all segments of watermain and the associated fittings. A link in the model must represent a single stretch of watermain that contains uniform composition, diameter and ages. These values are manually entered by the model user during the construction of said model.

### 1. Configuration, Diameter, Type and Age

The configuration of the Village’s water distribution system includes watermain diameter, composition, and age that were obtained from design mapping supplied by the Village’s Water Department.

Refer to Appendix A for a copy of the water system configuration map. The water system map reflects all information gathered with respect to wells, valve locations, hydrant locations, tank locations, booster pump station locations, watermain configuration, and watermain size.

### 2. Friction Losses

As water flows through the various pipes within a water distribution system, friction losses are incurred that result in a reduction of system pressures (i.e. decrease in hydraulic grade). For purposes of this analysis, the Hazen-Williams equation was used to estimate friction head loss within the distribution system. Utilization of this formula requires the estimation of the Hazen-Williams coefficient, also known as a C-factor, which is a measure of the internal surface roughness. The Village’s water system consists primarily of asbestos-cement pipe whose internal roughness remains largely unchanged throughout its age. As a result, the C factor for new asbestos cement pipe (140) was utilized for existing asbestos-cement pipe, plastic pipe and HDPE piping. Ductile Iron watermain typically has a C factor of 120 when new, however, given the age of much of the ductile iron in the system and the potential for biofilm growth, a C factor of 110 was utilized.

Modelling un-lined cast iron watermain is more complicated as the interior of the watermain can become tuberculated. The level of tuburculation is associated with age and its location within the water system. While independent testing of the watermain is preferred, extensive research has been conducted on piping within systems producing the table below. This table was utilized to assess the internal roughness of un-lined cast iron piping in the Village's system based upon approximate age and location within the system. Piping within looped areas of the system were estimated to have experienced appreciable attack (tuburculation), while severe (attack) tuburculation was used for dead end watermain.

**C VALUE RANGES FOR CAST IRON WATERMAIN**

| 30 years old | 4-inch | 6-inch | 8-inch | 10-inch | 12-inch |
|---|---|---|---|---|---|
| Trend 1 - Slight Attack | 100 | 106 | 108.3 | 110.1 | 112 |
| Trend 2 - Moderate Attack | 83 | 90 | 92.5 | 94.5 | 97 |
| Trend 3 - Appreciable Attack | 59 | 70 | 71.8 | 74.4 | 78 |
| Trend 4 - Severe Attack | 41 | 50 | 53.0 | 55.7 | 58 |

| 40 years old | 4-inch | 6-inch | 8-inch | 10-inch | 12-inch |
|---|---|---|---|---|---|
| Trend 1 - Slight Attack | 96.5 | 102.9 | 104.9 | 106.8 | 108.6 |
| Trend 2 - Moderate Attack | 78.2 | 86.2 | 88.4 | 90.6 | 93.0 |
| Trend 3 - Appreciable Attack | 55.4 | 65.8 | 67.9 | 70.4 | 73.8 |
| Trend 4 - Severe Attack | 36.9 | 46.0 | 49.3 | 52.0 | 54.4 |

| 50 years old | 4-inch | 6-inch | 8-inch | 10-inch | 12-inch |
|---|---|---|---|---|---|
| Trend 1 - Slight Attack | 93.7 | 100.4 | 102.3 | 104.2 | 106.1 |
| Trend 2 - Moderate Attack | 74.8 | 83.1 | 85.3 | 87.6 | 90.1 |
| Trend 3 - Appreciable Attack | 52.5 | 62.5 | 64.8 | 67.4 | 70.6 |
| Trend 4 - Severe Attack | 33.6 | 42.8 | 46.1 | 48.9 | 51.4 |

| 60 years old | 4-inch | 6-inch | 8-inch | 10-inch | 12-inch |
|---|---|---|---|---|---|
| Trend 1 - Slight Attack | 90 | 97 | 98.5 | 100.3 | 102 |
| Trend 2 - Moderate Attack | 69 | 79 | 80.6 | 83.0 | 85 |
| Trend 3 - Appreciable Attack | 49 | 58 | 60.6 | 63.1 | 66 |
| Trend 4 - Severe Attack | 30 | 39 | 42.5 | 45.3 | 48 |

| 100 years old | 4-inch | 6-inch | 8-inch | 10-inch | 12-inch |
|---|---|---|---|---|---|
| Trend 1 - Slight Attack | 81 | 89 | 90.7 | 92.7 | 95 |
| Trend 2 - Moderate Attack | 61 | 70 | 72.4 | 74.8 | 78 |
| Trend 3 – Appreciable Attack | 40 | 49 | 51.8 | 54.4 | 57 |
| Trend 4 – Severe Attack | 21 | 30 | 33.3 | 36.0 | 39 |

### 3. Minor Losses

Minor losses are defined as head loss incurred at fittings and other appurtenances within a water distribution system (i.e. valves, etc.). These minor losses are a direct result of turbulence within the flow of water as it moves through the various fittings and appurtenances. Typically, with older water distribution systems, these losses are negligible compared to the head losses due to friction. Furthermore, head losses provided for a particular stretch of watermain may not be constant over time depending upon the flow pattern. Therefore, minor losses were not incorporated into the model and would have had negligible impact on the overall model operation.

## B. Nodes

The water model consists of various types of nodal elements that commonly include reservoirs, tanks, valves and interconnections of pipes (junctions). Nodes interconnected together with the previously described links form a complete network. It is at the nodes where critical operating and boundary conditions are entered into the model as described briefly below.

### 1. Junctions

Junction nodes are points placed at the intersection of two or more pipes, at points of water consumption, and at points where pipe attributes (i.e. diameter composition) change. Subsequent to the creation of a junction node in a hydraulic model, the ground elevation at the newly created junction location must be entered. If demands occur within the hydraulic model the water demand is also entered at a junction near to the point of consumption. If the hydraulic model is to be used in simulating the water system for extended periods, a stepwise demand pattern must be applied to the entered demand describing how said demand occurs through a 24-hour period. The data entry requirements are described in greater detail below.

### a. Elevations

Ground elevations are essential data for the hydraulic model as it influences system pressures at a given location. Elevations for the junctions were obtained from existing topography from the original system design along with elevational data obtained from the NYSGIS Clearinghouse.

### b. Water Demand

Water demands (and their associated fluctuations over time) impact pressure, available flow, direction of flow, and water age within the Village's water distribution system. As such, the allocation of the overall water use across the distribution system is an important component of the development of the hydraulic model. The goal is to generally match actual water use across the system. While it is not feasible or practical to enter each individual water demand record throughout the system, the large water users were identified and their demand entered into the model. It is these large users that dictate the general flow of water throughout the distribution system. Twenty of the top water users were easily identified, below which, the typical demand mirrored that of a typical residential user. The top identified 20 users and their listed water average demand are:

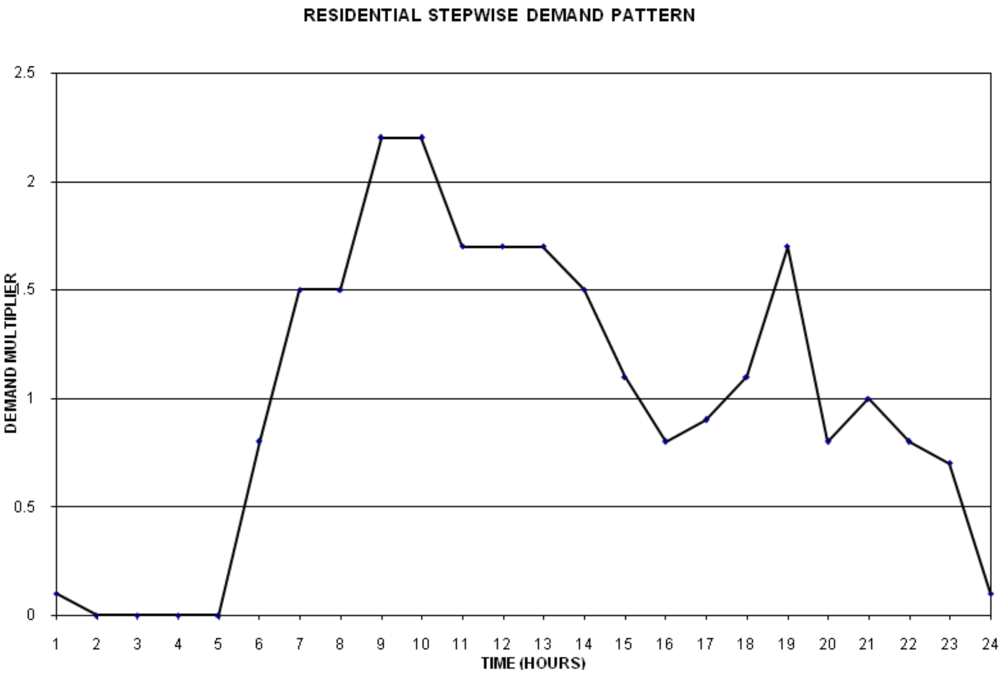
| User | User Address | Usage Type | Usage Hours | Usage (gpm) |
|---|---|---|---|---|
| Dresser Rand | 37 Coats Street | Comm/Ind | 24 | 31.8 |
| Argentieri Brothers | 50 West Hanover St. | Comm/Ind | 8 | 29.0 |
| Arvos Group | 121 South Main St. | Comm/Ind | 8 | 16.5 |
| Wellsville Manor Care Ctr. | 4100 Bolivar Road | Res | 24 | 11.5 |
| Wellsville Central School | School Street | Inst | 8 | 10.9 |
| Wellsville High School | 126 West State St. | Inst | 8 | 10.8 |
| Jones Memorial Hospital | 191 North Main St. | Comm/Ind | 24 | 8.4 |
| Wellsville Manor Hills | 4192 Bolivar Road | Res | 24 | 7.4 |

|  |  |  |  |  |
|---|---|---|---|---|
| Willey, Phil | 56 1/2 North Main St. | Comm/Ind | 8 | 6.6 |
| HRNC, LLC | 160 Seneca Street | Res | 24 | 6.3 |
| Wellsville Lazer Wash Inc | 2925 Airway Drive | Comm/Ind | 16 | 5.8 |
| SUNY Alfred, Food Serv. | South Brooklyn Ave. | Comm/Ind | 12 | 5.4 |
| Texas Hot | 132 North Main Street | Comm/Ind | 8 | 4.8 |
| Indus Hotels Inc | 30 West Dyke StreeT | Comm/Ind | 16 | 4.1 |
| Hanover Street Laundry | 18 West Hanover St. | Comm/Ind | 16 | 3.2 |
| Kmart Store #7677 | 121 Bolivar Road | Comm/Ind | 12 | 2.9 |
| Rub-A-Dub Laundry | 84 1/2 North Main St. | Comm/Ind | 16 | 2.4 |
| Scio Water Department | Riverside Drive | Res | 24 | 2.4 |
| TOPS Markets Inc- 249 | 111 Bolivar Road | Comm/Ind | 12 | 2.2 |
| Allegany County ARC | 196 East Dyke St. | Res | 24 | 1.1 |

The above listed large users consist of 159,214 gallons per day. The entire village average daily water usage is 713,967 gallons per day. The remainder of the usage is primarily residential and light commercial in nature and was distributed evenly throughout the distribution system in the areas containing residential and commercial land use.

### c. Use Pattern

To model the fluctuation of water consumption of the various users over time, a number of stepwise demand patterns were developed and applied to each entered demand. The stepwise pattern mimics the times of operation identified above. For example, a typical stepwise demand pattern was utilized to simulate residential water demands over the course of a 24-hour period in absence of actual metered hourly water use data. The residential stepwise demand pattern utilized is shown graphically as follows:



Multiplying an average daily (i.e. baseline) demand by the dimensionless demand multiplier generates a water demand pattern at a point in time. For instance, at 8:00 AM the consumption for a single residence having an average demand of 1 gpm is calculated as follows:

Demand at 8AM = Entered Average Daily Demand x Demand Multiplier
Demand at 8AM = 1 gpm x 1.5
Demand at 8AM = 1.5 gpm

## 2. Storage Tanks & Reservoirs

A water storage facility can be modeled as a storage tank or a reservoir. A reservoir is used to simulate a water supply for the system whereas a water storage tank is used mainly for the purposes of temporary storage having a finite volume. Reservoirs on the other hand, have unlimited volume and are generally used to model a supply source such as a lake or groundwater supply.

### a. Type

The Village of Wellsville water system utilizes two cylindrical concrete water storage tanks. Cylindrical tanks are typically ground level water storage tanks that require the input of a diameter, a base elevation, a minimum water surface level above the base elevation, and a maximum water surface level above the base elevation.

### b. Diameter, Elevations, Levels & Curves

Overflow elevations and base elevations for the water storage facilities are important data in the creation of a hydraulic model of the Villages water system. Water surface elevations within storage facilities greatly influence hydraulic grades across a water system as well as water age. Each tank has the same finished floor and overflow elevation of 1720 ft. and 1740 ft. respectively. Each tank is also 131 feet in diameter.

## 3. Surface Water Supply & Finished Water Pumps

The Village of Wellsville withdrawals water from the Genesee River, south of the State Street Bridge. Subsequent to the treatment process, finished water enters the clearwell where it is withdrawn by some combination of three finished water booster pumps. Two 125 Hp and one 60 Hp pump finished water from the clearwell to the two 2MG reservoirs. One 125 Hp pump runs at a time and is operated manually. If the clearwell reaches a high level, the 60Hp pump becomes operational. Therefore, there are two flow/pressure regimes associated with plant operation; first one 125 Hp pump operating and second both a 125 Hp and a 60 Hp pump operating.

It is understood that the 125 Hp finished water pumps are operated manually but the water treatment plant operator with the exception of the 60 HP pump. The 60 Hp pump becomes operational when an elevated water level in the clearwell occurs. The total discharge with both pumps under various operation conditions is as follows:

| Pump | Flow (gpm) |
|---|---|
| 125 Hp Only | 1350 |
| 60 Hp Only | 700 |
| 125 HP & 60 Hp Together | 1700 |

## 4. Booster Pumping Stations

The Village maintains a single booster pump station to service residential parcels on Sunset Avenue.  Sunset Avenue, located near the existing water storage tanks, previously had relatively low operational pressures until a small duplex booster pump station was installed.  This pump station consists of two alternating 60 gpm, 3Hp pumps and a small 45 gallon hydropneumatic tank.  As such this pump station is designed to maintain pressure in a range of 30-50 psi in the watermain along Sunset Avenue.

While the program does not provide a hydropneumatic tank option, this was modelled using a ground level cylindrical tank.  The tank height is dictated by the maximum pressure (pump off) of 50 psi or 115 feet (equal to 50 psi x 2.31 ft/psi).  The pump is called to operate at 30 psi or 69.3 feet (30 psi x 2.31 ft/psi).  The resulting diameter of a tank having a volume of 45 gallons at 115 feet in height is 0.26 feet.

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 1 (gpm) | Pattern 1 (Char) | Demand 2 (gpm) | Pattern 2 (Char) | Demand 3 | Pattern 3 (Char) | Demand 4 (gpm) | Pattern 4 (Char) | Demand 5 (gpm) | Pattern 5 (Char) | Demand 6 (gpm) | Pattern 6 (Char) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ☐ | J10 | 0.00 | RESIDENTIAL | 3.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 2 | ☐ | J12 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 3 | ☐ | J14 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 4 | ☐ | J16 | 2.40 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 5 | ☐ | J18 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 6 | ☐ | J20 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 7 | ☐ | J22 | 1.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 8 | ☐ | J24 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 9 | ☐ | J26 | 0.40 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 10 | ☐ | J28 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 11 | ☐ | J30 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 12 | ☐ | J32 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 13 | ☐ | J36 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 14 | ☐ | J38 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 15 | ☐ | J42 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 16 | ☐ | J44 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 17 | ☐ | J46 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 18 | ☐ | J48 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 19 | ☐ | J50 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 20 | ☐ | J52 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 21 | ☐ | J54 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 22 | ☐ | J56 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 23 | ☐ | J58 | 1.00 | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 24 | ☐ | J60 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 25 | ☐ | J62 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 26 | ☐ | J64 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 27 | ☐ | J66 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 28 | ☐ | J72 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 29 | ☐ | J74 | 0.00 | RESIDENTIAL | 3.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 8.40 | 24-HOUR | 0.13 | Unaccounted |
| 30 | ☐ | J76 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 31 | ☐ | J78 | 0.00 | RESIDENTIAL | 3.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 32 | ☐ | J80 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 33 | ☐ | J82 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 34 | ☐ | J84 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 35 | ☐ | J86 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 36 | ☐ | J90 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 1 (gpm) | Pattern 1 (Char) | Demand 2 (gpm) | Pattern 2 (Char) | Demand 3 | Pattern 3 (Char) | Demand 4 (gpm) | Pattern 4 (Char) | Demand 5 (gpm) | Pattern 5 (Char) | Demand 6 (gpm) | Pattern 6 (Char) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 37 | ☐ | J92 | 0.60 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 38 | ☐ | J96 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 39 | ☐ | J98 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 40 | ☐ | J104 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 41 | ☐ | J106 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 42 | ☐ | J108 | 0.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 31.80 | 24-HOUR | 0.13 | Unaccounted |
| 43 | ☐ | J114 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 44 | ☐ | J116 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 45 | ☐ | J118 | 0.40 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 46 | ☐ | J120 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 47 | ☐ | J122 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 48 | ☐ | J124 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 49 | ☐ | J126 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 50 | ☐ | J128 | 1.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 51 | ☐ | J130 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 52 | ☐ | J132 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 53 | ☐ | J134 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 54 | ☐ | J136 | 0.60 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 55 | ☐ | J138 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 56 | ☐ | J140 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 57 | ☐ | J142 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 58 | ☐ | J146 | 0.60 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 59 | ☐ | J148 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 60 | ☐ | J150 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 61 | ☐ | J152 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 62 | ☐ | J156 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 63 | ☐ | J158 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 64 | ☐ | J160 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 65 | ☐ | J166 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 66 | ☐ | J168 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 67 | ☐ | J176 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 68 | ☐ | J180 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 69 | ☐ | J182 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 70 | ☐ | J186 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 71 | ☐ | J188 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 72 | ☐ | J192 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 1 (gpm) | Pattern 1 (Char) | Demand 2 (gpm) | Pattern 2 (Char) | Demand 3 | Pattern 3 (Char) | Demand 4 (gpm) | Pattern 4 (Char) | Demand 5 (gpm) | Pattern 5 (Char) | Demand 6 (gpm) | Pattern 6 (Char) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73 | ☐ | J194 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 74 | ☐ | J196 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 75 | ☐ | J200 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 76 | ☐ | J202 | 0.40 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 77 | ☐ | J208 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 78 | ☐ | J210 | 0.60 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 79 | ☐ | J212 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 80 | ☐ | J214 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 81 | ☐ | J218 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 82 | ☐ | J224 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 83 | ☐ | J226 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 84 | ☐ | J228 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 85 | ☐ | J230 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 86 | ☐ | J232 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 87 | ☐ | J234 | 0.60 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 88 | ☐ | J238 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 89 | ☐ | J240 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 90 | ☐ | J242 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 91 | ☐ | J244 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 92 | ☐ | J248 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 93 | ☐ | J250 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 94 | ☐ | J252 | 2.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 95 | ☐ | J254 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 96 | ☐ | J256 | 0.40 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 97 | ☐ | J260 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 98 | ☐ | J262 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 99 | ☐ | J266 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 100 | ☐ | J274 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 101 | ☐ | J276 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 102 | ☐ | J278 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 103 | ☐ | J280 | 0.00 | RESIDENTIAL | 16.50 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 104 | ☐ | J288 | 0.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 4.10 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 105 | ☐ | J290 | 0.00 | RESIDENTIAL | 29.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 106 | ☐ | J292 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 107 | ☐ | J294 | 0.60 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 108 | ☐ | J296 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |

Input Data - Junction Demands

| * BASE * |  | ID (Char) | Demand 1 (gpm) | Pattern 1 (Char) | Demand 2 (gpm) | Pattern 2 (Char) | Demand 3 | Pattern 3 (Char) | Demand 4 (gpm) | Pattern 4 (Char) | Demand 5 (gpm) | Pattern 5 (Char) | Demand 6 (gpm) | Pattern 6 (Char) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 109 | ☐ | J298 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 110 | ☐ | J300 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 111 | ☐ | J304 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 112 | ☐ | J306 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 113 | ☐ | J308 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 114 | ☐ | J312 | 1.00 | RESIDENTIAL | 10.90 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 115 | ☐ | J314 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 116 | ☐ | J320 | 2.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 117 | ☐ | J322 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 118 | ☐ | J324 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 119 | ☐ | J326 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 120 | ☐ | J328 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 121 | ☐ | J330 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 122 | ☐ | J334 | 2.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 123 | ☐ | J336 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 124 | ☐ | J340 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 125 | ☐ | J346 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 126 | ☐ | J348 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 127 | ☐ | J350 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 128 | ☐ | J352 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 129 | ☐ | J356 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 130 | ☐ | J358 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 131 | ☐ | J360 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 132 | ☐ | J362 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 133 | ☐ | J364 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 134 | ☐ | J366 | 0.60 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 135 | ☐ | J368 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 136 | ☐ | J370 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 137 | ☐ | J372 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 138 | ☐ | J374 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 139 | ☐ | J376 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 140 | ☐ | J378 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 141 | ☐ | J380 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 142 | ☐ | J382 | 1.00 | RESIDENTIAL |  | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 143 | ☐ | J384 |  | RESIDENTIAL | 3.00 | 8-HOUR |  | 12-HOUR |  | 16-HOUR |  | 24-HOUR | 0.13 | Unaccounted |
| 144 | ☐ | J386 | 0.00 | RESIDENTIAL | 4.80 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 1 (gpm) | Pattern 1 (Char) | Demand 2 (gpm) | Pattern 2 (Char) | Demand 3 | Pattern 3 (Char) | Demand 4 (gpm) | Pattern 4 (Char) | Demand 5 (gpm) | Pattern 5 (Char) | Demand 6 (gpm) | Pattern 6 (Char) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 145 | ☐ | J388 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 146 | ☐ | J390 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 147 | ☐ | J392 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 148 | ☐ | J396 | 0.60 | RESIDENTIAL | 3.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 149 | ☐ | J398 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 150 | ☐ | J400 | 0.60 | RESIDENTIAL | 3.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 151 | ☐ | J402 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 152 | ☐ | J406 | 0.60 | RESIDENTIAL | 3.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 153 | ☐ | J408 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 154 | ☐ | J410 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 155 | ☐ | J414 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 156 | ☐ | J416 | 0.00 | RESIDENTIAL | 10.80 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 157 | ☐ | J420 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 158 | ☐ | J422 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 159 | ☐ | J428 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 160 | ☐ | J430 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 161 | ☐ | J432 | 1.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 162 | ☐ | J434 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 163 | ☐ | J436 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 164 | ☐ | J440 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 165 | ☐ | J442 | | RESIDENTIAL | 3.00 | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 166 | ☐ | J444 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 167 | ☐ | J446 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 168 | ☐ | J448 | 0.00 | RESIDENTIAL | 3.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 169 | ☐ | J450 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 170 | ☐ | J452 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 171 | ☐ | J454 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 172 | ☐ | J456 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 173 | ☐ | J458 | 0.00 | RESIDENTIAL | 3.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 174 | ☐ | J460 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 175 | ☐ | J462 | 0.00 | RESIDENTIAL | 3.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 176 | ☐ | J464 | 0.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 5.80 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 177 | ☐ | J466 | 0.80 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 178 | ☐ | J468 | 0.00 | RESIDENTIAL | 0.00 | 8-HOUR | 2.90 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 179 | ☐ | J470 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 180 | ☐ | J472 | 0.00 | RESIDENTIAL | 0.00 | 8-HOUR | 2.20 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 1 (gpm) | Pattern 1 (Char) | Demand 2 (gpm) | Pattern 2 (Char) | Demand 3 | Pattern 3 (Char) | Demand 4 (gpm) | Pattern 4 (Char) | Demand 5 (gpm) | Pattern 5 (Char) | Demand 6 (gpm) | Pattern 6 (Char) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 181 | ☐ | J474 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 182 | ☐ | J476 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 183 | ☐ | J478 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 184 | ☐ | J480 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 185 | ☐ | J482 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 186 | ☐ | J484 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 187 | ☐ | J486 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 188 | ☐ | J488 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 189 | ☐ | J490 | 6.30 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 190 | ☐ | J492 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 191 | ☐ | J498 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 192 | ☐ | J500 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 193 | ☐ | J502 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 194 | ☐ | J506 | 0.60 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 195 | ☐ | J508 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 196 | ☐ | J512 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 197 | ☐ | J514 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 198 | ☐ | J516 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 199 | ☐ | J518 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 200 | ☐ | J520 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 201 | ☐ | J522 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 202 | ☐ | J524 | 1.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 203 | ☐ | J526 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 204 | ☐ | J530 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 205 | ☐ | J532 | 0.60 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 206 | ☐ | J534 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 207 | ☐ | J536 | 0.40 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 208 | ☐ | J538 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 209 | ☐ | J542 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 210 | ☐ | J544 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 211 | ☐ | J546 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 212 | ☐ | J548 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 213 | ☐ | J550 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 214 | ☐ | J552 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 215 | ☐ | J554 | 0.40 | RESIDENTIAL | 0.00 | 8-HOUR | 5.40 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 216 | ☐ | J556 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 1 (gpm) | Pattern 1 (Char) | Demand 2 (gpm) | Pattern 2 (Char) | Demand 3 | Pattern 3 (Char) | Demand 4 (gpm) | Pattern 4 (Char) | Demand 5 (gpm) | Pattern 5 (Char) | Demand 6 (gpm) | Pattern 6 (Char) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 217 | ☐ | J558 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 218 | ☐ | J560 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 219 | ☐ | J562 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 220 | ☐ | J564 | 1.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 221 | ☐ | J566 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 222 | ☐ | J570 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 223 | ☐ | J572 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 224 | ☐ | J578 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 225 | ☐ | J580 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 226 | ☐ | J582 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 227 | ☐ | J584 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 228 | ☐ | J586 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 229 | ☐ | J588 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 230 | ☐ | J590 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 231 | ☐ | J592 | 1.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 232 | ☐ | J594 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 233 | ☐ | J600 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 234 | ☐ | J602 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 235 | ☐ | J604 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 236 | ☐ | J606 | 2.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 237 | ☐ | J608 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 238 | ☐ | J610 | 1.00 | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 239 | ☐ | J612 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 240 | ☐ | J614 | | RESIDENTIAL | | 8-HOUR | | 12-HOUR | | 16-HOUR | | 24-HOUR | 0.13 | Unaccounted |
| 241 | ☐ | J616 | 11.50 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 242 | ☐ | J618 | 0.60 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 0.00 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 243 | ☐ | J620 | 0.00 | RESIDENTIAL | 0.00 | 8-HOUR | 0.00 | 12-HOUR | 3.20 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 244 | ☐ | J622 | 0.00 | RESIDENTIAL | 3.00 | 8-HOUR | 0.00 | 12-HOUR | 2.40 | 16-HOUR | 0.00 | 24-HOUR | 0.13 | Unaccounted |
| 245 | ☐ | J628 | 1.60 | RESIDENTIAL | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 246 | ☐ | J630 | 1.60 | RESIDENTIAL | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 247 | ☐ | J632 | 1.60 | RESIDENTIAL | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 248 | ☐ | J634 | 1.60 | RESIDENTIAL | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 249 | ☐ | J636 | | RESIDENTIAL | | | | | | | | | | |
| 250 | ☐ | J638 | | RESIDENTIAL | | | | | | | | | | |
| 251 | ☐ | J640 | | RESIDENTIAL | | | | | | | | | | |
| 252 | ☐ | J642 | | RESIDENTIAL | | | | | | | | | | |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 1 (gpm) | Pattern 1 (Char) | Demand 2 (gpm) | Pattern 2 (Char) | Demand 3 | Pattern 3 (Char) | Demand 4 (gpm) | Pattern 4 (Char) | Demand 5 (gpm) | Pattern 5 (Char) | Demand 6 (gpm) | Pattern 6 (Char) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 253 | ☐ | J644 | | RESIDENTIAL | | | | | | | | | | |
| 254 | ☐ | J646 | | RESIDENTIAL | | | | | | | | | | |
| 255 | ☐ | J648 | | RESIDENTIAL | | | | | | | | | | |
| 256 | ☐ | J650 | | RESIDENTIAL | | | | | | | | | | |
| 257 | ☐ | J652 | | RESIDENTIAL | | | | | | | | | | |
| 258 | ☐ | J654 | | RESIDENTIAL | | | | | | | | | | |
| 259 | ☐ | J656 | | RESIDENTIAL | | | | | | | | | | |
| 260 | ☐ | J658 | | RESIDENTIAL | | | | | | | | | | |
| 261 | ☐ | J660 | 0.80 | RESIDENTIAL | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 262 | ☐ | J662 | 0.40 | RESIDENTIAL | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 263 | ☐ | J664 | 0.60 | RESIDENTIAL | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 264 | ☐ | J666 | 0.60 | RESIDENTIAL | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 265 | ☐ | J668 | 0.00 | RESIDENTIAL | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 266 | ☐ | J670 | | RESIDENTIAL | | | | | | | | | | |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 7 (gpm) | Pattern 7 (Char) | Demand 8 (gpm) | Pattern 8 (Char) | Demand 9 (gpm) |
|---|---|---|---|---|---|---|---|
| 1 | ☐ | J10 | 0.00 | | 0.00 | | 0.00 |
| 2 | ☐ | J12 | | | | | |
| 3 | ☐ | J14 | | | | | |
| 4 | ☐ | J16 | 0.00 | | 0.00 | | 0.00 |
| 5 | ☐ | J18 | | | | | |
| 6 | ☐ | J20 | | | | | |
| 7 | ☐ | J22 | 0.00 | | 0.00 | | 0.00 |
| 8 | ☐ | J24 | | | | | |
| 9 | ☐ | J26 | 0.00 | | 0.00 | | 0.00 |
| 10 | ☐ | J28 | | | | | |
| 11 | ☐ | J30 | | | | | |
| 12 | ☐ | J32 | | | | | |
| 13 | ☐ | J36 | | | | | |
| 14 | ☐ | J38 | | | | | |
| 15 | ☐ | J42 | | | | | |
| 16 | ☐ | J44 | | | | | |
| 17 | ☐ | J46 | | | | | |
| 18 | ☐ | J48 | | | | | |
| 19 | ☐ | J50 | | | | | |
| 20 | ☐ | J52 | | | | | |
| 21 | ☐ | J54 | | | | | |
| 22 | ☐ | J56 | | | | | |
| 23 | ☐ | J58 | | | | | |
| 24 | ☐ | J60 | | | | | |
| 25 | ☐ | J62 | | | | | |
| 26 | ☐ | J64 | | | | | |
| 27 | ☐ | J66 | | | | | |
| 28 | ☐ | J72 | | | | | |
| 29 | ☐ | J74 | 0.00 | | 0.00 | | 0.00 |
| 30 | ☐ | J76 | | | | | |
| 31 | ☐ | J78 | 0.00 | | 0.00 | | 0.00 |
| 32 | ☐ | J80 | | | | | |
| 33 | ☐ | J82 | | | | | |
| 34 | ☐ | J84 | | | | | |
| 35 | ☐ | J86 | | | | | |
| 36 | ☐ | J90 | | | | | |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 7 (gpm) | Pattern 7 (Char) | Demand 8 (gpm) | Pattern 8 (Char) | Demand 9 (gpm) |
|---|---|---|---|---|---|---|---|
| 37 | ☐ | J92 | 0.00 | | 0.00 | | 0.00 |
| 38 | ☐ | J96 | | | | | |
| 39 | ☐ | J98 | | | | | |
| 40 | ☐ | J104 | | | | | |
| 41 | ☐ | J106 | | | | | |
| 42 | ☐ | J108 | 0.00 | | 0.00 | | 0.00 |
| 43 | ☐ | J114 | | | | | |
| 44 | ☐ | J116 | | | | | |
| 45 | ☐ | J118 | 0.00 | | 0.00 | | 0.00 |
| 46 | ☐ | J120 | | | | | |
| 47 | ☐ | J122 | | | | | |
| 48 | ☐ | J124 | | | | | |
| 49 | ☐ | J126 | | | | | |
| 50 | ☐ | J128 | 0.00 | | 0.00 | | 0.00 |
| 51 | ☐ | J130 | | | | | |
| 52 | ☐ | J132 | | | | | |
| 53 | ☐ | J134 | | | | | |
| 54 | ☐ | J136 | 0.00 | | 0.00 | | 0.00 |
| 55 | ☐ | J138 | | | | | |
| 56 | ☐ | J140 | | | | | |
| 57 | ☐ | J142 | | | | | |
| 58 | ☐ | J146 | 0.00 | | 0.00 | | 0.00 |
| 59 | ☐ | J148 | | | | | |
| 60 | ☐ | J150 | | | | | |
| 61 | ☐ | J152 | | | | | |
| 62 | ☐ | J156 | | | | | |
| 63 | ☐ | J158 | | | | | |
| 64 | ☐ | J160 | | | | | |
| 65 | ☐ | J166 | | | | | |
| 66 | ☐ | J168 | | | | | |
| 67 | ☐ | J176 | | | | | |
| 68 | ☐ | J180 | | | | | |
| 69 | ☐ | J182 | | | | | |
| 70 | ☐ | J186 | | | | | |
| 71 | ☐ | J188 | | | | | |
| 72 | ☐ | J192 | | | | | |

Input Data - Junction Demands

| * BASE * | | ID<br>(Char) | Demand 7<br>(gpm) | Pattern 7<br>(Char) | Demand 8<br>(gpm) | Pattern 8<br>(Char) | Demand 9<br>(gpm) |
|---|---|---|---|---|---|---|---|
| 73 | ☐ | J194 | | | | | |
| 74 | ☐ | J196 | | | | | |
| 75 | ☐ | J200 | | | | | |
| 76 | ☐ | J202 | 0.00 | | 0.00 | | 0.00 |
| 77 | ☐ | J208 | | | | | |
| 78 | ☐ | J210 | 0.00 | | 0.00 | | 0.00 |
| 79 | ☐ | J212 | | | | | |
| 80 | ☐ | J214 | | | | | |
| 81 | ☐ | J218 | | | | | |
| 82 | ☐ | J224 | | | | | |
| 83 | ☐ | J226 | | | | | |
| 84 | ☐ | J228 | | | | | |
| 85 | ☐ | J230 | | | | | |
| 86 | ☐ | J232 | | | | | |
| 87 | ☐ | J234 | 0.00 | | 0.00 | | 0.00 |
| 88 | ☐ | J238 | | | | | |
| 89 | ☐ | J240 | | | | | |
| 90 | ☐ | J242 | | | | | |
| 91 | ☐ | J244 | | | | | |
| 92 | ☐ | J248 | | | | | |
| 93 | ☐ | J250 | | | | | |
| 94 | ☐ | J252 | 0.00 | | 0.00 | | 0.00 |
| 95 | ☐ | J254 | | | | | |
| 96 | ☐ | J256 | 0.00 | | 0.00 | | 0.00 |
| 97 | ☐ | J260 | | | | | |
| 98 | ☐ | J262 | | | | | |
| 99 | ☐ | J266 | | | | | |
| 100 | ☐ | J274 | | | | | |
| 101 | ☐ | J276 | | | | | |
| 102 | ☐ | J278 | | | | | |
| 103 | ☐ | J280 | 0.00 | | 0.00 | | 0.00 |
| 104 | ☐ | J288 | 0.00 | | 0.00 | | 0.00 |
| 105 | ☐ | J290 | 0.00 | | 0.00 | | 0.00 |
| 106 | ☐ | J292 | | | | | |
| 107 | ☐ | J294 | 0.00 | | 0.00 | | 0.00 |
| 108 | ☐ | J296 | | | | | |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 7 (gpm) | Pattern 7 (Char) | Demand 8 (gpm) | Pattern 8 (Char) | Demand 9 (gpm) |
|---|---|---|---|---|---|---|---|
| 109 | ☐ | J298 | | | | | |
| 110 | ☐ | J300 | | | | | |
| 111 | ☐ | J304 | | | | | |
| 112 | ☐ | J306 | | | | | |
| 113 | ☐ | J308 | | | | | |
| 114 | ☐ | J312 | 0.00 | | 0.00 | | 0.00 |
| 115 | ☐ | J314 | | | | | |
| 116 | ☐ | J320 | 0.00 | | 0.00 | | 0.00 |
| 117 | ☐ | J322 | | | | | |
| 118 | ☐ | J324 | | | | | |
| 119 | ☐ | J326 | | | | | |
| 120 | ☐ | J328 | | | | | |
| 121 | ☐ | J330 | | | | | |
| 122 | ☐ | J334 | 0.00 | | 0.00 | | 0.00 |
| 123 | ☐ | J336 | | | | | |
| 124 | ☐ | J340 | | | | | |
| 125 | ☐ | J346 | | | | | |
| 126 | ☐ | J348 | | | | | |
| 127 | ☐ | J350 | | | | | |
| 128 | ☐ | J352 | | | | | |
| 129 | ☐ | J356 | | | | | |
| 130 | ☐ | J358 | | | | | |
| 131 | ☐ | J360 | | | | | |
| 132 | ☐ | J362 | | | | | |
| 133 | ☐ | J364 | | | | | |
| 134 | ☐ | J366 | 0.00 | | 0.00 | | 0.00 |
| 135 | ☐ | J368 | | | | | |
| 136 | ☐ | J370 | | | | | |
| 137 | ☐ | J372 | | | | | |
| 138 | ☐ | J374 | | | | | |
| 139 | ☐ | J376 | | | | | |
| 140 | ☐ | J378 | | | | | |
| 141 | ☐ | J380 | | | | | |
| 142 | ☐ | J382 | | | | | |
| 143 | ☐ | J384 | | | | | |
| 144 | ☐ | J386 | 0.00 | | 0.00 | | 0.00 |

Input Data - Junction Demands

| * BASE * |  | ID (Char) | Demand 7 (gpm) | Pattern 7 (Char) | Demand 8 (gpm) | Pattern 8 (Char) | Demand 9 (gpm) |
|---|---|---|---|---|---|---|---|
| 145 | ☐ | J388 |  |  |  |  |  |
| 146 | ☐ | J390 |  |  |  |  |  |
| 147 | ☐ | J392 |  |  |  |  |  |
| 148 | ☐ | J396 | 0.00 |  | 0.00 |  | 0.00 |
| 149 | ☐ | J398 |  |  |  |  |  |
| 150 | ☐ | J400 | 0.00 |  | 0.00 |  | 0.00 |
| 151 | ☐ | J402 |  |  |  |  |  |
| 152 | ☐ | J406 | 0.00 |  | 0.00 |  | 0.00 |
| 153 | ☐ | J408 |  |  |  |  |  |
| 154 | ☐ | J410 |  |  |  |  |  |
| 155 | ☐ | J414 |  |  |  |  |  |
| 156 | ☐ | J416 | 0.00 |  | 0.00 |  | 0.00 |
| 157 | ☐ | J420 |  |  |  |  |  |
| 158 | ☐ | J422 |  |  |  |  |  |
| 159 | ☐ | J428 |  |  |  |  |  |
| 160 | ☐ | J430 |  |  |  |  |  |
| 161 | ☐ | J432 | 0.00 |  | 0.00 |  | 0.00 |
| 162 | ☐ | J434 |  |  |  |  |  |
| 163 | ☐ | J436 |  |  |  |  |  |
| 164 | ☐ | J440 |  |  |  |  |  |
| 165 | ☐ | J442 |  |  |  |  |  |
| 166 | ☐ | J444 |  |  |  |  |  |
| 167 | ☐ | J446 |  |  |  |  |  |
| 168 | ☐ | J448 | 0.00 |  | 0.00 |  | 0.00 |
| 169 | ☐ | J450 |  |  |  |  |  |
| 170 | ☐ | J452 |  |  |  |  |  |
| 171 | ☐ | J454 |  |  |  |  |  |
| 172 | ☐ | J456 |  |  |  |  |  |
| 173 | ☐ | J458 | 0.00 |  | 0.00 |  | 0.00 |
| 174 | ☐ | J460 |  |  |  |  |  |
| 175 | ☐ | J462 | 0.00 |  | 0.00 |  | 0.00 |
| 176 | ☐ | J464 | 0.00 |  | 0.00 |  | 0.00 |
| 177 | ☐ | J466 | 0.00 |  | 0.00 |  | 0.00 |
| 178 | ☐ | J468 | 0.00 |  | 0.00 |  | 0.00 |
| 179 | ☐ | J470 |  |  |  |  |  |
| 180 | ☐ | J472 | 0.00 |  | 0.00 |  | 0.00 |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 7 (gpm) | Pattern 7 (Char) | Demand 8 (gpm) | Pattern 8 (Char) | Demand 9 (gpm) |
|---|---|---|---|---|---|---|---|
| 181 | ☐ | J474 | | | | | |
| 182 | ☐ | J476 | | | | | |
| 183 | ☐ | J478 | | | | | |
| 184 | ☐ | J480 | | | | | |
| 185 | ☐ | J482 | | | | | |
| 186 | ☐ | J484 | | | | | |
| 187 | ☐ | J486 | | | | | |
| 188 | ☐ | J488 | | | | | |
| 189 | ☐ | J490 | 0.00 | | 0.00 | | 0.00 |
| 190 | ☐ | J492 | | | | | |
| 191 | ☐ | J498 | | | | | |
| 192 | ☐ | J500 | | | | | |
| 193 | ☐ | J502 | | | | | |
| 194 | ☐ | J506 | 0.00 | | 0.00 | | 0.00 |
| 195 | ☐ | J508 | | | | | |
| 196 | ☐ | J512 | | | | | |
| 197 | ☐ | J514 | | | | | |
| 198 | ☐ | J516 | | | | | |
| 199 | ☐ | J518 | | | | | |
| 200 | ☐ | J520 | | | | | |
| 201 | ☐ | J522 | | | | | |
| 202 | ☐ | J524 | 0.00 | | 0.00 | | 0.00 |
| 203 | ☐ | J526 | | | | | |
| 204 | ☐ | J530 | | | | | |
| 205 | ☐ | J532 | 0.00 | | 0.00 | | 0.00 |
| 206 | ☐ | J534 | | | | | |
| 207 | ☐ | J536 | 0.00 | | 0.00 | | 0.00 |
| 208 | ☐ | J538 | | | | | |
| 209 | ☐ | J542 | | | | | |
| 210 | ☐ | J544 | | | | | |
| 211 | ☐ | J546 | | | | | |
| 212 | ☐ | J548 | | | | | |
| 213 | ☐ | J550 | | | | | |
| 214 | ☐ | J552 | | | | | |
| 215 | ☐ | J554 | 0.00 | | 0.00 | | 0.00 |
| 216 | ☐ | J556 | | | | | |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 7 (gpm) | Pattern 7 (Char) | Demand 8 (gpm) | Pattern 8 (Char) | Demand 9 (gpm) |
|---|---|---|---|---|---|---|---|
| 217 | ☐ | J558 | | | | | |
| 218 | ☐ | J560 | | | | | |
| 219 | ☐ | J562 | | | | | |
| 220 | ☐ | J564 | 0.00 | | 0.00 | | 0.00 |
| 221 | ☐ | J566 | | | | | |
| 222 | ☐ | J570 | | | | | |
| 223 | ☐ | J572 | | | | | |
| 224 | ☐ | J578 | | | | | |
| 225 | ☐ | J580 | | | | | |
| 226 | ☐ | J582 | | | | | |
| 227 | ☐ | J584 | | | | | |
| 228 | ☐ | J586 | | | | | |
| 229 | ☐ | J588 | | | | | |
| 230 | ☐ | J590 | | | | | |
| 231 | ☐ | J592 | 0.00 | | 0.00 | | 0.00 |
| 232 | ☐ | J594 | | | | | |
| 233 | ☐ | J600 | | | | | |
| 234 | ☐ | J602 | | | | | |
| 235 | ☐ | J604 | | | | | |
| 236 | ☐ | J606 | 0.00 | | 0.00 | | 0.00 |
| 237 | ☐ | J608 | | | | | |
| 238 | ☐ | J610 | | | | | |
| 239 | ☐ | J612 | | | | | |
| 240 | ☐ | J614 | | | | | |
| 241 | ☐ | J616 | 0.00 | | 0.00 | | 0.00 |
| 242 | ☐ | J618 | 0.00 | | 0.00 | | 0.00 |
| 243 | ☐ | J620 | 0.00 | | 0.00 | | 0.00 |
| 244 | ☐ | J622 | 0.00 | | 0.00 | | 0.00 |
| 245 | ☐ | J628 | 0.00 | | 0.00 | | 0.00 |
| 246 | ☐ | J630 | 0.00 | | 0.00 | | 0.00 |
| 247 | ☐ | J632 | 0.00 | | 0.00 | | 0.00 |
| 248 | ☐ | J634 | 0.00 | | 0.00 | | 0.00 |
| 249 | ☐ | J636 | | | | | |
| 250 | ☐ | J638 | | | | | |
| 251 | ☐ | J640 | | | | | |
| 252 | ☐ | J642 | | | | | |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Demand 7 (gpm) | Pattern 7 (Char) | Demand 8 (gpm) | Pattern 8 (Char) | Demand 9 (gpm) |
|---|---|---|---|---|---|---|---|
| 253 | ☐ | J644 | | | | | |
| 254 | ☐ | J646 | | | | | |
| 255 | ☐ | J648 | | | | | |
| 256 | ☐ | J650 | | | | | |
| 257 | ☐ | J652 | | | | | |
| 258 | ☐ | J654 | | | | | |
| 259 | ☐ | J656 | | | | | |
| 260 | ☐ | J658 | | | | | |
| 261 | ☐ | J660 | 0.00 | | 0.00 | | 0.00 |
| 262 | ☐ | J662 | 0.00 | | 0.00 | | 0.00 |
| 263 | ☐ | J664 | 0.00 | | 0.00 | | 0.00 |
| 264 | ☐ | J666 | 0.00 | | 0.00 | | 0.00 |
| 265 | ☐ | J668 | 0.00 | | 0.00 | | 0.00 |
| 266 | ☐ | J670 | | | | | |

Input Data - Junction Demands

| * BASE * |  | ID<br>(Char) | Pattern 9<br>(Char) | Demand 10<br>(gpm) | Pattern 10<br>(Char) |
|---|---|---|---|---|---|
| 1 | ☐ | J10 |  | 0.00 |  |
| 2 | ☐ | J12 |  |  |  |
| 3 | ☐ | J14 |  |  |  |
| 4 | ☐ | J16 |  | 0.00 |  |
| 5 | ☐ | J18 |  |  |  |
| 6 | ☐ | J20 |  |  |  |
| 7 | ☐ | J22 |  | 0.00 |  |
| 8 | ☐ | J24 |  |  |  |
| 9 | ☐ | J26 |  | 0.00 |  |
| 10 | ☐ | J28 |  |  |  |
| 11 | ☐ | J30 |  |  |  |
| 12 | ☐ | J32 |  |  |  |
| 13 | ☐ | J36 |  |  |  |
| 14 | ☐ | J38 |  |  |  |
| 15 | ☐ | J42 |  |  |  |
| 16 | ☐ | J44 |  |  |  |
| 17 | ☐ | J46 |  |  |  |
| 18 | ☐ | J48 |  |  |  |
| 19 | ☐ | J50 |  |  |  |
| 20 | ☐ | J52 |  |  |  |
| 21 | ☐ | J54 |  |  |  |
| 22 | ☐ | J56 |  |  |  |
| 23 | ☐ | J58 |  |  |  |
| 24 | ☐ | J60 |  |  |  |
| 25 | ☐ | J62 |  |  |  |
| 26 | ☐ | J64 |  |  |  |
| 27 | ☐ | J66 |  |  |  |
| 28 | ☐ | J72 |  |  |  |
| 29 | ☐ | J74 |  | 0.00 |  |
| 30 | ☐ | J76 |  |  |  |
| 31 | ☐ | J78 |  | 0.00 |  |
| 32 | ☐ | J80 |  |  |  |
| 33 | ☐ | J82 |  |  |  |
| 34 | ☐ | J84 |  |  |  |
| 35 | ☐ | J86 |  |  |  |
| 36 | ☐ | J90 |  |  |  |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Pattern 9 (Char) | Demand 10 (gpm) | Pattern 10 (Char) |
|---|---|---|---|---|---|
| 37 | ☐ | J92 | | 0.00 | |
| 38 | ☐ | J96 | | | |
| 39 | ☐ | J98 | | | |
| 40 | ☐ | J104 | | | |
| 41 | ☐ | J106 | | | |
| 42 | ☐ | J108 | | 0.00 | |
| 43 | ☐ | J114 | | | |
| 44 | ☐ | J116 | | | |
| 45 | ☐ | J118 | | 0.00 | |
| 46 | ☐ | J120 | | | |
| 47 | ☐ | J122 | | | |
| 48 | ☐ | J124 | | | |
| 49 | ☐ | J126 | | | |
| 50 | ☐ | J128 | | 0.00 | |
| 51 | ☐ | J130 | | | |
| 52 | ☐ | J132 | | | |
| 53 | ☐ | J134 | | | |
| 54 | ☐ | J136 | | 0.00 | |
| 55 | ☐ | J138 | | | |
| 56 | ☐ | J140 | | | |
| 57 | ☐ | J142 | | | |
| 58 | ☐ | J146 | | 0.00 | |
| 59 | ☐ | J148 | | | |
| 60 | ☐ | J150 | | | |
| 61 | ☐ | J152 | | | |
| 62 | ☐ | J156 | | | |
| 63 | ☐ | J158 | | | |
| 64 | ☐ | J160 | | | |
| 65 | ☐ | J166 | | | |
| 66 | ☐ | J168 | | | |
| 67 | ☐ | J176 | | | |
| 68 | ☐ | J180 | | | |
| 69 | ☐ | J182 | | | |
| 70 | ☐ | J186 | | | |
| 71 | ☐ | J188 | | | |
| 72 | ☐ | J192 | | | |

Input Data - Junction Demands

| * BASE * |  | ID<br>(Char) | Pattern 9<br>(Char) | Demand 10<br>(gpm) | Pattern 10<br>(Char) |
|---|---|---|---|---|---|
| 73 | ☐ | J194 |  |  |  |
| 74 | ☐ | J196 |  |  |  |
| 75 | ☐ | J200 |  |  |  |
| 76 | ☐ | J202 |  | 0.00 |  |
| 77 | ☐ | J208 |  |  |  |
| 78 | ☐ | J210 |  | 0.00 |  |
| 79 | ☐ | J212 |  |  |  |
| 80 | ☐ | J214 |  |  |  |
| 81 | ☐ | J218 |  |  |  |
| 82 | ☐ | J224 |  |  |  |
| 83 | ☐ | J226 |  |  |  |
| 84 | ☐ | J228 |  |  |  |
| 85 | ☐ | J230 |  |  |  |
| 86 | ☐ | J232 |  |  |  |
| 87 | ☐ | J234 |  | 0.00 |  |
| 88 | ☐ | J238 |  |  |  |
| 89 | ☐ | J240 |  |  |  |
| 90 | ☐ | J242 |  |  |  |
| 91 | ☐ | J244 |  |  |  |
| 92 | ☐ | J248 |  |  |  |
| 93 | ☐ | J250 |  |  |  |
| 94 | ☐ | J252 |  | 0.00 |  |
| 95 | ☐ | J254 |  |  |  |
| 96 | ☐ | J256 |  | 0.00 |  |
| 97 | ☐ | J260 |  |  |  |
| 98 | ☐ | J262 |  |  |  |
| 99 | ☐ | J266 |  |  |  |
| 100 | ☐ | J274 |  |  |  |
| 101 | ☐ | J276 |  |  |  |
| 102 | ☐ | J278 |  |  |  |
| 103 | ☐ | J280 |  | 0.00 |  |
| 104 | ☐ | J288 |  | 0.00 |  |
| 105 | ☐ | J290 |  | 0.00 |  |
| 106 | ☐ | J292 |  |  |  |
| 107 | ☐ | J294 |  | 0.00 |  |
| 108 | ☐ | J296 |  |  |  |

Input Data - Junction Demands

| * BASE * | | ID<br>(Char) | Pattern 9<br>(Char) | Demand 10<br>(gpm) | Pattern 10<br>(Char) |
|---|---|---|---|---|---|
| 109 | ☐ | J298 | | | |
| 110 | ☐ | J300 | | | |
| 111 | ☐ | J304 | | | |
| 112 | ☐ | J306 | | | |
| 113 | ☐ | J308 | | | |
| 114 | ☐ | J312 | | 0.00 | |
| 115 | ☐ | J314 | | | |
| 116 | ☐ | J320 | | 0.00 | |
| 117 | ☐ | J322 | | | |
| 118 | ☐ | J324 | | | |
| 119 | ☐ | J326 | | | |
| 120 | ☐ | J328 | | | |
| 121 | ☐ | J330 | | | |
| 122 | ☐ | J334 | | 0.00 | |
| 123 | ☐ | J336 | | | |
| 124 | ☐ | J340 | | | |
| 125 | ☐ | J346 | | | |
| 126 | ☐ | J348 | | | |
| 127 | ☐ | J350 | | | |
| 128 | ☐ | J352 | | | |
| 129 | ☐ | J356 | | | |
| 130 | ☐ | J358 | | | |
| 131 | ☐ | J360 | | | |
| 132 | ☐ | J362 | | | |
| 133 | ☐ | J364 | | | |
| 134 | ☐ | J366 | | 0.00 | |
| 135 | ☐ | J368 | | | |
| 136 | ☐ | J370 | | | |
| 137 | ☐ | J372 | | | |
| 138 | ☐ | J374 | | | |
| 139 | ☐ | J376 | | | |
| 140 | ☐ | J378 | | | |
| 141 | ☐ | J380 | | | |
| 142 | ☐ | J382 | | | |
| 143 | ☐ | J384 | | | |
| 144 | ☐ | J386 | | 0.00 | |

Input Data - Junction Demands

| * BASE * | | ID (Char) | Pattern 9 (Char) | Demand 10 (gpm) | Pattern 10 (Char) |
|---|---|---|---|---|---|
| 145 | ☐ | J388 | | | |
| 146 | ☐ | J390 | | | |
| 147 | ☐ | J392 | | | |
| 148 | ☐ | J396 | | 0.00 | |
| 149 | ☐ | J398 | | | |
| 150 | ☐ | J400 | | 0.00 | |
| 151 | ☐ | J402 | | | |
| 152 | ☐ | J406 | | 0.00 | |
| 153 | ☐ | J408 | | | |
| 154 | ☐ | J410 | | | |
| 155 | ☐ | J414 | | | |
| 156 | ☐ | J416 | | 0.00 | |
| 157 | ☐ | J420 | | | |
| 158 | ☐ | J422 | | | |
| 159 | ☐ | J428 | | | |
| 160 | ☐ | J430 | | | |
| 161 | ☐ | J432 | | 0.00 | |
| 162 | ☐ | J434 | | | |
| 163 | ☐ | J436 | | | |
| 164 | ☐ | J440 | | | |
| 165 | ☐ | J442 | | | |
| 166 | ☐ | J444 | | | |
| 167 | ☐ | J446 | | | |
| 168 | ☐ | J448 | | 0.00 | |
| 169 | ☐ | J450 | | | |
| 170 | ☐ | J452 | | | |
| 171 | ☐ | J454 | | | |
| 172 | ☐ | J456 | | | |
| 173 | ☐ | J458 | | 0.00 | |
| 174 | ☐ | J460 | | | |
| 175 | ☐ | J462 | | 0.00 | |
| 176 | ☐ | J464 | | 0.00 | |
| 177 | ☐ | J466 | | 0.00 | |
| 178 | ☐ | J468 | | 0.00 | |
| 179 | ☐ | J470 | | | |
| 180 | ☐ | J472 | | 0.00 | |

Input Data - Junction Demands

| * BASE * | | ID<br>(Char) | Pattern 9<br>(Char) | Demand 10<br>(gpm) | Pattern 10<br>(Char) |
|---|---|---|---|---|---|
| 181 | ☐ | J474 | | | |
| 182 | ☐ | J476 | | | |
| 183 | ☐ | J478 | | | |
| 184 | ☐ | J480 | | | |
| 185 | ☐ | J482 | | | |
| 186 | ☐ | J484 | | | |
| 187 | ☐ | J486 | | | |
| 188 | ☐ | J488 | | | |
| 189 | ☐ | J490 | | 0.00 | |
| 190 | ☐ | J492 | | | |
| 191 | ☐ | J498 | | | |
| 192 | ☐ | J500 | | | |
| 193 | ☐ | J502 | | | |
| 194 | ☐ | J506 | | 0.00 | |
| 195 | ☐ | J508 | | | |
| 196 | ☐ | J512 | | | |
| 197 | ☐ | J514 | | | |
| 198 | ☐ | J516 | | | |
| 199 | ☐ | J518 | | | |
| 200 | ☐ | J520 | | | |
| 201 | ☐ | J522 | | | |
| 202 | ☐ | J524 | | 0.00 | |
| 203 | ☐ | J526 | | | |
| 204 | ☐ | J530 | | | |
| 205 | ☐ | J532 | | 0.00 | |
| 206 | ☐ | J534 | | | |
| 207 | ☐ | J536 | | 0.00 | |
| 208 | ☐ | J538 | | | |
| 209 | ☐ | J542 | | | |
| 210 | ☐ | J544 | | | |
| 211 | ☐ | J546 | | | |
| 212 | ☐ | J548 | | | |
| 213 | ☐ | J550 | | | |
| 214 | ☐ | J552 | | | |
| 215 | ☐ | J554 | | 0.00 | |
| 216 | ☐ | J556 | | | |

Input Data - Junction Demands

| * BASE * | | ID<br>(Char) | Pattern 9<br>(Char) | Demand 10<br>(gpm) | Pattern 10<br>(Char) |
|---|---|---|---|---|---|
| 217 | ☐ | J558 | | | |
| 218 | ☐ | J560 | | | |
| 219 | ☐ | J562 | | | |
| 220 | ☐ | J564 | | 0.00 | |
| 221 | ☐ | J566 | | | |
| 222 | ☐ | J570 | | | |
| 223 | ☐ | J572 | | | |
| 224 | ☐ | J578 | | | |
| 225 | ☐ | J580 | | | |
| 226 | ☐ | J582 | | | |
| 227 | ☐ | J584 | | | |
| 228 | ☐ | J586 | | | |
| 229 | ☐ | J588 | | | |
| 230 | ☐ | J590 | | | |
| 231 | ☐ | J592 | | 0.00 | |
| 232 | ☐ | J594 | | | |
| 233 | ☐ | J600 | | | |
| 234 | ☐ | J602 | | | |
| 235 | ☐ | J604 | | | |
| 236 | ☐ | J606 | | 0.00 | |
| 237 | ☐ | J608 | | | |
| 238 | ☐ | J610 | | | |
| 239 | ☐ | J612 | | | |
| 240 | ☐ | J614 | | | |
| 241 | ☐ | J616 | | 0.00 | |
| 242 | ☐ | J618 | | 0.00 | |
| 243 | ☐ | J620 | | 0.00 | |
| 244 | ☐ | J622 | | 0.00 | |
| 245 | ☐ | J628 | | 0.00 | |
| 246 | ☐ | J630 | | 0.00 | |
| 247 | ☐ | J632 | | 0.00 | |
| 248 | ☐ | J634 | | 0.00 | |
| 249 | ☐ | J636 | | | |
| 250 | ☐ | J638 | | | |
| 251 | ☐ | J640 | | | |
| 252 | ☐ | J642 | | | |

Input Data - Junction Demands

| * BASE * |  | ID (Char) | Pattern 9 (Char) | Demand 10 (gpm) | Pattern 10 (Char) |
|---|---|---|---|---|---|
| 253 | ☐ | J644 |  |  |  |
| 254 | ☐ | J646 |  |  |  |
| 255 | ☐ | J648 |  |  |  |
| 256 | ☐ | J650 |  |  |  |
| 257 | ☐ | J652 |  |  |  |
| 258 | ☐ | J654 |  |  |  |
| 259 | ☐ | J656 |  |  |  |
| 260 | ☐ | J658 |  |  |  |
| 261 | ☐ | J660 |  | 0.00 |  |
| 262 | ☐ | J662 |  | 0.00 |  |
| 263 | ☐ | J664 |  | 0.00 |  |
| 264 | ☐ | J666 |  | 0.00 |  |
| 265 | ☐ | J668 |  | 0.00 |  |
| 266 | ☐ | J670 |  |  |  |

Input Data - Junction Information

| | | ID<br>(Char) | Description<br>(Char) | Year of Installation | Year of Retirement | Zone<br>(Char) | Elevation<br>(ft) | Phase<br>(Int) |
|---|---|---|---|---|---|---|---|---|
| 1 | ☐ | J10 | | | | Low Pressure | 1,524.00 | |
| 2 | ☐ | J12 | | | | Low Pressure | 1,516.00 | |
| 3 | ☐ | J14 | | | | Low Pressure | 1,493.00 | |
| 4 | ☐ | J16 | | | | Low Pressure | 1,506.00 | |
| 5 | ☐ | J18 | | | | Low Pressure | 1,515.00 | |
| 6 | ☐ | J20 | | | | Low Pressure | 1,506.00 | |
| 7 | ☐ | J22 | | | | Low Pressure | 1,507.00 | |
| 8 | ☐ | J24 | | | | Low Pressure | 1,505.00 | |
| 9 | ☐ | J26 | | | | 2-inch | 1,502.00 | |
| 10 | ☐ | J28 | | | | Low Pressure | 1,509.00 | |
| 11 | ☐ | J30 | | | | Low Pressure | 1,513.00 | |
| 12 | ☐ | J32 | | | | Low Pressure | 1,513.00 | |
| 13 | ☐ | J36 | | | | Low Pressure | 1,512.00 | |
| 14 | ☐ | J38 | | | | Low Pressure | 1,512.00 | |
| 15 | ☐ | J42 | | | | Low Pressure | 1,513.00 | |
| 16 | ☐ | J44 | | | | Low Pressure | 1,517.00 | |
| 17 | ☐ | J46 | | | | Low Pressure | 1,511.00 | |
| 18 | ☐ | J48 | | | | Low Pressure | 1,513.00 | |
| 19 | ☐ | J50 | Main Street Commercia | | | Low Pressure | 1,520.00 | |
| 20 | ☐ | J52 | | | | Low Pressure | 1,516.00 | |
| 21 | ☐ | J54 | | | | Low Pressure | 1,515.00 | |
| 22 | ☐ | J56 | | | | Low Pressure | 1,514.00 | |
| 23 | ☐ | J58 | Main Street Commercia | | | Low Pressure | 1,518.00 | |
| 24 | ☐ | J60 | Main Street Commercia | | | Low Pressure | 1,521.00 | |
| 25 | ☐ | J62 | Main Street Commercia | | | Low Pressure | 1,517.00 | |
| 26 | ☐ | J64 | Main Street Commercia | | | Low Pressure | 1,523.00 | |
| 27 | ☐ | J66 | | | | Low Pressure | 1,517.00 | |
| 28 | ☐ | J72 | Main Street Commercia | | | Low Pressure | 1,518.00 | |
| 29 | ☐ | J74 | Main Street Commercia | | | Low Pressure | 1,522.00 | |
| 30 | ☐ | J76 | | | | Low Pressure | 1,516.00 | |
| 31 | ☐ | J78 | | | | Low Pressure | 1,520.00 | |
| 32 | ☐ | J80 | | | | Low Pressure | 1,520.00 | |
| 33 | ☐ | J82 | | | | Low Pressure | 1,540.00 | |
| 34 | ☐ | J84 | | | | Low Pressure | 1,568.00 | |
| 35 | ☐ | J86 | | | | Low Pressure | 1,605.00 | |
| 36 | ☐ | J90 | | | | Low Pressure | 1,657.00 | |

Input Data - Junction Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Elevation (ft) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|
| 37 | ☐ | J92 | | | | Low Pressure | 1,675.00 | |
| 38 | ☐ | J96 | | | | Low Pressure | 1,572.00 | |
| 39 | ☐ | J98 | | | | Low Pressure | 1,527.00 | |
| 40 | ☐ | J104 | | | | Low Pressure | 1,533.00 | |
| 41 | ☐ | J106 | | | | Low Pressure | 1,517.00 | |
| 42 | ☐ | J108 | | | | Low Pressure | 1,517.00 | |
| 43 | ☐ | J114 | | | | Low Pressure | 1,575.00 | |
| 44 | ☐ | J116 | | | | Low Pressure | 1,548.00 | |
| 45 | ☐ | J118 | | | | Low Pressure | 1,560.00 | |
| 46 | ☐ | J120 | | | | Low Pressure | 1,558.00 | |
| 47 | ☐ | J122 | | | | Low Pressure | 1,596.00 | |
| 48 | ☐ | J124 | | | | Low Pressure | 1,518.00 | |
| 49 | ☐ | J126 | | | | Low Pressure | 1,514.00 | |
| 50 | ☐ | J128 | | | | Low Pressure | 1,519.00 | |
| 51 | ☐ | J130 | | | | Low Pressure | 1,523.00 | |
| 52 | ☐ | J132 | | | | Low Pressure | 1,522.00 | |
| 53 | ☐ | J134 | | | | Low Pressure | 1,530.00 | |
| 54 | ☐ | J136 | | | | Low Pressure | 1,536.00 | |
| 55 | ☐ | J138 | | | | Low Pressure | 1,536.00 | |
| 56 | ☐ | J140 | | | | Low Pressure | 1,530.00 | |
| 57 | ☐ | J142 | | | | Low Pressure | 1,540.00 | |
| 58 | ☐ | J146 | | | | Low Pressure | 1,610.00 | |
| 59 | ☐ | J148 | | | | Low Pressure | 1,585.00 | |
| 60 | ☐ | J150 | | | | Low Pressure | 1,526.00 | |
| 61 | ☐ | J152 | | | | Low Pressure | 1,564.00 | |
| 62 | ☐ | J156 | | | | 2-inch | 1,581.00 | |
| 63 | ☐ | J158 | | | | Low Pressure | 1,559.00 | |
| 64 | ☐ | J160 | | | | Low Pressure | 1,605.00 | |
| 65 | ☐ | J166 | | | | Low Pressure | 1,610.00 | |
| 66 | ☐ | J168 | | | | 2-inch | 1,696.00 | |
| 67 | ☐ | J176 | | | | Low Pressure | 1,530.00 | |
| 68 | ☐ | J180 | | | | Low Pressure | 1,568.00 | |
| 69 | ☐ | J182 | | | | Low Pressure | 1,538.00 | |
| 70 | ☐ | J186 | | | | Low Pressure | 1,569.00 | |
| 71 | ☐ | J188 | | | | Low Pressure | 1,605.00 | |
| 72 | ☐ | J192 | | | | Low Pressure | 1,654.00 | |

Input Data - Junction Information

| | | ID<br>(Char) | Description<br>(Char) | Year of Installation | Year of Retirement | Zone<br>(Char) | Elevation<br>(ft) | Phase<br>(Int) |
|---|---|---|---|---|---|---|---|---|
| 73 | ☐ | J194 | | | | 2-inch | 1,690.00 | |
| 74 | ☐ | J196 | | | | Low Pressure | 1,609.00 | |
| 75 | ☐ | J200 | | | | Low Pressure | 1,625.00 | |
| 76 | ☐ | J202 | | | | High Pressure | 1,718.00 | |
| 77 | ☐ | J208 | | | | Tank | 1,723.00 | |
| 78 | ☐ | J210 | | | | High Pressure | 1,768.00 | |
| 79 | ☐ | J212 | | | | Low Pressure | 1,604.00 | |
| 80 | ☐ | J214 | | | | Tank | 1,722.00 | |
| 81 | ☐ | J218 | | | | Tank | 1,725.00 | |
| 82 | ☐ | J224 | | | | Low Pressure | 1,570.00 | |
| 83 | ☐ | J226 | | | | Low Pressure | 1,534.00 | |
| 84 | ☐ | J228 | | | | Low Pressure | 1,551.00 | |
| 85 | ☐ | J230 | | | | Low Pressure | 1,537.00 | |
| 86 | ☐ | J232 | | | | Low Pressure | 1,548.00 | |
| 87 | ☐ | J234 | | | | 2-inch | 1,554.00 | |
| 88 | ☐ | J238 | | | | Low Pressure | 1,533.00 | |
| 89 | ☐ | J240 | | | | Low Pressure | 1,540.00 | |
| 90 | ☐ | J242 | | | | Low Pressure | 1,513.00 | |
| 91 | ☐ | J244 | | | | Low Pressure | 1,513.00 | |
| 92 | ☐ | J248 | Main Street Commercia | | | Low Pressure | 1,504.00 | |
| 93 | ☐ | J250 | | | | Low Pressure | 1,504.00 | |
| 94 | ☐ | J252 | | | | Low Pressure | 1,499.00 | |
| 95 | ☐ | J254 | | | | Low Pressure | 1,517.00 | |
| 96 | ☐ | J256 | | | | 2-inch | 1,524.00 | |
| 97 | ☐ | J260 | | | | Low Pressure | 1,494.00 | |
| 98 | ☐ | J262 | | | | Low Pressure | 1,497.00 | |
| 99 | ☐ | J266 | | | | Low Pressure | 1,532.00 | |
| 100 | ☐ | J274 | | | | Low Pressure | 1,500.00 | |
| 101 | ☐ | J276 | | | | Low Pressure | 1,498.00 | |
| 102 | ☐ | J278 | | | | Low Pressure | 1,498.00 | |
| 103 | ☐ | J280 | | | | Low Pressure | 1,496.00 | |
| 104 | ☐ | J288 | | | | Low Pressure | 1,497.00 | |
| 105 | ☐ | J290 | | | | Low Pressure | 1,495.00 | |
| 106 | ☐ | J292 | | | | Low Pressure | 1,496.00 | |
| 107 | ☐ | J294 | | | | Low Pressure | 1,494.00 | |
| 108 | ☐ | J296 | | | | Low Pressure | 1,543.00 | |

Input Data - Junction Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Elevation (ft) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|
| 109 | ☐ | J298 | | | | Low Pressure | 1,523.00 | |
| 110 | ☐ | J300 | | | | Low Pressure | 1,506.00 | |
| 111 | ☐ | J304 | | | | Low Pressure | 1,506.00 | |
| 112 | ☐ | J306 | | | | Low Pressure | 1,507.00 | |
| 113 | ☐ | J308 | | | | Low Pressure | 1,504.00 | |
| 114 | ☐ | J312 | | | | Low Pressure | 1,508.00 | |
| 115 | ☐ | J314 | | | | Low Pressure | 1,517.00 | |
| 116 | ☐ | J320 | | | | Low Pressure | 1,590.00 | |
| 117 | ☐ | J322 | | | | Low Pressure | 1,518.00 | |
| 118 | ☐ | J324 | | | | Low Pressure | 1,538.00 | |
| 119 | ☐ | J326 | | | | Low Pressure | 1,534.00 | |
| 120 | ☐ | J328 | | | | Low Pressure | 1,512.00 | |
| 121 | ☐ | J330 | | | | Low Pressure | 1,506.00 | |
| 122 | ☐ | J334 | | | | Low Pressure | 1,503.00 | |
| 123 | ☐ | J336 | | | | Low Pressure | 1,503.00 | |
| 124 | ☐ | J340 | | | | Low Pressure | 1,506.00 | |
| 125 | ☐ | J346 | | | | Low Pressure | 1,498.00 | |
| 126 | ☐ | J348 | | | | Low Pressure | 1,499.00 | |
| 127 | ☐ | J350 | | | | Low Pressure | 1,501.00 | |
| 128 | ☐ | J352 | | | | Low Pressure | 1,499.00 | |
| 129 | ☐ | J356 | | | | Low Pressure | 1,500.00 | |
| 130 | ☐ | J358 | | | | Low Pressure | 1,505.00 | |
| 131 | ☐ | J360 | | | | Low Pressure | 1,508.00 | |
| 132 | ☐ | J362 | | | | Low Pressure | 1,509.00 | |
| 133 | ☐ | J364 | | | | Low Pressure | 1,519.00 | |
| 134 | ☐ | J366 | | | | Low Pressure | 1,521.00 | |
| 135 | ☐ | J368 | | | | Low Pressure | 1,538.00 | |
| 136 | ☐ | J370 | | | | Low Pressure | 1,535.00 | |
| 137 | ☐ | J372 | | | | 2-inch | 1,527.00 | |
| 138 | ☐ | J374 | | | | Low Pressure | 1,507.00 | |
| 139 | ☐ | J376 | | | | Low Pressure | 1,497.00 | |
| 140 | ☐ | J378 | | | | Low Pressure | 1,548.00 | |
| 141 | ☐ | J380 | | | | Low Pressure | 1,529.00 | |
| 142 | ☐ | J382 | | | | Low Pressure | 1,535.00 | |
| 143 | ☐ | J384 | Main Street Commercia | | | Low Pressure | 1,516.00 | |
| 144 | ☐ | J386 | Main Street Commercia | | | Low Pressure | 1,517.00 | |

Input Data - Junction Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Elevation (ft) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|
| 145 | ☐ | J388 | Main Street Commercia | | | 2-inch | 1,525.00 | |
| 146 | ☐ | J390 | Main Street Commercia | | | Low Pressure | 1,516.00 | |
| 147 | ☐ | J392 | Main Street Commercia | | | Low Pressure | 1,516.00 | |
| 148 | ☐ | J396 | Main Street Commercia | | | Low Pressure | 1,533.00 | |
| 149 | ☐ | J398 | | | | Low Pressure | 1,521.00 | |
| 150 | ☐ | J400 | Main Street Commercia | | | Low Pressure | 1,521.00 | |
| 151 | ☐ | J402 | Main Street Commercia | | | Low Pressure | 1,506.00 | |
| 152 | ☐ | J406 | Main Street Commercia | | | Low Pressure | 1,512.00 | |
| 153 | ☐ | J408 | | | | Low Pressure | 1,522.00 | |
| 154 | ☐ | J410 | | | | Low Pressure | 1,504.00 | |
| 155 | ☐ | J414 | | | | Low Pressure | 1,496.00 | |
| 156 | ☐ | J416 | | | | Low Pressure | 1,498.00 | |
| 157 | ☐ | J420 | | | | Low Pressure | 1,495.00 | |
| 158 | ☐ | J422 | | | | WTP | 1,497.00 | |
| 159 | ☐ | J428 | Main Street Commercia | | | Low Pressure | 1,504.00 | |
| 160 | ☐ | J430 | | | | Low Pressure | 1,502.00 | |
| 161 | ☐ | J432 | | | | Low Pressure | 1,492.00 | |
| 162 | ☐ | J434 | | | | Low Pressure | 1,505.00 | |
| 163 | ☐ | J436 | | | | Low Pressure | 1,504.00 | |
| 164 | ☐ | J440 | Main Street Commercia | | | Low Pressure | 1,509.00 | |
| 165 | ☐ | J442 | Main Street Commercia | | | Low Pressure | 1,504.00 | |
| 166 | ☐ | J444 | | | | Low Pressure | 1,505.00 | |
| 167 | ☐ | J446 | | | | Low Pressure | 1,525.00 | |
| 168 | ☐ | J448 | | | | Low Pressure | 1,524.00 | |
| 169 | ☐ | J450 | | | | Low Pressure | 1,512.00 | |
| 170 | ☐ | J452 | | | | Low Pressure | 1,530.00 | |
| 171 | ☐ | J454 | | | | Low Pressure | 1,508.00 | |
| 172 | ☐ | J456 | | | | Low Pressure | 1,528.00 | |
| 173 | ☐ | J458 | | | | Low Pressure | 1,513.00 | |
| 174 | ☐ | J460 | | | | Low Pressure | 1,525.00 | |
| 175 | ☐ | J462 | | | | Low Pressure | 1,514.00 | |
| 176 | ☐ | J464 | | | | Low Pressure | 1,510.00 | |
| 177 | ☐ | J466 | | | | Low Pressure | 1,497.00 | |
| 178 | ☐ | J468 | | | | Low Pressure | 1,492.00 | |
| 179 | ☐ | J470 | | | | Low Pressure | 1,492.00 | |
| 180 | ☐ | J472 | | | | Low Pressure | 1,486.00 | |

Input Data - Junction Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Elevation (ft) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|
| 181 | ☐ | J474 | | | | Low Pressure | 1,524.00 | |
| 182 | ☐ | J476 | | | | Low Pressure | 1,513.00 | |
| 183 | ☐ | J478 | | | | Low Pressure | 1,504.00 | |
| 184 | ☐ | J480 | | | | Low Pressure | 1,522.00 | |
| 185 | ☐ | J482 | | | | Low Pressure | 1,517.00 | |
| 186 | ☐ | J484 | | | | Low Pressure | 1,524.00 | |
| 187 | ☐ | J486 | | | | Low Pressure | 1,503.00 | |
| 188 | ☐ | J488 | | | | Low Pressure | 1,499.00 | |
| 189 | ☐ | J490 | | | | Low Pressure | 1,498.00 | |
| 190 | ☐ | J492 | | | | Low Pressure | 1,493.00 | |
| 191 | ☐ | J498 | | | | Low Pressure | 1,492.00 | |
| 192 | ☐ | J500 | | | | Low Pressure | 1,527.00 | |
| 193 | ☐ | J502 | | | | Low Pressure | 1,499.00 | |
| 194 | ☐ | J506 | | | | Low Pressure | 1,491.00 | |
| 195 | ☐ | J508 | | | | Low Pressure | 1,499.00 | |
| 196 | ☐ | J512 | | | | Low Pressure | 1,496.00 | |
| 197 | ☐ | J514 | | | | 2-inch | 1,498.00 | |
| 198 | ☐ | J516 | | | | Low Pressure | 1,496.00 | |
| 199 | ☐ | J518 | | | | Low Pressure | 1,500.00 | |
| 200 | ☐ | J520 | | | | Low Pressure | 1,569.00 | |
| 201 | ☐ | J522 | | | | Low Pressure | 1,577.00 | |
| 202 | ☐ | J524 | | | | Low Pressure | 1,563.00 | |
| 203 | ☐ | J526 | | | | Low Pressure | 1,492.00 | |
| 204 | ☐ | J530 | | | | Low Pressure | 1,593.00 | |
| 205 | ☐ | J532 | | | | 2-inch | 1,636.00 | |
| 206 | ☐ | J534 | | | | Low Pressure | 1,503.00 | |
| 207 | ☐ | J536 | | | | 2-inch | 1,503.00 | |
| 208 | ☐ | J538 | | | | Low Pressure | 1,510.00 | |
| 209 | ☐ | J542 | | | | Low Pressure | 1,565.00 | |
| 210 | ☐ | J544 | | | | Low Pressure | 1,533.00 | |
| 211 | ☐ | J546 | | | | Low Pressure | 1,505.00 | |
| 212 | ☐ | J548 | | | | Low Pressure | 1,552.00 | |
| 213 | ☐ | J550 | | | | Low Pressure | 1,533.00 | |
| 214 | ☐ | J552 | | | | Low Pressure | 1,505.00 | |
| 215 | ☐ | J554 | | | | Low Pressure | 1,502.00 | |
| 216 | ☐ | J556 | | | | Low Pressure | 1,496.00 | |

Input Data - Junction Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Elevation (ft) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|
| 217 | ☐ | J558 | | | | Low Pressure | 1,590.00 | |
| 218 | ☐ | J560 | | | | Low Pressure | 1,497.00 | |
| 219 | ☐ | J562 | | | | Low Pressure | 1,497.00 | |
| 220 | ☐ | J564 | | | | Low Pressure | 1,495.00 | |
| 221 | ☐ | J566 | | | | Low Pressure | 1,572.00 | |
| 222 | ☐ | J570 | | | | Low Pressure | 1,498.00 | |
| 223 | ☐ | J572 | | | | Low Pressure | 1,498.00 | |
| 224 | ☐ | J578 | | | | Low Pressure | 1,496.00 | |
| 225 | ☐ | J580 | | | | Low Pressure | 1,493.00 | |
| 226 | ☐ | J582 | | | | Low Pressure | 1,492.00 | |
| 227 | ☐ | J584 | | | | Low Pressure | 1,504.00 | |
| 228 | ☐ | J586 | | | | Low Pressure | 1,501.00 | |
| 229 | ☐ | J588 | | | | Low Pressure | 1,504.00 | |
| 230 | ☐ | J590 | | | | Low Pressure | 1,556.00 | |
| 231 | ☐ | J592 | | | | Low Pressure | 1,595.00 | |
| 232 | ☐ | J594 | | | | Low Pressure | 1,497.00 | |
| 233 | ☐ | J600 | | | | Low Pressure | 1,534.00 | |
| 234 | ☐ | J602 | | | | Low Pressure | 1,533.00 | |
| 235 | ☐ | J604 | | | | Low Pressure | 1,532.00 | |
| 236 | ☐ | J606 | | | | Low Pressure | 1,559.00 | |
| 237 | ☐ | J608 | | | | Low Pressure | 1,648.00 | |
| 238 | ☐ | J610 | | | | Low Pressure | 1,505.00 | |
| 239 | ☐ | J612 | | | | WTP | 1,497.00 | |
| 240 | ☐ | J614 | | | | WTP | 1,497.00 | |
| 241 | ☐ | J616 | | | | Low Pressure | 1,497.00 | |
| 242 | ☐ | J618 | | | | Low Pressure | 1,493.00 | |
| 243 | ☐ | J620 | | | | Low Pressure | 1,498.00 | |
| 244 | ☐ | J622 | Main Street Commercia | | | Low Pressure | 1,513.00 | |
| 245 | ☐ | J628 | | | | Low Pressure | 1,524.00 | |
| 246 | ☐ | J630 | | | | Low Pressure | 1,565.00 | |
| 247 | ☐ | J632 | | | | Low Pressure | 1,560.00 | |
| 248 | ☐ | J634 | | | | Low Pressure | 1,562.00 | |
| 249 | ☐ | J636 | | | | Low Pressure | 1,515.00 | |
| 250 | ☐ | J638 | | | | Low Pressure | 1,498.00 | |
| 251 | ☐ | J640 | | | | Low Pressure | 1,498.00 | |
| 252 | ☐ | J642 | | | | Low Pressure | 1,498.00 | |

Input Data - Junction Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Elevation (ft) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|
| 253 | ☐ | J644 | | | | Low Pressure | 1,500.00 | |
| 254 | ☐ | J646 | | | | Low Pressure | 0.00 | |
| 255 | ☐ | J648 | | | | Low Pressure | 1,499.00 | |
| 256 | ☐ | J650 | | | | Low Pressure | 1,500.00 | |
| 257 | ☐ | J652 | | | | Low Pressure | 1,499.00 | |
| 258 | ☐ | J654 | | | | Low Pressure | 1,505.00 | |
| 259 | ☐ | J656 | | | | Low Pressure | 1,506.00 | |
| 260 | ☐ | J658 | | | | Low Pressure | 1,502.00 | |
| 261 | ☐ | J660 | | | | High Pressure | 1,691.00 | |
| 262 | ☐ | J662 | | | | Low Pressure | 1,665.00 | |
| 263 | ☐ | J664 | | | | High Pressure | 1,630.00 | |
| 264 | ☐ | J666 | | | | High Pressure | 0.00 | |
| 265 | ☐ | J668 | | | | High Pressure | 1,710.00 | |
| 266 | ☐ | J670 | | | | Low Pressure | 1,505.00 | |

Input Data - Pipe Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Material (Char) | Lining (Char) | Cost ID (Char) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ☐ | 0 | | | | | CI | | | |
| 2 | ☐ | 1 | | | | | CA | | | |
| 3 | ☐ | 2 | | | | | CA | | | |
| 4 | ☐ | 3 | | | | | GAL | | | |
| 5 | ☐ | 4 | | | | | CA | | | |
| 6 | ☐ | 5 | | | | | PL | | | |
| 7 | ☐ | 6 | | | | | DI | | | |
| 8 | ☐ | 7 | | | | | CI | | | |
| 9 | ☐ | 8 | | | | | CA | | | |
| 10 | ☐ | 9 | | | | | CI | | | |
| 11 | ☐ | 10 | | | | | CI | | | |
| 12 | ☐ | 11 | | | | | CI | | | |
| 13 | ☐ | 12 | | | | | DI | | | |
| 14 | ☐ | 13 | | | | | CI | | | |
| 15 | ☐ | 14 | | | | | CI | | | |
| 16 | ☐ | 15 | | | | | CI | | | |
| 17 | ☐ | 16 | | | | | CI | | | |
| 18 | ☐ | 18 | | | | | CI | | | |
| 19 | ☐ | 19 | | | | | CI | | | |
| 20 | ☐ | 20 | | | | | DI | | | |
| 21 | ☐ | 21 | | | | | DI | | | |
| 22 | ☐ | 22 | | | | | DI | | | |
| 23 | ☐ | 23 | | | | | CI | | | |
| 24 | ☐ | 24 | | | | | CI | | | |
| 25 | ☐ | 25 | | | | | DI | | | |
| 26 | ☐ | 26 | | | | | DI | | | |
| 27 | ☐ | 28 | | | | | CI | | | |
| 28 | ☐ | 29 | | | | | CI | | | |
| 29 | ☐ | 30 | | | | | CI | | | |
| 30 | ☐ | 31 | | | | | CI | | | |
| 31 | ☐ | 32 | | | | | CA | | | |
| 32 | ☐ | 33 | | | | | CA | | | |
| 33 | ☐ | 34 | | | | | DI | | | |
| 34 | ☐ | 35 | | | | | PL | | | |
| 35 | ☐ | 36 | | | | | CI | | | |
| 36 | ☐ | 37 | | | | | DI | | | |

Input Data - Pipe Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Material (Char) | Lining (Char) | Cost ID (Char) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|---|---|
| 37 | ☐ | 38 | | | | | DI | | | |
| 38 | ☐ | 40 | | | | | CI | | | |
| 39 | ☐ | 41 | | | | | CA | | | |
| 40 | ☐ | 42 | | | | | CI | | | |
| 41 | ☐ | 43 | | | | | GAL | | | |
| 42 | ☐ | 44 | | | | | CI | | | |
| 43 | ☐ | 46 | | | | | GAL | | | |
| 44 | ☐ | 47 | | | | | CI | | | |
| 45 | ☐ | 48 | | | | | DI | | | |
| 46 | ☐ | 49 | | | | | DI | | | |
| 47 | ☐ | 50 | | | | | CI | | | |
| 48 | ☐ | 52 | | | | | CI | | | |
| 49 | ☐ | 53 | | | | | CI | | | |
| 50 | ☐ | 54 | | | | | PL | | | |
| 51 | ☐ | 55 | | | | | DI | | | |
| 52 | ☐ | 57 | | | | | DI | | | |
| 53 | ☐ | 58 | | | | | DI | | | |
| 54 | ☐ | 59 | | | | | PL | | | |
| 55 | ☐ | 60 | | | | | CI | | | |
| 56 | ☐ | 61 | | | | | DI | | | |
| 57 | ☐ | 64 | | | | | CI | | | |
| 58 | ☐ | 65 | | | | | CI | | | |
| 59 | ☐ | 66 | | | | | CU | | | |
| 60 | ☐ | 68 | | | | | CI | | | |
| 61 | ☐ | 70 | | | | | CI | | | |
| 62 | ☐ | 71 | | | | | CI | | | |
| 63 | ☐ | 72 | | | | | GAL | | | |
| 64 | ☐ | 73 | | | | | CI | | | |
| 65 | ☐ | 74 | | | | | CI | | | |
| 66 | ☐ | 77 | | | | | CI | | | |
| 67 | ☐ | 78 | | | | | CI | | | |
| 68 | ☐ | 79 | | | | | CI | | | |
| 69 | ☐ | 80 | | | | | CI | | | |
| 70 | ☐ | 84 | | | | | CI | | | |
| 71 | ☐ | 85 | | | | | CI | | | |
| 72 | ☐ | 86 | | | | | DI | | | |

Input Data - Pipe Information

|  |  | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Material (Char) | Lining (Char) | Cost ID (Char) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|---|---|
| 73 | ☐ | 87 |  |  |  |  | DI |  |  |  |
| 74 | ☐ | 88 |  |  |  |  | DI |  |  |  |
| 75 | ☐ | 89 |  |  |  |  | CI |  |  |  |
| 76 | ☐ | 90 |  |  |  |  | PL |  |  |  |
| 77 | ☐ | 91 |  |  |  |  | CA |  |  |  |
| 78 | ☐ | 93 |  |  |  |  | DI |  |  |  |
| 79 | ☐ | 94 |  |  |  |  | DI |  |  |  |
| 80 | ☐ | 95 |  |  |  |  | CI |  |  |  |
| 81 | ☐ | 97 |  |  |  |  | CI |  |  |  |
| 82 | ☐ | 98 |  |  |  |  | GAL |  |  |  |
| 83 | ☐ | 99 |  |  |  |  | DI |  |  |  |
| 84 | ☐ | 103 |  |  |  |  | DI |  |  |  |
| 85 | ☐ | 104 |  |  |  |  | CI |  |  |  |
| 86 | ☐ | 106 |  |  |  |  | DI |  |  |  |
| 87 | ☐ | 107 |  |  |  |  | DI |  |  |  |
| 88 | ☐ | 108 |  |  |  |  | CI |  |  |  |
| 89 | ☐ | 109 |  |  |  |  | DI |  |  |  |
| 90 | ☐ | 110 |  |  |  |  | CI |  |  |  |
| 91 | ☐ | 113 |  |  |  |  | CI |  |  |  |
| 92 | ☐ | 114 |  |  |  |  | GAL |  |  |  |
| 93 | ☐ | 117 |  |  |  |  | CI |  |  |  |
| 94 | ☐ | 118 |  |  |  |  | CI |  |  |  |
| 95 | ☐ | 119 |  |  |  |  | CI |  |  |  |
| 96 | ☐ | 120 |  |  |  |  | CI |  |  |  |
| 97 | ☐ | 121 |  |  |  |  | GAL |  |  |  |
| 98 | ☐ | 122 |  |  |  |  | CI |  |  |  |
| 99 | ☐ | 124 |  |  |  |  | DI |  |  |  |
| 100 | ☐ | 125 |  |  |  |  | CI |  |  |  |
| 101 | ☐ | 126 |  |  |  |  | CI |  |  |  |
| 102 | ☐ | 127 |  |  |  |  | CI |  |  |  |
| 103 | ☐ | 128 |  |  |  |  | CI |  |  |  |
| 104 | ☐ | 129 |  |  |  |  | CI |  |  |  |
| 105 | ☐ | 130 |  |  |  |  | CI |  |  |  |
| 106 | ☐ | 131 |  |  |  |  | PL |  |  |  |
| 107 | ☐ | 132 |  |  |  |  | DI |  |  |  |
| 108 | ☐ | 133 |  |  |  |  | PL |  |  |  |

Input Data - Pipe Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Material (Char) | Lining (Char) | Cost ID (Char) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|---|---|
| 109 | ☐ | 135 | | | | | CI | | | |
| 110 | ☐ | 136 | | | | | CI | | | |
| 111 | ☐ | 137 | | | | | DI | | | |
| 112 | ☐ | 138 | | | | | DI | | | |
| 113 | ☐ | 139 | | | | | CI | | | |
| 114 | ☐ | 141 | | | | | DI | | | |
| 115 | ☐ | 142 | | | | | DI | | | |
| 116 | ☐ | 143 | | | | | DI | | | |
| 117 | ☐ | 144 | | | | | DI | | | |
| 118 | ☐ | 145 | | | | | DI | | | |
| 119 | ☐ | 146 | | | | | DI | | | |
| 120 | ☐ | 147 | | | | | DI | | | |
| 121 | ☐ | 148 | | | | | DI | | | |
| 122 | ☐ | 149 | | | | | DI | | | |
| 123 | ☐ | 150 | | | | | DI | | | |
| 124 | ☐ | 151 | | | | | CI | | | |
| 125 | ☐ | 152 | | | | | DI | | | |
| 126 | ☐ | 153 | | | | | DI | | | |
| 127 | ☐ | 154 | | | | | PL | | | |
| 128 | ☐ | 155 | | | | | CI | | | |
| 129 | ☐ | 156 | | | | | CI | | | |
| 130 | ☐ | 157 | | | | | CI | | | |
| 131 | ☐ | 158 | | | | | PL | | | |
| 132 | ☐ | 159 | | | | | CA | | | |
| 133 | ☐ | 161 | | | | | DI | | | |
| 134 | ☐ | 162 | | | | | GAL | | | |
| 135 | ☐ | 163 | | | | | CI | | | |
| 136 | ☐ | 164 | | | | | DI | | | |
| 137 | ☐ | 165 | | | | | CI | | | |
| 138 | ☐ | 166 | | | | | CI | | | |
| 139 | ☐ | 167 | | | | | CI | | | |
| 140 | ☐ | 168 | | | | | CU | | | |
| 141 | ☐ | 169 | | | | | GAL | | | |
| 142 | ☐ | 170 | | | | | DI | | | |
| 143 | ☐ | 171 | | | | | DI | | | |
| 144 | ☐ | 172 | | | | | DI | | | |

Input Data - Pipe Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Material (Char) | Lining (Char) | Cost ID (Char) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|---|---|
| 145 | ☐ | 173 | | | | | CA | | | |
| 146 | ☐ | 174 | | | | | CI | | | |
| 147 | ☐ | 175 | | | | | CI | | | |
| 148 | ☐ | 176 | | | | | CI | | | |
| 149 | ☐ | 177 | | | | | DI | | | |
| 150 | ☐ | 178 | | | | | DI | | | |
| 151 | ☐ | 179 | | | | | CI | | | |
| 152 | ☐ | 180 | | | | | DI | | | |
| 153 | ☐ | 182 | | | | | CI | | | |
| 154 | ☐ | 183 | | | | | DI | | | |
| 155 | ☐ | 184 | | | | | CI | | | |
| 156 | ☐ | 185 | | | | | DI | | | |
| 157 | ☐ | 186 | | | | | | | | |
| 158 | ☐ | 188 | | | | | DI | | | |
| 159 | ☐ | 190 | | | | | CI | | | |
| 160 | ☐ | 191 | | | | | | | | |
| 161 | ☐ | 192 | | | | | | | | |
| 162 | ☐ | 193 | | | | | | | | |
| 163 | ☐ | P11 | | | | | DI | | | |
| 164 | ☐ | P13 | | | | | CA | | | |
| 165 | ☐ | P15 | | | | | CA | | | |
| 166 | ☐ | P17 | | | | | DI | | | |
| 167 | ☐ | P19 | | | | | CA | | | |
| 168 | ☐ | P21 | | | | | CA | | | |
| 169 | ☐ | P23 | | | | | CA | | | |
| 170 | ☐ | P25 | | | | | CA | | | |
| 171 | ☐ | P29 | | | | | CI | | | |
| 172 | ☐ | P31 | | | | | CI | | | |
| 173 | ☐ | P33 | | | | | CI | | | |
| 174 | ☐ | P37 | | | | | CI | | | |
| 175 | ☐ | P39 | | | | | CI | | | |
| 176 | ☐ | P41 | | | | | CI | | | |
| 177 | ☐ | P43 | | | | | DI | | | |
| 178 | ☐ | P45 | | | | | DI | | | |
| 179 | ☐ | P47 | | | | | DI | | | |
| 180 | ☐ | P49 | | | | | CI | | | |

Input Data - Pipe Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Material (Char) | Lining (Char) | Cost ID (Char) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|---|---|
| 181 | ☐ | P51 | | | | | CI | | | |
| 182 | ☐ | P63 | | | | | CA | | | |
| 183 | ☐ | P65 | | | | | DI | | | |
| 184 | ☐ | P67 | | | | | DI | | | |
| 185 | ☐ | P69 | | | | | DI | | | |
| 186 | ☐ | P71 | | | | | CI | | | |
| 187 | ☐ | P77 | | | | | DI | | | |
| 188 | ☐ | P79 | | | | | CI | | | |
| 189 | ☐ | P81 | | | | | CI | | | |
| 190 | ☐ | P83 | | | | | CI | | | |
| 191 | ☐ | P85 | | | | | CI | | | |
| 192 | ☐ | P89 | | | | | CI | | | |
| 193 | ☐ | P93 | | | | | DI | | | |
| 194 | ☐ | P95 | | | | | CI | | | |
| 195 | ☐ | P97 | | | | | CI | | | |
| 196 | ☐ | P101 | | | | | DI | | | |
| 197 | ☐ | P103 | | | | | DI | | | |
| 198 | ☐ | P105 | | | | | CI | | | |
| 199 | ☐ | P109 | | | | | CI | | | |
| 200 | ☐ | P111 | | | | | CI | | | |
| 201 | ☐ | P113 | | | | | CI | | | |
| 202 | ☐ | P115 | | | | | CI | | | |
| 203 | ☐ | P119 | | | | | CI | | | |
| 204 | ☐ | P121 | | | | | CI | | | |
| 205 | ☐ | P123 | | | | | DI | | | |
| 206 | ☐ | P125 | | | | | CI | | | |
| 207 | ☐ | P129 | | | | | DI | | | |
| 208 | ☐ | P133 | | | | | DI | | | |
| 209 | ☐ | P135 | | | | | CI | | | |
| 210 | ☐ | P137 | | | | | DI | | | |
| 211 | ☐ | P141 | | | | | CI | | | |
| 212 | ☐ | P145 | | | | | DI | | | |
| 213 | ☐ | P147 | | | | | DI | | | |
| 214 | ☐ | P149 | | | | | DI | | | |
| 215 | ☐ | P151 | | | | | DI | | | |
| 216 | ☐ | P153 | | | | | DI | | | |

Input Data - Pipe Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Material (Char) | Lining (Char) | Cost ID (Char) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|---|---|
| 217 | ☐ | P155 | | | | | DI | | | |
| 218 | ☐ | P159 | | | | | DI | | | |
| 219 | ☐ | P161 | | | | | CI | | | |
| 220 | ☐ | P163 | | | | | CI | | | |
| 221 | ☐ | P165 | | | | | DI | | | |
| 222 | ☐ | P167 | | | | | DI | | | |
| 223 | ☐ | P169 | | | | | CI | | | |
| 224 | ☐ | P171 | | | | | CI | | | |
| 225 | ☐ | P173 | | | | | DI | | | |
| 226 | ☐ | P175 | | | | | CI | | | |
| 227 | ☐ | P177 | | | | | CI | | | |
| 228 | ☐ | P181 | | | | | CI | | | |
| 229 | ☐ | P183 | | | | | CI | | | |
| 230 | ☐ | P185 | | | | | CI | | | |
| 231 | ☐ | P187 | | | | | CI | | | |
| 232 | ☐ | P189 | | | | | CI | | | |
| 233 | ☐ | P191 | | | | | CI | | | |
| 234 | ☐ | P193 | | | | | PL | | | |
| 235 | ☐ | P195 | | | | | CI | | | |
| 236 | ☐ | P197 | | | | | DI | | | |
| 237 | ☐ | P203 | | | | | CI | | | |
| 238 | ☐ | P205 | | | | | DI | | | |
| 239 | ☐ | P207 | | | | | DI | | | |
| 240 | ☐ | P209 | | | | | DI | | | |
| 241 | ☐ | P211 | | | | | DI | | | |
| 242 | ☐ | P213 | | | | | DI | | | |
| 243 | ☐ | P215 | | | | | DI | | | |
| 244 | ☐ | P217 | | | | | CI | | | |
| 245 | ☐ | P221 | | | | | CI | | | |
| 246 | ☐ | P227 | | | | | CI | | | |
| 247 | ☐ | P229 | | | | | CI | | | |
| 248 | ☐ | P231 | | | | | CA | | | |
| 249 | ☐ | P233 | | | | | CI | | | |
| 250 | ☐ | P237 | | | | | CI | | | |
| 251 | ☐ | P239 | | | | Low Pressure | DIP | | | |
| 252 | ☐ | P243 | | | | | DI | | | |

Input Data - Pipe Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Material (Char) | Lining (Char) | Cost ID (Char) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|---|---|
| 253 | ☐ | P245 | | | | | CI | | | |
| 254 | ☐ | P247 | | | | | CI | | | |
| 255 | ☐ | P249 | | | | | CI | | | |
| 256 | ☐ | P251 | | | | | CI | | | |
| 257 | ☐ | P253 | | | | | CI | | | |
| 258 | ☐ | P255 | | | | | CI | | | |
| 259 | ☐ | P257 | | | | | DI | | | |
| 260 | ☐ | P259 | | | | | DI | | | |
| 261 | ☐ | P263 | | | | | DI | | | |
| 262 | ☐ | P267 | | | | | CI | | | |
| 263 | ☐ | P269 | | | | | CI | | | |
| 264 | ☐ | P271 | | | | | CI | | | |
| 265 | ☐ | P275 | | | | | CI | | | |
| 266 | ☐ | P277 | | | | | DI | | | |
| 267 | ☐ | P279 | | | | | DI | | | |
| 268 | ☐ | P281 | | | | | DI | | | |
| 269 | ☐ | P283 | | | | | DI | | | |
| 270 | ☐ | P285 | | | | | DI | | | |
| 271 | ☐ | P287 | | | | | HDPE | | | |
| 272 | ☐ | P289 | | | | | | | | |
| 273 | ☐ | P291 | | | | | CI | | | |
| 274 | ☐ | P293 | | | | | CI | | | |
| 275 | ☐ | P295 | | | | | CI | | | |
| 276 | ☐ | P297 | | | | | DI | | | |
| 277 | ☐ | P299 | | | | | CA | | | |
| 278 | ☐ | P301 | | | | | DI | | | |
| 279 | ☐ | P303 | | | | | CI | | | |
| 280 | ☐ | P307 | | | | | CA | | | |
| 281 | ☐ | P309 | | | | | CA | | | |
| 282 | ☐ | P311 | | | | | CA | | | |
| 283 | ☐ | P313 | | | | | DI | | | |
| 284 | ☐ | P315 | | | | | DI | | | |
| 285 | ☐ | P317 | | | | | DI | | | |
| 286 | ☐ | P319 | | | | | | | | |
| 287 | ☐ | P321 | | | | | | | | |
| 288 | ☐ | P323 | | | | | | | | |

Input Data - Pipe Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Material (Char) | Lining (Char) | Cost ID (Char) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|---|---|
| 289 | ☐ | P325 | | | | | | | | |
| 290 | ☐ | P327 | | | | | | | | |
| 291 | ☐ | P329 | | | | | | | | |
| 292 | ☐ | P333 | | | | | DI | | | |
| 293 | ☐ | P335 | | | | | DI | | | |
| 294 | ☐ | P337 | | | | | | | | |
| 295 | ☐ | P339 | | | | | CI | | | |
| 296 | ☐ | P341 | | | | | CI | | | |
| 297 | ☐ | P347 | | | | | CI | | | |
| 298 | ☐ | P349 | | | | Low Pressure | | | | |
| 299 | ☐ | P351 | | | | Low Pressure | | | | |
| 300 | ☐ | P353 | | | | Low Pressure | | | | |
| 301 | ☐ | P355 | | | | | | | | |
| 302 | ☐ | P357 | | | | Low Pressure | | | | |
| 303 | ☐ | P359 | | | | Low Pressure: | CI | | | |
| 304 | ☐ | P361 | | | | | | | | |
| 305 | ☐ | P363 | | | | | | | | |
| 306 | ☐ | P365 | | | | | | | | |
| 307 | ☐ | P367 | | | | | | | | |
| 308 | ☐ | P369 | | | | Low Pressure | CI | | | |
| 309 | ☐ | P371 | | | | | | | | |
| 310 | ☐ | P373 | | | | | | | | |
| 311 | ☐ | P375 | | | | | | | | |
| 312 | ☐ | P377 | | | | | | | | |
| 313 | ☐ | P379 | | | | | | | | |
| 314 | ☐ | P381 | | | | Low Pressure | CI | | | |
| 315 | ☐ | P383 | | | | | GAL | | | |
| 316 | ☐ | P385 | | | | | PL | | | |
| 317 | ☐ | P387 | | | | Low Pressure | DI | | | |
| 318 | ☐ | P389 | | | | | CI | | | |
| 319 | ☐ | P391 | | | | Low Pressure | CI | | | |
| 320 | ☐ | P393 | | | | | DI | | | |
| 321 | ☐ | P397 | | | | | HDPE | | | |
| 322 | ☐ | P399 | | | | | HDPE | | | |
| 323 | ☐ | P401 | | | | | HDPE | | | |
| 324 | ☐ | P403 | | | | | HDPE | | | |

Input Data - Pipe Information

| | | ID (Char) | Description (Char) | Year of Installation | Year of Retirement | Zone (Char) | Material (Char) | Lining (Char) | Cost ID (Char) | Phase (Int) |
|---|---|---|---|---|---|---|---|---|---|---|
| 325 | ☐ | P405 | | | | | PL | | | |
| 326 | ☐ | P407 | | | | | DI | | | |
| 327 | ☐ | P409 | | | | | | | | |
| 328 | ☐ | P415 | | | | | DI | | | |
| 329 | ☐ | P417 | | | | | | | | |

Input Data - Pipe Modeling

| * BASE * | | ID (Char) | Length (ft) | Diameter (in) | Roughness (Double) | Minor Loss (Double) | Totalizer (Boolean) | Check Valve (Boolean) |
|---|---|---|---|---|---|---|---|---|
| 1 | ☐ | 0 | 1,669.27 | 6.00 | 58.00 | | No | No |
| 2 | ☐ | 1 | 5,984.20 | 8.00 | 140.00 | | No | No |
| 3 | ☐ | 2 | 981.50 | 6.00 | 140.00 | | No | No |
| 4 | ☐ | 3 | 124.91 | 2.00 | 49.00 | | No | No |
| 5 | ☐ | 4 | 666.34 | 6.00 | 140.00 | | No | No |
| 6 | ☐ | 5 | 320.27 | 8.00 | 140.00 | | No | No |
| 7 | ☐ | 6 | 558.28 | 8.00 | 110.00 | | No | No |
| 8 | ☐ | 7 | 880.92 | 6.00 | 58.00 | | No | No |
| 9 | ☐ | 8 | 733.23 | 6.00 | 58.00 | 0.00 | No | No |
| 10 | ☐ | 9 | 299.13 | 6.00 | 58.00 | 0.00 | No | No |
| 11 | ☐ | 10 | 824.44 | 10.00 | 63.00 | 0.00 | No | No |
| 12 | ☐ | 11 | 45.57 | 10.00 | 63.00 | | No | No |
| 13 | ☐ | 12 | 211.56 | 8.00 | 110.00 | | No | No |
| 14 | ☐ | 13 | 586.10 | 6.00 | 58.00 | | No | No |
| 15 | ☐ | 14 | 701.70 | 6.00 | 58.00 | 0.00 | No | No |
| 16 | ☐ | 15 | 410.89 | 8.00 | 63.00 | | No | No |
| 17 | ☐ | 16 | 645.35 | 6.00 | 58.00 | 0.00 | No | No |
| 18 | ☐ | 18 | 168.34 | 6.00 | 58.00 | 0.00 | No | No |
| 19 | ☐ | 19 | 179.78 | 10.00 | 63.00 | | No | No |
| 20 | ☐ | 20 | 383.11 | 10.00 | 110.00 | | No | No |
| 21 | ☐ | 21 | 703.13 | 12.00 | 110.00 | | No | No |
| 22 | ☐ | 22 | 113.89 | 12.00 | 110.00 | 0.00 | No | No |
| 23 | ☐ | 23 | 930.56 | 6.00 | 58.00 | 0.00 | No | No |
| 24 | ☐ | 24 | 385.22 | 6.00 | 58.00 | 0.00 | No | No |
| 25 | ☐ | 25 | 1,918.54 | 8.00 | 110.00 | | No | No |
| 26 | ☐ | 26 | 948.50 | 6.00 | 110.00 | | No | No |
| 27 | ☐ | 28 | 1,892.42 | 6.00 | 58.00 | | No | No |
| 28 | ☐ | 29 | 159.47 | 10.00 | 63.00 | | No | No |
| 29 | ☐ | 30 | 56.60 | 10.00 | 63.00 | | No | No |
| 30 | ☐ | 31 | 1,099.02 | 12.00 | 63.00 | | No | No |
| 31 | ☐ | 32 | 472.82 | 6.00 | 140.00 | | No | No |
| 32 | ☐ | 33 | 1,096.47 | 6.00 | 140.00 | 0.00 | No | No |
| 33 | ☐ | 34 | 574.52 | 6.00 | 110.00 | | No | No |
| 34 | ☐ | 35 | 998.51 | 6.00 | 140.00 | | No | No |
| 35 | ☐ | 36 | 243.50 | 6.00 | 58.00 | | No | No |
| 36 | ☐ | 37 | 238.46 | 8.00 | 110.00 | | No | No |

Input Data - Pipe Modeling

| * BASE * | | ID (Char) | Length (ft) | Diameter (in) | Roughness (Double) | Minor Loss (Double) | Totalizer (Boolean) | Check Valve (Boolean) |
|---|---|---|---|---|---|---|---|---|
| 37 | ☐ | 38 | 247.38 | 8.00 | 110.00 | | No | No |
| 38 | ☐ | 40 | 380.61 | 6.00 | 58.00 | | No | No |
| 39 | ☐ | 41 | 1,056.11 | 6.00 | 140.00 | | No | No |
| 40 | ☐ | 42 | 602.00 | 6.00 | 58.00 | | No | No |
| 41 | ☐ | 43 | 403.95 | 2.00 | 49.00 | | No | No |
| 42 | ☐ | 44 | 853.16 | 6.00 | 58.00 | | No | No |
| 43 | ☐ | 46 | 1,066.52 | 2.00 | 49.00 | | No | No |
| 44 | ☐ | 47 | 926.42 | 10.00 | 63.00 | | No | No |
| 45 | ☐ | 48 | 477.70 | 8.00 | 110.00 | | No | No |
| 46 | ☐ | 49 | 429.24 | 12.00 | 110.00 | | No | No |
| 47 | ☐ | 50 | 936.01 | 6.00 | 58.00 | | No | No |
| 48 | ☐ | 52 | 51.96 | 14.00 | 63.00 | | No | No |
| 49 | ☐ | 53 | 135.40 | 6.00 | 58.00 | | No | No |
| 50 | ☐ | 54 | 764.09 | 2.00 | 140.00 | | No | No |
| 51 | ☐ | 55 | 275.02 | 8.00 | 110.00 | | No | No |
| 52 | ☐ | 57 | 530.56 | 6.00 | 110.00 | | No | No |
| 53 | ☐ | 58 | 449.48 | 14.00 | 110.00 | 0.00 | No | No |
| 54 | ☐ | 59 | 13.41 | 2.00 | 140.00 | 0.00 | No | No |
| 55 | ☐ | 60 | 313.41 | 14.00 | 63.00 | 0.00 | No | No |
| 56 | ☐ | 61 | 264.46 | 14.00 | 110.00 | 0.00 | No | No |
| 57 | ☐ | 64 | 2,259.23 | 6.00 | 58.00 | | No | No |
| 58 | ☐ | 65 | 604.77 | 6.00 | 58.00 | 0.00 | No | No |
| 59 | ☐ | 66 | 310.22 | 1.00 | 49.00 | 0.00 | No | No |
| 60 | ☐ | 68 | 622.29 | 12.00 | 63.00 | | No | No |
| 61 | ☐ | 70 | 369.84 | 6.00 | 58.00 | | No | No |
| 62 | ☐ | 71 | 1,082.02 | 6.00 | 58.00 | 0.00 | No | No |
| 63 | ☐ | 72 | 222.77 | 2.00 | 49.00 | | No | No |
| 64 | ☐ | 73 | 964.17 | 6.00 | 58.00 | | No | No |
| 65 | ☐ | 74 | 513.79 | 6.00 | 58.00 | | No | No |
| 66 | ☐ | 77 | 595.51 | 8.00 | 63.00 | | No | No |
| 67 | ☐ | 78 | 610.71 | 6.00 | 58.00 | 0.00 | No | No |
| 68 | ☐ | 79 | 266.03 | 6.00 | 58.00 | | No | No |
| 69 | ☐ | 80 | 1,406.39 | 6.00 | 58.00 | | No | No |
| 70 | ☐ | 84 | 469.21 | 14.00 | 63.00 | 0.00 | No | No |
| 71 | ☐ | 85 | 457.07 | 4.00 | 49.00 | | No | No |
| 72 | ☐ | 86 | 369.69 | 10.00 | 110.00 | | No | No |

Input Data - Pipe Modeling

| * BASE * | | ID (Char) | Length (ft) | Diameter (in) | Roughness (Double) | Minor Loss (Double) | Totalizer (Boolean) | Check Valve (Boolean) |
|---|---|---|---|---|---|---|---|---|
| 73 | ☐ | 87 | 1,545.68 | 6.00 | 110.00 | | No | No |
| 74 | ☐ | 88 | 3,264.51 | 8.00 | 110.00 | | No | No |
| 75 | ☐ | 89 | 403.87 | 6.00 | 58.00 | | No | No |
| 76 | ☐ | 90 | 560.33 | 8.00 | 140.00 | | No | No |
| 77 | ☐ | 91 | 1,046.87 | 6.00 | 140.00 | | No | No |
| 78 | ☐ | 93 | 1,557.57 | 8.00 | 110.00 | | No | No |
| 79 | ☐ | 94 | 1,534.09 | 8.00 | 110.00 | | No | No |
| 80 | ☐ | 95 | 29.95 | 6.00 | 58.00 | | No | No |
| 81 | ☐ | 97 | 633.63 | 6.00 | 58.00 | | No | No |
| 82 | ☐ | 98 | 1,809.04 | 2.00 | 49.00 | | No | No |
| 83 | ☐ | 99 | 103.56 | 8.00 | 110.00 | 0.00 | No | No |
| 84 | ☐ | 103 | 1,137.84 | 8.00 | 110.00 | | No | No |
| 85 | ☐ | 104 | 526.30 | 6.00 | 58.00 | 0.00 | No | No |
| 86 | ☐ | 106 | 550.10 | 8.00 | 110.00 | | No | No |
| 87 | ☐ | 107 | 435.22 | 6.00 | 110.00 | 0.00 | No | No |
| 88 | ☐ | 108 | 2,376.64 | 6.00 | 58.00 | | No | No |
| 89 | ☐ | 109 | 691.09 | 8.00 | 110.00 | | No | No |
| 90 | ☐ | 110 | 530.01 | 6.00 | 58.00 | 0.00 | No | No |
| 91 | ☐ | 113 | 2.61 | 6.00 | 58.00 | | No | No |
| 92 | ☐ | 114 | 446.52 | 2.00 | 49.00 | | No | No |
| 93 | ☐ | 117 | 1,145.70 | 8.00 | 6.30 | 0.00 | No | No |
| 94 | ☐ | 118 | 517.88 | 6.00 | 58.00 | | No | No |
| 95 | ☐ | 119 | 361.84 | 10.00 | 63.00 | | No | No |
| 96 | ☐ | 120 | 450.79 | 8.00 | 63.00 | | No | No |
| 97 | ☐ | 121 | 329.84 | 2.00 | 49.00 | | No | No |
| 98 | ☐ | 122 | 47.99 | 6.00 | 58.00 | | No | No |
| 99 | ☐ | 124 | 591.91 | 6.00 | 110.00 | | No | No |
| 100 | ☐ | 125 | 766.66 | 6.00 | 58.00 | 0.00 | No | No |
| 101 | ☐ | 126 | 391.72 | 4.00 | 49.00 | | No | No |
| 102 | ☐ | 127 | 436.80 | 6.00 | 58.00 | | No | No |
| 103 | ☐ | 128 | 219.89 | 10.00 | 63.00 | | No | No |
| 104 | ☐ | 129 | 97.42 | 6.00 | 58.00 | | No | No |
| 105 | ☐ | 130 | 423.47 | 6.00 | 58.00 | | No | No |
| 106 | ☐ | 131 | 2,178.31 | 12.00 | 140.00 | | No | No |
| 107 | ☐ | 132 | 535.99 | 12.00 | 110.00 | 0.00 | No | No |
| 108 | ☐ | 133 | 410.24 | 12.00 | 140.00 | | No | No |

## Input Data - Pipe Modeling

| * BASE * | | ID (Char) | Length (ft) | Diameter (in) | Roughness (Double) | Minor Loss (Double) | Totalizer (Boolean) | Check Valve (Boolean) |
|---|---|---|---|---|---|---|---|---|
| 109 | ☐ | 135 | 533.67 | 8.00 | 63.00 | | No | No |
| 110 | ☐ | 136 | 1,418.14 | 6.00 | 58.00 | | No | No |
| 111 | ☐ | 137 | 966.79 | 8.00 | 110.00 | | No | No |
| 112 | ☐ | 138 | 856.97 | 8.00 | 110.00 | 0.00 | No | No |
| 113 | ☐ | 139 | 210.69 | 4.00 | 49.00 | 0.00 | No | No |
| 114 | ☐ | 141 | 410.67 | 8.00 | 110.00 | | No | No |
| 115 | ☐ | 142 | 1,085.83 | 8.00 | 110.00 | 0.00 | No | No |
| 116 | ☐ | 143 | 1,100.96 | 8.00 | 110.00 | | No | No |
| 117 | ☐ | 144 | 971.82 | 8.00 | 110.00 | | No | No |
| 118 | ☐ | 145 | 733.66 | 8.00 | 110.00 | | No | No |
| 119 | ☐ | 146 | 176.74 | 8.00 | 110.00 | | No | No |
| 120 | ☐ | 147 | 1,732.99 | 8.00 | 110.00 | | No | No |
| 121 | ☐ | 148 | 1,229.63 | 8.00 | 110.00 | | No | No |
| 122 | ☐ | 149 | 449.31 | 6.00 | 110.00 | | No | No |
| 123 | ☐ | 150 | 1,388.80 | 8.00 | 110.00 | | No | No |
| 124 | ☐ | 151 | 819.37 | 6.00 | 58.00 | 0.00 | No | No |
| 125 | ☐ | 152 | 936.54 | 8.00 | 110.00 | | No | No |
| 126 | ☐ | 153 | 610.40 | 8.00 | 110.00 | 0.00 | No | No |
| 127 | ☐ | 154 | 1,825.32 | 6.00 | 140.00 | | No | No |
| 128 | ☐ | 155 | 2,982.74 | 8.00 | 63.00 | | No | No |
| 129 | ☐ | 156 | 336.72 | 8.00 | 63.00 | | No | No |
| 130 | ☐ | 157 | 1,128.69 | 6.00 | 58.00 | | No | No |
| 131 | ☐ | 158 | 795.33 | 6.00 | 140.00 | | No | No |
| 132 | ☐ | 159 | 356.36 | 6.00 | 140.00 | | No | No |
| 133 | ☐ | 161 | 421.73 | 8.00 | 110.00 | | No | No |
| 134 | ☐ | 162 | 457.73 | 2.00 | 49.00 | | No | No |
| 135 | ☐ | 163 | 697.15 | 6.00 | 58.00 | | No | No |
| 136 | ☐ | 164 | 485.07 | 8.00 | 110.00 | | No | No |
| 137 | ☐ | 165 | 1,569.70 | 6.00 | 58.00 | | No | No |
| 138 | ☐ | 166 | 1,369.69 | 6.00 | 58.00 | | No | No |
| 139 | ☐ | 167 | 743.61 | 6.00 | 58.00 | | No | No |
| 140 | ☐ | 168 | 550.77 | 2.00 | 49.00 | 0.00 | No | No |
| 141 | ☐ | 169 | 250.72 | 2.00 | 49.00 | | No | No |
| 142 | ☐ | 170 | 1,743.93 | 10.00 | 110.00 | | No | No |
| 143 | ☐ | 171 | 579.67 | 8.00 | 110.00 | | No | No |
| 144 | ☐ | 172 | 575.29 | 6.00 | 110.00 | | No | No |

Input Data - Pipe Modeling

| * BASE * | | ID (Char) | Length (ft) | Diameter (in) | Roughness (Double) | Minor Loss (Double) | Totalizer (Boolean) | Check Valve (Boolean) |
|---|---|---|---|---|---|---|---|---|
| 145 | ☐ | 173 | 573.32 | 6.00 | 140.00 | | No | No |
| 146 | ☐ | 174 | 262.25 | 6.00 | 58.00 | 0.00 | No | No |
| 147 | ☐ | 175 | 1,144.86 | 6.00 | 58.00 | | No | No |
| 148 | ☐ | 176 | 1,240.44 | 6.00 | 58.00 | | No | No |
| 149 | ☐ | 177 | 533.05 | 10.00 | 110.00 | 0.00 | No | No |
| 150 | ☐ | 178 | 323.48 | 8.00 | 110.00 | | No | No |
| 151 | ☐ | 179 | 584.26 | 6.00 | 58.00 | | No | No |
| 152 | ☐ | 180 | 440.78 | 8.00 | 110.00 | | No | No |
| 153 | ☐ | 182 | 375.89 | 8.00 | 63.00 | | No | No |
| 154 | ☐ | 183 | 553.00 | 8.00 | 110.00 | | No | No |
| 155 | ☐ | 184 | 1,168.55 | 6.00 | 58.00 | | No | No |
| 156 | ☐ | 185 | 758.23 | 6.00 | 110.00 | | No | No |
| 157 | ☐ | 186 | 962.21 | 6.00 | 110.00 | 0.00 | No | No |
| 158 | ☐ | 188 | 49.07 | 10.00 | 110.00 | 0.00 | No | No |
| 159 | ☐ | 190 | 33.85 | 6.00 | 58.00 | 0.00 | No | No |
| 160 | ☐ | 191 | 286.11 | 6.00 | 58.00 | 0.00 | No | No |
| 161 | ☐ | 192 | 1,981.98 | 6.00 | 58.00 | 0.00 | No | No |
| 162 | ☐ | 193 | 1,113.31 | 4.00 | 49.00 | 0.00 | No | No |
| 163 | ☐ | P11 | 338.43 | 8.00 | 110.00 | | No | No |
| 164 | ☐ | P13 | 24.16 | 8.00 | 140.00 | | No | No |
| 165 | ☐ | P15 | 1,483.45 | 6.00 | 140.00 | | No | No |
| 166 | ☐ | P17 | 404.12 | 8.00 | 110.00 | | No | No |
| 167 | ☐ | P19 | 194.72 | 8.00 | 140.00 | | No | No |
| 168 | ☐ | P21 | 336.12 | 8.00 | 140.00 | | No | No |
| 169 | ☐ | P23 | 400.71 | 8.00 | 140.00 | | No | No |
| 170 | ☐ | P25 | 402.36 | 8.00 | 140.00 | | No | No |
| 171 | ☐ | P29 | 334.57 | 10.00 | 63.00 | | No | No |
| 172 | ☐ | P31 | 413.02 | 10.00 | 63.00 | | No | No |
| 173 | ☐ | P33 | 553.71 | 10.00 | 63.00 | | No | No |
| 174 | ☐ | P37 | 16.86 | 8.00 | 63.00 | | No | No |
| 175 | ☐ | P39 | 453.06 | 8.00 | 63.00 | | No | No |
| 176 | ☐ | P41 | 702.70 | 6.00 | 58.00 | 0.00 | No | No |
| 177 | ☐ | P43 | 77.78 | 10.00 | 110.00 | | No | No |
| 178 | ☐ | P45 | 547.75 | 10.00 | 110.00 | | No | No |
| 179 | ☐ | P47 | 775.87 | 10.00 | 110.00 | | No | No |
| 180 | ☐ | P49 | 259.41 | 8.00 | 63.00 | | No | No |

## Input Data - Pipe Modeling

| * BASE * | | ID (Char) | Length (ft) | Diameter (in) | Roughness (Double) | Minor Loss (Double) | Totalizer (Boolean) | Check Valve (Boolean) |
|---|---|---|---|---|---|---|---|---|
| 181 | ☐ | P51 | 459.11 | 8.00 | 63.00 | | No | No |
| 182 | ☐ | P63 | 257.68 | 6.00 | 140.00 | | No | No |
| 183 | ☐ | P65 | 379.92 | 8.00 | 110.00 | | No | No |
| 184 | ☐ | P67 | 362.84 | 8.00 | 110.00 | | No | No |
| 185 | ☐ | P69 | 168.25 | 8.00 | 110.00 | | No | No |
| 186 | ☐ | P71 | 492.39 | 6.00 | 58.00 | 0.00 | No | No |
| 187 | ☐ | P77 | 604.86 | 12.00 | 110.00 | | No | No |
| 188 | ☐ | P79 | 394.65 | 12.00 | 63.00 | | No | No |
| 189 | ☐ | P81 | 313.49 | 12.00 | 63.00 | | No | No |
| 190 | ☐ | P83 | 24.48 | 14.00 | 63.00 | | No | No |
| 191 | ☐ | P85 | 751.89 | 14.00 | 63.00 | | No | No |
| 192 | ☐ | P89 | 1,435.82 | 6.00 | 58.00 | | No | No |
| 193 | ☐ | P93 | 294.95 | 8.00 | 110.00 | | No | No |
| 194 | ☐ | P95 | 434.09 | 6.00 | 58.00 | | No | No |
| 195 | ☐ | P97 | 448.91 | 6.00 | 58.00 | | No | No |
| 196 | ☐ | P101 | 33.84 | 14.00 | 110.00 | 0.00 | No | No |
| 197 | ☐ | P103 | 103.52 | 14.00 | 110.00 | 0.00 | Yes | No |
| 198 | ☐ | P105 | 1,143.48 | 14.00 | 63.00 | 0.00 | No | No |
| 199 | ☐ | P109 | 192.05 | 6.00 | 58.00 | 0.00 | No | No |
| 200 | ☐ | P111 | 751.63 | 6.00 | 58.00 | | No | No |
| 201 | ☐ | P113 | 43.54 | 12.00 | 63.00 | | No | No |
| 202 | ☐ | P115 | 1,325.28 | 12.00 | 63.00 | 0.00 | No | No |
| 203 | ☐ | P119 | 351.17 | 6.00 | 58.00 | | No | No |
| 204 | ☐ | P121 | 257.03 | 6.00 | 58.00 | | No | No |
| 205 | ☐ | P123 | 1,421.54 | 10.00 | 110.00 | 0.00 | No | No |
| 206 | ☐ | P125 | 503.59 | 6.00 | 58.00 | | No | No |
| 207 | ☐ | P129 | 1,266.15 | 8.00 | 110.00 | 0.00 | No | No |
| 208 | ☐ | P133 | 587.53 | 8.00 | 110.00 | 0.00 | No | No |
| 209 | ☐ | P135 | 451.88 | 6.00 | 58.00 | | No | No |
| 210 | ☐ | P137 | 1,974.65 | 8.00 | 110.00 | | No | No |
| 211 | ☐ | P141 | 80.45 | 8.00 | 63.00 | | No | No |
| 212 | ☐ | P145 | 914.77 | 10.00 | 110.00 | | No | No |
| 213 | ☐ | P147 | 798.03 | 10.00 | 110.00 | | No | No |
| 214 | ☐ | P149 | 490.78 | 10.00 | 110.00 | | No | No |
| 215 | ☐ | P151 | 1,112.05 | 10.00 | 110.00 | | No | No |
| 216 | ☐ | P153 | 411.27 | 10.00 | 110.00 | | No | No |

Input Data - Pipe Modeling

| * BASE * |  | ID (Char) | Length (ft) | Diameter (in) | Roughness (Double) | Minor Loss (Double) | Totalizer (Boolean) | Check Valve (Boolean) |
|---|---|---|---|---|---|---|---|---|
| 217 | ☐ | P155 | 69.73 | 8.00 | 110.00 |  | No | No |
| 218 | ☐ | P159 | 72.56 | 8.00 | 110.00 |  | No | No |
| 219 | ☐ | P161 | 533.22 | 6.00 | 58.00 |  | No | No |
| 220 | ☐ | P163 | 4,362.63 | 6.00 | 58.00 |  | No | No |
| 221 | ☐ | P165 | 918.32 | 8.00 | 110.00 |  | No | No |
| 222 | ☐ | P167 | 618.33 | 8.00 | 110.00 |  | No | No |
| 223 | ☐ | P169 | 103.25 | 6.00 | 58.00 |  | No | No |
| 224 | ☐ | P171 | 211.99 | 6.00 | 58.00 |  | No | No |
| 225 | ☐ | P173 | 64.60 | 8.00 | 110.00 |  | No | No |
| 226 | ☐ | P175 | 1,384.45 | 8.00 | 63.00 |  | No | No |
| 227 | ☐ | P177 | 812.99 | 10.00 | 63.00 |  | No | No |
| 228 | ☐ | P181 | 406.72 | 10.00 | 63.00 |  | No | No |
| 229 | ☐ | P183 | 124.46 | 10.00 | 63.00 |  | No | No |
| 230 | ☐ | P185 | 391.09 | 6.00 | 58.00 | 0.00 | No | No |
| 231 | ☐ | P187 | 893.11 | 6.00 | 58.00 |  | No | No |
| 232 | ☐ | P189 | 555.38 | 10.00 | 63.00 |  | No | No |
| 233 | ☐ | P191 | 97.99 | 10.00 | 63.00 |  | No | No |
| 234 | ☐ | P193 | 766.61 | 12.00 | 140.00 |  | No | No |
| 235 | ☐ | P195 | 43.65 | 6.00 | 58.00 |  | No | No |
| 236 | ☐ | P197 | 667.89 | 8.00 | 110.00 | 0.00 | No | No |
| 237 | ☐ | P203 | 358.92 | 8.00 | 63.00 |  | No | No |
| 238 | ☐ | P205 | 872.28 | 8.00 | 110.00 |  | No | No |
| 239 | ☐ | P207 | 371.47 | 8.00 | 110.00 | 0.00 | No | No |
| 240 | ☐ | P209 | 397.32 | 8.00 | 110.00 | 0.00 | No | No |
| 241 | ☐ | P211 | 389.56 | 8.00 | 110.00 | 0.00 | No | No |
| 242 | ☐ | P213 | 1,247.91 | 8.00 | 110.00 | 0.00 | No | No |
| 243 | ☐ | P215 | 396.80 | 8.00 | 110.00 |  | No | No |
| 244 | ☐ | P217 | 1,560.77 | 6.00 | 58.00 |  | No | No |
| 245 | ☐ | P221 | 563.76 | 6.00 | 58.00 |  | No | No |
| 246 | ☐ | P227 | 417.77 | 6.00 | 58.00 |  | No | No |
| 247 | ☐ | P229 | 663.68 | 6.00 | 58.00 |  | No | No |
| 248 | ☐ | P231 | 326.91 | 6.00 | 140.00 |  | No | No |
| 249 | ☐ | P233 | 381.89 | 6.00 | 58.00 | 0.00 | No | No |
| 250 | ☐ | P237 | 65.34 | 6.00 | 58.00 |  | No | No |
| 251 | ☐ | P239 | 726.64 | 6.00 | 110.00 | 0.00 | No | No |
| 252 | ☐ | P243 | 3.15 | 8.00 | 110.00 |  | No | No |

Input Data - Pipe Modeling

| * BASE * |  | ID (Char) | Length (ft) | Diameter (in) | Roughness (Double) | Minor Loss (Double) | Totalizer (Boolean) | Check Valve (Boolean) |
|---|---|---|---|---|---|---|---|---|
| 253 | ☐ | P245 | 340.33 | 6.00 | 58.00 | 0.00 | No | No |
| 254 | ☐ | P247 | 1,173.11 | 6.00 | 58.00 |  | No | No |
| 255 | ☐ | P249 | 346.50 | 6.00 | 58.00 |  | No | No |
| 256 | ☐ | P251 | 318.91 | 6.00 | 58.00 |  | No | No |
| 257 | ☐ | P253 | 792.56 | 6.00 | 58.00 |  | No | No |
| 258 | ☐ | P255 | 205.70 | 6.00 | 58.00 |  | No | No |
| 259 | ☐ | P257 | 1,010.81 | 8.00 | 110.00 |  | No | No |
| 260 | ☐ | P259 | 1,251.05 | 8.00 | 110.00 |  | No | No |
| 261 | ☐ | P263 | 30.87 | 8.00 | 110.00 |  | No | No |
| 262 | ☐ | P267 | 191.73 | 6.00 | 58.00 |  | No | No |
| 263 | ☐ | P269 | 506.07 | 8.00 | 63.00 |  | No | No |
| 264 | ☐ | P271 | 164.09 | 8.00 | 63.00 |  | No | No |
| 265 | ☐ | P275 | 190.37 | 6.00 | 58.00 | 0.00 | No | No |
| 266 | ☐ | P277 | 1,055.29 | 8.00 | 110.00 |  | No | No |
| 267 | ☐ | P279 | 283.83 | 8.00 | 110.00 |  | No | No |
| 268 | ☐ | P281 | 531.72 | 8.00 | 110.00 |  | No | No |
| 269 | ☐ | P283 | 433.59 | 8.00 | 110.00 |  | No | No |
| 270 | ☐ | P285 | 454.56 | 8.00 | 110.00 |  | No | No |
| 271 | ☐ | P287 | 42.39 | 2.00 | 140.00 | 0.00 | No | No |
| 272 | ☐ | P289 | 1,288.79 | 6.00 | 58.00 | 0.00 | No | No |
| 273 | ☐ | P291 | 626.35 | 6.00 | 58.00 | 0.00 | No | No |
| 274 | ☐ | P293 | 567.27 | 6.00 | 58.00 | 0.00 | No | No |
| 275 | ☐ | P295 | 592.77 | 6.00 | 58.00 | 0.00 | No | No |
| 276 | ☐ | P297 | 457.04 | 8.00 | 110.00 | 0.00 | No | No |
| 277 | ☐ | P299 | 652.64 | 8.00 | 140.00 | 0.00 | No | No |
| 278 | ☐ | P301 | 254.95 | 10.00 | 110.00 | 0.00 | No | No |
| 279 | ☐ | P303 | 466.76 | 6.00 | 58.00 | 0.00 | No | No |
| 280 | ☐ | P307 | 356.07 | 8.00 | 140.00 | 0.00 | No | No |
| 281 | ☐ | P309 | 549.88 | 8.00 | 140.00 | 0.00 | No | No |
| 282 | ☐ | P311 | 488.21 | 10.00 | 63.00 | 0.00 | No | No |
| 283 | ☐ | P313 | 44.27 | 10.00 | 110.00 | 0.00 | No | No |
| 284 | ☐ | P315 | 69.04 | 12.00 | 110.00 | 0.00 | No | No |
| 285 | ☐ | P317 | 54.43 | 12.00 | 110.00 | 0.00 | No | No |
| 286 | ☐ | P319 | 104.47 | 12.00 | 110.00 | 0.00 | No | No |
| 287 | ☐ | P321 | 68.83 | 12.00 | 110.00 | 0.00 | No | No |
| 288 | ☐ | P323 | 91.48 | 12.00 | 110.00 | 0.00 | No | No |

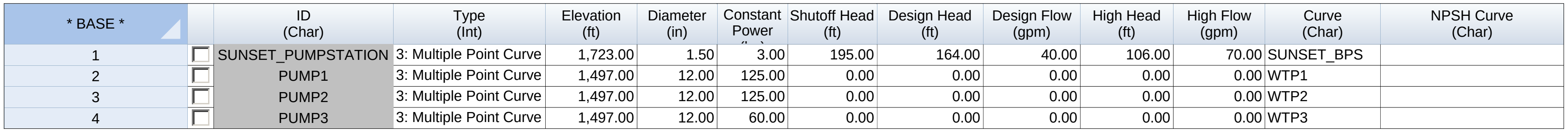
Input Data - Pipe Modeling

| * BASE * | | ID (Char) | Length (ft) | Diameter (in) | Roughness (Double) | Minor Loss (Double) | Totalizer (Boolean) | Check Valve (Boolean) |
|---|---|---|---|---|---|---|---|---|
| 289 | ☐ | P325 | 67.48 | 12.00 | 110.00 | 0.00 | No | No |
| 290 | ☐ | P327 | 113.46 | 12.00 | 110.00 | 0.00 | No | No |
| 291 | ☐ | P329 | 61.07 | 12.00 | 110.00 | 0.00 | No | No |
| 292 | ☐ | P333 | 819.06 | 8.00 | 110.00 | | No | No |
| 293 | ☐ | P335 | 861.93 | 8.00 | 110.00 | | No | No |
| 294 | ☐ | P337 | 377.05 | 6.00 | 58.00 | 0.00 | No | No |
| 295 | ☐ | P339 | 334.64 | 10.00 | 63.00 | | No | No |
| 296 | ☐ | P341 | 808.68 | 10.00 | 63.00 | 0.00 | No | No |
| 297 | ☐ | P347 | 562.20 | 8.00 | 63.00 | 0.00 | No | No |
| 298 | ☐ | P349 | 598.24 | 8.00 | 61.00 | 0.00 | No | No |
| 299 | ☐ | P351 | 499.39 | 8.00 | 61.00 | 0.00 | No | No |
| 300 | ☐ | P353 | 138.83 | 8.00 | 61.00 | 0.00 | No | No |
| 301 | ☐ | P355 | 174.18 | 4.00 | 49.00 | 0.00 | No | No |
| 302 | ☐ | P357 | 437.43 | 6.00 | 58.00 | 0.00 | No | No |
| 303 | ☐ | P359 | 162.42 | 8.00 | 61.00 | 0.00 | No | No |
| 304 | ☐ | P361 | 758.57 | 6.00 | 58.00 | 0.00 | No | No |
| 305 | ☐ | P363 | 675.41 | 10.00 | 63.00 | 0.00 | No | No |
| 306 | ☐ | P365 | 191.65 | 6.00 | 58.00 | 0.00 | No | No |
| 307 | ☐ | P367 | 679.01 | 6.00 | 58.00 | 0.00 | No | No |
| 308 | ☐ | P369 | 480.90 | 6.00 | 58.00 | 0.00 | No | No |
| 309 | ☐ | P371 | 792.57 | 6.00 | 58.00 | 0.00 | No | No |
| 310 | ☐ | P373 | 285.90 | 8.00 | 61.00 | 0.00 | No | No |
| 311 | ☐ | P375 | 291.53 | 8.00 | 61.00 | 0.00 | No | No |
| 312 | ☐ | P377 | 305.88 | 6.00 | 58.00 | 0.00 | No | No |
| 313 | ☐ | P379 | 749.94 | 6.00 | 58.00 | 0.00 | No | No |
| 314 | ☐ | P381 | 438.87 | 6.00 | 58.00 | 0.00 | No | No |
| 315 | ☐ | P383 | 338.02 | 2.00 | 49.00 | | No | No |
| 316 | ☐ | P385 | 887.95 | 8.00 | 140.00 | | No | No |
| 317 | ☐ | P387 | 496.06 | 8.00 | 110.00 | 0.00 | No | No |
| 318 | ☐ | P389 | 525.00 | 6.00 | 58.00 | | No | No |
| 319 | ☐ | P391 | 2,031.11 | 8.00 | 58.00 | 0.00 | No | No |
| 320 | ☐ | P393 | 563.18 | 6.00 | 110.00 | | No | No |
| 321 | ☐ | P397 | 675.29 | 2.00 | 140.00 | 0.00 | No | No |
| 322 | ☐ | P399 | 225.91 | 2.00 | 140.00 | 0.00 | No | No |
| 323 | ☐ | P401 | 913.11 | 2.00 | 140.00 | 0.00 | No | No |
| 324 | ☐ | P403 | 275.61 | 2.00 | 140.00 | 0.00 | No | No |

Input Data - Pipe Modeling

| * BASE * | | ID (Char) | Length (ft) | Diameter (in) | Roughness (Double) | Minor Loss (Double) | Totalizer (Boolean) | Check Valve (Boolean) |
|---|---|---|---|---|---|---|---|---|
| 325 | ☐ | P405 | 85.74 | 2.00 | 140.00 | 0.00 | No | No |
| 326 | ☐ | P407 | 268.27 | 8.00 | 110.00 | 0.00 | No | No |
| 327 | ☐ | P409 | 3,609.13 | 8.00 | 63.00 | 0.00 | No | No |
| 328 | ☐ | P415 | 995.90 | 10.00 | 110.00 | 0.00 | No | No |
| 329 | ☐ | P417 | 403.61 | 6.00 | 58.00 | 0.00 | No | No |

Input Data - Pump Modeling



| * BASE * | | ID (Char) | Type (Int) | Elevation (ft) | Diameter (in) | Constant Power | Shutoff Head (ft) | Design Head (ft) | Design Flow (gpm) | High Head (ft) | High Flow (gpm) | Curve (Char) | NPSH Curve (Char) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ☐ | SUNSET_PUMPSTATION | 3: Multiple Point Curve | 1,723.00 | 1.50 | 3.00 | 195.00 | 164.00 | 40.00 | 106.00 | 70.00 | SUNSET_BPS | |
| 2 | ☐ | PUMP1 | 3: Multiple Point Curve | 1,497.00 | 12.00 | 125.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | WTP1 | |
| 3 | ☐ | PUMP2 | 3: Multiple Point Curve | 1,497.00 | 12.00 | 125.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | WTP2 | |
| 4 | ☐ | PUMP3 | 3: Multiple Point Curve | 1,497.00 | 12.00 | 60.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | WTP3 | |

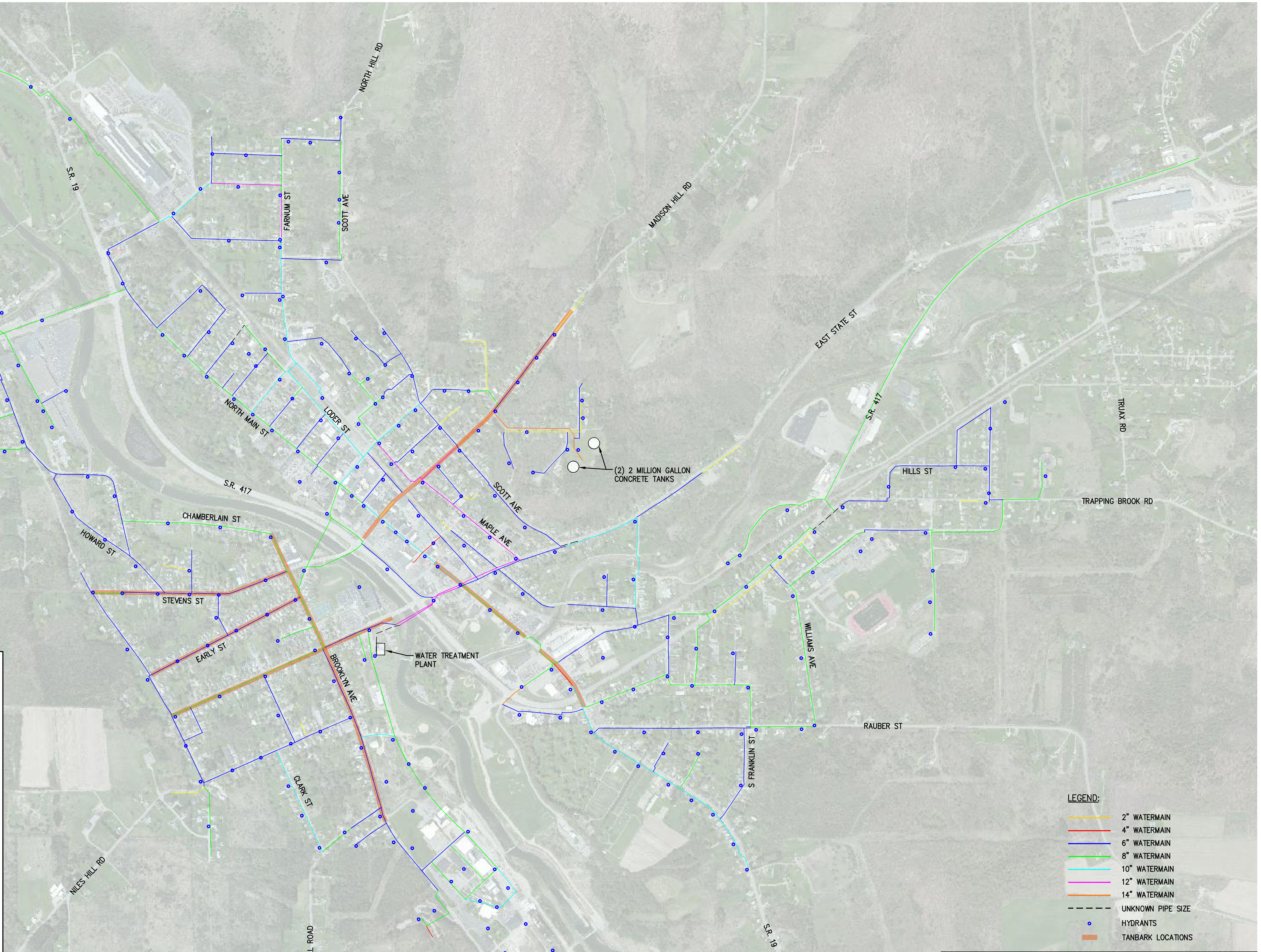
Input Data - Reservoir Modeling

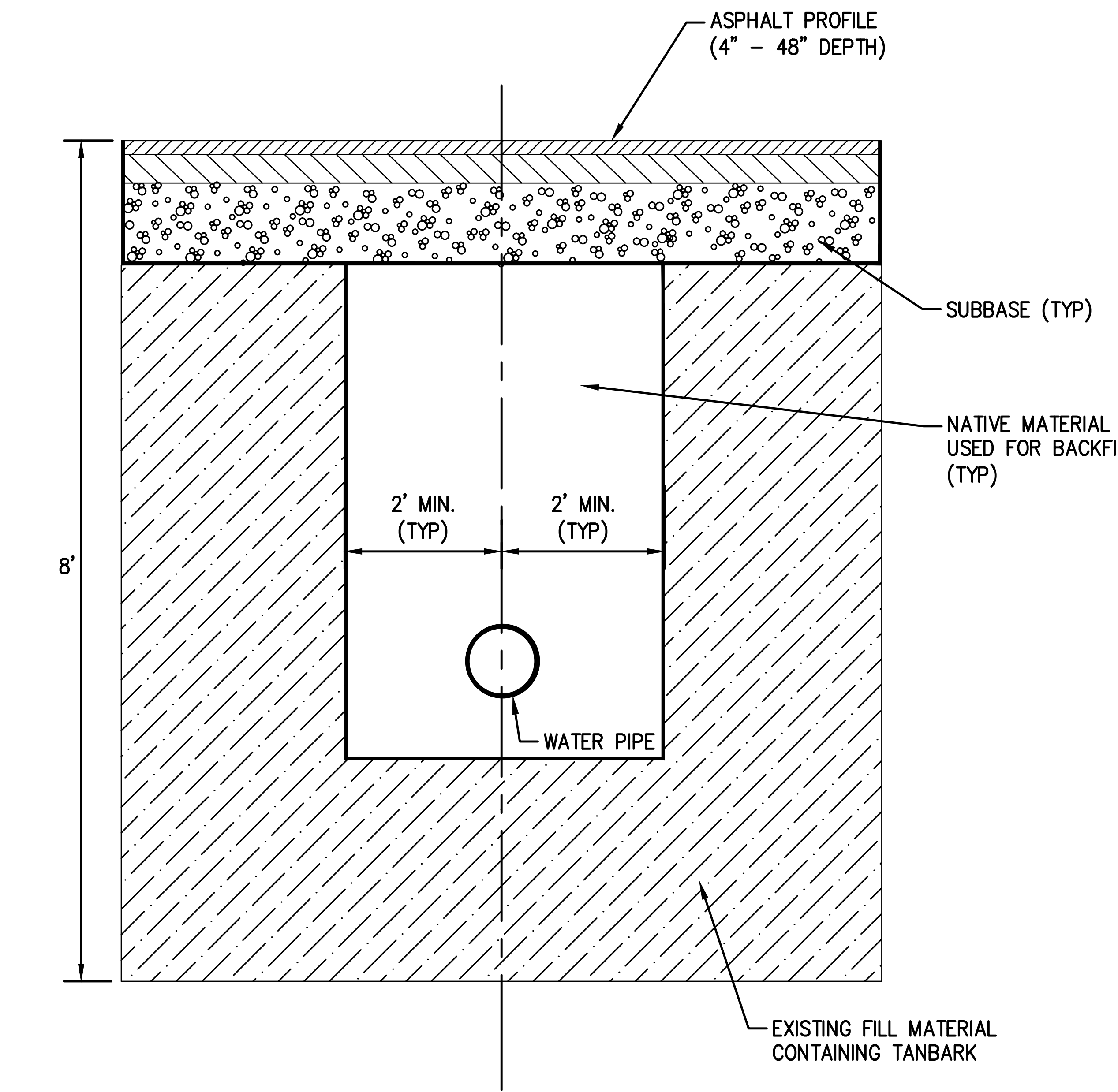
| * BASE * | | ID (Char) | Type (Int) | Head (ft) | Pattern (Char) |
|---|---|---|---|---|---|
| 1 | ☐ | CLEARWELL | 0: Fixed Head | 1,487.00 | |

## Input Data - Tank Modeling

| * BASE * | | ID (Char) | Type (Int) | Elevation (ft) | Minimum Level (ft) | Maximum Level (ft) | Initial Level (ft) | Diameter (ft) |
|---|---|---|---|---|---|---|---|---|
| 1 | ☐ | TANK_1 | 0: Cylindrical | 1,720.00 | 0.00 | 20.00 | 18.00 | 131.00 |
| 2 | ☐ | TANK_2 | 0: Cylindrical | 1,720.00 | 0.00 | 20.00 | 18.00 | 131.00 |
| 3 | ☐ | SUNSET_HYDRO | 0: Cylindrical | 1,723.00 | 69.30 | 115.00 | 115.00 | 0.26 |

# APPENDIX D
# TANBARK LOCATION MAP





**1 TANBARK TYPICAL ROAD SECTION**

SCALE: N.T.S.

HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 · 358 · 1000
FAX · 358 · 1800

HORSEHEADS, NY
ROCHESTER, NY
TOWANDA, PA

# TANBARK LOCATION MAP

# APPENDIX E
# HYDRANT FIRE FLOWS

**INSURANCE SERVICES OFFICE, INC.**
4 B EVES DRIVE SUITE 200 MARLTON, NJ 08053 (609) 985-5600 FAX (609) 985-6464

October 24, 1997

Honorable Susan C. Goetschius, Mayor
Village of Wellsville
156 N. Main St.
Wellsville, NY. 14895

Dear Mayor Goetschius:

We wish to thank, Director of Public Works Robert Chaffee, Fire Chief Stanley Ingraham and others for the cooperation given to our representative during our recent survey. We have completed our evaluation of the fire insurance classification for your Village of Wellsville and confirm that Class 4 continues to apply.

The class 4 classification applies to properties with a needed fire flow of 3,500 gpm or less. The private and public protection at properties with larger needed fire flows are individually evaluated, and may vary from the class 4 classification

The purpose of our visit was to gather information needed to determine a fire insurance classification which may be used to develop advisory property insurance premium calculations. This survey was not conducted for property loss prevention or life safety purposes and no life safety or property loss prevention recommendations will be made.

We are attaching copies of our Grading Sheet and the results of the hydrant flow tests witnessed during our survey. Extra copies of this letter and attachments are also enclosed so that you may distribute them to other interested parties if you so desire.

If you have any questions concerning the new classification, please let us know.

Very truly yours,

Carl F. Shaner

Carl F. Shaner
Technical Consultant

CSF/caf

Enclosure

cc:

## Grading Sheet for Wellsville TFPD, Allegany Co., NY.

Public Protection Class: 4 Surveyed: July/97

| Feature | | Credit Assigned | Maximum Credit |
|---|---|---|---|
| Receiving and Handling Fire Alarms | | 06.50 % | 10.00 % |
| Fire Department | | 32.72 | 50.00 % |
| Water Supply | | 32.66 | 40.00 % |
| *Divergence | | -03.72 | |
| | Total Credit | 68.64 % | 100.00 % |

The Public Protection Class is based on the total percentage credit as follows:

| Class | % |
|---|---|
| 1 | 90.00 or more |
| 2 | 80.00 to 89.99 |
| 3 | 70.00 to 79.99 |
| 4 | 60.00 to 69.99 |
| 5 | 50.00 to 59.99 |
| 6 | 40.00 to 49.99 |
| 7 | 30.00 to 39.99 |
| 8 | 20.00 to 29.99 |
| 9 | 10.00 to 19.99 |
| 10 | 0 to 9.99 |

**Divergence is a reduction in credit to reflect a difference in the relative credits for Fire Department and Water Supply.

The above classification has been develped for use in property insurance premium calculations fire insurance rating purposes only.

# HYDRANT FLOW DATA SUMMARY

CITY: Wellsville State NY ZIP: 14895 WITNESSED BY R. A. Herman DATE: July 30, 1997

| TEST NO. | TYPE DIST. * | TEST LOCATION | SERVICE | FLOW - GPM |  |  |  | PRESSURE PSI |  | FLOW AT 20 PSI |  | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | INDIVIDUAL HYDRANTS |  |  | TOTAL | STATIC | RESID. | NEEDED ** | AVAIL. |  |
| 1 | Comm | W. State St. 1st hyd e/o S. Brooklyn St. | Main | 3203 |  |  | 3203 | 110 | 80 | 3500 | *5800 | gauge hyd. Bonnet Leaks |
| 2 | Comm | S. Brooklyn St. opp. Lunn Court | Main | 2556 |  |  | 2556 | 110 | 65 | 3000 | 3700 |  |
| *3 | Comm | Chenault Ave @ Water Treatment Plant | Main | 1320 |  |  | 1320 | 110 | 40 | 2250 | 1500 | Flow hyd Bonnet Leaks |
| *4 | Comm | S. Brooklyn St. @ Otis Eastern Pipe Yard | Main | 790 |  |  | 790 | 110 | 55 | 1500 | *1000 | three hydrants on property unusable |
| 5 | Res | Stevens St. 2nd hyd e/o Highland Ave | Main | 750 |  |  | 750 | 95 | 55 | 750 | 1100 |  |
| 6 | Comm | Riverwalk Plaza 2nd hyd s/o Bolivar Rd. | Main | 1300 |  |  | 1300 | 108 | 20 | 2250 | 1300 |  |
| *7 | Comm | Route 417 @ Nursing Home | Main | 950 |  |  | 950 | 110 | 40 | 1500 | 1100 |  |
| *8 | Res | Route 19 2nd hyd n/o Vossler Rd. | Main | 880 |  |  | 880 | 100 | 20 | 500 | 900 |  |
| 9 | Comm | N. Main St. E. Pearl St. | Main | 1840 |  |  | 1840 | 100 | 80 | 3500 | 3900 | Flow hyd. hard to operate |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

THE ABOVE LISTED NEEDED FIRE FLOWS ARE FOR PROPERTY INSURANCE PREMIUM CALCULATIONS ONLY AND ARE NOT INTENDED TO PREDICT THE MAXIMUM AMOUNT OF WATER REQUIRED FOR A LARGE SCALE FIRE CONDITION. THE AVAILABLE FLOWS ONLY INDICATE THE CONDITIONS THAT EXISTED AT THE TIME AND AT THE LOCATION WHERE TESTS WERE WITNESSED.

* Comm = Commercial ; Res = Residential

ded is the rate of flow for a specific duration for a full credit condition. Needed Fire Flows greater than 3,500 gpm are not considered in determining the classification of the city when using the Fire Suppression Rating

# HYDRANT FLOW DATA SUMMARY

CITY: Wellsville State NY ZIP: 14895 WITNESSED BY R.A. Herman DATE: July 30, 1997

| TEST NO. | TYPE DIST. * | TEST LOCATION | SERVICE | FLOW - GPM | | | | PRESSURE PSI | | FLOW AT 20 PSI | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | INDIVIDUAL HYDRANTS | | | TOTAL | STATIC | RESID. | NEEDED ** | AVAIL. | |
| 10 | Comm | Central Ave w/o Loder St. | Main | 2743 | | | 2743 | 95 | 62 | 3000 | 4300 | |
| 11 | Comm | O'Conner St. w/o Scott St. | Main | 670 | | | 670 | 85 | 45 | 2250 | 900 | |
| 12 | Comm | N. Main St. 1st hyd n/o E. State St. | Main | 1917 | | | 1917 | 100 | 74 | 3000 | 3500 | |
| 13 | Comm | S. Main St. n/o Dyke Creek | Main | 1160 | | | 1160 | 105 | 85 | 2500 | 2500 | |
| 14 | Comm | School St. opp Fair St. | Main | 1436 | | | 1436 | 100 | 65 | 4500 | 2200 | |
| 15 | Res | S. Main St. opp Orchard Place | Main | 430 | | | 430 | 95 | 30 | 500 | 450 | |
| | | | | | | | | | | | | |
| | | *Note: Water Flows Limited By Hydrant Distribution | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | * Flow Tests Located in Wellsville TFPD | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

THE ABOVE LISTED NEEDED FIRE FLOWS ARE FOR PROPERTY INSURANCE PREMIUM CALCULATIONS ONLY AND ARE NOT INTENDED TO PREDICT THE MAXIMUM AMOUNT OF WATER REQUIRED FOR A LARGE SCALE FIRE CONDITION. THE AVAILABLE FLOWS ONLY INDICATE THE CONDITIONS THAT EXISTED AT THE TIME AND AT THE LOCATION WHERE TESTS WERE WITNESSED.

* Comm = Commercial ; Res = Residential

** Needed is the rate of flow for a specific duration for a full credit condition. Needed Fire Flows greater than 3,500 gpm are not considered in determining the classification of the city when using the Fire Suppression Rating hedule..

| | |
|---|---|
| **LOCATION/ ADDRESS** | **FLOW G/MIN** |
| | |
| EMBERS PARKING LOT | 1550 |
| LOADER NEAR LOMBARD | 1455 |
| ICE HOUSE E. DYKE | 1455 |
| FRONT OF HIGH SCHOOL | 1455 |
| E. STATE / MAPLE | 1455 |
| CENTRAL / LOADER | 1455 |
| S MAIN /RAUBER | 1405 |
| 119 WILLIAMS | 1400 |
| MAIN / ELM | 1375 |
| PRESTONS CHEV | 1350 |
| HARTS JEWERERY | 1300 |
| FARNUM / OCONNER K-81 | 1300 |
| 159 CAMERON | 1300 |
| FARNUM / OCONNER K-11 | 1250 |
| END OF S. MAIN | 1250 |
| END OF PUTZMAN | 1250 |
| 375 S MAIN | 1250 |
| 253 E. DYKE | 1250 |
| COATS AT DRESSER | 1200 |
| PIZZA KING | 1190 |
| MUSIC ALLEY | 1190 |
| 41 HOWARD | 1190 |
| 135 HOWARD | 1190 |
| 130 CHAMBERLIN | 1190 |
| 12 MEADOW BROOK | 1190 |
| #1 BEHIND TOPS | 1190 |
| W.STATE BROOKLYN | 1150 |
| SHERIDAN / BOLIVAR RD | 1130 |
| RIVERWALK PARKING LOT | 1130 |
| PUTZMAN / FARNUM | 1130 |
| POST OFFICE | 1130 |
| NATIONAL GRID | 1130 |
| N. MAIN EXT | 1130 |
| MIDDLE UPPER JEFFERSON | 1130 |
| MAIN / CHESTNUT | 1130 |
| LAZER WASH | 1130 |
| HILL CREST / FASSET LANE | 1130 |
| FLORDIA AVE / FASSETT LANE | 1130 |
| BEHIND HIGH SCHOOL | 1130 |
| 91 HERMAN | 1130 |
| 2895 ROBBINS COURT | 1130 |
| 207 FARNUM | 1130 |
| #2 BEHIND TOPS | 1130 |

| LOCATION/ ADDRESS | FLOW G/MIN |
|---|---|
| | |
| W. DYKE W&L GARAGE | 1060 |
| HILL / CREASENT | 1060 |
| END OF LINE ACROSS FROM LC WHITFORDS | 1060 |
| CAMERON / HANOVER | 1060 |
| 114 CLARK | 1060 |
| LATTER DAY SAINTS | 1050 |
| 199 RAUBER | 1050 |
| TRAPPINGBROOK APTS | 1000 |
| TOP OF W. STATE | 1000 |
| STEVENS / HOWARD | 1000 |
| PINE / BROOKLYN | 1000 |
| PEARL / MADISON | 1000 |
| NELSON / S. HIGHLAND | 1000 |
| 65 SCOTT AVE | 1000 |
| 46 CLARK | 1000 |
| 119 SENACA | 1000 |
| WHEEELER / PEARL | 920 |
| RIVERSIDE ARSNICK AND LACE | 920 |
| RIVERSIDE AUBER | 900 |
| FASSET LANE / HIGHLAND | 900 |
| BROOKLYN HTS | 900 |
| 79 OCONNER | 900 |
| 228 BROOKLYN | 875 |
| PEARL / SCOTT | 850 |
| PINE T. MGWS | 840 |
| 16 SUNNYDALE | 840 |
| 100 E. PEARL | 800 |
| STEVENS / WITTER | 750 |
| SCOTT / JEFFERSON | 750 |
| TOP OF STEVENS | 650 |
| RADIO STATIO RAILROAD AVE | 650 |
| HYLAND DALE ELDRIDGE | 600 |
| 2ND HYDRANT UP ON EARLY | 600 |
| 268 SCOTT | 600 |
| 17 HANOVER | 600 |
| 290 FARNUM | 500 |
| 25 HAMILTON | 500 |
| PLEASANT | 250 |
| 45 N. BROAD | 250 |
| 329 SCOTT | 250 |
| 54 STEVENS | 100 |

# APPENDIX F
# POTENTIAL PROBLEM AREAS MAP

HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 • 358 • 1000
FAX • 358 • 1800

HORSEHEADS, NY
ROCHESTER, NY
TOWANDA, PA

# POTENTIAL PROBLEM AREAS

# APPENDIX G
# WATER STORAGE TANK INSPECTION REPORT

ROBOTIC OBSERVATION VENTURES
(R.O.V.)

---

# POTABLE WATER STORAGE STRUCTURE INSPECTION
# FOR
# WELLSVILLE WEST
# WELLSVILLE, NEW YORK

## INSPECTED ON
## AUGUST 27, 2014

---

**P.O. Box 632, Hamburg, NY 14075**
**Phone & FAX (716) 627-4631**

## GENERAL

The inspection was performed by a robotically operated vehicle (R.O.V.) with topside real time monitoring and recording.

The make and model of the remotely operated vehicle is Seabotix Gen2 150.

The inspection was performed to determine the structure's condition including all ceiling and wall surfaces, floor condition and structure penetrators.

Client's representative was present during the inspection.

The R.O.V. pilot was David Kazmierczak.
The R.O.V. handler was Brian Abrams.

Prior to insertion into the storage structure the R.O.V. and umbilical were disinfected with a solution of approximately 4% sodium hypochlorite applied by pressurized sprayer.

## TANK SPECIFICATIONS

The tank is a Natgun pre-stressed, wire reinforced, concrete tank 130 feet in diameter, 20 feet deep, with a normal storage capacity of two million gallons.

No cathodic protection was present in the tank at the time of inspection.

## INSPECTION

On the day of the inspection the water level in the tank was approximately 8 Ft. to 10 Ft. below overflow. In addition there was a small amount of floating particulate which reflected the R.O.V.'s. lighting. This did not, however, reduce the visibility of the top or roof of the tank.

The roof appears to be in good condition.

There is some biofilm cover on all below water surfaces.

The wall surfaces appeared to be in good condition.

The floor has 90% heavy sediment on bottom of tank.

The inflow & outflow floor penetrator pipes are located within catch basins set into the floor. The inside of the pipes appeared in relatively good condition.

## OPINION

No immediate attention is required at this time.

**NOTE – THE LAST PAGE OF THIS REPORT EXPLAINS THE ON SCREEN INFORMATION DISPLAY.**

**ALL WATER DEPTH READINGS ARE FROM THE WATER SURFACE ON THE DAY, AND AT THE TIME OF THE INSPECTION.**

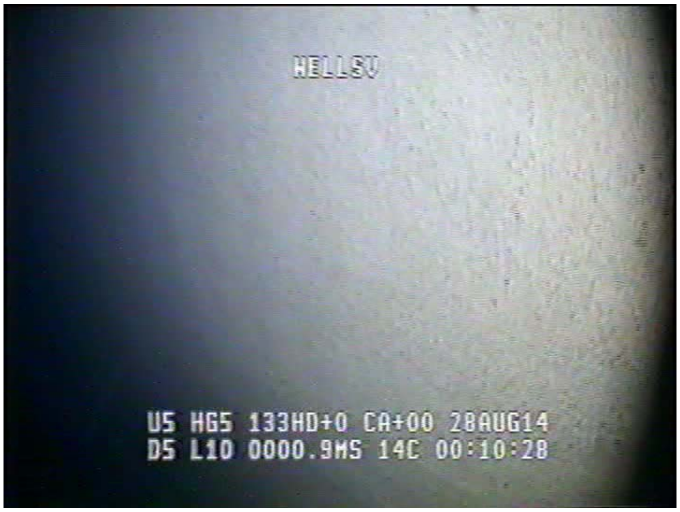
**THE ACCURACY OF THIS DEPTH IS BASED ON THE WATER LEVEL REMAINING STATIC THROUGHOUT THE PROCEDURE.**

View of overflow near water level.

View of coating patch on wall in upper third of tank. Wall appears to be in good condition.

Isolated rusting through wall coating in upper third of tank.

View of wall hatch. Hatch appears to be in good condition. Note the bio-film on wall.



Detail view of wall coating in the middle third of the tank. Note the exposed aggregate.

Isolated rusting in the middle third of the tank.

View of the tank wall intersecting with the tank floor. Note the accumulation of flaked wall coating on the floor.

View of the inflow floor penetrator pipe. The pipe appears to be good condition.

View of the outflow floor penetrator pipe. The pipe appears to be in good condition.

View of the second inflow floor penetrator pipe. The pipe appears to be in good condition.

View of the tank wall intersection with the tank roof. The roof appears to be in good condition.

View of the top of the overflow. The overflow appears to be in good condition.

View of the center of the tank roof. The roof appears to be in good condition.

View of the tank floor. Note the complete sediment coverage.

Detail view of the accumulated sediment at the tank wall intersection with the tank floor.

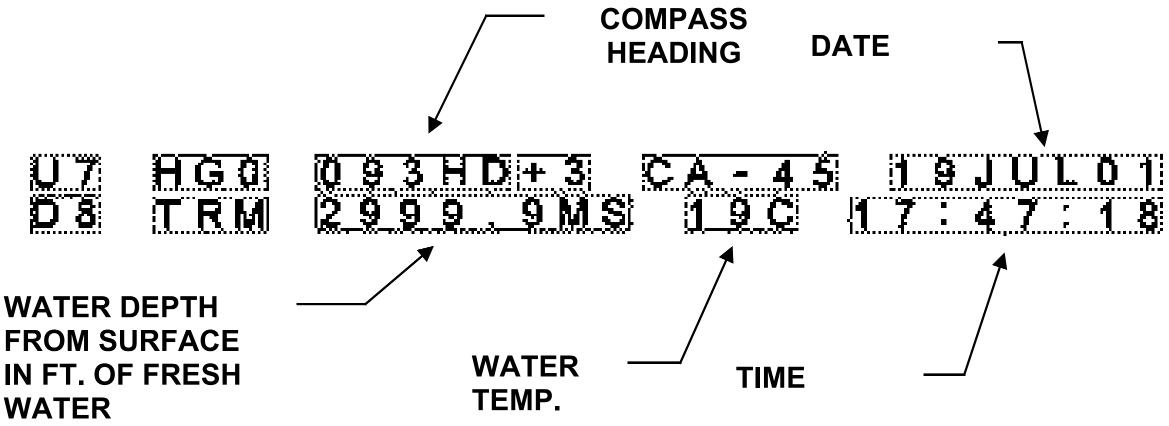

WELLSV-
U5 HG5 133HD+0 CA+15 28AUG14
D5 L10 0010.7MS 14C 01:07:23


WELLSV
U5 HG5 133HD+0 CA+15 28AUG14
D5 L10+0010.8MS 14C 01:07:37


WELLSV
U5 HG5 133HD+0 CA+15 28AUG14
D5 L10 0010.4MS 14C 01:10:52

The above report is based on our interpretation of the enclosed video in addition to our observations of the structure at the time of inspection.

# VIDEO OVERLAY LEGEND



**DURING THE INSPECTION THE R.O.V. IS CALIBRATED TO FEET AND TENTHS OF A FOOT AND DEGREES FAHRENHEIT.**
**(THE LEGEND VIEW ABOVE, PROVIDED BY THE MANUFACTURER, INDICATES METERS OF SEA WATER AND DEGREES CENTIGRADE)**

**THE R.O.V. DEPTH INDICATOR IS CALIBRATED PRIOR TO DIVING TO SHOW 0.0 FT. OF DEPTH AT THE WATER COLUMN SURFACE INSIDE THE STRUCTURE AT THE TIME OF CALIBRATION.**

**THE REMAINDER OF THE OVERLAY CONTAINS R.O.V. OPERATIONAL INFORMATION**

# APPENDIX H
## STATIC PRESSURE MAPPING

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CN

**Junction**

● <all other values>

**TYPE**

● Active

● Domain

○ Inactive

**Tank**

<all other values>

**TYPE**

Active

Domain

Inactive

**Reservoir**

<all other values>

**TYPE**

Active

Domain

Inactive

**Pump**

<all other values>

**TYPE**

Active

Domain

Inactive

**Pipe**

<all other values>

**TYPE**

Active

Domain

Inactive

HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 358 1000
FAX 358 1800

HORSEHEADS, NY ROCHESTER, NY TOWANDA, PA

STATIC PRESSURES - PUMPS OFF

# APPENDIX I
# FIRE FLOW MAPPING

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CN

HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 358 1000
FAX 358 1800

HORSEHEADS, NY ROCHESTER, NY TOWANDA, PA

# AVAILABLE FIRE FLOWS - PUMPS OFF

# APPENDIX J
# ALLEGANY COUNTY DOH 2015 SANITARY SURVEY

RECEIVED
APR 01 2015
BY:

Taking St ps for a Healthier Commun ty

ALLEGANY COUNTY
DEPARTMENT OF HEALTH
7 Court Street, County Office Building, Room 30
Belmont, NY 14813-1076

Loreen Ballengee, MS
Public Health Director
E-mail: ballenl@alleganyco.com

585-268-9250
Fax: 585-268-9264

Thomas E. Hull, MS
Deputy Public Health Director
Director of Environmental Health
E-mail: hullte@alleganyco.com

March 18, 2015

Wellsville Village Board
PO Box 591
Wellsville, NY 14709

RE: 2015 Sanitary Survey-Wellsville Village Water Supply

Dear Mayor Lynch and Village Board Members:

On March 16, 2015, I conducted a sanitary survey of the public water system serving the Village of Wellsville. Your Chief Water Treatment Plant Operator, Dana Harris, assisted me. The inspection evaluated eight system components in accordance with Subpart 40-2 of the New York State Sanitary Code. Deficiencies, requirements, or recommendations from the inspection are documented in the component area to which they apply. If there were no problems in a specific area, this is indicated. The inspection results are as follows:

**Source-**No problems or deficiencies were noted at the time of the inspection. During that time the turbidity levels of the river were higher than normal, but not to the point where the filters were unable to achieve adequate effluent turbidity levels. The operator was monitoring the influent and effluent levels and was ready to take the appropriate measures should the levels exceed the acceptable limits.

**Treatment-**No problems or deficiencies were noted at the time of the inspection.

**Distribution System-**No problem or deficiencies were reported at the time of the inspection. At the time of the inspection it was unknown if all of the backflow prevention devises throughout the distribution system had received their required annual testing, as Mr. Harris is not in charge of that aspect of the water system. Please ensure that all of the devises have been tested and that the reports are on file with the appropriate person.

**Finished Water Storage-**No problems or deficiencies were noted at the time of the inspection. You should consider the installation of a fence around the reservoir area to discourage unauthorized access.

**Pumps and Controls-**No problems or deficiencies were noted at the time of the inspection.

**Monitoring and Reporting-**At the time of the inspection all of your system's monitoring and reporting requirement had been met.

**System Operation and Management-**No problems or deficiencies were noted at the time of the inspection. The operators have taken measures to aid in the remote operating and monitoring of the plant by installing video cameras at critical components and readouts, which allow them to be viewed on their cellphones at any location where cell-service is available. This innovation is to be commended and will be recommended to other water systems throughout the county.

**Operator Certification-**At the time of the inspection your system had the following New York State Health Department certified operators: Dana L. Harris, Grades IIA & C; Brent W. Roberts, Grades IIA, C, & D; Daniel S. Gardner, Grades IIA & D; Joshua Fry, Grade D; and Wayne Stonemetz, Grade D. Please notify this department should this status change.

A copy of the official inspection report, DOH-4234, is enclosed for your records.

If you have any questions or concerns, please contact this office.

Sincerely,

Richard G. Haywood

Richard G. Haywood
Public Health Sanitarian

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Water Supply Protection

# Water System Field Compliance Report: A Review of Compliance with Subpart 5-1 of the New York State Sanitary Code

Public Water System Name: Wellsville Village
Street Address: 111 West State Street
Town, Village, or City: Wellsville
County: Allegany

PWS ID Number: N Y 0 2 0 0 3 2 7
PWS Type ☒ C ☐ NC ☐ NTNC ☐ NP
Source Type ☒ Surface ☐ Ground ☐ GWUDI
Date of Service: 03 / 17 / 15 (M M / D D / Y Y)

Begin Time: __ __ : __ __ (H H : M M)
End Time: __ __ : __ __ (H H : M M)

Disinfection Waiver Issued? ☐ Yes ☒ No
4-Log Virus Treatment? ☐ Yes ☒ No

Field Visit Type ☐ Pre-operational ☐ Complaint ☐ Incident ☐ Illness ☐ Reinspection ☒ Sanitary Survey ☐ Inspection

Public Health Hazard Types

| Part 5 Subsection | Summary Description of Sanitary Code Requirement | SDWIS | Status |
|---|---|---|---|
| 5-1.12(a) | Appropriate actions are taken in response to deteriorating source water quality or diminished effectiveness of treatment with potential for MCL violation. | SA | 4 |
| 5-1.22(a) | Obtain health department approval prior to the construction or modification of a water system. | SB | 4 |
| 5-1.23(a) | Obtain health department approval prior to use of an emergency water supply or alteration of a treatment process necessary to protect public health. | SD | 4 |
| 5-1.27 | Maintain minimum distribution system pressure of 20 psi at ground level. | SH | 1 |
| 5-1.30 | Bypass of any stage of treatment. | SJ | 1 |
| 5-1.30 | Disinfection of a groundwater source, surface water source or groundwater source influenced by surface water. | ND<br>41 | 1 |
| 5-1.30(b) | Filtration of surface source and groundwater influenced by surface water unless avoidance criteria is met. | 42 | 1 |
| 5-1.30(b)(2) | Free chlorine residual disinfection concentration in the water entering the distribution system must be at least 0.2 mg/l and may not be less than the minimum concentration for compliance for more than four hours. Systems using other chemical disinfectants shall maintain residual disinfection levels entering the distribution system comparable to requirements for systems using chlorination. | 41 | 1 |
| 5-1.30(g) | Maintain free chlorine residual at representative points in the distribution system. | NR | 1 |
| 5-1.31 | Protect the water distribution system from the creation of cross connections of sufficient hazard to adversely affect the health of water consumers. | SJ | 1 |
| 5-1.71(a) | Exercise due care and diligence in the maintenance and supervision of all sources of the public water to prevent so far as possible, their pollution and depletion. | SN | 1 |
| 5-1.71(b) | Exercise due care and diligence in the operation and maintenance of a water treatment plant and distribution system. | SO | 1 |

Have all outstanding violations been resolved? ☐ Yes ☐ No
Explain ______________________________

Part 5 Requirements

| Part 5 Subsection | Deficiency | Summary Description of Sanitary Code Requirement | SDWIS | Status |
|---|---|---|---|---|
| 5-1.23(c) | M | Conspicuous posting of Sanitary Code Section 5-1.23, "Reporting Emergencies." | SF | 1 |
| 5-1.29 | S M | Finished (treated) water used for priming pumps. | | 4 |
| 5-1.30 | S M | Redundant disinfection equipment provided. | ND | 1 |
| 5-1.30 (e) | S | Complies with disinfection waiver provision. | ND | 4 |
| 5-1.31(a)(3) | S M | Cross connection control program is implemented by supplier of water, including records of all device testing. | SJ | 3 |
| 5-1.72(c) | S M | Complete daily records of operation of a water system. | 09<br>10 | 1 |
| 5-1.72(d) | S M | Maintain records (e.g., sample results, reports, filter backwash recycle flow information). | 09 | 1 |
| 5-1.72(b) | S | System is in compliance with Subpart 5-4. The correct number and level of operator(s) are available during plant operation. System has designated operators of appropriate grade level in responsible charge. | SQ<br>SY<br>12 | 1 |
| 5-1.73 | S M | Provide or have available test kit. | | 1 |
| App.5-A 3.2.1 | S M | Developed well sources sufficient to meet maximum day demand with the largest well out of service. | | 4 |
| App.5-A 6.1 | S | Pumps are accessible for maintenance and 3 feet above the 100 year flood plain. | | 4 |
| App.5-A 20.3 | S M | Water tanks, hatches, roofing, and access ways are watertight, vermin proof, and secure. | | 1 |
| App.5-A 20.7 | S M | Tank overflow terminates 12"-24" above grade with proper screen on outlet. | | 1 |
| App.5-B.2(d) | S M | Finished grade of well is mounded to divert surface water. | | 4 |
| App.5-B.5(g) | S | Vented, water tight, vermin proof sanitary seal well cap. | SO | 4 |
| App.5-D.3(b) | S M | Well casing in good condition and more than 18" above grade. | | 4 |

Chlorine Residual __________ mg/l Sample Collection Time ____ : ____
Point of Collection ______________________________
Chlorine Residual __________ mg/l Sample Collection Time ____ : ____
Point of Collection ______________________________

Comments SJ- Need to determine that all backflow Prevention devises are receiving annual testing.

Completed by Rich D. Haywood Date 3 / 27 / 2015
Received by ______________________________ Date ____ / ____ / ____

Status Codes: 1. No violation observed 2. All or parts of an item in violation 3. Item was not reviewed 4. Item not applicable 5. Item(s) corrected during inspection
Deficiency Codes: S: Significant Deficiency M: Minor Deficiency R: Recommendation

## Chapter 1. State Sanitary Code
## Part 5. Drinking Water Supplies
## Subpart 5-1. Public Water Systems
## Statutory Authority: Public Health Law, Section 225

http://www.health.ny.gov/environmental/water/drinking/regulations

| Public Health Hazards |
|---|
| 1. 5-1.12(a) |
| 2. 5-1.22(a) |
| 3. 5-1.23(b) |
| 4. 5-1.25 |
| 5. 5-1.27 |
| 6. 5-1.30 |
| 7. 5-1.30(a)(b) |
| 8. 5-1.30(b) |
| 9. 5-1.30(g) |
| 10. 5-1.31 |
| 11. 5-1.71(a) |
| 12. 5-1.71(b) |

| Part 5 Requirements |
|---|
| 13. 5-1.23(c) |
| 14. 5-1.28 |
| 15. 5-1.30 |
| 16. 5-1.30(e) |
| 17. 5-1.72(b) |
| 18. 5-1.72(c) |
| 19. 5-1.72(d) |
| 20. 5-1.72(c) |
| Appendix 5-B Requirements<br>21. App. 5-B.2(d)<br>22. App. 5-B.5(g) |
| Appendix 5-D Requirements<br>23. App. 5-B.3(b) |

**Instructions for Completion of DOH-4234**

1. Provide all information regarding name of facility, facility code, type of inspection, etc.
2. Within the boxes under Status, indicate the "status code explanation" number (1-5). Any items with a violation(s) (Status Code 2) must be entered into SDWIS.
3. Within the boxes under Deficiency, circle the corresponding deficiency code (S, M, R) which must be entered into SDWIS.
4. Describe violation(s) in the comments section of the form.
5. All violations listed on this form must be entered into both the SDWIS Site Visit module and the SDWIS Violation module. All violations listed under Public Health Hazard shall be entered as a significant deficiency in the Site Visit module as well as a violation in the Violation module.

**Note to Water System Operator**

1. Refer to Subpart 5-1 of the State Sanitary Code (SSC) to review specific requirements.
2. For violations noted under:
   - Standards for Water Wells, refer to Appendix 5-B
   - Special Requirements for Wells Serving Public Water Systems, refer to Appendix 5-D
   - Appendix 5-A, Recommended Standards for Water Works, 2007 Edition

# APPENDIX K
# ASSET MANAGEMENT

# Village of Wellsville Water System Inventory Worksheet (HUNT 1861-034)

Date Worksheet Completed/Updated: January 2017

| | | | | | | | | | | | | | | Amortized Annual Costs | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Asset | Description | Installation Date | Condition | Service History | Maintenance Needed | Expected Useful Life (yrs) | Adjusted Useful Life (yrs) | Age (yrs) | Remaining Useful Life (yrs) | Description of Cost | Replacement Cost | Installation Cost | Total Cost | Short Term Assets | Long Term Assets | Preventative Maintenance |
| **Water Treatment Plant** | | | | | | | | | | | | | | | | |
| Raw Water Supply Pump 1 | 15 HP | 1990 | Good | | | 15-20 | 40 | 27 | 13 | Cost to replace raw water supply pump | $16,800.00 | $5,000.00 | $21,800.00 | $1,676.92 | | |
| Raw Water Supply Pump 2 | 15 HP | 1990 | Good | | | 15-20 | 40 | 27 | 13 | Cost to replace raw water supply pump | $16,800.00 | $5,000.00 | $21,800.00 | $1,676.92 | | |
| Raw Water Supply Pump 3 | 25 HP | 1990 | Good | | | 15-20 | 40 | 27 | 13 | Cost to replace raw water supply pump | $17,000.00 | $7,000.00 | $24,000.00 | $1,846.15 | | |
| Raw Water Supply Pump 4 | 25 HP | 1990 | Good | | | 15-20 | 40 | 27 | 13 | Cost to replace raw water supply pump | $17,000.00 | $7,000.00 | $24,000.00 | $1,846.15 | | |
| VFD for 15 HP Supply Pumps | 2 VFDs | 1990 | Good | | | 10-15 | 35 | 27 | 8 | Cost to replace VFDs for supply pumps | $13,000.00 | $1,500.00 | $14,500.00 | $1,812.50 | | |
| VFD for 25 HP Supply Pumps | 2 VFDs | 1990 | Good | | | 10-15 | 35 | 27 | 8 | Cost to replace VFDs for supply pumps | $13,000.00 | $1,500.00 | $14,500.00 | $1,812.50 | | |
| Treatment Building | | 1990 | Good | | | 40-60 | 60 | 27 | 33 | Cost to construct a new water treatment building | $2,457,500.00 | - | $2,457,500.00 | | $74,469.70 | |
| Filter Unit 1 | Mixed-media filter | 1990 | Good | | | 40-50 | 50 | 27 | 23 | Cost to replace filter | $275,000.00 | $200,000.00 | $475,000.00 | | $20,652.17 | |
| | | | | | | 20 | 40 | 27 | 13 | Cost to remove and replace filter media | $80,000.00 | - | $80,000.00 | $6,153.85 | | |
| Filter Unit 2 | Mixed-media filter | 1990 | Good | | | 40-50 | 50 | 27 | 23 | Cost to replace filter | $275,000.00 | $200,000.00 | $475,000.00 | | $20,652.17 | |
| | | | | | | 20 | 40 | 27 | 13 | Cost to remove and replace filter media | $80,000.00 | - | $80,000.00 | $6,153.85 | | |
| Filter Unit 3 | Mixed-media filter | 1990 | Good | | | 40-50 | 50 | 27 | 23 | Cost to replace filter | $275,000.00 | $200,000.00 | $475,000.00 | | $20,652.17 | |
| | | | | | | 20 | 40 | 27 | 13 | Cost to remove and replace filter media | $80,000.00 | - | $80,000.00 | $6,153.85 | | |
| Chlorinator 1 | Chlorine gas used for disinfection; Siemens | 2002 | Good | | | 20-25 | 25 | 15 | 10 | Cost to replace gas chlorinator with automatic switchover | $2,300.00 | $1,150.00 | $3,450.00 | $345.00 | | |
| Chlorinator 2 | Chlorine gas used for disinfection; Siemens | 2002 | Good | | | 20-25 | 25 | 15 | 10 | Cost to replace gas chlorinator with automatic switchover | $2,300.00 | $1,150.00 | $3,450.00 | $345.00 | | |
| Chlorinator Booster Pump | Pump to boost flow in order to create a vacuum for chlorine gas disinfection system | 2002 | Good | | | 15-20 | 30 | 15 | 15 | Cost to replace booster pump | $1,500.00 | $750.00 | $2,250.00 | $150.00 | | |
| Cylinder Scale 1 | | 2002 | Good | | | 20-25 | 30 | 15 | 15 | Cost to replace scales for chlorine gas cylinders | $2,000.00 | $600.00 | $2,600.00 | $173.33 | | |
| Cylinder Scale 2 | | 2002 | Good | | | 20-25 | 30 | 15 | 15 | Cost to replace scales for chlorine gas cylinders | $2,000.00 | $600.00 | $2,600.00 | $173.33 | | |
| Chlorination Gas Detection System | | 2002 | Good | | | 25 | 25 | 15 | 10 | Cost to replace gas detection monitoring system | $800.00 | $400.00 | $1,200.00 | $120.00 | | |
| Emergency Eye Wash | | 2002 | Good | | | 25 | 25 | 15 | 10 | Cost to replace emergency eye wash | $300.00 | $150.00 | $450.00 | $45.00 | | |
| Chlorine Analyzer | Hach | 2002 | Good | | | 25 | 25 | 15 | 10 | Cost to replace chlorine analyzer | $950.00 | $475.00 | $1,425.00 | $142.50 | | |
| Chemical Feed Pump | Feed pump for fluoridation of water | 2002 | Good | | | 10-15 | 20 | 15 | 5 | Cost to replace chemical feed pump | $850.00 | $425.00 | $1,275.00 | $255.00 | | |
| Treated Water Flow Meter | Turbine flow meter; Model: Water Specialities 7-TR15-S; 12 inch; S/N: 20083093 | 2009 | Good | Calibrated on 5/13/16: 1% difference, no adjustment | Calibration showed no adjustment is necessary | 25 | 25 | 8 | 17 | Cost to replace meter | $19,000 | $4,500.00 | $23,500.00 | $1,382.35 | | |
| Clearwell Inlet Flow Meter | Turbine flow meter; Model: Water Specialities TR15; 12 inch: S/N: 20081718-12 | 2009 | Good | Calibrated on 5/13/16: 1% difference, no adjustment | Calibration showed no adjustment is necessary | 25 | 25 | 8 | 17 | Cost to replace meter | $19,000 | $4,500.00 | $23,500.00 | $1,382.35 | | |
| Treated Water Chart Recorder | Model: Honeywell DR45AT; Type: 7 day round chart; S/N: C4000000466114; Max flow rate: 2250 gpm | 1990 | Good | Calibrated on 5/13/16: 0% difference, no adjustment | Calibration showed no adjustment is necessary | 50-60 | 60 | 27 | 33 | Cost to replace chart recorder | $2,500 | $750.00 | $3,250.00 | | $98.48 | |
| Clearwell Inlet Chart Recorder | Model: Honeywell DR45AT; Type: 7 day round chart; S/N: C4000000466113; Max flow rate: 2250 gpm | 1990 | Good | Calibrated on 5/13/16: 0% difference, no adjustment | Calibration showed no adjustment is necessary | 50-60 | 60 | 27 | 33 | Cost to replace chart recorder | $2,500 | $750.00 | $3,250.00 | | $98.48 | |
| Clearwell | 500,000 gallon clearwell for treated water from plant | 1990 | Good | | | 60-80 | 80 | 27 | 53 | Cost to demolish and rebuild clearwell | $500,000 | - | $500,000.00 | | $9,433.96 | |
| | | | | | Inspection: every 3-5 years according to AWWA standards | 3-5 | 32 | 27 | 5 | Cost to inspect clearwell | $2,000 | - | $2,000.00 | | | $400.00 |
| Clearwell Booster Pump 1 | 125 HP, Goulds with US Motors; vertical turbine pump; manual operation; pumps run approx. 13 hours a day Monday thru Friday; alternated every day | 1990 | Good | Regular maintenance for pump and motor performed regularly via work orders | | 15-20 | 35 | 27 | 8 | Cost to replace booster pump | $47,000 | $15,000.00 | $62,000.00 | $7,750.00 | | |
| Pump 1 Control Valve & Controller | Operated by solenoid valve and used to reduce water hammer | 1990 | Good | | | 40-50 | 50 | 27 | 23 | Cost to replace pump control valve | $15,000 | $5,000 | $20,000.00 | | $869.57 | |
| Pump 1 Check Valve | Backflow prevention | 1990 | Good | | | 40-50 | 50 | 27 | 23 | Cost to replace check valve | $1,700 | $850 | $2,550.00 | | $110.87 | |
| Air Release Valve 1 | Air release valve on discharge line of pump | 1990 | Good | | | 15-20 | 35 | 27 | 8 | Cost to replace air release valve | $800 | $400 | $1,200.00 | $150.00 | | |
| Clearwell Booster Pump 2 | 125 HP, Goulds with US Motors; vertical turbine pump; manual operation; pumps run approx. 13 hours a day Monday thru Friday; alternated every day | 1990 | Good | Regular maintenance for pump and motor performed regularly via work orders | | 15-20 | 40 | 27 | 13 | Cost to replace booster pump | $47,000 | $15,000.00 | $62,000.00 | $4,769.23 | | |
| Pump 2 Control Valve & Controller | Operated by solenoid valve and used to reduce water hammer | 1990 | Good | | | 40-50 | 50 | 27 | 23 | Cost to replace pump control valve | $15,000 | $5,000 | $20,000.00 | | $869.57 | |
| Pump 2 Check Valve | Backflow prevention | 1990 | Good | | | 40-50 | 50 | 27 | 23 | Cost to replace check valve | $1,700 | $850 | $2,550.00 | | $110.87 | |
| Air Release Valve 2 | Air release valve on discharge line of pump | 1990 | Good | | | 15-20 | 35 | 27 | 8 | Cost to replace air release valve | $800 | $400 | $1,200.00 | $150.00 | | |
| Clearwell Booster Pump 3 | 60 HP, Goulds with US motors; vertical turbine pump; smaller pump is run if clearwell is full/high; manual operation | 1990 | Good | Regular maintenance for pump and motor performed regularly via work orders | | 15-20 | 40 | 27 | 13 | Cost to replace booster pump | $34,500 | $11,500 | $46,000.00 | $3,538.46 | | |
| Pump 3 Control Valve & Controller | Operated by solenoid valve and used to reduce water hammer | 1990 | Good | | | 40-50 | 50 | 27 | 23 | Cost to replace pump control valve | $15,000 | $5,000 | $20,000.00 | | $869.57 | |
| Pump 3 Check Valve | Backflow prevention | 1990 | Good | | | 40-50 | 50 | 27 | 23 | Cost to replace check valve | $1,700 | $850 | $2,550.00 | | $110.87 | |
| Air Release Valve 3 | Air release valve on discharge line of pump | 1990 | Good | | | 15-20 | 35 | 27 | 8 | Cost to replace air release valve | $800 | $400 | $1,200.00 | $150.00 | | |

## Village of Wellsville Water System Inventory Worksheet (HUNT 1861-034)

Date Worksheet Completed/Updated: January 2017

| | | | | | | | | | | | | | | Amortized Annual Costs | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Asset | Description | Installation Date | Condition | Service History | Maintenance Needed | Expected Useful Life (yrs) | Adjusted Useful Life (yrs) | Age (yrs) | Remaining Useful Life (yrs) | Description of Cost | Replacement Cost | Installation Cost | Total Cost | Short Term Assets | Long Term Assets | Preventative Maintenance |
| **Water Storage** | | | | | | | | | | | | | | | | |
| Water Storage Tank 1 | 2.0 MG volume, 130 feet in diameter, 20 feet deep; Natgun pre-stressed, wire reinforced concrete tank | 2001 | Good | Last inspected August 2014 | Inspection determined that no immediate attention was required. | 100 | 100 | 16 | 84 | Replacement of tank and foundation | $1,500,000 | $500,000 | $2,000,000 | | $23,809.52 | |
| | | | | | Inspection: AWWA D103 recommends that all potable storage tanks be inspected every 5 years | 5 | 5 | 3 | 2 | Cost to inspect storage tank | $2,000 | - | $2,000 | | | $1,000.00 |
| Water Storage Tank 2 | 2.0 MG volume, 130 feet in diameter, 20 feet deep; Natgun pre-stressed, wire reinforced concrete tank | 2001 | Good | Last inspected August 2014 | Inspection determined that no immediate attention was required. | 100 | 100 | 16 | 84 | Replacement of tank and foundation | $1,500,000 | $500,000 | $2,000,000 | | $23,809.52 | |
| | | | | | Inspection: AWWA D103 recommends that all potable storage tanks be inspected every 5 years | 5 | 5 | 3 | 2 | Cost to inspect storage tank | $2,000 | - | $2,000 | | | $1,000.00 |
| **Distribution System** | | | | | | | | | | | | | | | | |
| Valves | One valve broken in closed position during exercising program; 369+/- valves | | | Valves last exercised in 2010 (approx) | The Village owns a valve exerciser and used to exercise valves on a regular schedule. The Village should implement a valve exercising program. One valve broken in closed position should be replaced. | | | | | Cost to replace all isolation valves within the system | $959,400 | $479,700 | $1,439,100 | | | |
| Hydrants | 283+/- hydrants | | | | | | | | | Cost to replace all the hydrants within the system | $1,698,000 | $849,000 | $2,547,000 | | | |
| Booster Pump Building | | 2006 | Good | | | 40-60 | 60 | 11 | 49 | Cost to replace building and electric | $30,000 | - | $30,000 | | $612.24 | |
| Booster Pump 1 & Controls | Booster pump located near concrete storage tanks; 3 HP | 2006 | Good | | | 15-20 | 20 | 11 | 9 | Cost to replace booster pump | $4,000 | $2,000 | $6,000 | $666.67 | | |
| Booster Pump 2 & Controls | Booster pump located near concrete storage tanks; 3 HP | 2006 | Good | | | 15-20 | 20 | 11 | 9 | Cost to replace booster pump | $4,000 | $2,000 | $6,000 | $666.67 | | |
| Hydropneumatic Tank | | 2006 | Good | | | 20-25 | 25 | 11 | 14 | Cost to replace hydropneumatic tank | $500 | $100 | $600 | $42.86 | | |
| Master Meter | Master meter for water used by Scio | | | | | 25 | 25 | 15 | 10 | Cost to replace meter | $12,000 | $4,000 | $16,000 | $1,600.00 | | |
| Distribution Piping | Diameters ranges from 4in to 14 in; Pipe Material: asbestos transite, cast iron, copper, ductile iron, galvanized, plastic; 27.62 miles of distribution piping | | | 9 leaks repaired in 2015; 9 leaks repaired in 2014; 3 leaks repaired in 2016 up until March 15 | | | | | | Cost to replace water system's entire distribution system | $25,077,840 | $12,538,920 | $37,616,760 | | | |
| **Meters** | | | | | | | | | | | | | | | | |
| Meter Software | AMR handheld devices for drive by meter readings | | | | | | | | | | | | | | | |
| Service Connection Meters | Approximately 2300 service connections; Standardizing o Badger meters | | | Meter replacement began in 2011 and was completed in 2016. | Residential meter is $140 each, $115 for installation | 25 | | | 25 | Cost to replace all residential and small commercial meters | $320,740 | $263,465 | $584,205 | $ 23,368.20 | | |
| | High School - Sensus 4"-6" | | Good | Calibrated on 6/15/16: 1% difference, no adjustment | | 25 | | | 13 | Cost to replace meter | $9,375 | $5,715 | $15,090 | $ 1,160.77 | | |
| | Elementary School - Sensus 4"-6" | | Good | Calibrated on 6/15/16: 1% difference, no adjustment | | 25 | | | 13 | Cost to replace meter | $9,375 | $5,715 | $15,090 | $ 1,160.77 | | |
| | Argentieri Laundry - Rockwell 4" | | Poor | Calibrated on 6/15/16: greater than 100% difference | No movement for a long time, kess than one revolution, for a 15 minute span | 25 | | | 1 | Cost to replace meter | $6,800 | $2,800 | $9,600 | $ 9,600.00 | | |
| | Jones Memorial Hospital - Rockwell 4" | | Poor | Calibrated on 6/15/16: greater than 100% difference | No movement when the flow was below 2.7 CFM | 25 | | | 1 | Cost to replace meter | $6,800 | $2,800 | $9,600 | $ 9,600.00 | | |
| | Manor Care Center Spectrum 260, 2" | | Good | Calibrated on 6/15/16: 1% difference, no adjustment | | 25 | | | 13 | Cost to replace meter | $1,080 | $636 | $1,716 | $ 132.00 | | |
| | Manor Care Center (behind WWTP) - Rockwell 2"-3" | | Good | Calibrated on 6/15/16: 1% difference, no adjustment | | 25 | | | 13 | Cost to replace meter | $2,495 | $1,459 | $3,954 | $ 304.15 | | |
| | | | | | | | | | | | | **Totals** | **$51,361,265** | **$98,456.34** | **$197,229.75** | **$2,400.00** |

# APPENDIX L
# VILLAGE BUDGET AND WATER RATES

# Village of Wellsville

## Water Rates/Rate Changes - Effective June 1st, 2015

| | Village | Town |
|---|---|---|
| Customer Meter Charge per month: | $16.00 | $24.00 |
| 1 to 3 units (per unit) | $0.57 | $0.86 |
| 4 to 50 units (per unit) | $3.83 | $5.75 |
| 51-100 units (per unit) | $2.64 | $3.96 |
| 101 to 150 units (per unit) | $2.37 | $3.56 |
| over 150 units (per unit) | $1.38 | $2.07 |
| Meter usage fee * | $2.00 | $3.00 |

**Outside Village customers are charged at %150**

* Usage fee will be combined with Meter charge on monthly billing

## Miscellaneous Water Charges:

| | |
|---|---|
| Account change over charge | $5.00 |

(applied to solid waste/electric if no water service)

| | |
|---|---|
| Water turn on or off during work hours: | $20.00 |
| Water turn on or off after hours: | $90.00 |
| Water turn off/on same day: | $20.00 |
| Non-payment water turn on/off during work hours: | $40.00 |
| Non-payment water turn on/off after hours: | $80.00 |
| Frost Bottom - meter replacement: | $150.00 |

Flow test

| | |
|---|---|
| Testing if meter in working order: | $50.00 |
| Testing if meter is faulty - with replacement | $0.00 |
| Freeze - ups (line thaw), customer side | actual cost |

\>> The village is responsible for service from the main to the curb box. The Customer is responsible for the line from the curb box to the house and inside the house.

| | |
|---|---|
| New 1" Service Connection Fee | $330.00 |

The owner digs the ditch and backfills it. The Village taps the main, supplies and installs the line to and including the curb box, patches the street, and supplies. Connections over 1" will be at actual cost.

| | |
|---|---|
| Street Opening | $150.00 |

Other calls after working hours: to be billed at actual cost

\>> The Village reserves the right to change rates periodically to cover actual costs.

# Detailed Budget Report

## Village of Wellsville

### 2014 to 2015 TENTATIVE BUDGET

| WATER FUND | 2014-2015 TENTATIVE | 2013-2014 APPROVED | DIF % | 2012-2013 BUDGET | FIRST 8 MONTHS | 8 ESTIMATED | 2012-2013 ACTUAL |
|---|---|---|---|---|---|---|---|
| **REVENUES:** | | | | | | | |
| F.2140.000 | | | | | | | |
| WATER SALES | 1,115,850.00 | 1,077,000.00 | 3.61% | 1,056,000.00 | 679,747.28 | 1,019,620.92 | 1,023,310.97 |
| F.2142.000 | | | | | | | |
| WATER SALES - UNMETERED | 0.00 | 6,000.00 | -100.00% | 5,000.00 | 0.00 | 0.00 | 0.00 |
| F.2144.000 | | | | | | | |
| SERVICE CHARGES | 9,000.00 | 6,000.00 | 50.00% | 5,000.00 | 13,443.46 | 20,165.19 | 275,916.50 |
| F.2145.000 | | | | | | | |
| SERVICE TAPS - CONNECTION | 3,000.00 | 6,000.00 | -50.00% | 4,700.00 | 0.00 | 0.00 | 8,775.00 |
| F.2148.000 | | | | | | | |
| PENALTY ON WATER SALES | 12,000.00 | 15,000.00 | -20.00% | 12,000.00 | 15,262.38 | 22,893.57 | 22,403.52 |
| **TOTAL DEPARTMENTAL INCOME** | **1,139,850.00** | **1,110,000.00** | | **1,082,700.00** | **708,453.12** | **1,062,679.68** | **1,330,405.99** |
| F.2401.000 | | | | | | | |
| INTEREST INCOME | 150.00 | 300.00 | -50.00% | 300.00 | 100.55 | 150.83 | 189.77 |
| **TOTAL USE OF MONEY AND PROPERTY** | **150.00** | **300.00** | | **300.00** | **100.55** | **150.83** | **189.77** |
| **TOTAL REVENUES** | **1,140,000.00** | **1,110,300.00** | | **1,083,000.00** | **708,553.67** | **1,062,830.51** | **1,330,595.76** |
| **APPROPRIATED FUND BALANCE** | **0.00** | **0.00** | | **0.00** | **24,721.58** | **24,721.58** | **0.00** |
| **TOTAL REVENUE AND OTHER SOURCES** | **1,140,000.00** | **1,110,300.00** | 2.67% | **1,083,000.00** | **733,275.25** | **1,087,552.09** | **1,330,595.76** |
| **APPROPRIATIONS:** | | | | | | | |
| F.1420.101 | | | | | | | |
| LEGAL - VILLAGE ATTORNEY | 3,387.05 | 3,135.76 | 8.01% | 3,135.76 | 2,111.05 | 3,135.76 | 3,179.34 |
| **TOTAL PERSONNEL SERVICES** | **3,387.05** | **3,135.76** | | **3,135.76** | **2,111.05** | **3,135.76** | **3,179.34** |
| F.1440.400 | | | | | | | |
| ENGINEERING - CONSULTANTS | 4,800.00 | 4,400.00 | 9.09% | 2,000.00 | 770.00 | 4,400.00 | 4,263.75 |

# Detailed Budget Report
## Village of Wellsville
### 2014 to 2015 TENTATIVE BUDGET

| WATER FUND | 2014-2015 TENTATIVE | 2013-2014 APPROVED | DIF % | 2012-2013 BUDGET | FIRST 8 MONTHS | 8 ESTIMATED | 2012-2013 ACTUAL |
|---|---|---|---|---|---|---|---|
| **TOTAL CONTRACTUAL EXPENSE** | **4,800.00** | **4,400.00** | | **2,000.00** | **770.00** | **4,400.00** | **4,263.75** |
| F.1910.400 | | | | | | | |
| SPECIAL ITEMS - GENERAL LIBILITY | 18,000.00 | 19,500.00 | -7.69% | 20,000.00 | 13,460.43 | 13,460.43 | 14,994.50 |
| **TOTAL INSURANCE** | **18,000.00** | **19,500.00** | | **20,000.00** | **13,460.43** | **13,460.43** | **14,994.50** |
| **TOTAL GOVERNMENT SUPPORT** | **26,187.05** | **27,035.76** | | **25,135.76** | **16,341.48** | **20,996.19** | **22,437.59** |
| F.5111.200 | | | | | | | |
| VEHICLE MAINT - RESERVE FOR EQUIPMENT | 25,000.00 | 20,000.00 | 25.00% | 6,000.00 | 0.00 | 20,000.00 | 0.00 |
| F.5111.202 | | | | | | | |
| EQUIPMENT (from reserve fund) | 0.00 | 0.00 | #DIV/0! | 0.00 | 24,721.58 | 24,721.58 | 0.00 |
| F.5111.204 | | | | | | | |
| VEHICLE MAINTENANCE - SAFETY EQUIPMENT | 0.00 | 1,500.00 | -100.00% | 1,000.00 | 0.00 | 1,500.00 | 0.00 |
| **TOTAL EQUIPMENT/CAPITAL OUTLAY** | **25,000.00** | **21,500.00** | | **7,000.00** | **24,721.58** | **46,221.58** | **0.00** |
| F.5111.450 | | | | | | | |
| VEHICLE MAINTENANCE - CONTRACTUAL/MISC | 1,200.00 | 300.00 | 300.00% | 400.00 | 82.74 | 124.11 | 374.60 |
| F.5111.461 | | | | | | | |
| VEHICLE MAINTENANCE -UNLEADED FUEL | 6,000.00 | 7,000.00 | -14.29% | 7,000.00 | 3,145.65 | 4,718.48 | 5,457.76 |
| F.5111.462 | | | | | | | |
| VEHICLE MAINTENANCE - UNLEADED FUEL SURC | 600.00 | 600.00 | 0.00% | 731.00 | 232.47 | 348.71 | 392.91 |
| F.5111.463 | | | | | | | |
| VEHICLE MAINTENANCE - DIESEL FUEL | 1,200.00 | 1,800.00 | -33.33% | 2,154.00 | 493.42 | 740.13 | 1,413.82 |
| F.5111.465 | | | | | | | |
| VEHICLE MAINTENANCE - TIRES/TUBES/REPAIR | 900.00 | 900.00 | 0.00% | 1,000.00 | 47.00 | 70.50 | 632.82 |
| F.5111.468 | | | | | | | |
| VEHICLE MAINTENANCE - GREASE/OIL/ANTI-FR | 300.00 | 300.00 | 0.00% | 300.00 | 0.00 | 0.00 | 0.00 |
| F.5111.473 | | | | | | | |
| VEHICLE MAINTENANCE - VEH EQUIP | 9,000.00 | 7,500.00 | 20.00% | 7,500.00 | 6,374.97 | 9,562.46 | 9,034.26 |
| F.5111.475 | | | | | | | |
| VEHICLE MAINTENANCE - GENERATOR MAINT | 2,400.00 | 1,800.00 | 33.33% | 1,450.00 | 331.28 | 496.92 | 282.84 |
| F.5111.476 | | | | | | | |
| VEHICLE MAINTENANCE - BATTERIES | 300.00 | 150.00 | 100.00% | 100.00 | 0.00 | 0.00 | 0.00 |

# Detailed Budget Report

## Village of Wellsville

### 2014 to 2015 TENTATIVE BUDGET

| WATER FUND | 2014-2015 TENTATIVE | 2013-2014 APPROVED | DIF % | 2012-2013 BUDGET | FIRST 8 MONTHS | 8 ESTIMATED | 2012-2013 ACTUAL |
|---|---|---|---|---|---|---|---|
| F.5111.478<br>VEHICLE MAINTENANCE - CDL TESTING | 0.00 | 300.00 | -100.00% | 200.00 | 0.00 | 0.00 | 258.74 |
| **TOTAL CONTRACTUAL EXPENSE** | **21,900.00** | **20,650.00** | | **20,835.00** | **10,707.53** | **16,061.30** | **17,847.75** |
| **TOTAL TRANSPORTATION** | **46,900.00** | **42,150.00** | | **27,835.00** | **35,429.11** | **62,282.88** | **17,847.75** |
| F.8310.100<br>WATER ADMIN - DPW SALARY | 17,649.54 | 17,320.16 | 1.90% | 16,809.12 | 10,748.47 | 17,320.16 | 17,932.17 |
| F.8310.104<br>WATER ADMIN - BILLING SUPERVISOR | 10,224.22 | 10,023.75 | 2.00% | 10,023.75 | 6,772.89 | 10,023.75 | 10,064.24 |
| F.8310.106<br>VILLAGE TREASURER | 10,482.47 | 9,711.90 | 7.93% | 9,722.32 | 6,071.79 | 9,711.90 | 9,769.01 |
| F.8310.108<br>WATER ADMIN - VILLAGE CLERK | 9,241.95 | 8,986.52 | 2.84% | 8,551.23 | 5,756.21 | 8,986.52 | 8,779.97 |
| F.8310.109<br>WATER ADMIN - DEPUTY VILLAGE CLERK | 3,695.69 | 4,103.01 | -9.93% | 4,794.07 | 2,729.39 | 4,103.01 | 3,809.48 |
| F.8310.111<br>WATER ADMIN - RECEPTIONIST | 8,268.69 | 7,987.22 | 3.52% | 8,007.30 | 4,499.78 | 7,987.22 | 7,909.41 |
| F.8310.112<br>WATER ADMIN - SECRETATY | 7,698.53 | 7,489.73 | 2.79% | 7,285.42 | 4,315.51 | 7,489.73 | 7,501.09 |
| F.8310.113<br>WATER ADMIN - E/W SECRETARY | 2,524.70 | 2,475.20 | 2.00% | 2,524.70 | 1,699.61 | 2,475.20 | 2,536.02 |
| F.8310.117<br>WATER ADMIN - DATA ENTRY CLERK SALARY | 6,548.13 | 6,323.57 | 3.55% | 6,471.69 | 3,601.41 | 6,323.57 | 5,878.37 |
| F.8310.118<br>WATER ADMIN - METER READING | 745.04 | 4,598.10 | -83.80% | 5,952.96 | 3,668.14 | 4,598.10 | 8,227.62 |
| F.8310.124<br>DEPUTY DIRECTOR DPW | 13,264.09 | 12,897.95 | 2.84% | 12,914.17 | 8,410.63 | 12,897.95 | 13,898.79 |
| **TOTAL PERSONNEL SERVICES** | **90,343.05** | **91,917.10** | | **93,056.73** | **58,273.83** | **91,917.10** | **96,306.17** |
| F.8310.201<br>WATER ADMIN - EQUIPMENT | 10,000.00 | 9,125.00 | 9.59% | 2,000.00 | 0.00 | 9,125.00 | 0.00 |
| **TOTAL EQUIPMENT/CAPITAL OUTLAY** | **10,000.00** | **9,125.00** | | **2,000.00** | **0.00** | **9,125.00** | **0.00** |

# Detailed Budget Report

## Village of Wellsville

### 2014 to 2015 TENTATIVE BUDGET

| WATER FUND | 2014-2015 TENTATIVE | 2013-2014 APPROVED | DIF % | 2012-2013 BUDGET | FIRST 8 MONTHS | 8 ESTIMATED | 2012-2013 ACTUAL |
|---|---|---|---|---|---|---|---|
| F.8310.401 | | | | | | | |
| WATER ADMIN - COPIER EXPENSE | 300.00 | 300.00 | 0.00% | 400.00 | 110.53 | 165.80 | 78.31 |
| F.8310.402 | | | | | | | |
| WATER ADMIN - COMPUTER SUPPLIES DPW | 1,200.00 | 300.00 | 300.00% | 400.00 | 1,140.46 | 1,710.69 | 434.02 |
| F.8310.403 | | | | | | | |
| WATER ADMIN - OFFICE SUPPLIES | 1,200.00 | 1,200.00 | 0.00% | 700.00 | 438.08 | 657.12 | 352.07 |
| F.8310.405 | | | | | | | |
| WATER ADMIN - CONFERENCES/SCHOOLING | 3,000.00 | 3,000.00 | 0.00% | 2,500.00 | 295.93 | 3,000.00 | 1,874.25 |
| F.8310.406 | | | | | | | |
| WATER ADMIN - ASSOCIATION DUES | 600.00 | 600.00 | 0.00% | 500.00 | 0.00 | 0.00 | 233.00 |
| F.8310.407 | | | | | | | |
| WATER ADMIN - COMPUTER SUPPLIES | 600.00 | 600.00 | 0.00% | 500.00 | 119.40 | 179.10 | 493.38 |
| F.8310.408 | | | | | | | |
| WATER ADMIN - ADVERTISING & PRINTING | 300.00 | 600.00 | -50.00% | 1,000.00 | 0.00 | 0.00 | 788.63 |
| F.8310.411 | | | | | | | |
| WATER ADMIN - VILLAGE BOARD EXPENSES | 0.00 | 0.00 | #DIV/0! | 1,000.00 | 0.00 | 0.00 | 0.00 |
| F.8310.412 | | | | | | | |
| WATER ADMIN - COMPUTER SOFTWARE PLAN | 0.00 | 0.00 | #DIV/0! | 100.00 | 0.00 | 0.00 | 6.45 |
| F.8310.413 | | | | | | | |
| WATER ADMIN - COMPUTER SOFTWARE TRAININ( | 600.00 | 600.00 | 0.00% | 400.00 | 61.25 | 91.88 | 139.75 |
| F.8310.421 | | | | | | | |
| WATER ADMIN - TELEPHONE | 1,200.00 | 1,200.00 | 0.00% | 1,500.00 | 803.61 | 1,205.42 | 909.23 |
| F.8310.422 | | | | | | | |
| WATER ADMIN - CELL PHONE | 1,200.00 | 1,500.00 | -20.00% | 1,750.00 | 123.34 | 185.01 | 161.88 |
| F.8310.431 | | | | | | | |
| WATER ADMIN - COMPUTER SOFTWARE | 300.00 | 300.00 | 0.00% | 200.00 | 0.00 | 0.00 | 0.00 |
| F.8310.432 | | | | | | | |
| WATER ADMIN - TRAINING | 900.00 | 900.00 | 0.00% | 900.00 | 0.00 | 0.00 | 27.00 |
| F.8310.433 | | | | | | | |
| WATER ADMIN - POSTAGE/POSTAL SUPPLIES | 3,600.00 | 3,600.00 | 0.00% | 4,500.00 | 2,825.40 | 4,238.10 | 3,440.35 |
| F.8310.435 | | | | | | | |
| WATER ADMIN - AUDIT EXPENSES | 3,600.00 | 2,400.00 | 50.00% | 2,500.00 | 450.00 | 2,400.00 | 3,148.03 |
| F.8310.436 | | | | | | | |
| WATER ADMIN - TELEPHONE BILLING OFFICE | 300.00 | 300.00 | 0.00% | 300.00 | 166.39 | 249.59 | 265.67 |
| F.8310.437 | | | | | | | |

# Detailed Budget Report

## Village of Wellsville

### 2014 to 2015 TENTATIVE BUDGET

| WATER FUND | 2014-2015 TENTATIVE | 2013-2014 APPROVED | DIF % | 2012-2013 BUDGET | FIRST 8 MONTHS | 8 ESTIMATED | 2012-2013 ACTUAL |
|---|---|---|---|---|---|---|---|
| WATER ADMIN - GEN OPER BILLING OFFICE | 300.00 | 300.00 | 0.00% | 500.00 | 35.15 | 52.73 | 62.64 |
| F.8310.438 | | | | | | | |
| WATER ADMIN -BILLING OFFICE SUPPLIES | 300.00 | 300.00 | 0.00% | 400.00 | 111.57 | 167.36 | 163.32 |
| F.8310.439 | | | | | | | |
| WATER ADMIN-COMPUTER MAINTENANCE | 3,600.00 | 3,600.00 | 0.00% | 3,000.00 | 2,521.53 | 3,782.30 | 2,916.38 |
| F.8310.440 | | | | | | | |
| WATER ADMIN - PAPER | 300.00 | 300.00 | 0.00% | 120.00 | 537.55 | 806.33 | 418.94 |
| F.8310.441 | | | | | | | |
| WATER ADMIN - CONSULTANT BILLING OFFICE | 0.00 | 0.00 | #DIV/0! | 0.00 | 0.00 | 0.00 | 0.00 |
| F.8310.450 | | | | | | | |
| WATER ADMIN - MISCELLANEOUS EXP | 600.00 | 900.00 | -33.33% | 725.00 | 848.46 | 1,272.69 | 742.14 |
| F.8310.460 | | | | | | | |
| WATER ADMIN - GIS EXPENSES | 1,600.00 | 1,250.00 | 28.00% | 1,250.00 | 358.53 | 537.80 | 986.22 |
| F.8310.499 | | | | | | | |
| WATER ADMIN - DPW OFFICE | 300.00 | 300.00 | 0.00% | 300.00 | 110.41 | 165.62 | 0.00 |
| **TOTAL CONTRACTUAL EXPENSE** | **25,900.00** | **24,350.00** | | **25,445.00** | **11,057.59** | **20,867.49** | **17,641.66** |
| **TOTAL WATER ADMINISTRATION** | **126,243.05** | **125,392.10** | | **120,501.73** | **69,331.42** | **121,909.59** | **113,947.83** |
| F.8320.425 | | | | | | | |
| SUPPLY & PUMPING - ELECTRIC TREATMENT | 15,000.00 | 15,000.00 | 0.00% | 18,000.00 | 9,330.51 | 13,995.77 | 12,918.03 |
| F.8320.426 | | | | | | | |
| SUPPLY & PUMPING-GENERATOR PROPANE | 2,400.00 | 2,400.00 | 0.00% | 2,000.00 | 2,400.00 | 2,400.00 | 2,438.98 |
| F.8320.427 | | | | | | | |
| SUPPLY & PUMPING - GENERATOR MAINT | 600.00 | 600.00 | 0.00% | 500.00 | 0.00 | 0.00 | 0.00 |
| F.8320.450 | | | | | | | |
| SUPPLY & PUMPING - GENERAL OPERATING | 600.00 | 600.00 | 0.00% | 500.00 | 8.00 | 12.00 | 429.32 |
| F.8320.451 | | | | | | | |
| SUPPLY & PUMPING - NEW INTAKE PARTS | 600.00 | 600.00 | 0.00% | 500.00 | 3.80 | 5.70 | 68.16 |
| F.8320.452 | | | | | | | |
| SUPPLY & PUMPING - TELEPHONE & LEASING | 300.00 | 300.00 | 0.00% | 120.00 | 85.20 | 127.80 | 69.32 |
| F.8320.453 | | | | | | | |
| SUPPLY & PUMPING - CONTROL BOARD | 300.00 | 300.00 | 0.00% | 200.00 | 0.00 | 0.00 | 0.00 |
| F.8320.454 | | | | | | | |
| SUPPLY & PUMPING - PUMPS/REPAIR | 6,000.00 | 4,000.00 | 50.00% | 5,000.00 | 304.86 | 4,000.00 | 552.11 |

# Detailed Budget Report

## Village of Wellsville

### 2014 to 2015 TENTATIVE BUDGET

| WATER FUND | 2014-2015 TENTATIVE | 2013-2014 APPROVED | DIF % | 2012-2013 BUDGET | FIRST 8 MONTHS | 8 ESTIMATED | 2012-2013 ACTUAL |
|---|---|---|---|---|---|---|---|
| **TOTAL CONTRACTUAL EXPENSE** | **25,800.00** | **23,800.00** | | **26,820.00** | **12,132.37** | **20,541.27** | **16,475.92** |
| **TOTAL SUPPLY AND PUMPING** | **25,800.00** | **23,800.00** | | **26,820.00** | **12,132.37** | **20,541.27** | **16,475.92** |
| F.8330.110<br>PURIFICATION -PLANT OPERATION | 142,854.91 | 116,860.68 | 22.24% | 146,544.26 | 75,921.82 | 116,860.68 | 124,875.07 |
| F.8330.120<br>PURIFICATION - PLANT OPERATION O/T | 9,000.00 | 9,000.00 | 0.00% | 9,000.00 | 3,852.74 | 5,779.11 | 6,420.98 |
| **TOTAL PERSONNEL SERVICES** | **151,854.91** | **125,860.68** | | **155,544.26** | **79,774.56** | **122,639.79** | **131,296.05** |
| F.8330.200<br>EQUIPMENT | 15,000.00 | 15,000.00 | 0.00% | 5,000.00 | 0.00 | 15,000.00 | 1,375.85 |
| **TOTAL EQUIPMENT/CAPITAL OUTLAY** | **15,000.00** | **15,000.00** | | **5,000.00** | **0.00** | **15,000.00** | **1,375.85** |
| F.8330.425<br>PURIFICATION - WTP ELECTRIC | 24,000.00 | 24,000.00 | 0.00% | 23,000.00 | 12,953.86 | 19,430.79 | 28,632.66 |
| F.8330.426<br>PURIFICATION - WTR DIESEL FUEL | 3,600.00 | 3,000.00 | 20.00% | 3,000.00 | 0.00 | 3,000.00 | 2,021.19 |
| F.8330.427<br>PURIFICATION - GENERATOE MAINT | 600.00 | 600.00 | 0.00% | 500.00 | 0.00 | 0.00 | 139.28 |
| F.8330.450<br>PURIFICATION - GEN OPER EXP | 300.00 | 300.00 | 0.00% | 250.00 | 100.62 | 150.93 | -58.26 |
| F.8330.460<br>PURIFICATION - OUTSIDE LAB TESTING | 7,200.00 | 8,000.00 | -10.00% | 6,000.00 | 2,164.46 | 8,000.00 | 2,744.11 |
| F.8330.461<br>PURIFICATION - LABORATORY SUPP | 900.00 | 750.00 | 20.00% | 750.00 | 309.42 | 464.13 | 474.48 |
| F.8330.462<br>PURIFICATION - LABORATORY EQUIP | 900.00 | 900.00 | 0.00% | 800.00 | 1,481.18 | 2,221.77 | 313.78 |
| F.8330.463<br>PURIFICATION - FILTER REPAIR P | 2,400.00 | 2,400.00 | 0.00% | 2,000.00 | 0.00 | 2,400.00 | 2,185.77 |
| F.8330.464<br>PURIFICATION - CONTROL BOARD | 900.00 | 300.00 | 200.00% | 500.00 | 6,693.50 | 6,693.50 | 279.92 |
| F.8330.465 | | | | | | | |

# Detailed Budget Report
## Village of Wellsville
### 2014 to 2015 TENTATIVE BUDGET

| WATER FUND | 2014-2015 TENTATIVE | 2013-2014 APPROVED | DIF % | 2012-2013 BUDGET | FIRST 8 MONTHS | 8 ESTIMATED | 2012-2013 ACTUAL |
|---|---|---|---|---|---|---|---|
| PURIFICATION - PUMPS/REPAIR | 4,800.00 | 4,800.00 | 0.00% | 5,000.00 | 0.00 | 4,800.00 | 4,759.57 |
| F.8330.466 | | | | | | | |
| PURIFICATION - TOOLS | 300.00 | 300.00 | 0.00% | 500.00 | 44.97 | 67.46 | 97.16 |
| F.8330.467 | | | | | | | |
| PURIFICATION - ELECTRICAL REPAIR | 300.00 | 300.00 | 0.00% | 200.00 | 0.00 | 0.00 | 0.00 |
| F.8330.468 | | | | | | | |
| PURIFICATION - MISC EQUIPMENT REPAIR | 1,500.00 | 1,500.00 | 0.00% | 1,500.00 | 954.02 | 1,431.03 | 1,416.74 |
| F.8330.480 | | | | | | | |
| PURIFICATION - CHEMICAL FEEDER | 1,200.00 | 1,000.00 | 20.00% | 1,000.00 | 437.08 | 655.62 | 962.41 |
| F.8330.494 | | | | | | | |
| PURIFICATION - MISC CHEMICALS | 36,000.00 | 35,000.00 | 2.86% | 35,000.00 | 21,095.97 | 31,643.96 | 30,049.67 |
| **TOTAL CONTRACTUAL EXPENSE** | **84,900.00** | **83,150.00** | | **80,000.00** | **46,235.08** | **80,959.18** | **74,018.48** |
| **TOTAL WATER PURIFICATION** | **251,754.91** | **224,010.68** | | **240,544.26** | **126,009.64** | **218,598.97** | **206,690.38** |
| F.8340.110 | | | | | | | |
| TRANSMISSION & DIST - MAIN LINE REPAIR | 81,769.81 | 88,780.49 | -7.90% | 54,834.00 | 64,191.05 | 88,780.49 | 80,545.04 |
| F.8340.120 | | | | | | | |
| TRANS & DIST - MAIN LINE REPAIRS OT | 7,000.00 | 7,000.00 | 0.00% | 7,000.00 | 5,008.45 | 7,512.68 | 5,756.71 |
| **TOTAL PERSONNEL SERVICES** | **88,769.81** | **95,780.49** | | **61,834.00** | **69,199.50** | **96,293.17** | **86,301.75** |
| F.8340.200 | | | | | | | |
| TRANSMISSION & DIST -RESV. DIST. FUND EQ | 0.00 | 1,200.00 | -100.00% | 1,000.00 | 0.00 | 1,200.00 | 0.00 |
| F.8340.201 | | | | | | | |
| TRANSMISSION & DIST - EQUIPMENT | 0.00 | 1,500.00 | -100.00% | 1,500.00 | 0.00 | 1,500.00 | 0.00 |
| F.8340.202 | | | | | | | |
| TRANSMISSION & DIST - HYDRANTS | 0.00 | 2,400.00 | -100.00% | 3,000.00 | 2,062.71 | 2,400.00 | 874.83 |
| **TOTAL EQUIPMENT/CAPITAL OUTLAY** | **0.00** | **5,100.00** | | **5,500.00** | **2,062.71** | **5,100.00** | **874.83** |
| F.8340.450 | | | | | | | |
| TRANSMISSION & DIST - GEN OPER EXP | 1,200.00 | 900.00 | 33.33% | 1,000.00 | 624.48 | 936.72 | 828.56 |
| F.8340.460 | | | | | | | |
| TRANSMISSION & DIST - MAIN LINE REPAIR | 12,000.00 | 12,000.00 | 0.00% | 11,750.00 | 9,922.24 | 14,883.36 | 12,899.77 |

# Detailed Budget Report

## Village of Wellsville

### 2014 to 2015 TENTATIVE BUDGET

| WATER FUND | 2014-2015 TENTATIVE | 2013-2014 APPROVED | DIF % | 2012-2013 BUDGET | FIRST 8 MONTHS | 8 ESTIMATED | 2012-2013 ACTUAL |
|---|---|---|---|---|---|---|---|
| F.8340.463 | | | | | | | |
| TRANSMISSION & DIST - HYDRANT REPAIRS | 7,000.00 | 3,600.00 | 94.44% | 3,400.00 | 2,502.71 | 3,754.07 | 821.50 |
| F.8340.465 | | | | | | | |
| TRANSMISSION & DIST - STREET REPAIRS | 20,000.00 | 7,000.00 | 185.71% | 5,000.00 | 5,568.28 | 8,352.42 | 4,449.89 |
| F.8340.466 | | | | | | | |
| TRANSMISSION & DIST - METER PURCHASE | 6,000.00 | 0.00 | #DIV/0! | 50,400.00 | 3,848.00 | 3,848.00 | 289,988.76 |
| F.8340.468 | | | | | | | |
| TRANSMISSION & DIST - RESERVOIR | 6,000.00 | 7,500.00 | -20.00% | 500.00 | 0.00 | 0.00 | 0.00 |
| F.8340.469 | | | | | | | |
| TRANSMISSION & DIST - TOOL REPAIR | 300.00 | 300.00 | 0.00% | 100.00 | 0.00 | 0.00 | 78.95 |
| F.8340.470 | | | | | | | |
| TRANSMISSION & DIST - PUMP REPAIR | 300.00 | 300.00 | 0.00% | 300.00 | 0.00 | 0.00 | 0.00 |
| F.8340.471 | | | | | | | |
| TRANSMISSION & DIST - EQUIPMENT REPAIR | 300.00 | 300.00 | 0.00% | 300.00 | 0.00 | 0.00 | 54.97 |
| F.8340.472 | | | | | | | |
| TRANSMISSION & DIST - ELEC DIST SYS | 1,200.00 | 1,200.00 | 0.00% | 1,000.00 | 292.10 | 438.15 | 926.35 |
| F.8340.473 | | | | | | | |
| TRANSMISSION & DIST - MISC HAND TOOL | 1,200.00 | 600.00 | 100.00% | 1,000.00 | 42.23 | 63.35 | 118.25 |
| F.8340.474 | | | | | | | |
| TRANSMISSION & DIST - GRAVEL & CONCR | 900.00 | 900.00 | 0.00% | 1,000.00 | 0.00 | 0.00 | 22.26 |
| F.8340.475 | | | | | | | |
| TRANSMISSION & DIST - EQUIPMENT RENT | 600.00 | 600.00 | 0.00% | 500.00 | 0.00 | 0.00 | 0.00 |
| F.8340.476 | | | | | | | |
| TRANSMISSION & DIST - WNYPA RAIL ROAD | 600.00 | 600.00 | 0.00% | 500.00 | 488.11 | 732.17 | 483.13 |
| F.8340.477 | | | | | | | |
| TRANSMISSION & DIST-PPE TRAINING/EQUIP | 1,800.00 | 1,800.00 | 0.00% | 2,416.00 | 946.31 | 1,419.47 | 1,911.34 |
| F.8340.478 | | | | | | | |
| PROPANE - RESERVOIR | 1,200.00 | 1,800.00 | -33.33% | 2,000.00 | 575.00 | 862.50 | 461.16 |
| **TOTAL CONTRACTUAL EXPENSE** | **60,600.00** | **39,400.00** | | **81,166.00** | **24,809.46** | **35,290.19** | **313,044.89** |
| **TOTAL TRANSMISSION AND DISTRIBUTION** | **149,369.81** | **140,280.49** | | **148,500.00** | **96,071.67** | **136,683.36** | **400,221.47** |
| F.8341.401 | | | | | | | |
| CONTRACTUAL - MATERIALS | 42,000.00 | 40,000.00 | 5.00% | 40,000.00 | 38,124.42 | 38,124.42 | 34,988.33 |

# Detailed Budget Report

## Village of Wellsville

### 2014 to 2015 TENTATIVE BUDGET

| WATER FUND | 2014-2015 TENTATIVE | 2013-2014 APPROVED | DIF % | 2012-2013 BUDGET | FIRST 8 MONTHS | 8 ESTIMATED | 2012-2013 ACTUAL |
|---|---|---|---|---|---|---|---|
| **TOTAL CONTRACTUAL EXPENSE** | **42,000.00** | **40,000.00** | | **40,000.00** | **38,124.42** | **38,124.42** | **34,988.33** |
| **TOTAL BUILDING AND GROUNDS MAINT** | **42,000.00** | **40,000.00** | | **40,000.00** | **38,124.42** | **38,124.42** | **34,988.33** |
| F.8350.118 | | | | | | | |
| BLDG & GROUNDS MAIN - JANITOR | 2,483.97 | 1,594.85 | 55.75% | 1,513.20 | 1,548.48 | 2,322.72 | 1,602.79 |
| **TOTAL PERSONNEL SERVICES** | **2,483.97** | **1,594.85** | | **1,513.20** | **1,548.48** | **2,322.72** | **1,602.79** |
| F.8350.423 | | | | | | | |
| BLDG & GROUNDS MAIN - NATURAL GAS | 6,000.00 | 8,000.00 | -25.00% | 8,000.00 | 2,831.17 | 4,246.76 | 5,198.70 |
| F.8350.441 | | | | | | | |
| BLDG & GROUNDS MAIN - JANITOTIAL SUPPL | 600.00 | 600.00 | 0.00% | 500.00 | 312.62 | 468.93 | 283.23 |
| F.8350.446 | | | | | | | |
| BLDG & GROUNDS MAIN - PAINT | 300.00 | 300.00 | 0.00% | 400.00 | 67.66 | 101.49 | 0.00 |
| F.8350.449 | | | | | | | |
| BLDG & GROUNDS MAIN - LAWN CARE | 300.00 | 300.00 | 0.00% | 500.00 | 286.81 | 430.22 | 222.03 |
| F.8350.450 | | | | | | | |
| BLDG & GROUNDS MAIN - MISCELLANEOUS | 1,500.00 | 900.00 | 66.67% | 1,000.00 | 531.06 | 796.59 | 558.85 |
| F.8350.451 | | | | | | | |
| BLDG & GROUNDS MAIN - MAINT MATERIAL | 1,500.00 | 1,500.00 | 0.00% | 1,500.00 | 378.72 | 568.08 | 532.47 |
| F.8350.452 | | | | | | | |
| BLDG & GROUNDS MAIN - ELECTRICAL REPAIR | 300.00 | 300.00 | 0.00% | 300.00 | 25.00 | 37.50 | 152.80 |
| F.8350.453 | | | | | | | |
| BLDG & GROUNDS MAIN - PLUMBING | 300.00 | 300.00 | 0.00% | 250.00 | 92.57 | 138.86 | 225.35 |
| F.8350.454 | | | | | | | |
| BLDG & GROUNDS MAIN - MEDICAL SERVICE | 0.00 | 0.00 | #DIV/0! | 100.00 | 0.00 | 0.00 | 0.00 |
| F.8350.460 | | | | | | | |
| BLDG & GROUNDS MAIN - GARAGE HEATING | 3,000.00 | 3,600.00 | -16.67% | 3,300.00 | 1,059.80 | 1,589.70 | 2,542.16 |
| F.8350.461 | | | | | | | |
| BLDG & GROUNDS MAIN - GARAGE JANITOR | 300.00 | 300.00 | 0.00% | 700.00 | 76.20 | 114.30 | 2.99 |
| F.8350.462 | | | | | | | |
| BLDG & GROUNDS MAIN - GARAGE TELEPHONE | 900.00 | 700.00 | 28.57% | 1,000.00 | 434.70 | 652.05 | 368.19 |
| F.8350.463 | | | | | | | |
| BLDG & GROUNDS MAIN - GARAGE OPER EXPEN | 600.00 | 300.00 | 100.00% | 500.00 | 0.00 | 0.00 | 279.62 |
| F.8350.465 | | | | | | | |

# Detailed Budget Report

## Village of Wellsville

### 2014 to 2015 TENTATIVE BUDGET

| | 2014-2015 | 2013-2014 | | 2012-2013 | | 8 | 2012-2013 |
|---|---|---|---|---|---|---|---|
| **WATER FUND** | **TENTATIVE** | **APPROVED** | **DIF %** | **BUDGET** | **FIRST 8 MONTHS** | **ESTIMATED** | **ACTUAL** |
| BLDG & GROUNDS MAIN - GARAGE MAINT | 300.00 | 300.00 | 0.00% | 100.00 | 0.00 | 0.00 | 0.81 |
| F.8350.466 | | | | | | | |
| BLDG & GROUNDS MAIN -COPIER | 300.00 | 300.00 | 0.00% | 750.00 | 70.29 | 105.44 | 84.05 |
| F.8350.475 | | | | | | | |
| BLDG & GROUNDS MAIN - MOWER REPAIRS | 300.00 | 300.00 | 0.00% | 500.00 | 2.30 | 3.45 | 299.85 |
| F.8350.476 | | | | | | | |
| BLDG & GROUNDS MAIN - OXYGEN ACETELYN | 0.00 | 0.00 | #DIV/0! | 200.00 | 241.75 | 362.63 | 121.00 |
| F.8350.497 | | | | | | | |
| BLDG & GROUNDS MAIN - DRIVEWAY SEALER | 650.00 | 600.00 | 8.33% | 600.00 | 615.00 | 922.50 | 575.00 |
| F.8350.498 | | | | | | | |
| BLDG & GROUNDS MAIN - PHONE SYS | 300.00 | 300.00 | 0.00% | 300.00 | 203.90 | 305.85 | 163.68 |
| **TOTAL CONTRACTUAL EXPENSE** | **17,450.00** | **18,900.00** | | **20,500.00** | **7,229.55** | **10,844.33** | **11,610.78** |
| **TOTAL HOME AND COMMUNITY BASED SERVICES** | **19,933.97** | **20,494.85** | | **22,013.20** | **8,778.03** | **13,167.05** | **13,213.57** |
| F.9010.800 | | | | | | | |
| EMPLOYEE BENEFITS - RETIREMENT/NYSER | 67,704.60 | 62,875.53 | 7.68% | 54,082.94 | 64,732.41 | 64,732.41 | 46,531.90 |
| F.9030.800 | | | | | | | |
| EMPLOYEE BENEFITS - SOCIAL SECURITY | 25,073.80 | 24,349.10 | 2.98% | 24,189.16 | 15,827.18 | 23,740.77 | 23,932.16 |
| F.9040.800 | | | | | | | |
| EMPLOYEE BENEFITS - WORKERS COMP. | 6,600.00 | 7,500.00 | -12.00% | 7,500.00 | 6,001.00 | 6,001.00 | 7,080.00 |
| F.9050.800 | | | | | | | |
| EMPLOYEE BENEFITS - UNEMPLOYMENT INS | 0.00 | 0.00 | #DIV/0! | 0.00 | 0.00 | 0.00 | 0.00 |
| F.9055.800 | | | | | | | |
| EMPLOYEE BENEFITS - DISABILITY INS | 600.00 | 600.00 | 0.00% | 500.00 | 135.96 | 203.94 | 190.51 |
| F.9060.800 | | | | | | | |
| EMPLOYEE BENEFITS - HOSPITALIZATION | 34,009.81 | 32,874.49 | 3.45% | 32,019.93 | 13,456.11 | 32,874.49 | 30,938.99 |
| F.9070.800 | | | | | | | |
| EMPLOYEE BENEFITS - PERSONAL EQUIPMENT R | 0.00 | 0.00 | #DIV/0! | 0.00 | 0.00 | 0.00 | 0.00 |
| F.9089.800 | | | | | | | |
| CLOTHING ALLOWANCE | 2,000.00 | 2,000.00 | 0.00% | 2,000.00 | 790.17 | 2,000.00 | 1,799.06 |
| **TOTAL EMPLOYEE BENEFITS** | **135,988.21** | **130,199.12** | | **120,292.04** | **100,942.83** | **129,552.61** | **110,472.62** |
| F.9710.600 | | | | | | | |

# Detailed Budget Report

## Village of Wellsville

### 2014 to 2015 TENTATIVE BUDGET

| WATER FUND | 2014-2015<br>TENTATIVE | 2013-2014<br>APPROVED | DIF % | 2012-2013<br>BUDGET | FIRST 8 MONTHS | 8<br>ESTIMATED | 2012-2013<br>ACTUAL |
|---|---|---|---|---|---|---|---|
| SERIAL BOND - PRINCIPAL WTPC PIB | 150,000.00 | 150,000.00 | 0.00% | 150,000.00 | 0.00 | 150,000.00 | 150,000.00 |
| F.9710.602 | | | | | | | |
| SERIAL BOND - RESERVOIR (New Bond) | 40,000.00 | 40,000.00 | 0.00% | 27,000.00 | 40,000.00 | 40,000.00 | 69,000.00 |
| F.9710.604 | | | | | | | |
| SERIAL BOND - METERS (New Bond) | 50,000.00 | 44,900.00 | 11.36% | 0.00 | 0.00 | 44,900.00 | 0.00 |
| F.9710.700 | | | | | | | |
| SERIAL BOND - RESERVOIR INTEREST (New Bond) | 47,325.00 | 48,125.00 | -1.66% | 73,458.00 | 24,262.50 | 48,125.00 | 18,991.75 |
| F.9710.701 | | | | | | | |
| SERIAL BOND - INTEREST WTPC PIB | 25,500.00 | 35,700.00 | -28.57% | 45,900.00 | 15,300.00 | 35,700.00 | 40,800.00 |
| F.9710.704 | | | | | | | |
| SERIAL BOND - METERS (New Bond) | 2,998.00 | 3,212.00 | -6.66% | 0.00 | 1,579.00 | 3,212.00 | 0.00 |
| **TOTAL BOND EXPENSE** | **315,823.00** | **321,937.00** | | **296,358.00** | **81,141.50** | **321,937.00** | **278,791.75** |
| F.9785.501 | | | | | | | |
| LEASE PAYMENT - BACKHOE | 0.00 | 15,000.00 | -100.00% | 15,000.00 | 15,000.00 | 15,000.00 | 15,000.00 |
| **TOTAL LEASE PAYMENT** | **0.00** | **15,000.00** | | **15,000.00** | **15,000.00** | **15,000.00** | **15,000.00** |
| **TOTAL DEBT SERVICE** | **315,823.00** | **336,937.00** | | **311,358.00** | **96,141.50** | **336,937.00** | **293,791.75** |
| **TOTAL APPROPRIATIONS** | **1,140,000.00** | **1,110,300.00** | 2.67% | **1,083,000.00** | **599,302.47** | **1,098,793.32** | **1,230,087.21** |
| **TOTAL EXCESS (DEFICIT)** | **(0.00)** | **(0.00)** | | **0.00** | **133,972.78** | **(11,241.24)** | **100,508.55** |
| Capital Purchases: | | | | | | | |
| | **0.00** | **25,000.00** | | | | | |
| | **0.00** | **25,000.00** | | **0.00** | | | |

# APPENDIX M
# LEAK REPAIR REPORTS

170 E DYKE

## LEAK REPAIR REPORT

Agency: WLSU Date 3/15/16

W.O. No.: 3 Foreman: D Gardner

**LEAK IDENTIFICATION** Map Reference: ______

Refer to Leak Discovery Report Page and Coordinates: ______

Discovery Date: 3/14/16 Leak No.: 3

Location (include street name and number): ______

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? ______ (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | | Main Line Leak | | Joint Leak | |
| Meter Spud Leak | | Service Lateral Leak | ✓ | Other Leak | |
| Meter Yoke Leak | | Fire Hydrant Leak | | Describe | |
| Curb Stop Leak | | Valve Leak | | | |

**DESCRIPTION OF REPAIR**

Damaged part was: ______ Repaired X Replaced

If replaced, what material was used? Copper + Comp Fitt.

If repaired, what repairs were made?

______ Leak Clamp ______ Repacked Valve

______ Welded ______ Recaulked Joint

______ Other (describe) ______

Repair Time 4 (From/To)

Crew Size 2 (persons)

Equipment Used for Repair

✓ Backhoe

X Dumptruck

Repair Costs:

| | |
|---|---|
| Materials | $ |
| Labor | $ |
| Equipment | $ |
| Other | $ |
| Total | $ |

Size of Leak:

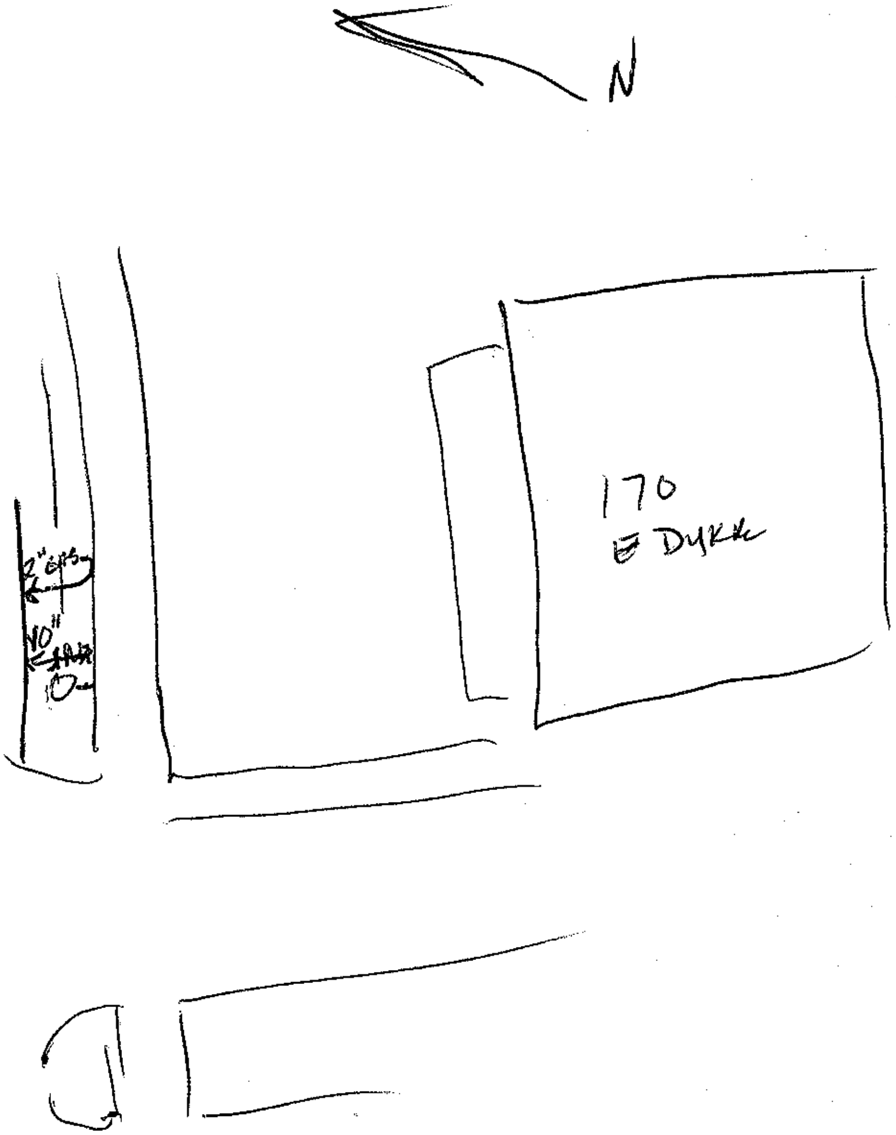
Measured ______ gpm

Estimated 30-50,000 DAY ~~gpm~~

Method Used: ______

*Form continues on next page.*

LEAK WAS A BRASS NIPPLE OUT OF CURB STOP
BROKE AT THREADS REPLACED WITH 3/4 MALE x COMP COMP x COMP COUPLE
12" COPPER PIPE



2" GAS LINE IS 27" UNDER GRASS 10" TOWARDS STREET
FROM CURB BOX INSTALLED A SS. ROD AND NEW BOX

## LEAK REPAIR REPORT

Agency: WCSD H2O Date 2/9/16

W.O. No.: #2 Foreman: D Gardner

**LEAK IDENTIFICATION**

Map Reference: ___

Refer to Leak Discovery Report

Page and Coordinates: 2

Discovery Date: 2/9/16

Leak No.: #2 2016

Location (include street name and number): ___

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? ___ (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ___ | Main Line Leak | ✓ | Joint Leak | ___ |
| Meter Spud Leak | ___ | Service Lateral Leak | ___ | Other Leak | ___ |
| Meter Yoke Leak | ___ | Fire Hydrant Leak | ___ | Describe | ___ |
| Curb Stop Leak | ___ | Valve Leak | ___ | | ___ |

**DESCRIPTION OF REPAIR**

Damaged part was: ✓ Repaired ___ Replaced

If replaced, what material was used? ___

If repaired, what repairs were made?

X Leak Clamp ___ Repacked Valve

___ Welded ___ Recaulked Joint

___ Other (describe) ___

Repair Time 8 - 11 30 (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

X Backhoe

X Dumptruck

Repair Costs:

Materials $ ___

Labor $ ___

Equipment $ ___

Other $ ___

Total $ ___

Size of Leak:

Measured ___ gpm

Estimated 2-30 G gpm

Method Used: Visual

Surfaced

*Form continues on next page.*

MALCOM GORDON DUG

TUNK

DAN GARDNER

STARTED DIGGING ABOUT 10 AM

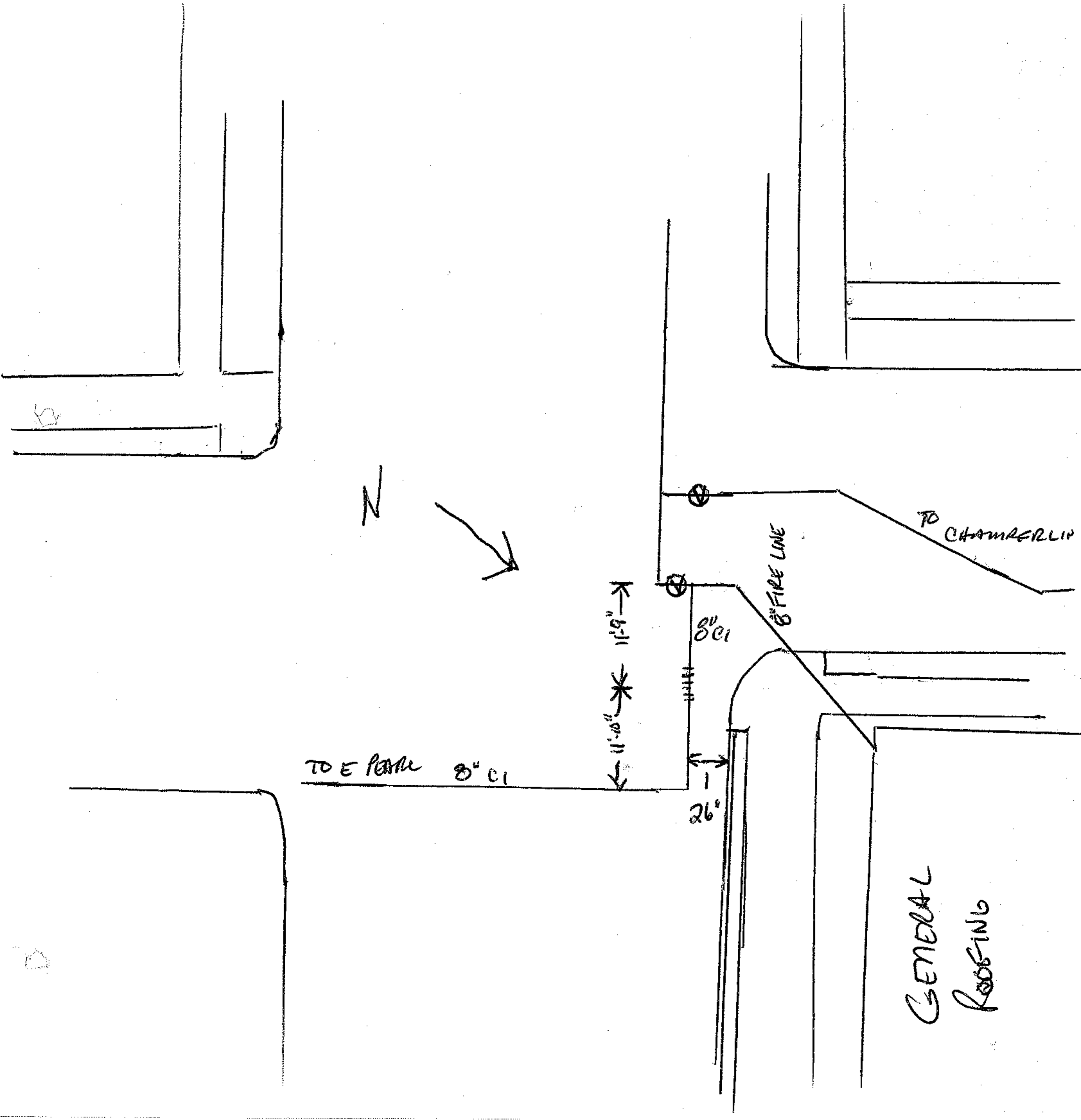
FINISHED REPAIRING LEAK 11 AM

BACKFILLED DONE AT 130

① BOLTS ON CLAMP ARE ON TOP
MIDDLE BOLT HOLDER ON CLAMP
BROKE

② MAIN IS 45" TOP OF MAIN TO TOP
of PAVEMENT

③ NO GAS IN THIS AREA



## LEAK REPAIR REPORT

Agency: Wezesville Water Date 1/20/16

W.O. No.: 12016 Foreman: D Gardner

**LEAK IDENTIFICATION** Map Reference: ____

Refer to Leak Discovery Report Page and Coordinates: ____

Discovery Date: 1/20/16 Leak No.: #1 2016

Location (include street name and number): ____

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

SHUT DOWN EARLY AT BROOKLYN SHALLOW

2 VALVES AT EARLY AND HAMILTON

Leak Found? ____ (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ____ | Main Line Leak | ✓ | Joint Leak | ____ |
| Meter Spud Leak | ____ | Service Lateral Leak | ____ | Other Leak | ____ |
| Meter Yoke Leak | ____ | Fire Hydrant Leak | ____ | Describe | ____ |
| Curb Stop Leak | ____ | Valve Leak | ____ | | ____ |

**DESCRIPTION OF REPAIR**

Damaged part was: ✓ Repaired ✓ Replaced

If replaced, what material was used? ____

If repaired, what repairs were made?

X Leak Clamp ____ Repacked Valve

____ Welded ____ Recaulked Joint

____ Other (describe) ____

Repair Time 8Am 445P (From/To)

Crew Size 4 (persons)

Equipment Used for Repair

✓ Backhoe

✓ Dumptruck

Repair Costs:

| | | |
|---|---|---|
| Materials | $ | |
| Labor | $ | |
| Equipment | $ | |
| Other | $ | |
| Total | $ | |

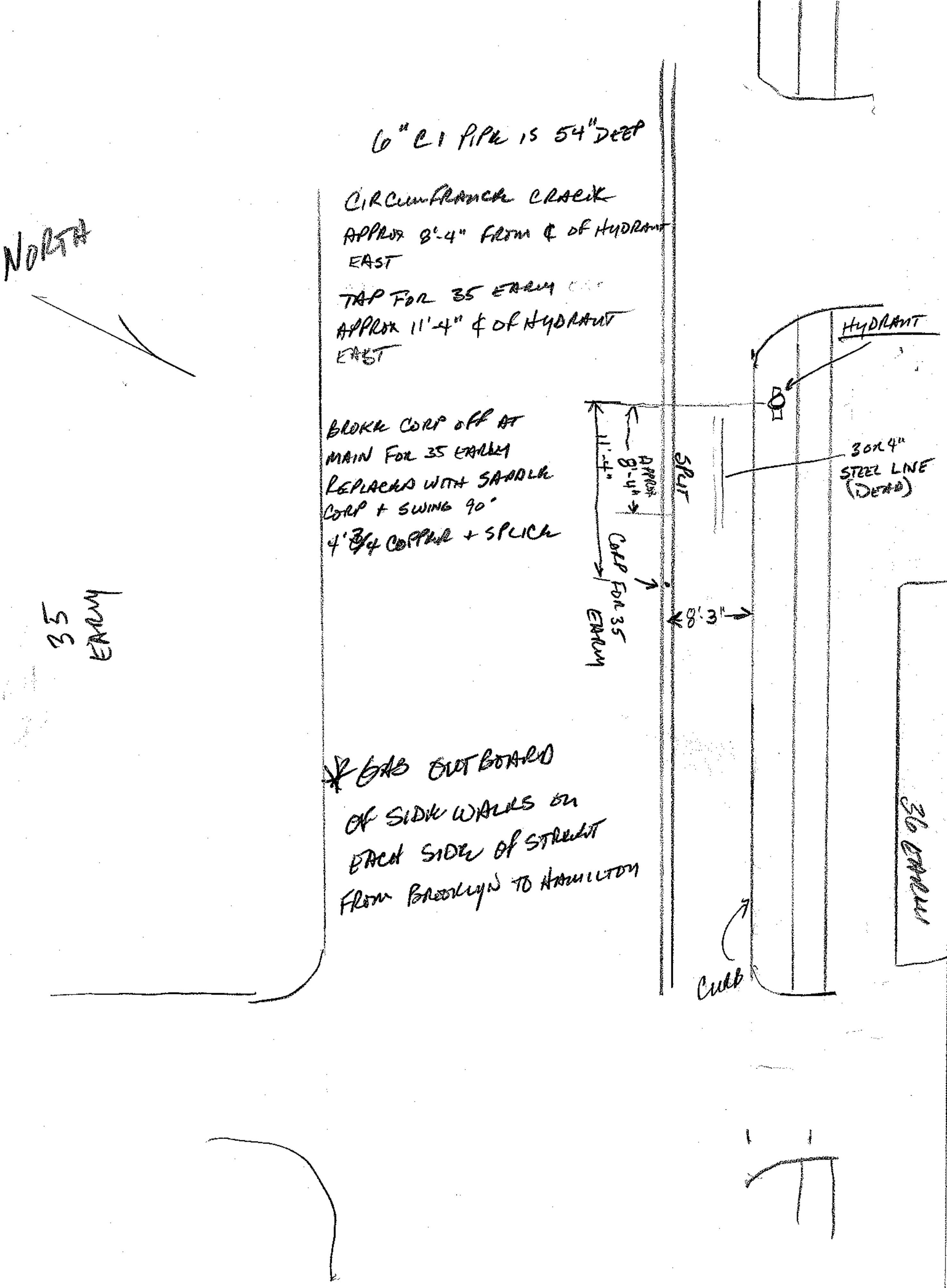
Size of Leak:

Measured ____ gpm

Gu Estimated 20-30 gpm

Method Used: Guess

*Form continues on next page.*



6" CI PIPE IS 54" DEEP

CIRCUMFRANCE CRACK
APPROX 8'-4" FROM ¢ OF HYDRANT
EAST

TAP FOR 35 EARLY
APPROX 11'-4" ¢ OF HYDRANT
EAST

BROKE CORP OFF AT
MAIN FOR 35 EARLY
REPLACED WITH SADDLE
CORP + SWING 90°
4' 3/4 COPPER + SPLICE

* GAS OUTBOARD
OF SIDEWALKS ON
EACH SIDE OF STREET
FROM BROOKLYN TO HAMILTON

2015

## LEAK REPAIR REPORT

Agency: NCSU H2O Date 12-11-15

W.O. No.: 12-11-15 Foreman: D [illegible]

**LEAK IDENTIFICATION**

Map Reference: ________

Refer to Leak Discovery Report

Page and Coordinates: ________

Discovery Date: 12-11-15 Leak No.: ________

Location (include street name and number): Chamberlin + North Brooklyn

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? ________ (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ____ | Main Line Leak | ✓ | Joint Leak | ____ |
| Meter Spud Leak | ____ | Service Lateral Leak | ____ | Other Leak | ____ |
| Meter Yoke Leak | ____ | Fire Hydrant Leak | ____ | Describe | ____ |
| Curb Stop Leak | ____ | Valve Leak | ____ | | |

**DESCRIPTION OF REPAIR**

Damaged part was: ✓ Repaired ____ Replaced

If replaced, what material was used? Full Circ Clamp

If repaired, what repairs were made?

✓ Leak Clamp ____ Repacked Valve

____ Welded ____ Recaulked Joint

____ Other (describe) ________

Repair Time 2 30^A / 30^P (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

✓ Backhoe

✓ Dumptruck

Repair Costs:

| | |
|---|---|
| Materials | $ ____ |
| Labor | $ ____ |
| Equipment | $ ____ |
| Other | $ ____ |
| Total | $ ____ |

Size of Leak:

Measured ________ gpm

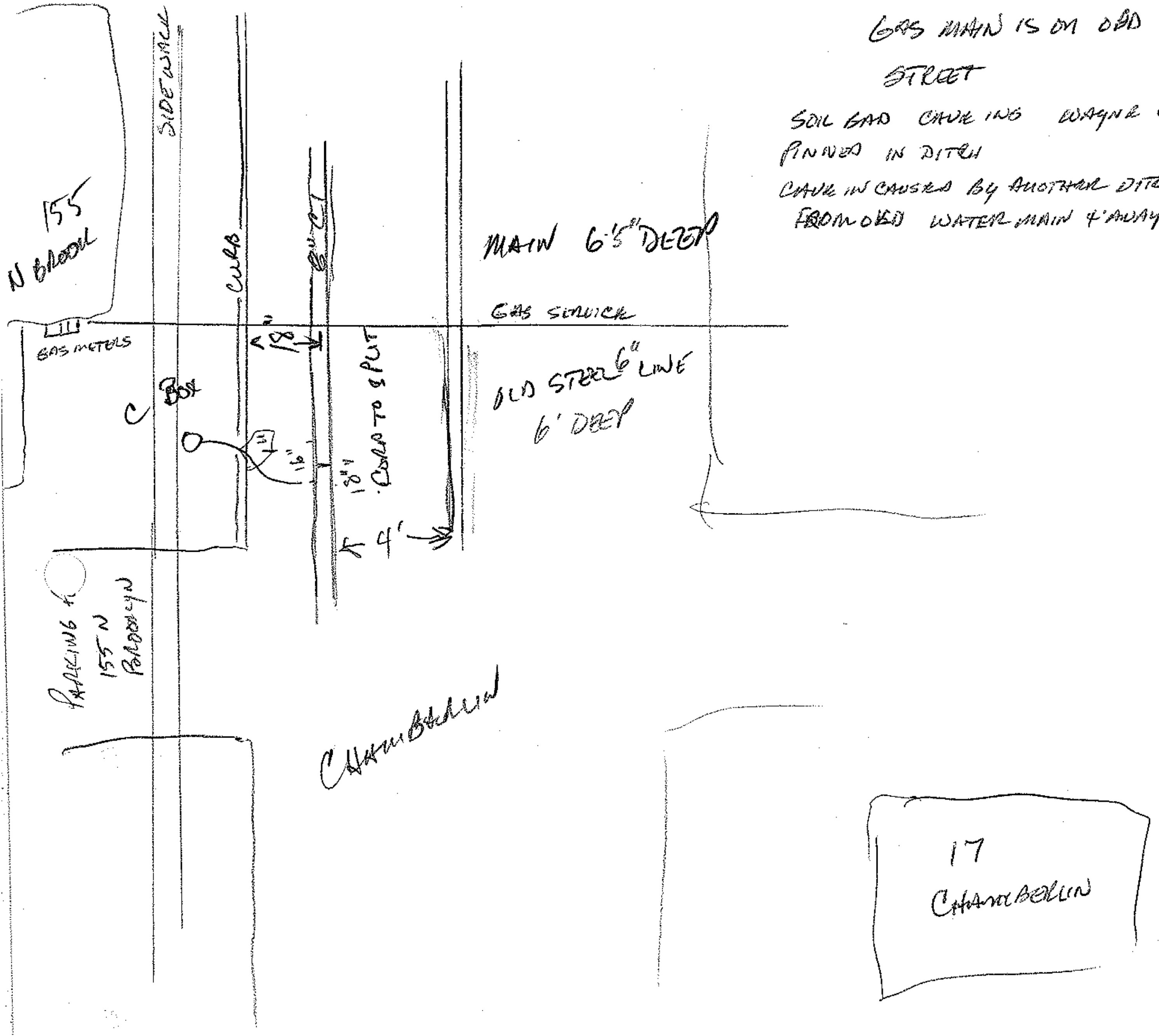
Estimated 30-50 gpm

Method Used: Guess

*Form continues on next page.*

12-11-15 2 AM (Found Police)

N Brooklyn
155 ~~Chamberlin~~



Gas main is on odd side of street

Soil gave caving Wayne got pinned in ditch
Cave in caused by another ditch line from old water main 4' away

Not to scale

①

## LEAK REPAIR REPORT

Agency: WSU H2O Date 3/5/15

W.O. No.: ______ Foreman: D Gardner

**LEAK IDENTIFICATION**

Map Reference: ______

Refer to Leak Discovery Report

Page and Coordinates: ______

Discovery Date: 3/5/15

Leak No.: 1st Leak of 2015

Location (include street name and number): ______

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? ______ (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ___ | Main Line Leak | ✓ | Joint Leak | ___ |
| Meter Spud Leak | ___ | Service Lateral Leak | ___ | Other Leak | ___ |
| Meter Yoke Leak | ___ | Fire Hydrant Leak | ___ | Describe | ______ |
| Curb Stop Leak | ___ | Valve Leak | ___ | | ______ |

**DESCRIPTION OF REPAIR**

Damaged part was: ✓ Repaired ___ Replaced

If replaced, what material was used? Full Circle Clamp

If repaired, what repairs were made?

✓ Leak Clamp ___ Repacked Valve

___ Welded ___ Recaulked Joint

___ Other (describe) ______

Repair Time 10Am 5Pm (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

✓ Backhoe

✓ Dumptruck

Repair Costs:

Materials $ ______

Labor $ ______

Equipment $ ______

Other $ ______

Total $ ______

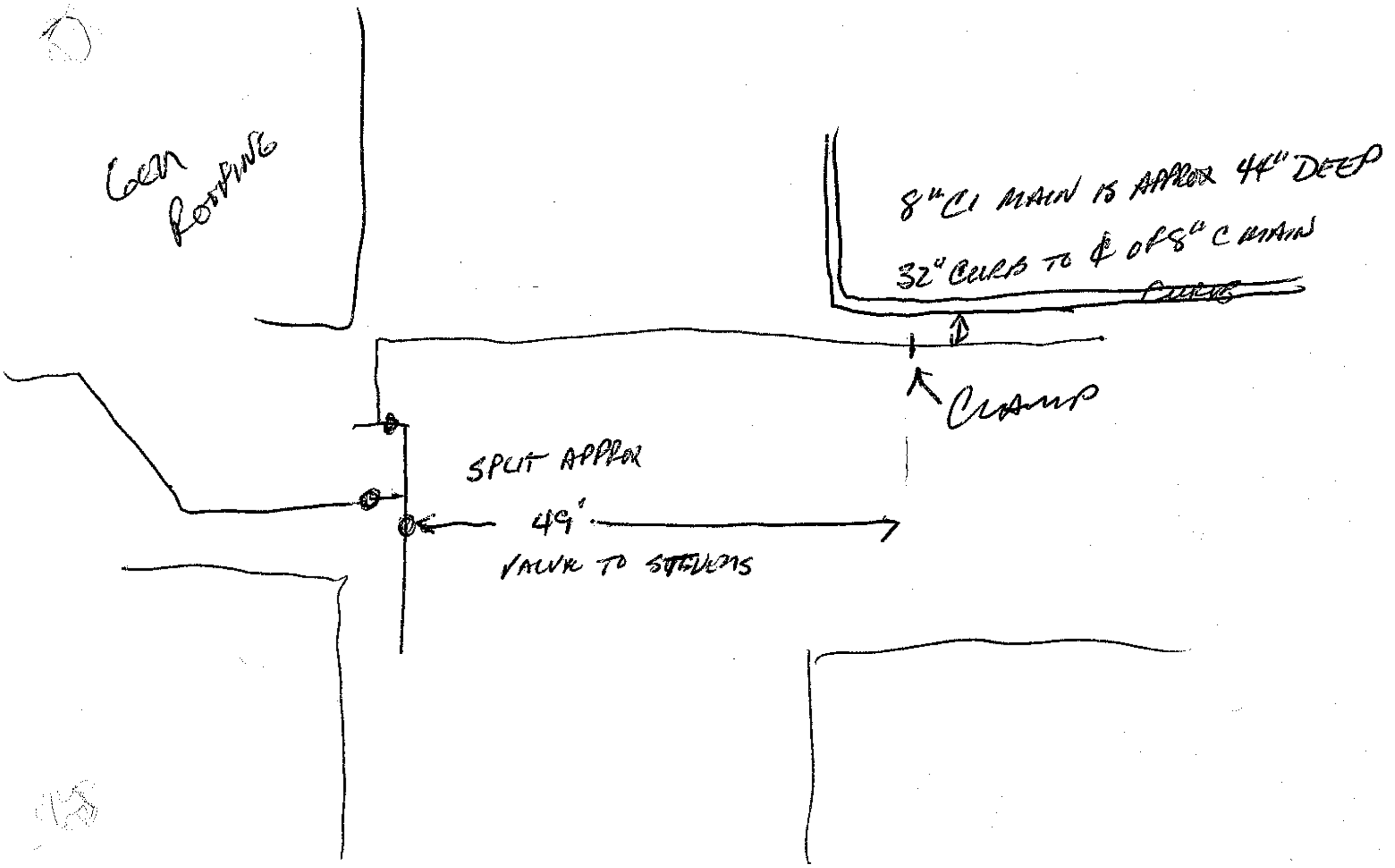
Size of Leak:

Measured ______ gpm

Estimated ______ gpm

Method Used: ______

*Form continues on next page.*


Gen Roofing
8" CI MAIN IS APPROX 44" DEEP
32" CURB TO ℄ OF 8" C MAIN
~~CURB~~
CLAMP
SPLIT APPROX
49'
VALVE TO STEVENS

## LEAK REPAIR REPORT

Agency: WLSV WATER Date 3/12/15

W.O. No.: LEAK #2 Foreman: D GARDNER

**LEAK IDENTIFICATION** Map Reference: ____

Refer to Leak Discovery Report Page and Coordinates: ____

Discovery Date: 3/12/15 Leak No.: ____

Location (include street name and number): 120 S BROOKLYN

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? Y (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ____ | Main Line Leak | ____ | Joint Leak | ____ |
| Meter Spud Leak | ____ | Service Lateral Leak | X | Other Leak | ____ |
| Meter Yoke Leak | ____ | Fire Hydrant Leak | ____ | Describe | ____ |
| Curb Stop Leak | ____ | Valve Leak | ____ | | ____ |

**DESCRIPTION OF REPAIR**

Damaged part was: ____ Repaired ____ Replaced

If replaced, what material was used? ____

If repaired, what repairs were made?

____ Leak Clamp ____ Repacked Valve

____ Welded ____ Recaulked Joint

____ Other (describe) ____

Repair Time ____ (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

____ Backhoe

____ Dumptruck

Repair Costs:

| | |
|---|---|
| Materials | $ ____ |
| Labor | $ ____ |
| Equipment | $ ____ |
| Other | $ ____ |
| Total | $ ____ |

Size of Leak:

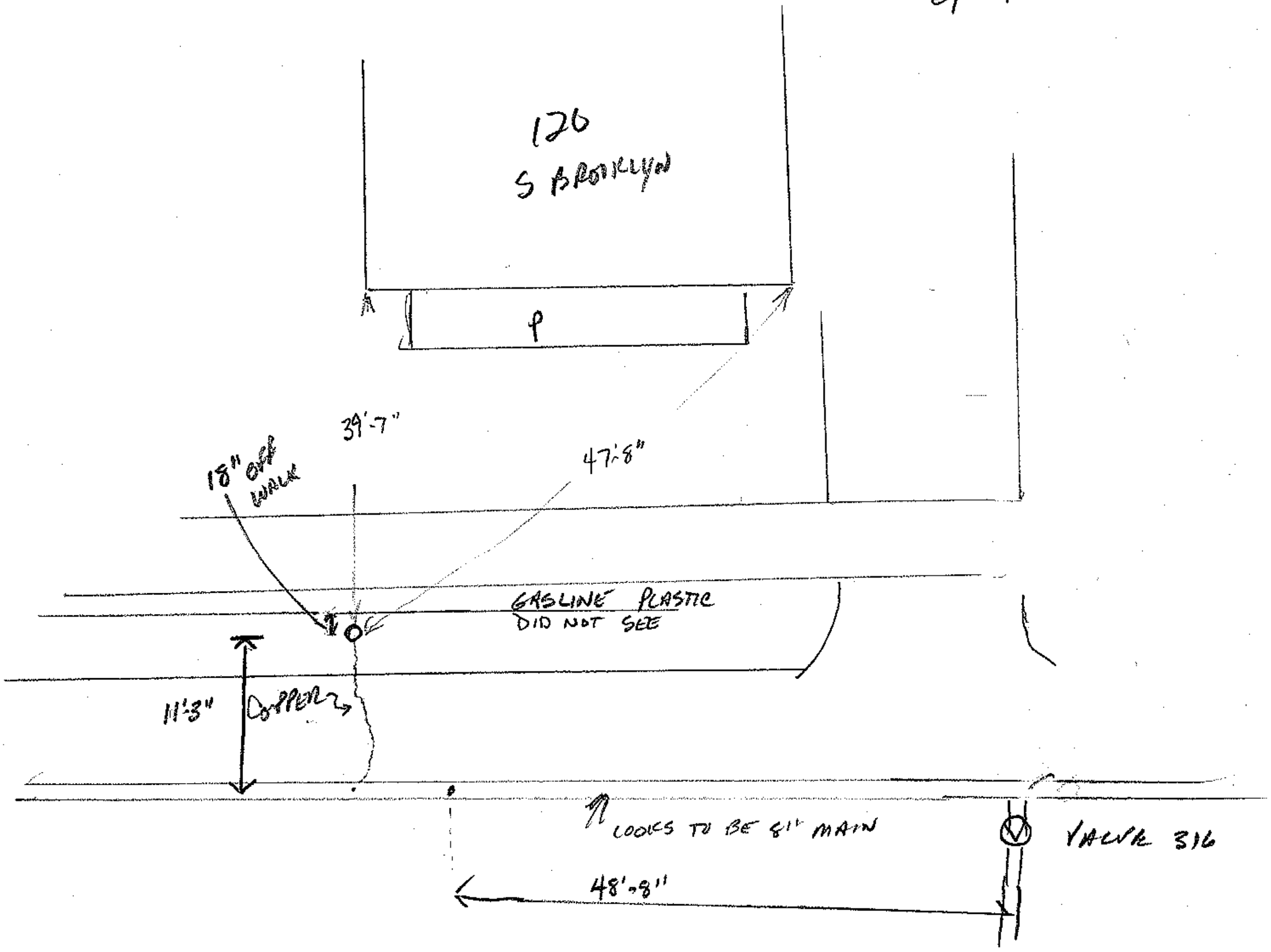
Measured ____ gpm

Estimated 7 GPM gpm

Method Used: ____

*Form continues on next page.*

3/12/15



① PLASTIC GAS LINE NEXT TO CURB BOX (DID NOT SEE)

② C IRON LINE LOOKS LIKE 8" NOT 6" DID NOT UNCOVER 5' DEEP

③ APPROX 48'-8" FROM ℄ VALVE 316 OLD CORP. STOP
SHUT OFF LEAD WHIP FAILED

④ FROST WAS 5' IN GROUND

## LEAK REPAIR REPORT

Agency: WLSN WATER Date 3/14/15

W.O. No.: LEAK # 3 Foreman: D GARDNER

**LEAK IDENTIFICATION** Map Reference: ______

Refer to Leak Discovery Report Page and Coordinates: ______

Discovery Date: 3/14/15 Leak No.: ______

Location (include street name and number): ______

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? Y (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ____ | Main Line Leak | X | Joint Leak | ____ |
| Meter Spud Leak | ____ | Service Lateral Leak | ____ | Other Leak | ____ |
| Meter Yoke Leak | ____ | Fire Hydrant Leak | ____ | Describe | ______ |
| Curb Stop Leak | ____ | Valve Leak | ____ | | ______ |

**DESCRIPTION OF REPAIR**

Damaged part was: ____ Repaired ____ Replaced

If replaced, what material was used? ______

If repaired, what repairs were made?

X Leak Clamp ____ Repacked Valve

____ Welded ____ Recaulked Joint

____ Other (describe) ______

Repair Time 12 HRS (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

✓ Backhoe

✓ Dumptruck

Repair Costs:

Materials $ ______

Labor $ ______

Equipment $ ______

Other $ ______

Total $ ______

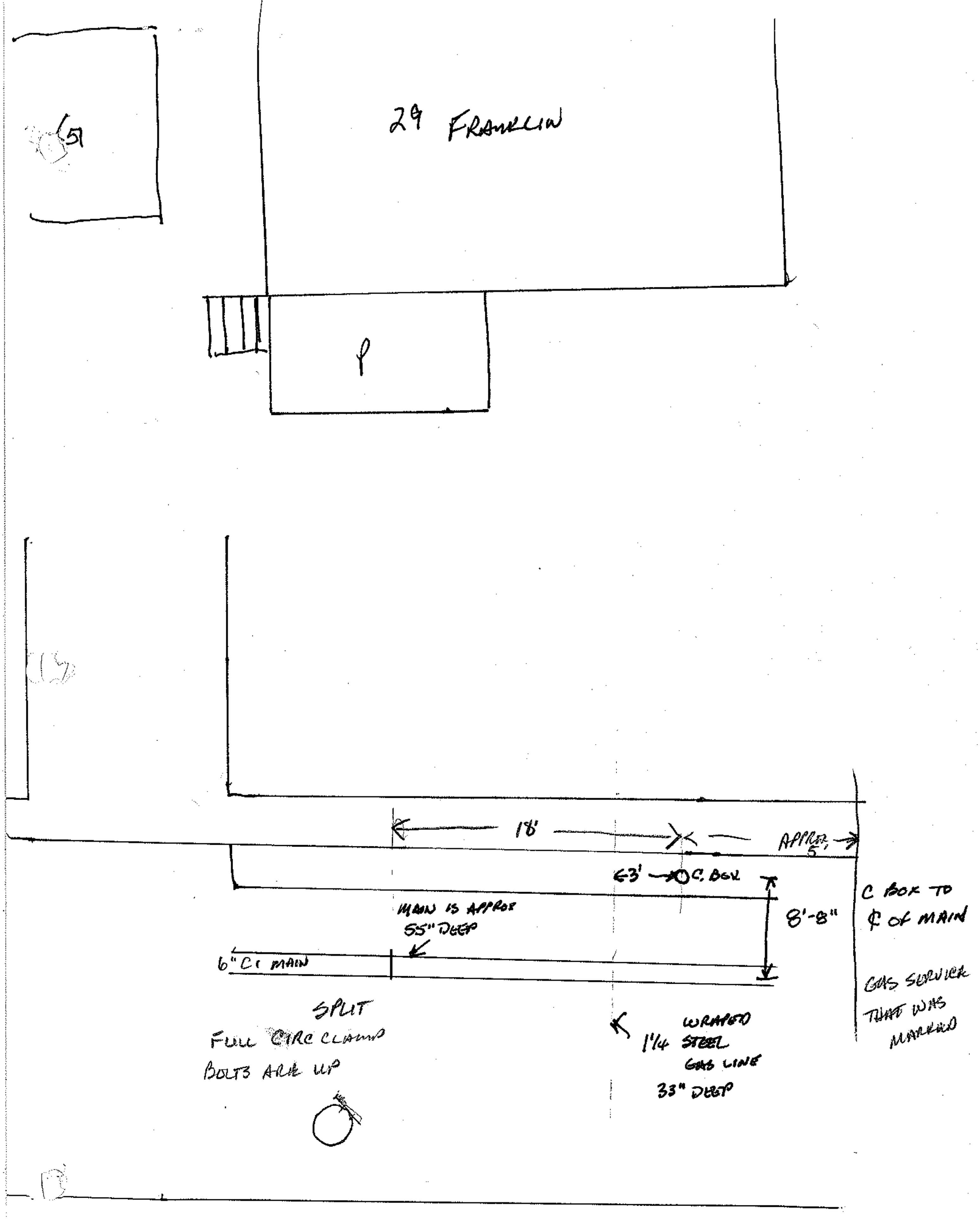
Size of Leak:

Measured ______ gpm

Estimated 20 gpm x 2 HRS

Method Used: GUESS

*Form continues on next page.*



GAS MAIN IS ON EVEN SIDE OF STREET

## LEAK REPAIR REPORT

Agency: WLSV Water  Date 3/30/15

W.O. No.: #5  Foreman: John Fry

**LEAK IDENTIFICATION**  Map Reference: ______

Refer to Leak Discovery Report  Page and Coordinates: ______

Discovery Date: 3/30/15  Leak No.: ______

Location (include street name and number): ______

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? ______ (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ___ | Main Line Leak | X | Joint Leak | ___ |
| Meter Spud Leak | ___ | Service Lateral Leak | ___ | Other Leak | ___ |
| Meter Yoke Leak | ___ | Fire Hydrant Leak | ___ | Describe | ______ |
| Curb Stop Leak | ___ | Valve Leak | ___ | | ______ |

**DESCRIPTION OF REPAIR**

Damaged part was: ___ Repaired ___ Replaced

If replaced, what material was used? ______

If repaired, what repairs were made?

X Leak Clamp ___ Repacked Valve

___ Welded ___ Recaulked Joint

___ Other (describe) ______

Repair Time 3 HRS (From/To)

Crew Size 5 (persons)

Equipment Used for Repair

X Backhoe

X Dumptruck

Repair Costs:

Materials $ ______

Labor $ ______

Equipment $ ______

Other $ ______

Total $ ______

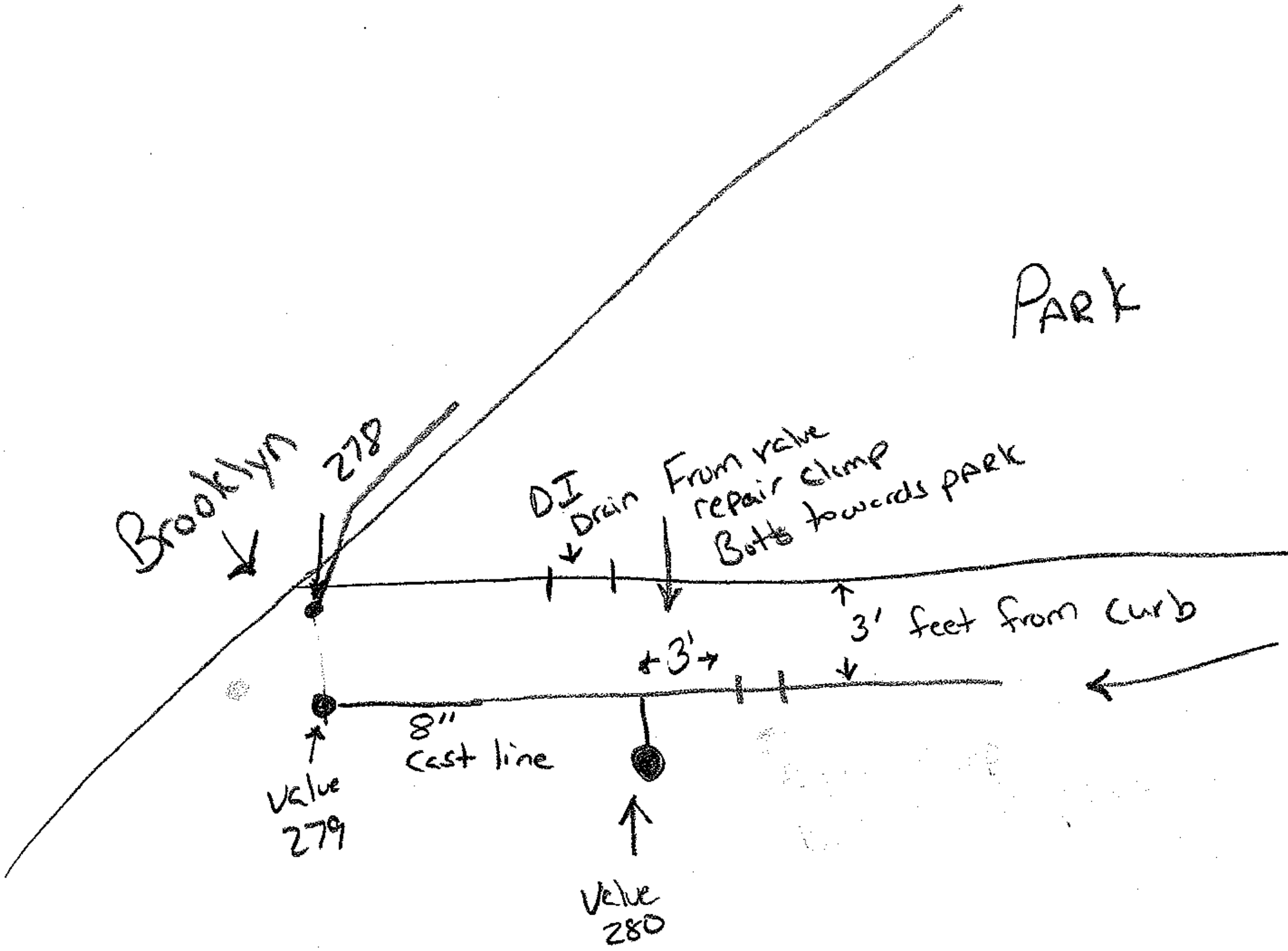
Size of Leak:

Measured ______ gpm

Estimated ______ gpm

Method Used: ______

*Form continues on next page.*



Line is about 4 feet Deep

Need to Shut water off
in BANK Parking Lot
and on Brooklyn Ave.

GAS Line not close

## LEAK REPAIR REPORT

Agency: WELLSB. STB. CREW Date 5/4/15

W.O. No.: ______ Foreman: BRAD MATTISON

**LEAK IDENTIFICATION** Map Reference: ______

Refer to Leak Discovery Report Page and Coordinates: ______

Discovery Date: ______ Leak No.: ______

Location (include street name and number): ______

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? ______ (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ___ | Main Line Leak | ✓ | Joint Leak | ___ |
| Meter Spud Leak | ___ | Service Lateral Leak | ___ | Other Leak | ___ |
| Meter Yoke Leak | ___ | Fire Hydrant Leak | ___ | Describe | ______ |
| Curb Stop Leak | ___ | Valve Leak | ___ | | ______ |

**DESCRIPTION OF REPAIR**

Damaged part was: ✓ Repaired ___ Replaced

If replaced, what material was used? F CIRC CLAMP

______

If repaired, what repairs were made?

___ Leak Clamp ___ Repacked Valve

___ Welded ___ Recaulked Joint

___ Other (describe) ______

______

Repair Time ______ (From/To)

Crew Size ______ (persons)

Equipment Used for Repair

___ Backhoe

___ Dumptruck

Repair Costs:

Materials $ ______

Labor $ ______

Equipment $ ______

Other $ ______

Total $ ______

Size of Leak:

Measured ______ gpm

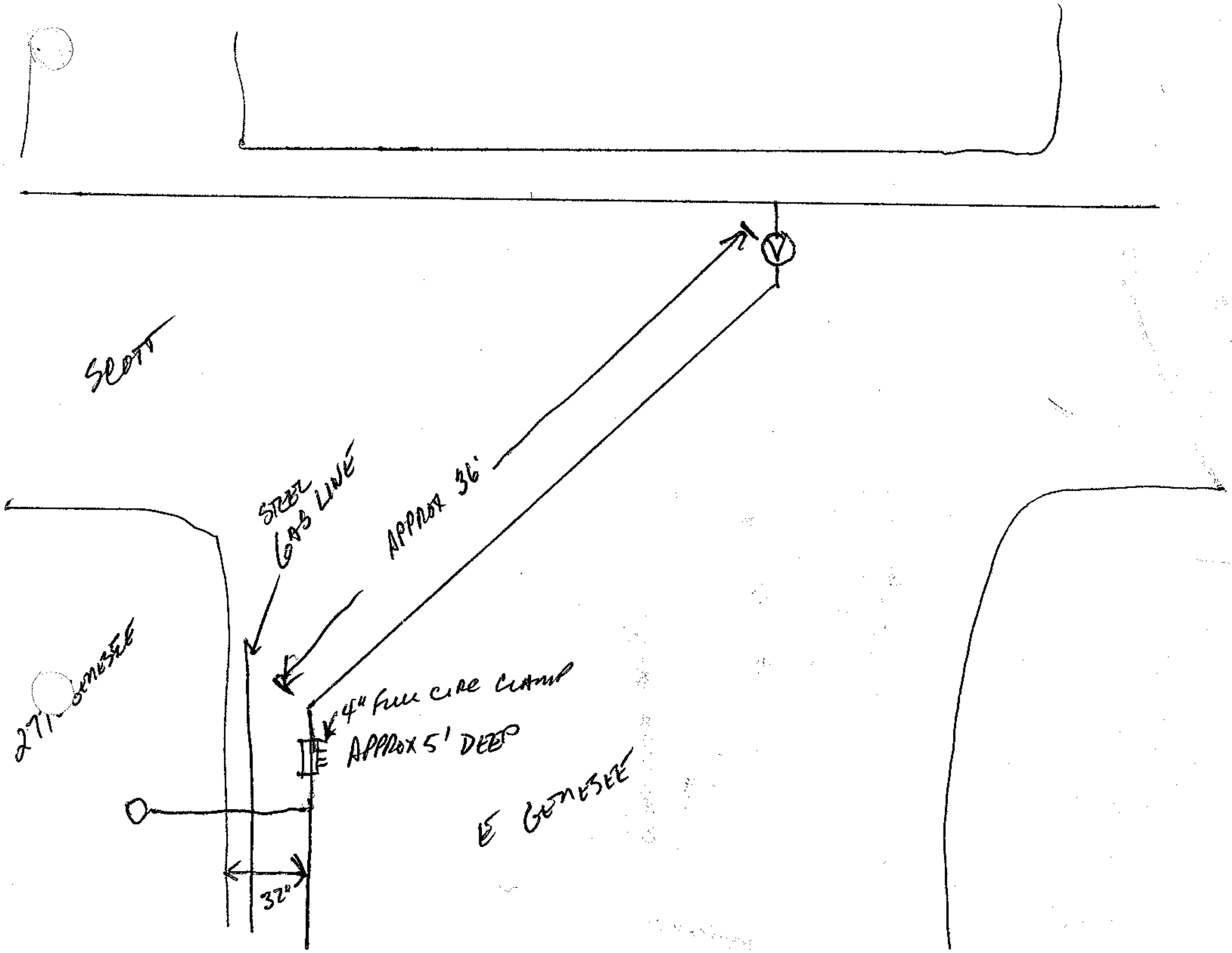
Estimated ______ gpm

Method Used: ______

______

THIS WAS JUST A PISSER UNTIL THEY UNCOVERED PENCIL PIN-HOLE LEAK

Form continues on next page.



PIN HOLE IN BOTTOM OF 4" CI
PIPE BAD SPOT BLEW OUT WHEN UNCOVERED

GAS IS BETWEEN 4" MAIN + CURB

STEWARTS CREW + WAYNE DUG THIS

CAST IRON HAS LEAD + OAKUM JOINTS

## LEAK REPAIR REPORT

Agency: ______ Date 5/19/15

W.O. No.: 5/19/15 Foreman: D GARDNER

**LEAK IDENTIFICATION** Map Reference: ______

Refer to Leak Discovery Report / Page and Coordinates: ______

Discovery Date: 5/14/15 Leak No.: ______

Location (include street name and number): 417 N HIGHLAND

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? ______ (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ___ | Main Line Leak | X | Joint Leak | ___ |
| Meter Spud Leak | ___ | Service Lateral Leak | ___ | Other Leak | ___ |
| Meter Yoke Leak | ___ | Fire Hydrant Leak | ___ | Describe | ______ |
| Curb Stop Leak | ___ | Valve Leak | ___ | | ______ |

**DESCRIPTION OF REPAIR**

Damaged part was: X Repaired ___ Replaced

If replaced, what material was used? ______

If repaired, what repairs were made?

X Leak Clamp ___ Repacked Valve

___ Welded ___ Recaulked Joint

___ Other (describe) ______

Repair Time 8 HRS (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

___ Backhoe

___ Dumptruck

Repair Costs:

| | |
|---|---|
| Materials | $ ______ |
| Labor | $ ______ |
| Equipment | $ ______ |
| Other | $ ______ |
| Total | $ ______ |

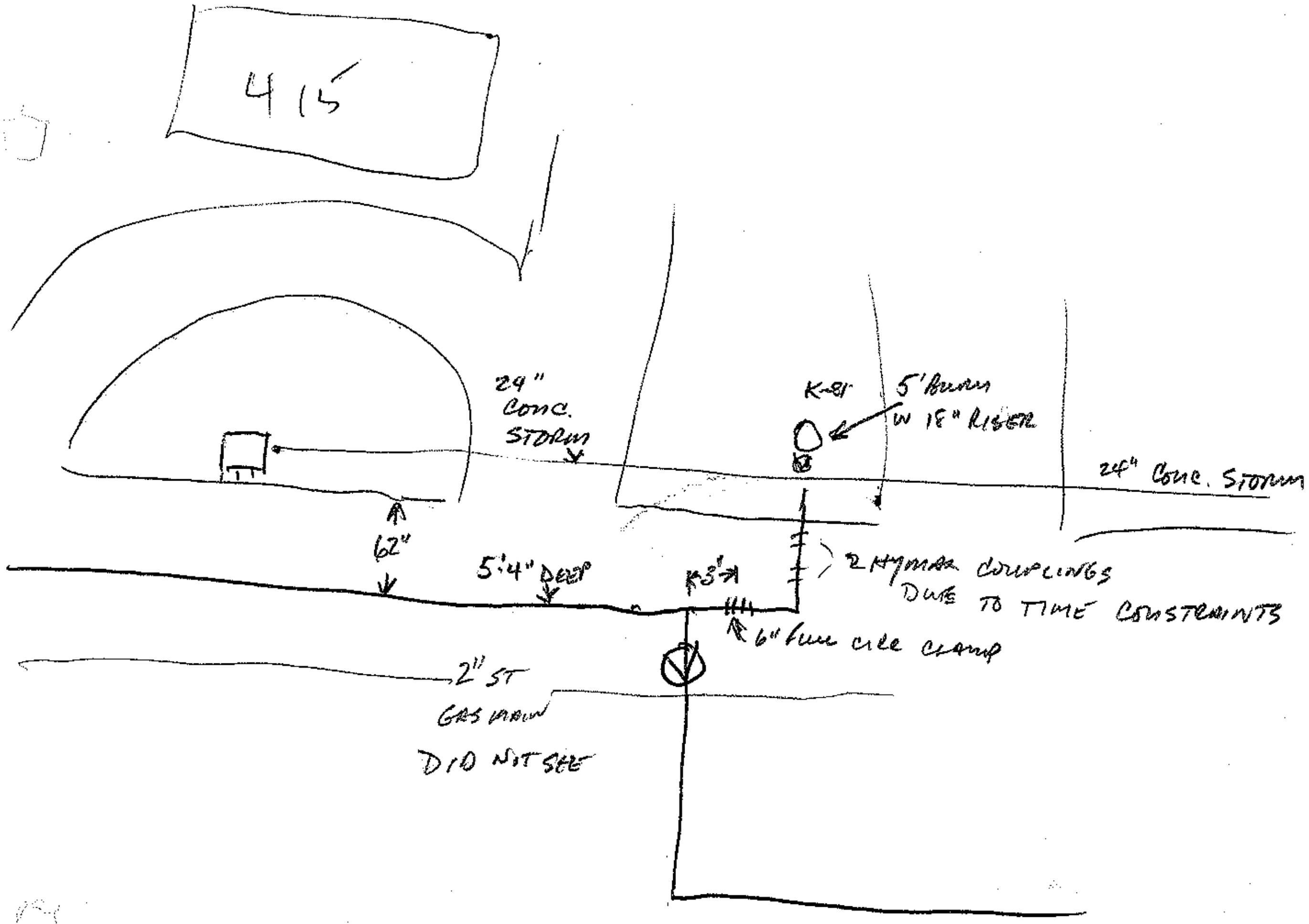
Size of Leak:

Measured ______ gpm

Estimated ______ gpm

Method Used: ______

*Form continues on next page.*



LEAK WAS ON 6" STUB TO HYDRANT

DUG UP OLD 4½ DARLING HYDRANT + REPLACED WITH 6" K-81

PINE ST

SERVICE LEAK

09-2015

RETAPPED 52 PINE

## LEAK REPAIR REPORT

Agency: WCSD Date 11/10/15

W.O. No.: ____ Foreman: D Goodwin

**LEAK IDENTIFICATION**

Map Reference: ____

Refer to Leak Discovery Report

Page and Coordinates: ____

Discovery Date: 11/6/15

Leak No.: ____

Location (include street name and number): 126 W STATE ST

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? ____ (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ____ | Main Line Leak | X | Joint Leak | ____ |
| Meter Spud Leak | ____ | Service Lateral Leak | ____ | Other Leak | ____ |
| Meter Yoke Leak | ____ | Fire Hydrant Leak | ____ | Describe | ____ |
| Curb Stop Leak | ____ | Valve Leak | ____ | | ____ |

**DESCRIPTION OF REPAIR**

Damaged part was: ____ Repaired ____ Replaced

If replaced, what material was used? ____

If repaired, what repairs were made?

X Leak Clamp ____ Repacked Valve

____ Welded ____ Recaulked Joint

____ Other (describe) ____

Repair Time ____ (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

✓ Backhoe

✓ Dumptruck

Repair Costs:

Materials $ ____

Labor $ ____

Equipment $ ____

Other $ ____

Total $ ____

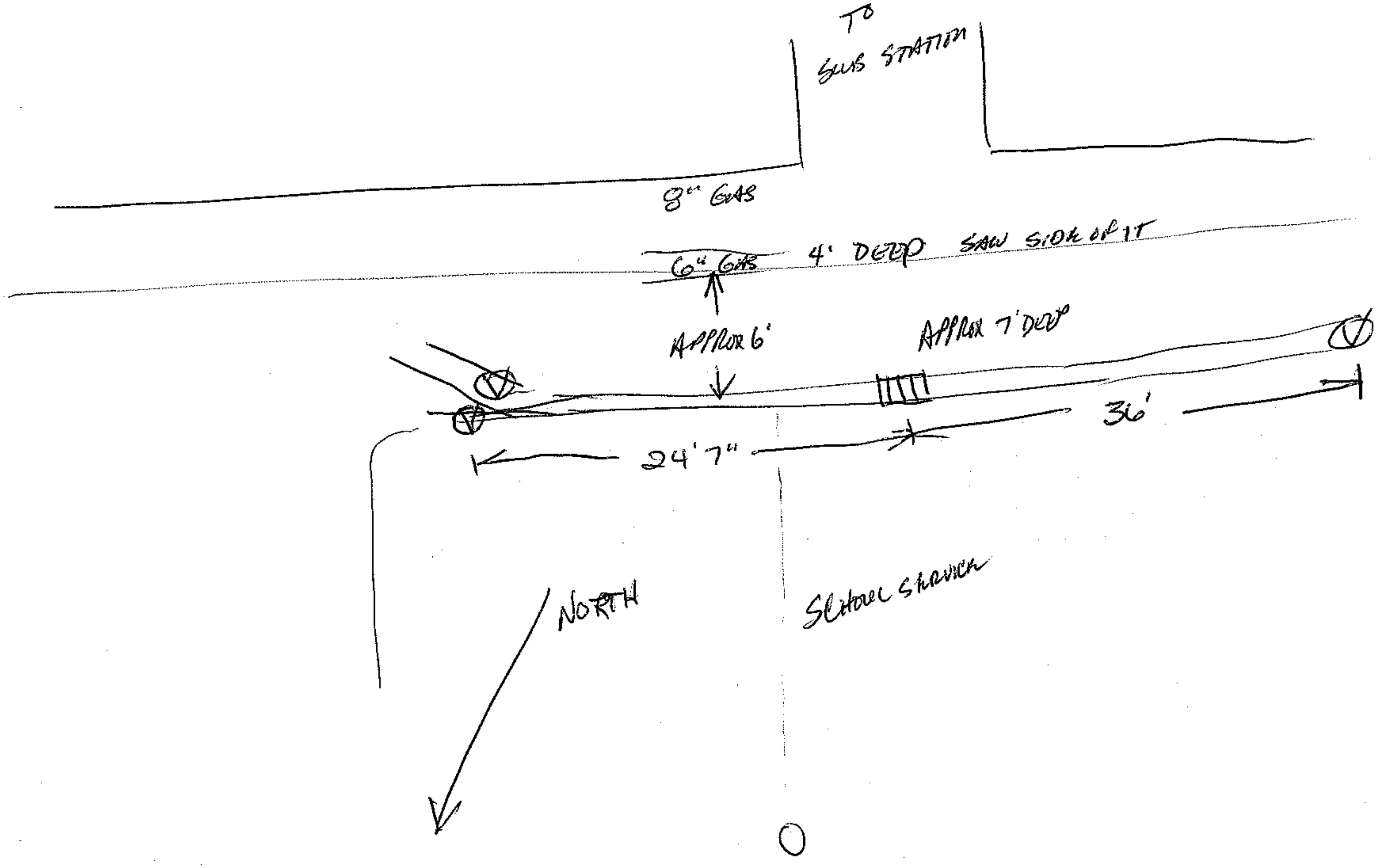
Size of Leak: SEE ATTACHED

Measured ____ gpm

Estimated ____ gpm

Method Used: ____

*Form continues on next page.*


TO SUB STATION
8" GAS
6" GAS
4' DEEP SAW SIDE OF IT
APPROX 6'
APPROX 7' DEEP
24'7"
36'
NORTH
SCHOOL SERVICE

2014

## LEAK REPAIR REPORT

Agency: WELLSVILLE WATER Date 12-18-14

W.O. No.: ______ Foreman: D GARDNER

**LEAK IDENTIFICATION**

Map Reference: ______

Refer to Leak Discovery Report

Page and Coordinates: ______

Discovery Date: 12-18-14

Leak No.: ______

Location (include street name and number): SERVICE TO 22 W STATE ST

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including: SEE BACK

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? Y (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ___ | Main Line Leak | ___ | Joint Leak | ___ |
| Meter Spud Leak | ___ | Service Lateral Leak | X | Other Leak | ___ |
| Meter Yoke Leak | ___ | Fire Hydrant Leak | ___ | Describe | ___ |
| Curb Stop Leak | ___ | Valve Leak | ___ | | ___ |

**DESCRIPTION OF REPAIR**

Damaged part was: ___ Repaired X Replaced

If replaced, what material was used? BRONZE SADDLE 3/4 COPPER SERVICE

If repaired, what repairs were made?

✓ Leak Clamp ___ Repacked Valve

___ Welded ___ Recaulked Joint

___ Other (describe) ______

Repair Time 8 AM - 930 PM (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

✓ Backhoe

✓ Dumptruck

Repair Costs:

Materials $ ______

Labor $ ______

Equipment $ ______

Other $ ______

Total $ ______

Size of Leak:

Measured ~~20~~ gpm

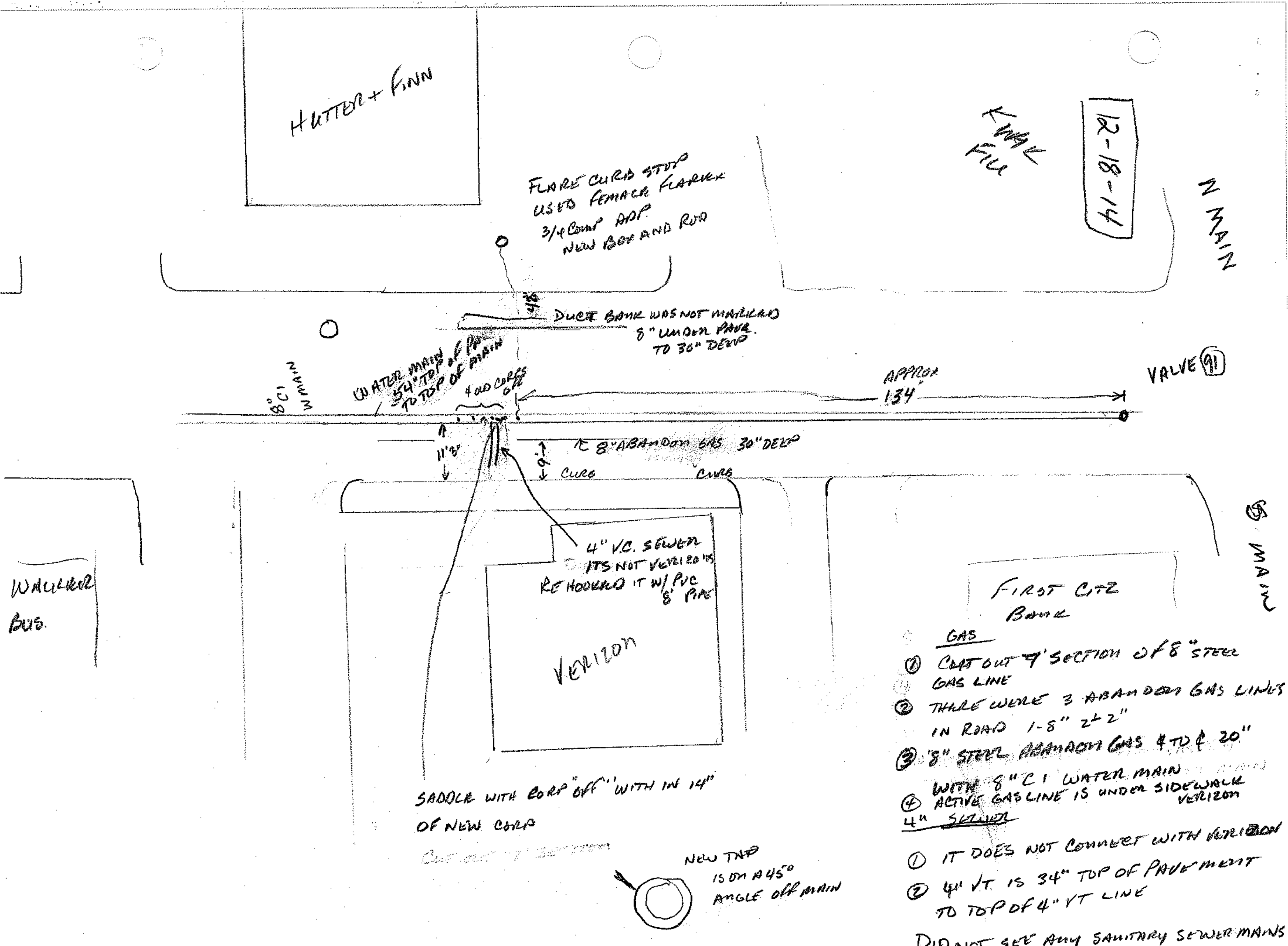
Estimated 10-100 gpm

Method Used: GUESS

USED APPROX 40 TONS GRAVEL

Form continues on next page.

12-18-14



GAS

① CUT OUT 7' SECTION OF 8" STEEL GAS LINE

② THERE WERE 3 ABANDON GAS LINES IN ROAD 1-8" 2-2"

③ "8" STEEL ABANDON GAS ℄ TO ℄ 20" WITH 8" C I WATER MAIN

④ ACTIVE GAS LINE IS UNDER SIDEWALK VERIZON

4" SEWER

① IT DOES NOT CONNECT WITH VERIZON

② 4" VT. IS 34" TOP OF PAVEMENT TO TOP OF 4" VT LINE

DID NOT SEE ANY SANITARY SEWER MAINS

DUCT BANK

① WAS NOT MARKED 42" OFF N CURB TOP 8" DEEP BOTTOM 30" DEEP

## LEAK REPAIR REPORT

Agency: WCSU WATER Date 11/10/14

W.O. No.: ______ Foreman: DAN GANONKA

**LEAK IDENTIFICATION** Map Reference: ______

Refer to Leak Discovery Report Page and Coordinates: ______

Discovery Date: 11/10/14 Leak No.: ______

Location (include street name and number): 111 W STATE ST

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

IN FRONT OF HYDRANT 5-1 WATER PLANT ON STREET

Leak Found? ✓ (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ____ | Main Line Leak | X | Joint Leak | ____ |
| Meter Spud Leak | ____ | Service Lateral Leak | ____ | Other Leak | ____ |
| Meter Yoke Leak | ____ | Fire Hydrant Leak | ____ | Describe | ______ |
| Curb Stop Leak | ____ | Valve Leak | ____ | | ______ |

**DESCRIPTION OF REPAIR**

Damaged part was: X Repaired ____ Replaced

If replaced, what material was used? ______

If repaired, what repairs were made?

X Leak Clamp ____ Repacked Valve

____ Welded ____ Recaulked Joint

____ Other (describe) ______

Repair Time 8 HRS (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

X Backhoe

X Dumptruck

Repair Costs: CLAMP

Materials $ ______

Labor $ ______

Equipment $ ______

Other $ ______

Total $ ______

Size of Leak:

Measured ______ gpm

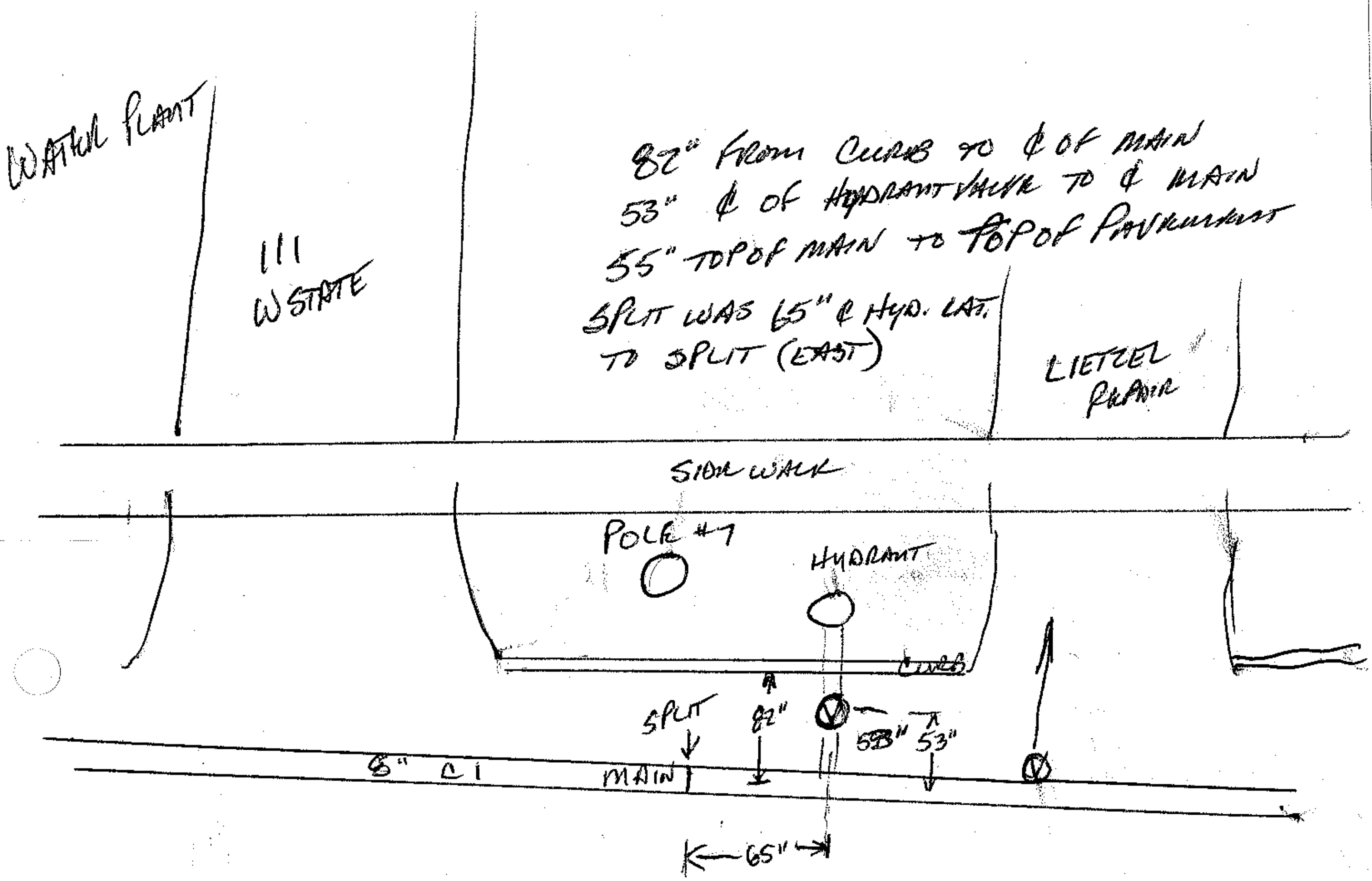
Estimated ______ gpm

Method Used: ______

Josh Fry

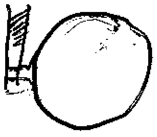
W STONEMENTS

*Form continues on next page.*



82" FROM CURB TO ℄ OF MAIN
53" ℄ OF HYDRANT VALVE TO ℄ MAIN
55" TOP OF MAIN TO TOP OF PAVEMENT

SPLIT WAS 65" ℄ HYD. LAT.
TO SPLIT (EAST)



BOLTS ARE STICKING UP

## LEAK REPAIR REPORT

Agency: Wisn Water Date 10/20/14

W.O. No.: ______ Foreman: D Gardner

**LEAK IDENTIFICATION** Map Reference: ______

Refer to Leak Discovery Report Page and Coordinates: ______

Discovery Date: 10/20/14 Leak No.: ______

Location (include street name and number): 392 E Dyke in front of LA Chance's House

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

1" LEAD WHIP BLEW OUT USED NEW SADDLE NEW 3/4 COPPER SERVICE NEW 3/4 CURB STOP W/BOX CUT SECTION OF LEAD OUT

Leak Found? Y (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ___ | Main Line Leak | ___ | Joint Leak | ___ |
| Meter Spud Leak | ___ | Service Lateral Leak | X | Other Leak | ___ |
| Meter Yoke Leak | ___ | Fire Hydrant Leak | ___ | Describe | ______ |
| Curb Stop Leak | ___ | Valve Leak | ___ | | ______ |

**DESCRIPTION OF REPAIR**

Damaged part was: ___ Repaired X Replaced

If replaced, what material was used? Copper

If repaired, what repairs were made?

___ Leak Clamp ___ Repacked Valve

___ Welded ___ Recaulked Joint

___ Other (describe) ______

Repair Time 1PM - 2AM (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

✓ Backhoe

✓ Dumptruck

Repair Costs:

Materials $ ______

Labor $ ______

Equipment $ ______

Other $ ______

Total $ ______

Size of Leak:

Measured ______ gpm

Estimated ______ gpm

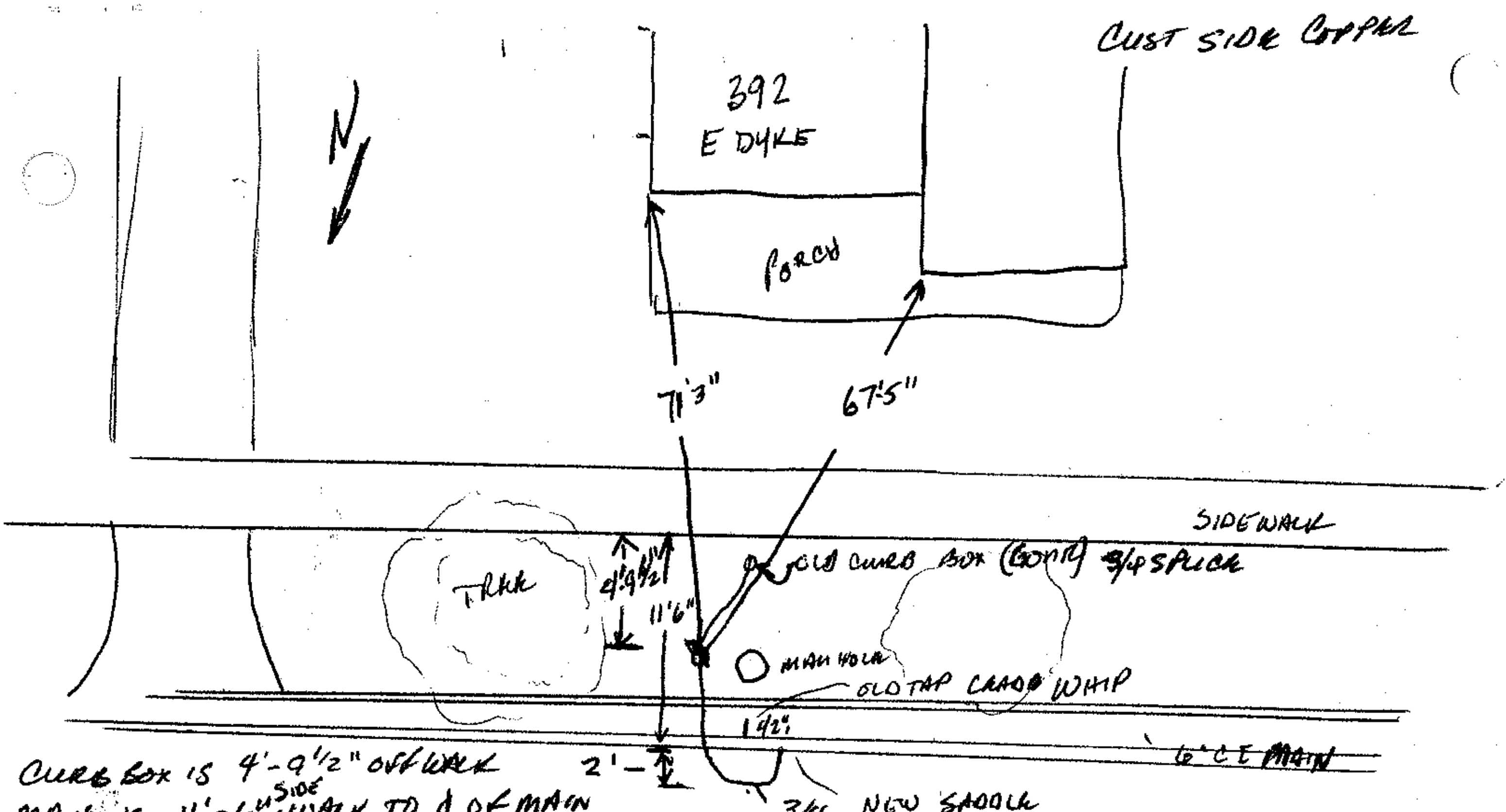
Method Used: ______

Josh Fry

Ryan Stisser

*Form continues on next page.*

CUST SIDE COPPER



3/4 NEW SADDLE
COPPER SERVICE
LAYS ON TOP OF MAIN WHERE IT CROSSES IT

CURB BOX IS 4'-9½" OFF WALK
MAIN IS 11'-6" SIDEWALK TO ℄ OF MAIN
MAIN IS APPROX 4'-9" DEEP
INSALLED SADDLE STREET SIDE OF MAIN
TAPPED ON SIDE
M[illegible] IS APPROX UNDER WHITE PAVEMENT LINE ON EDGE OF ROAD

## LEAK REPAIR REPORT

Agency: WLSN WATER Date 7/24/14

W.O. No.: ______ Foreman: ______

**LEAK IDENTIFICATION**

Map Reference: ______

Refer to Leak Discovery Report

Page and Coordinates: ______

Discovery Date: 7/24/14

Leak No.: ______

Location (include street name and number): 88-96 Rausar

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? Y (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ___ | Main Line Leak | X | Joint Leak | ___ |
| Meter Spud Leak | ___ | Service Lateral Leak | ___ | Other Leak | ___ |
| Meter Yoke Leak | ___ | Fire Hydrant Leak | ___ | Describe | ______ |
| Curb Stop Leak | ___ | Valve Leak | ___ | | ______ |

**DESCRIPTION OF REPAIR**

Damaged part was: ___ Repaired X Replaced

If replaced, what material was used? 2 Hymax 2' 6" PIPE

TOTAL 2-11^30

If repaired, what repairs were made?

___ Leak Clamp ___ Repacked Valve

___ Welded ___ Recaulked Joint

___ Other (describe) ______

Repair Time 3-9 (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

X Backhoe

✓ Dumptruck

100 PSI

Size of Leak: 1½ Hole

Measured ______ gpm

Estimated ______ gpm

Method Used: ______

Repair Costs:

| | |
|---|---|
| Materials | $ ______ |
| Labor | $ ______ |
| Equipment | $ ______ |
| Other | $ ______ |
| Total | $ ______ |

*Form continues on next page.*

5-' 4" TOP OF PIPE

APPROX 18" ABOVE TRANSITE

2' TOWARDS CURB 6" CI PIPE

IT HAD A CAPPED END

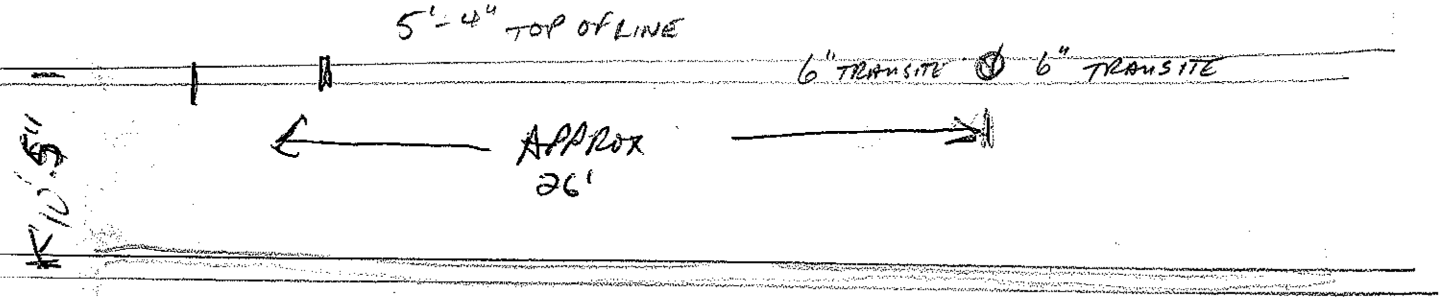
REMOVED 8'-10' OF IT

6" TRANSITE 1½" HOLE

REPLACED 2' OF TRANSITE (24-3/4")

GAS ON NORTH SIDE OF STREET

N



STEVENS ST

## LEAK REPAIR REPORT

Agency: WALSVILLE WATER Date 6/9/14

W.O. No.: ______ Foreman: D GARDNER

**LEAK IDENTIFICATION**

Map Reference: ______

Refer to Leak Discovery Report

Page and Coordinates: ______

Discovery Date: 6/9/14 Leak No.: ______

Location (include street name and number): ______

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? Y (Yes/No)

**TYPE OF LEAK**

Meter Leak ______
Meter Spud Leak ______
Meter Yoke Leak ______
Curb Stop Leak ______

Main Line Leak ______
Service Lateral Leak X
Fire Hydrant Leak ______
Valve Leak ______

Joint Leak ______
Other Leak ______
Describe ______

**DESCRIPTION OF REPAIR**

Damaged part was: ______ Repaired X Replaced

If replaced, what material was used? BRONZE

If repaired, what repairs were made?

______ Leak Clamp ______ Repacked Valve
______ Welded ______ Recaulked Joint
______ Other (describe) ______

Repair Time 4PM - 850PM (From/To)

Crew Size 4 + ENOUS (persons)

Equipment Used for Repair

______ Backhoe
______ Dumptruck

Repair Costs:

Materials $ ______
Labor $ ______
Equipment $ ______
Other $ ______
Total $ ______

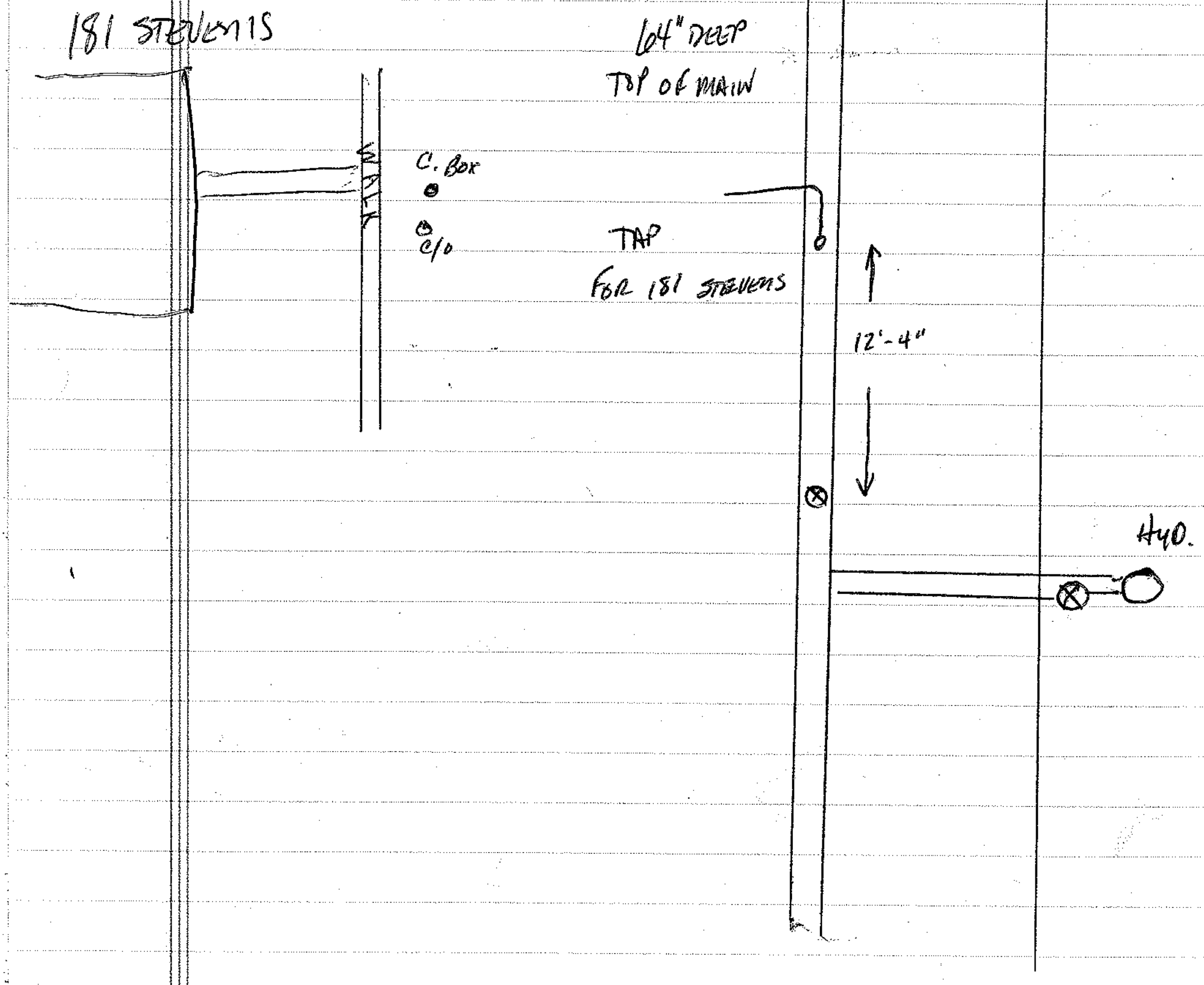
Size of Leak:

Measured 8AM TO 530PM gpm

Estimated ______ gpm

Method Used: ______

*Form continues on next page.*


181 STEVENS
WALK
C. BOX
C/O
64" DEEP
TOP OF MAIN
TAP
FOR 181 STEVENS
12'-4"
HYD.

## LEAK REPAIR REPORT

Agency: WELLSVILLE WATER  Date 12/9/12

W.O. No.: ______  Foreman: DAN GARDNER

**LEAK IDENTIFICATION**  Map Reference: ______

Refer to Leak Discovery Report  Page and Coordinates: ______

Discovery Date: 12/9/12  Leak No.: ______

Location (include street name and number): SCHOOL ST IN FRONT OF BEN CORNELIUS SHOP

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? YES (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ____ | Main Line Leak | ✓ | Joint Leak | ____ |
| Meter Spud Leak | ____ | Service Lateral Leak | ____ | Other Leak | ____ |
| Meter Yoke Leak | ____ | Fire Hydrant Leak | ____ | Describe | ______ |
| Curb Stop Leak | ____ | Valve Leak | ____ | | ______ |

**DESCRIPTION OF REPAIR**

Damaged part was: ____ Repaired ✓ Replaced

If replaced, what material was used? C 900

If repaired, what repairs were made?

____ Leak Clamp ____ Repacked Valve

____ Welded ____ Recaulked Joint

____ Other (describe) ______

Repair Time 7 HRS (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

✓ Backhoe

✓ Dumptruck

Repair Costs:

Materials $ ______

Labor $ ______

Equipment $ ______

Other $ ______

Total $ ______

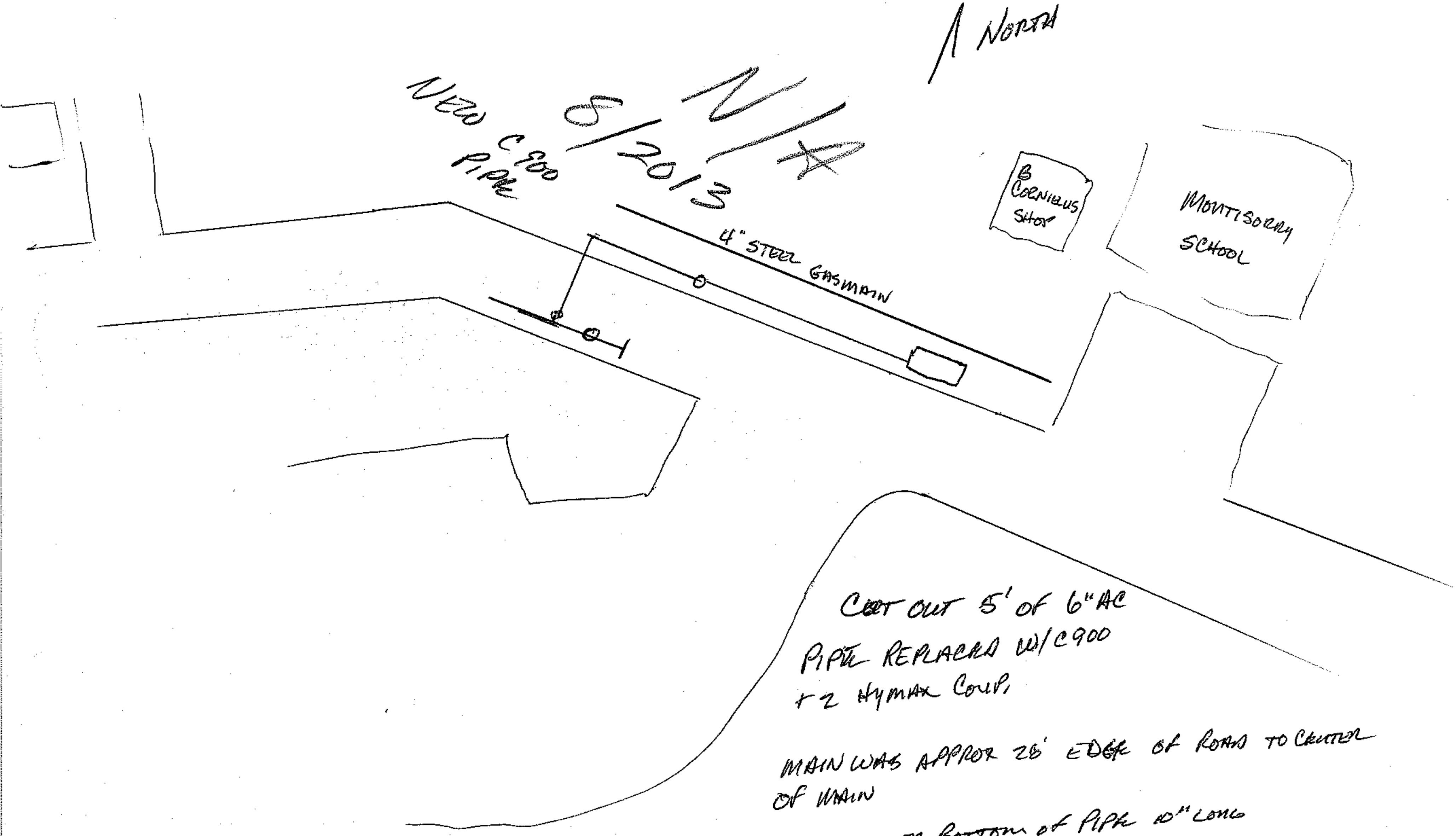
Size of Leak:

Measured ______ gpm

Estimated 800 gpm

Method Used: VISUAL

*Form continues on next page.*



8/2013

N/A

CUT OUT 5' OF 6" AC
PIPE REPLACED W/C900
+2 HYMAX COUP.

MAIN WAS APPROX 28' EDGE OF ROAD TO CENTER
OF MAIN

HOLE WAS ON BOTTOM OF PIPE 10" LONG
AND AVG. 2-2½" WIDE

## LEAK REPAIR REPORT

Agency: WELLSVILLE WATER  Date 9/17/13

W.O. No.: ________  Foreman: D GARDNER

**LEAK IDENTIFICATION**

Map Reference: N BROOKLYN NEXT TO GEN ROOFING

Refer to Leak Discovery Report

Page and Coordinates: ________

Discovery Date: 9/17/13

Leak No.: ________

Location (include street name and number): ________

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? ________ ([✓ Yes]/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ____ | Main Line Leak | ✓ | Joint Leak | ____ |
| Meter Spud Leak | ____ | Service Lateral Leak | ____ | Other Leak | ____ |
| Meter Yoke Leak | ____ | Fire Hydrant Leak | ____ | Describe | ____ |
| Curb Stop Leak | ____ | Valve Leak | ____ | | |

**DESCRIPTION OF REPAIR**

Damaged part was: ✓ Repaired ____ Replaced

If replaced, what material was used? ________

If repaired, what repairs were made?

✓ Leak Clamp  ____ Repacked Valve

____ Welded  ____ Recaulked Joint

____ Other (describe) ________

Repair Time 7 HRS (From/To)

Crew Size 3 (persons)

Equipment Used for Repair

____ Backhoe

____ Dumptruck

Repair Costs:

| | |
|---|---|
| Materials | $ ____ |
| Labor | $ ____ |
| Equipment | $ ____ |
| Other | $ ____ |
| Total | $ ____ |

Size of Leak:

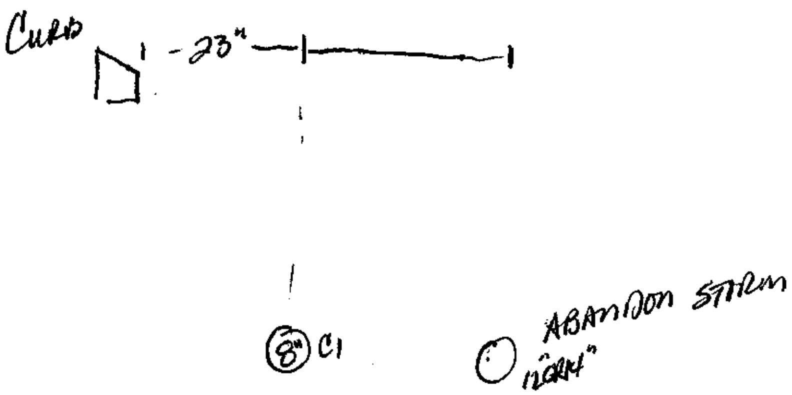
Measured ~~60-806~~ gpm

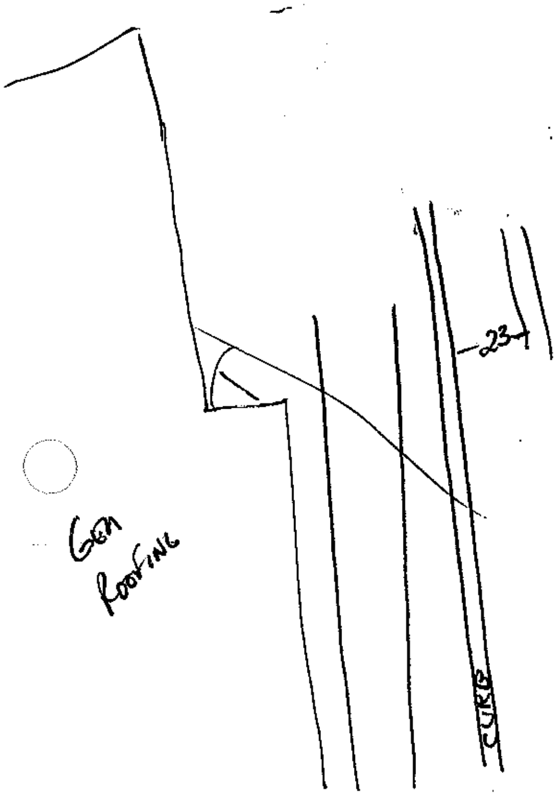
Estimated 60-80 gpm

Method Used: ________

*Form continues on next page.*

9/17/13





REPAIRED WITH FULL CIRC. CLAMP
FOUND A STORM DRAIN (CAPPED OFF)
8" DIP OR CI IS ABOUT 5'-6' DEEP

FARNUM NEAR FAIR VIEW

## LEAK REPAIR REPORT

Agency: Wolcott Water Date 11/4/13

W.O. No.: ______ Foreman: D Lanahan

**LEAK IDENTIFICATION**

Map Reference: Between VALVES 226 228

Refer to Leak Discovery Report

Page and Coordinates: ______

Discovery Date: 11/4/13

Leak No.: ______

Location (include street name and number): APPROX 24' SOUTH OF FAIRVIEW ON FARNUM

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? ______ ([✓ Yes]/No)

**TYPE OF LEAK**

Meter Leak ______

Meter Spud Leak ______

Meter Yoke Leak ______

Curb Stop Leak ______

Main Line Leak ✓

Service Lateral Leak ______

Fire Hydrant Leak ______

Valve Leak ______

Joint Leak ______

Other Leak ______

Describe ______

**DESCRIPTION OF REPAIR**

Damaged part was: ✓ Repaired ______ Replaced

If replaced, what material was used? Full Circle Clamp

If repaired, what repairs were made?

✓ Leak Clamp ______ Repacked Valve

______ Welded ______ Recaulked Joint

______ Other (describe) ______

Repair Time 1 - 6PM (From/To)

Crew Size 2 - +1 (persons)

Equipment Used for Repair

✓ Backhoe

✓ Dumptruck

Repair Costs:

Materials $ ______

Labor $ ______

Equipment $ ______

Other $ ______

Total $ ______

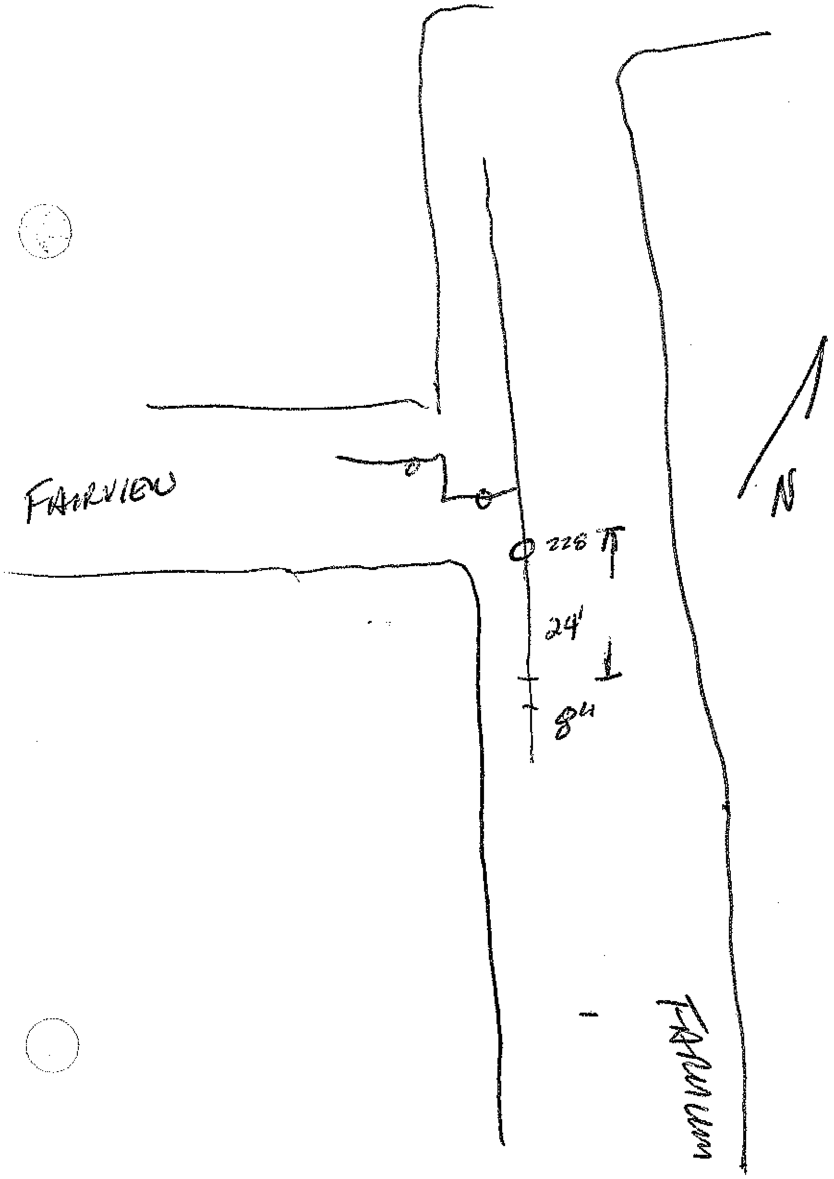
Size of Leak:

Measured ______ gpm

Estimated 50-80 gpm

Method Used: ______

*Form continues on next page.*



LEAK APPROX 24' SOUTH OF VALVE

228
USED FULL CIRC WITH TAP ONLY
THING WE HAD USED CORP TO PLUG OFF
TAP. CORP IS FACING WEST (SIDE OF MAIN)

8" CI PIPE IS ABOUT 5' TO TOP OF
MAIN

J FRY
W STONEMEITZ
D GARDNER

## LEAK REPAIR REPORT

Agency: WLSU WATER
Date 11/14/13

W.O. No.: ____
Foreman: D Gardner

**LEAK IDENTIFICATION**
Map Reference: 100 CHAMBERLIN
Refer to Leak Discovery Report
Page and Coordinates: SEW CURB CARD
Discovery Date: 11/14/13
Leak No.: ____
Location (include street name and number): ____

**FOR MAIN AND SERVICE LATERAL LEAKS ONLY**

Sketch a map of the site including:

1. Street name; north arrow.
2. Meter number (if applicable).
3. Mains and hydrants in shutdown area.
4. All valves (give valve numbers and show which were closed during repair).
5. Locate leak to nearest intersection or house with address. Show distances to property lines or street centerlines.

If Main or Service Leak, Attach Three Photos:

1. Straight down over leak or damage.
2. Close-up of leak and damage.
3. Any other photo which you feel will help.

Leak Found? ____ (Yes/No)

**TYPE OF LEAK**

| | | | | | |
|---|---|---|---|---|---|
| Meter Leak | ✓ | Main Line Leak | | Joint Leak | |
| Meter Spud Leak | | Service Lateral Leak | | Other Leak | |
| Meter Yoke Leak | | Fire Hydrant Leak | | Describe | |
| Curb Stop Leak | | Valve Leak | | | |

**DESCRIPTION OF REPAIR**

Damaged part was: ✓ Repaired ____ Replaced
If replaced, what material was used? ____

If repaired, what repairs were made?
✓ Leak Clamp ____ Repacked Valve
____ Welded ____ Recaulked Joint
____ Other (describe) ____

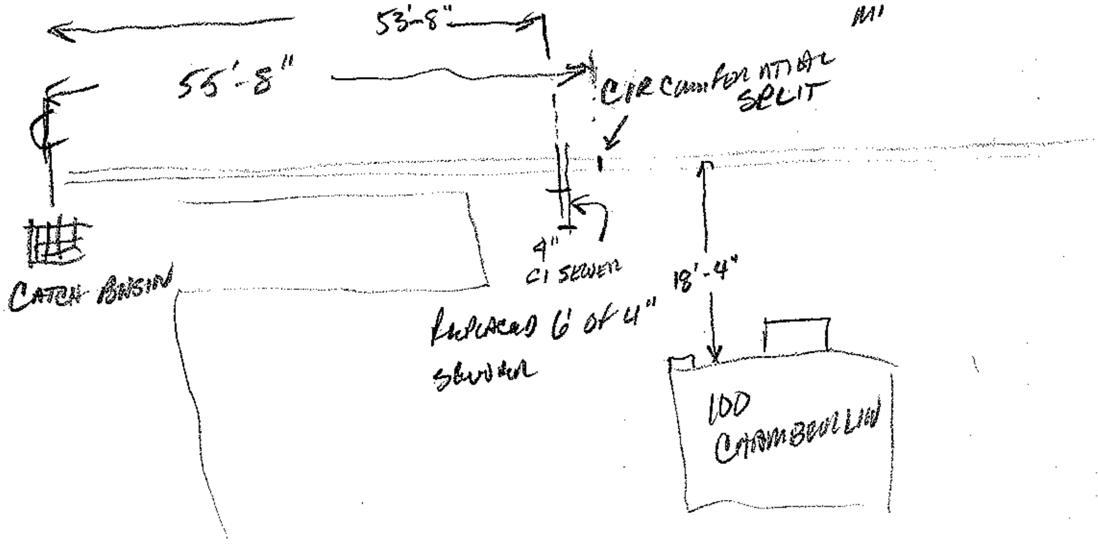
Repair Time 4-1030 (From/To)
Crew Size 4 (persons)
Equipment Used for Repair
____ Backhoe
____ Dumptruck

Repair Costs:
Materials $ $147.55 + SEWER REPAIRS $50.00
Labor $ ____
Equipment $ ____
Other $ ____
Total $ ____

Size of Leak:
Measured 40 gpm
Estimated ____ gpm
Method Used: ____

*Form continues on next page.*

WATER MAIN 64" PAVEMENT TO TOP OF MAIN
SEWER APPROX 53'-8" FROM CENTER OF C.B.



RYAN STIESER
K McCARTHY
J FRY
D GARDNER

# APPENDIX N
# NYLD LEAK DETECTION SURVEY

**NYLD Infrastructure** Field Report
NEW YORK LEAK DETECTION, INC.

Date: 04-11-2016 Technician: George Williams

Customer: HUNT Engineers, Architects & Land Surveyors, PC

Site Address: Village of Wellsville, 156 North Main Street, Wellsville, NY14895

Contact Person: Brad Mattison (Town of Wellsville) Phone: 585-610-8486 Phone: _____

**Scope of Work:** Leak Detection Survey -- Village of Wellsville on approximately 40 miles

**Type of Service:**

☒ *Leak Detection* ☐ *Utility Location/GPR* ☐ *Video Inspection*

☐ *Infrastructure Assessment* ☐ *Utility Mapping/AutoCAD*

---

**Type of Equipment Used**

☐ *Profiler EMP 400*
☒ *LC2500 Leak Correlator*
☒ *S-30 Surveyor*
☐ *Sonde*
☐ *Leica Robotic Total Station*
☐ *RD8000*
☐ *Noggin 250 mHz*
☐ Noggin 500 mHz
☐ Conquest 1000 mHz
☐ *Leica GPS*
☐ MetroTech Vivax vLocPro2
☐ PosiTector UTG G3
☐ *Video Inspection Camera*
☐ *Helium # Bottles*
☐ *Traceable Rodder*

**Marking Used**

☒ *Paint* ☐ *Flags* ☐ *Chalk*

☐ *Updated existing maps onsite* ☐ *Other:* ____________________

**Instructions from Onsite Contact:** ACP, Plastic, Cast Iron and Ductile pipe contained throughout system.

**Size of Pipe:** Varying

**Ground Cover/Weather Conditions:** 35-55 degrees, heavy rain at times.

**Information Transfer**

☒ *Information relayed on site to:* Brad Mattison and Dan Gardner ☐ *Hand drawn map (forward to office for digital remake)* ☐ *All markings picked up by surveyors*

**Key**

| | |
|---|---|
| Blue | Water |
| Red | Power |
| Orange | Communications |
| Yellow | Gas/Flammable Fuel |
| White | Unknown |
| Green | Storm/Sanitary |

**Notes/Testing Results:** Leak tested all hydrants throughout entire system using S-30 Surveyor as well as testing valves and curb boxes as needed. Correlations combined with surface acoustic testing utilized for leak locations. Continuity performed on areas containing asbestos concrete pipe. In areas where there were plastic mains scanned all accessible services for leak signal. Additionally found hydrants that have been moved or are not shown on provided mapping. Please see reports below for more information.

**Areas Scanned with Plastic Mains:**

1) Howard Street: Scanned all accessible services
2) School Street (C900): Scanned all accessible services
3) Sunset Avenue and Lee Place: Scanned all accessible services
4) Johnson Street: Scanned all available services
5) Oak Street: Scanned all accessible services
6) Main under creek near State highway 417 West and West State Street

**In all cases no leak signal detected**

**Areas Scanned with Asbestos Concrete Mains:**

1) Witter Avenue: scanned accessible services, continuity good
2) McDowell Avenue: Scanned accessible services, continuity good, note service to #11 McDowell is bent and inoperable.
3) Fairview Avenue: Continuity good
4) Rauber Street: Continuity good
5) West Hanover Street: Continuity good, this is an unknown however tone sounds similar to cast iron pipe.
6) Meadowbrook Court: Continuity good
7) Main which runs from Coats Street through the golf course and terminates at the municipal boundary on Riverside Drive: Continuity good
8) Main from the nursing home to Bolivar Road (417): Continuity good
9) North Highland Avenue to Seneca Street: Continuity good
10) West Dyke Street through the baseball field to Alfred State College: Continuity good

**NYLD Infrastructure**
NEW YORK LEAK DETECTION, INC.

Field Report

**NYLD**

**New York Leak Detection, Inc.**

LEAKAGE CONTROL REPORT

**(Drawings Not To Scale)**

Date: 04-12-2016
Leak/Work Order: # 1
Leak Priority Classification: 1

Technician: George Williams

Client: HUNT Engineers, Architects & Land Surveyors, PC

Street Address: 25 Hamilton Street, Village of Wellsville

| | |
|---|---|
| Sonic | X |
| Surfaced Water | |
| Other | |

**Estimation of Leak (GPD)**

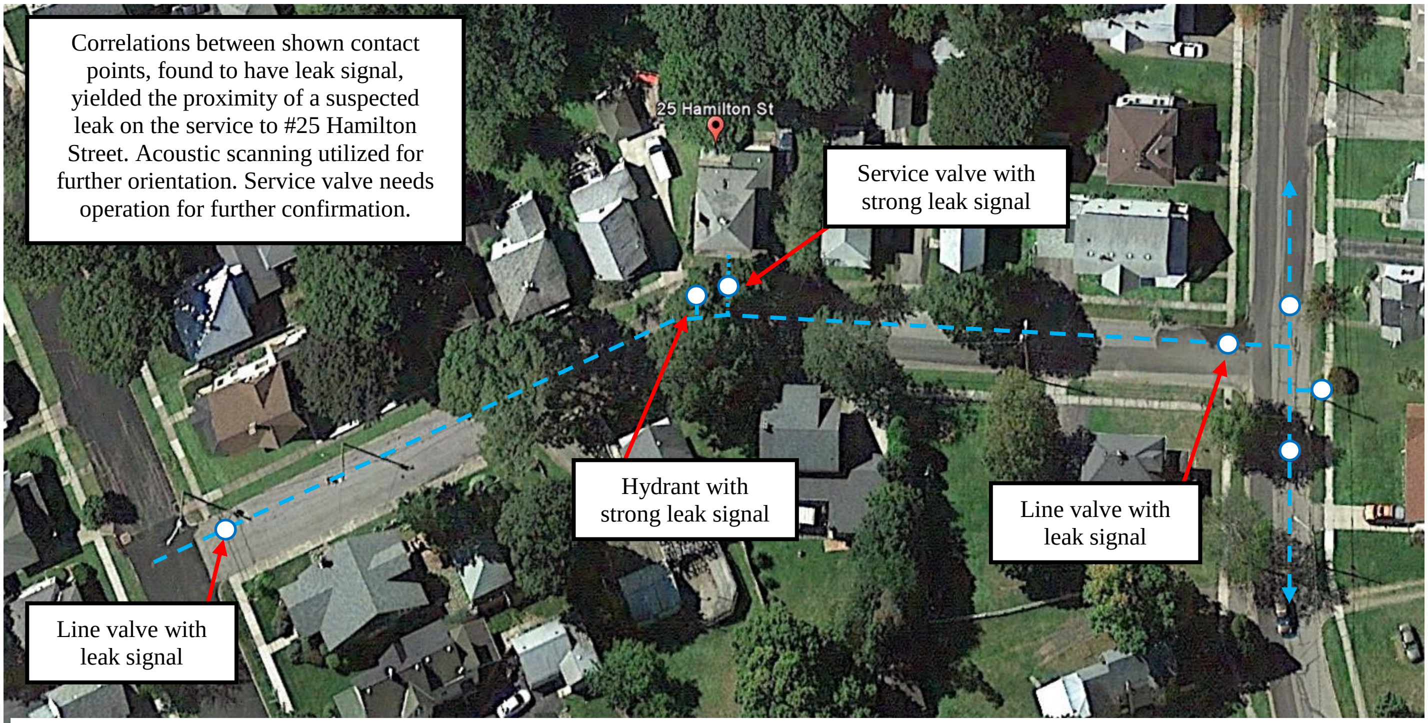
15,000

| | |
|---|---|
| Main Valve | X |
| Curb Valve | X |
| Meter Box | |
| Hydrant | X |
| Other | |

**Leak Appears To Be On**

| | |
|---|---|
| Main | |
| Service | X |
| Joint Connection | |
| Hydrant | |
| Valve | |
| Other | |

| | |
|---|---|
| Concrete | |
| Asphalt | X |
| Brick | |
| Gravel | |
| Soil | X |
| Other | |


Correlations between shown contact points, found to have leak signal, yielded the proximity of a suspected leak on the service to #25 Hamilton Street. Acoustic scanning utilized for further orientation. Service valve needs operation for further confirmation.

# NYLD Infrastructure

NEW YORK LEAK DETECTION, INC.

# Field Report

**NYLD**

**New York Leak Detection, Inc.**

LEAKAGE CONTROL REPORT

**(Drawings Not To Scale)**

Date: 04-12-2016
Leak/Work Order: # 2
Leak Priority Classification: 2

Technician: George Williams

Client: HUNT Engineers, Architects & Land Surveyors, PC

Street Address: 252 Farnum Street, Wellsville NY

| | |
|---|---|
| Sonic | X |
| Surfaced Water | |
| Other | |

**Estimation of Leak (GPD)**

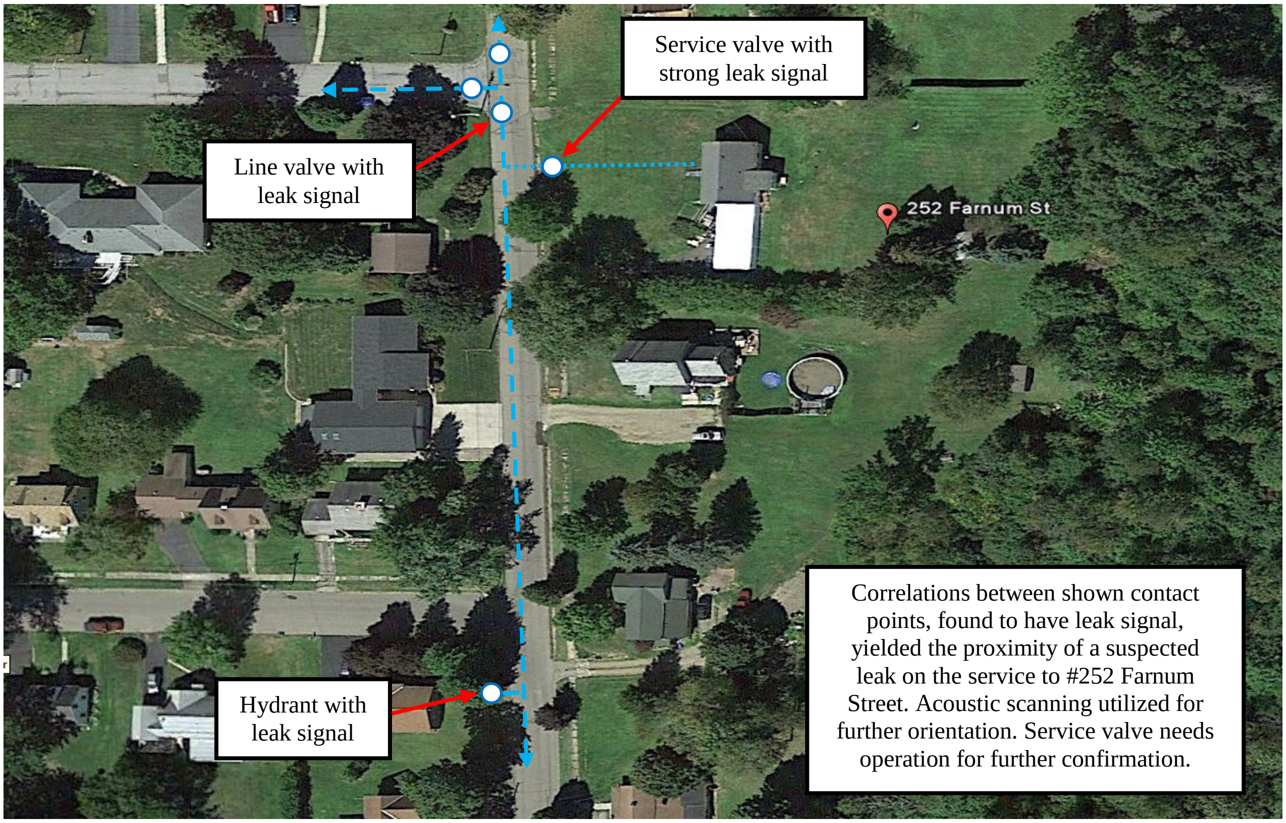
7,000

| | |
|---|---|
| Main Valve | X |
| Curb Valve | X |
| Meter Box | |
| Hydrant | X |
| Other | |

**Leak Appears To Be On**

| | |
|---|---|
| Main | |
| Service | X |
| Joint Connection | |
| Hydrant | |
| Valve | |
| Other | |

| | |
|---|---|
| Concrete | |
| Asphalt | X |
| Brick | |
| Gravel | |
| Soil | X |
| Other | |



Correlations between shown contact points, found to have leak signal, yielded the proximity of a suspected leak on the service to #252 Farnum Street. Acoustic scanning utilized for further orientation. Service valve needs operation for further confirmation.

Recognizing that underground leak detection and utilities locating is an art as well as a science, and that there are innumerable variables in achieving the desired results, NYLD does not guarantee accuracy in locating underground leaks or utilities and disclaims all liability for any damages based on information provided by NYLD.

NYLD strives to provide the highest quality service possible with the experience of the technicians and equipment used. It is our desire that our work provides our clients and customers with the information they need without adverse consequences.

**NYLD Infrastructure**
NEW YORK LEAK DETECTION, INC.

# Field Report

**NYLD**

**New York Leak Detection, Inc.**

LEAKAGE CONTROL REPORT

**(Drawings Not To Scale)**

Date: 04-13-2016
Leak/Work Order: # 5
Leak Priority Classification: 1

Technician: George Williams

Client: HUNT Engineers, Architects & Land Surveyors, PC

Street Address: South Main Street, Wellsville NY, near car dealership

| | |
|---|---|
| Sonic | X |
| Surfaced Water | |
| Other | |

**Estimation of Leak (GPD)**

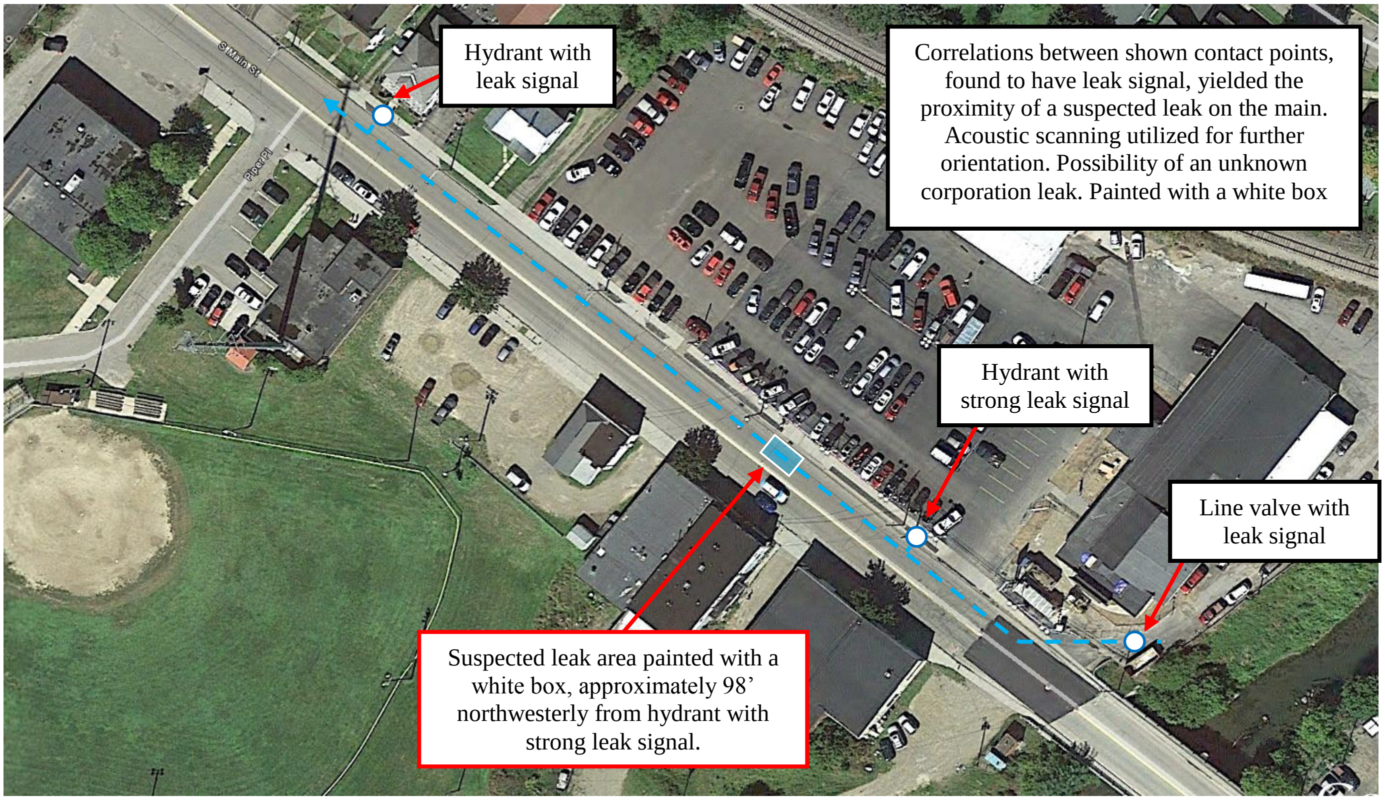
40,000

| | |
|---|---|
| Main Valve | X |
| Curb Valve | |
| Meter Box | |
| Hydrant | X |
| Other | |

**Leak Appears To Be On**

| | |
|---|---|
| Main | X |
| Service | |
| Joint Connection | |
| Hydrant | |
| Valve | |
| Other | |

| | |
|---|---|
| Concrete | |
| Asphalt | X |
| Brick | |
| Gravel | |
| Soil | |
| Other | |



Hydrant with leak signal

Correlations between shown contact points, found to have leak signal, yielded the proximity of a suspected leak on the main. Acoustic scanning utilized for further orientation. Possibility of an unknown corporation leak. Painted with a white box

Hydrant with strong leak signal

Line valve with leak signal

Suspected leak area painted with a white box, approximately 98' northwesterly from hydrant with strong leak signal.

Recognizing that underground leak detection and utilities locating is an art as well as a science, and that there are innumerable variables in achieving the desired results, NYLD does not guarantee accuracy in locating underground leaks or utilities and disclaims all liability for any damages based on information provided by NYLD.

NYLD strives to provide the highest quality service possible with the experience of the technicians and equipment used. It is our desire that our work provides our clients and customers with the information they need without adverse consequences.

**NYLD Infrastructure**

NEW YORK LEAK DETECTION, INC.

# Field Report

**NYLD**

**New York Leak Detection, Inc.**

LEAKAGE CONTROL REPORT

**(Drawings Not To Scale)**

Date: 04-13-2016

Leak/Work Order: # 6

Leak Priority Classification: 1

Technician: George Williams

Client: HUNT Engineers, Architects & Land Surveyors, PC

Street Address: 540 North Main Street, Wellsville NY

| | |
|---|---|
| Sonic | X |
| Surfaced Water | |
| Other | |

**Estimation of Leak (GPD)**

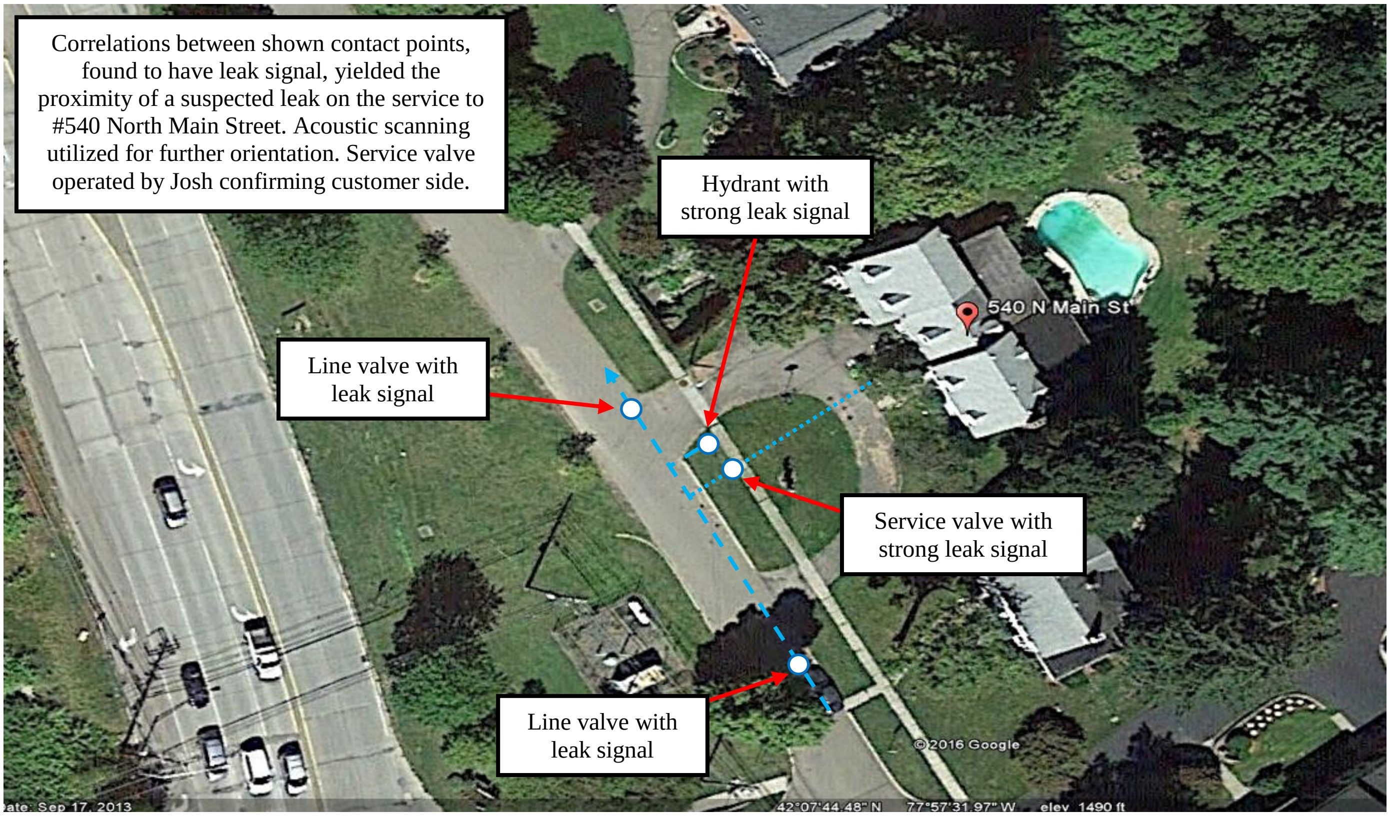
12,000

| | |
|---|---|
| Main Valve | X |
| Curb Valve | X |
| Meter Box | |
| Hydrant | X |
| Other | |

**Leak Appears To Be On**

| | |
|---|---|
| Main | |
| Service | X |
| Joint Connection | |
| Hydrant | |
| Valve | |
| Other | |

| | |
|---|---|
| Concrete | |
| Asphalt | |
| Brick | |
| Gravel | |
| Soil | X |
| Other | |



Correlations between shown contact points, found to have leak signal, yielded the proximity of a suspected leak on the service to #540 North Main Street. Acoustic scanning utilized for further orientation. Service valve operated by Josh confirming customer side.

Recognizing that underground leak detection and utilities locating is an art as well as a science, and that there are innumerable variables in achieving the desired results, NYLD does not guarantee accuracy in locating underground leaks or utilities and disclaims all liability for any damages based on information provided by NYLD.

NYLD strives to provide the highest quality service possible with the experience of the technicians and equipment used. It is our desire that our work provides our clients and customers with the information they need without adverse consequences.

**NYLD Infrastructure**
NEW YORK LEAK DETECTION, INC.

Field Report

**NYLD**

**New York Leak Detection, Inc.**

LEAKAGE CONTROL REPORT

**(Drawings Not To Scale)**

Date: 04-13-2016
Leak/Work Order: # 7
Leak Priority Classification: 2

Technician: George Williams

Client: HUNT Engineers, Architects & Land Surveyors, PC

Street Address: 47 Chestnut Street, Wellsville NY

| | |
|---|---|
| Sonic | X |
| Surfaced Water | |
| Other | |

**Estimation of Leak (GPD)**

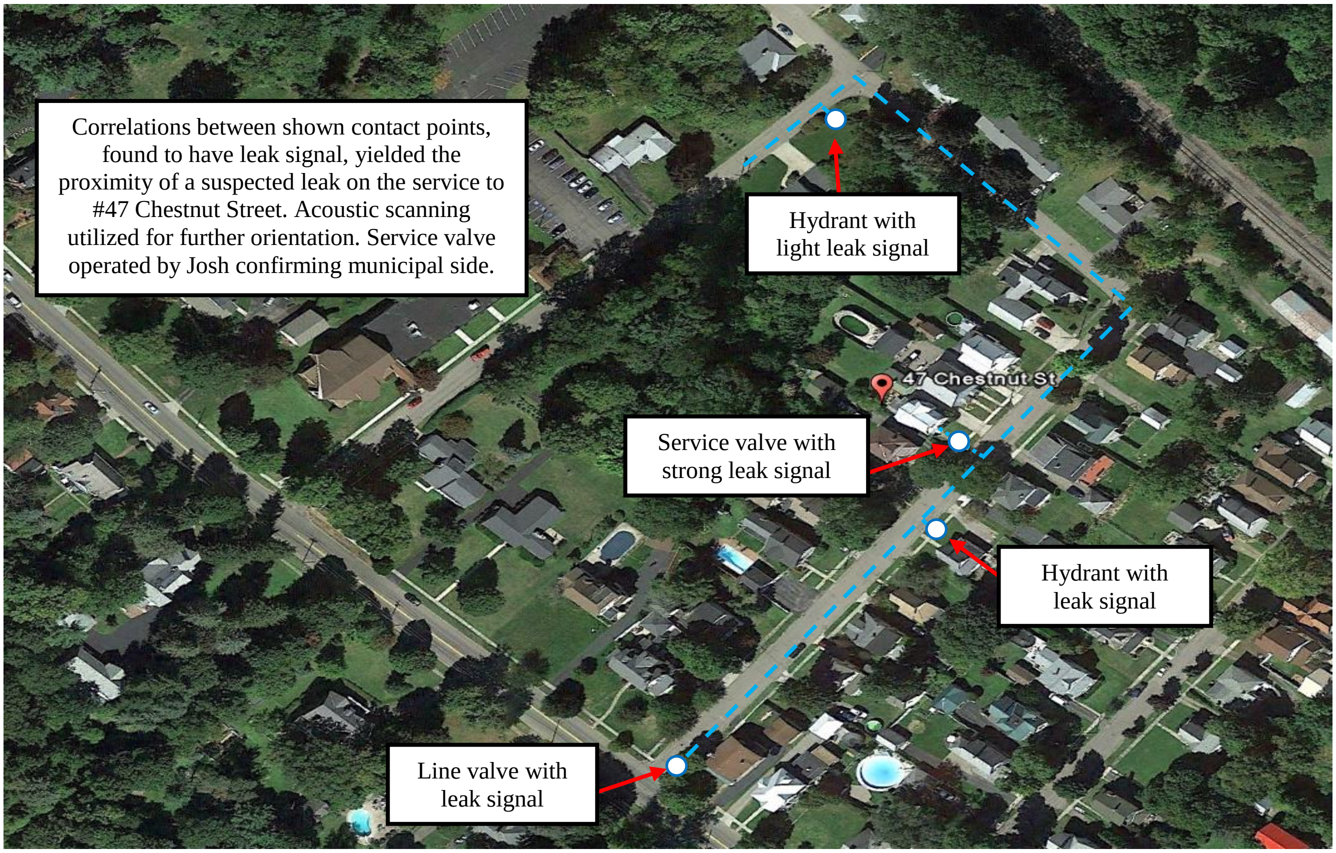
8,000

| | |
|---|---|
| Main Valve | X |
| Curb Valve | X |
| Meter Box | |
| Hydrant | X |
| Other | |

**Leak Appears To Be On**

| | |
|---|---|
| Main | |
| Service | X |
| Joint Connection | |
| Hydrant | |
| Valve | |
| Other | |

| | |
|---|---|
| Concrete | |
| Asphalt | |
| Brick | |
| Gravel | |
| Soil | |
| Other | |



Correlations between shown contact points, found to have leak signal, yielded the proximity of a suspected leak on the service to #47 Chestnut Street. Acoustic scanning utilized for further orientation. Service valve operated by Josh confirming municipal side.

Recognizing that underground leak detection and utilities locating is an art as well as a science, and that there are innumerable variables in achieving the desired results, NYLD does not guarantee accuracy in locating underground leaks or utilities and disclaims all liability for any damages based on information provided by NYLD.

NYLD strives to provide the highest quality service possible with the experience of the technicians and equipment used. It is our desire that our work provides our clients and customers with the information they need without adverse consequences.

**NYLD**

**New York Leak Detection, Inc.**

Date: 08-13-2016
Leak/Work Order: # 8
Leak Priority Classification: 1

LEAKAGE CONTROL REPORT

**(Drawings Not To Scale)**

Technician: George Williams

Client: HUNT Engineers, Architects & Land Surveyors, PC

Street Address: 60 Maple Avenue, Wellsville NY

| | |
|---|---|
| Sonic | X |
| Surfaced Water | |
| Other | |

**Estimation of Leak (GPD)**

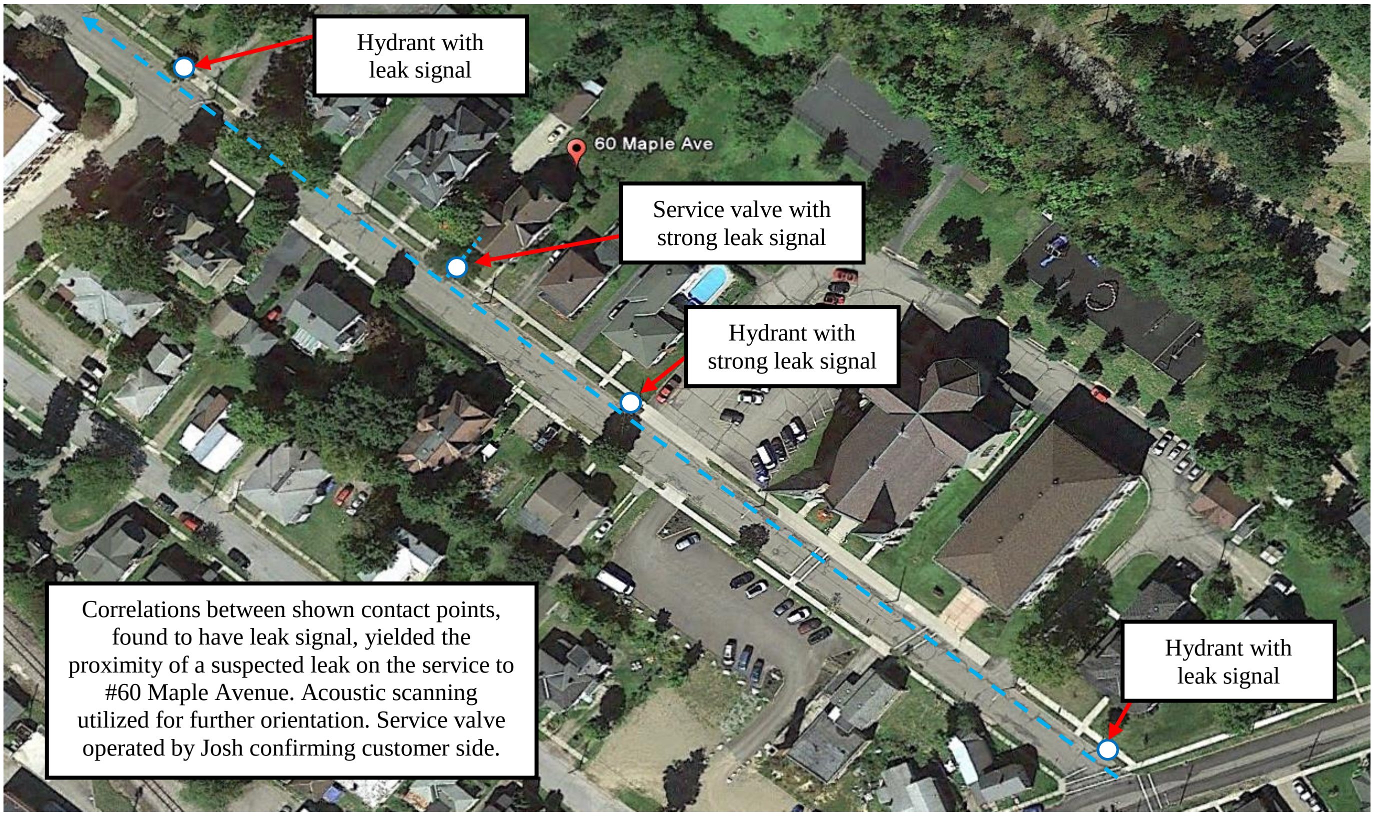
20,000

| | |
|---|---|
| Main Valve | |
| Curb Valve | X |
| Meter Box | |
| Hydrant | X |
| Other | |

**Leak Appears To Be On**

| | |
|---|---|
| Main | |
| Service | X |
| Joint Connection | |
| Hydrant | |
| Valve | |
| Other | |

| | |
|---|---|
| Concrete | |
| Asphalt | |
| Brick | |
| Gravel | |
| Soil | X |
| Other | |



Correlations between shown contact points, found to have leak signal, yielded the proximity of a suspected leak on the service to #60 Maple Avenue. Acoustic scanning utilized for further orientation. Service valve operated by Josh confirming customer side.

Recognizing that underground leak detection and utilities locating is an art as well as a science, and that there are innumerable variables in achieving the desired results, NYLD does not guarantee accuracy in locating underground leaks or utilities and disclaims all liability for any damages based on information provided by NYLD.

NYLD strives to provide the highest quality service possible with the experience of the technicians and equipment used. It is our desire that our work provides our clients and customers with the information they need without adverse consequences.

**NYLD Infrastructure**
NEW YORK LEAK DETECTION, INC.

Field Report

**NYLD**

**New York Leak Detection, Inc.**

LEAKAGE CONTROL REPORT

**(Drawings Not To Scale)**

Date: 08-14-2016
Leak/Work Order: # 9
Leak Priority Classification: 2

Technician: George Williams

Client: HUNT Engineers, Architects & Land Surveyors, PC

Street Address: 47 Elm Street, Wellsville NY

| | |
|---|---|
| Sonic | X |
| Surfaced Water | |
| Other | |

**Estimation of Leak (GPD)**

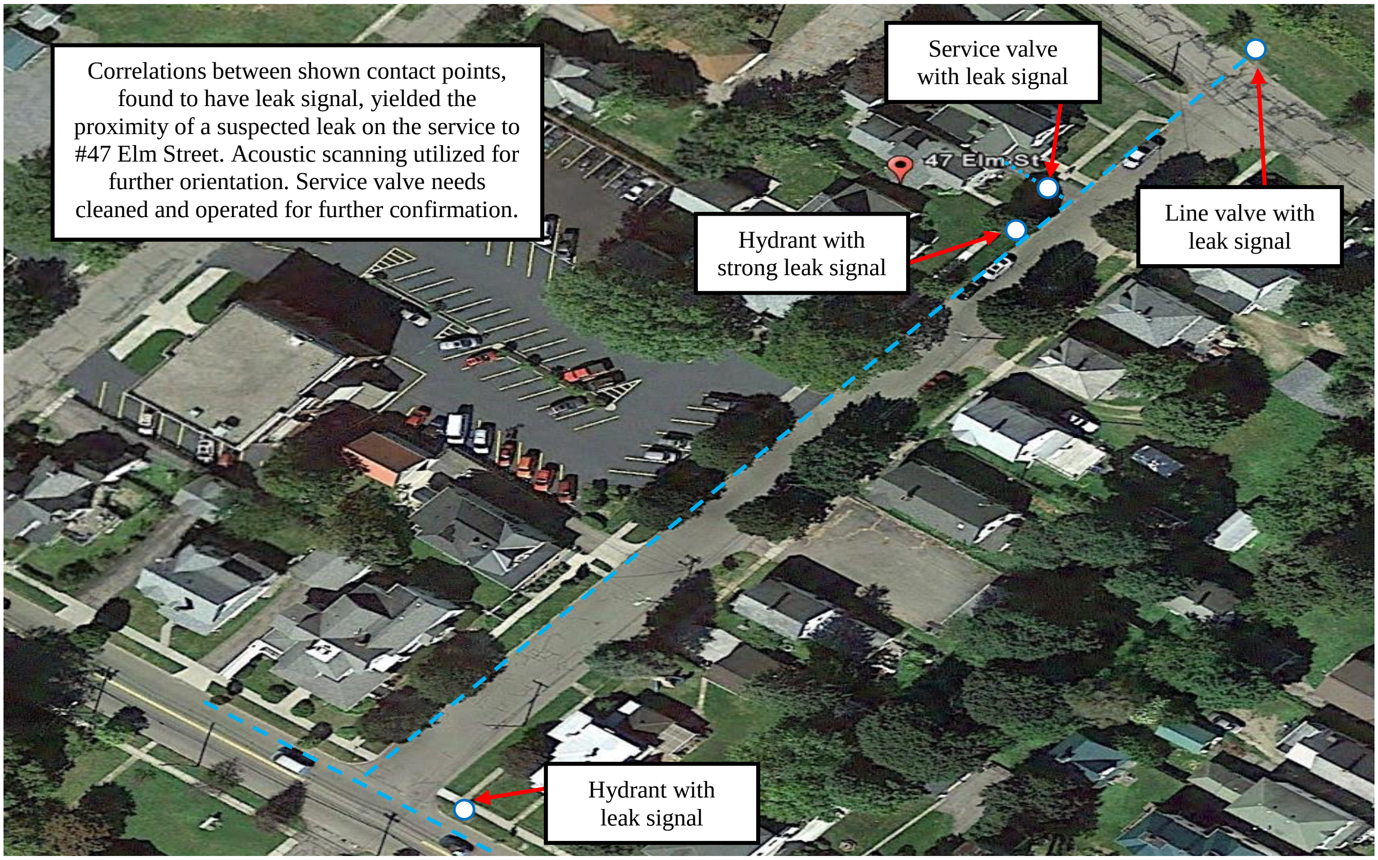
6,000

| | |
|---|---|
| Main Valve | X |
| Curb Valve | X |
| Meter Box | |
| Hydrant | X |
| Other | |

**Leak Appears To Be On**

| | |
|---|---|
| Main | |
| Service | X |
| Joint Connection | |
| Hydrant | |
| Valve | |
| Other | |

| | |
|---|---|
| Concrete | |
| Asphalt | X |
| Brick | |
| Gravel | |
| Soil | X |
| Other | |



Correlations between shown contact points, found to have leak signal, yielded the proximity of a suspected leak on the service to #47 Elm Street. Acoustic scanning utilized for further orientation. Service valve needs cleaned and operated for further confirmation.

Service valve with leak signal

Line valve with leak signal

Hydrant with strong leak signal

Hydrant with leak signal

Recognizing that underground leak detection and utilities locating is an art as well as a science, and that there are innumerable variables in achieving the desired results, NYLD does not guarantee accuracy in locating underground leaks or utilities and disclaims all liability for any damages based on information provided by NYLD.

NYLD strives to provide the highest quality service possible with the experience of the technicians and equipment used. It is our desire that our work provides our clients and customers with the information they need without adverse consequences.

Rev.7-8-14

# **NYLD** Infrastructure

NEW YORK LEAK DETECTION, INC.

Field Report

**NYLD**

**New York Leak Detection, Inc.**

LEAKAGE CONTROL REPORT

**(Drawings Not To Scale)**

Date: 08-14-2016
Leak/Work Order: # 10
Leak Priority Classification: 1

Technician: George Williams

Client: HUNT Engineers, Architects & Land Surveyors, PC

Street Address: 313 N. Main Street, Wellsville NY

| | |
|---|---|
| Sonic | X |
| Surfaced Water | |
| Other | |

**Estimation of Leak (GPD)**

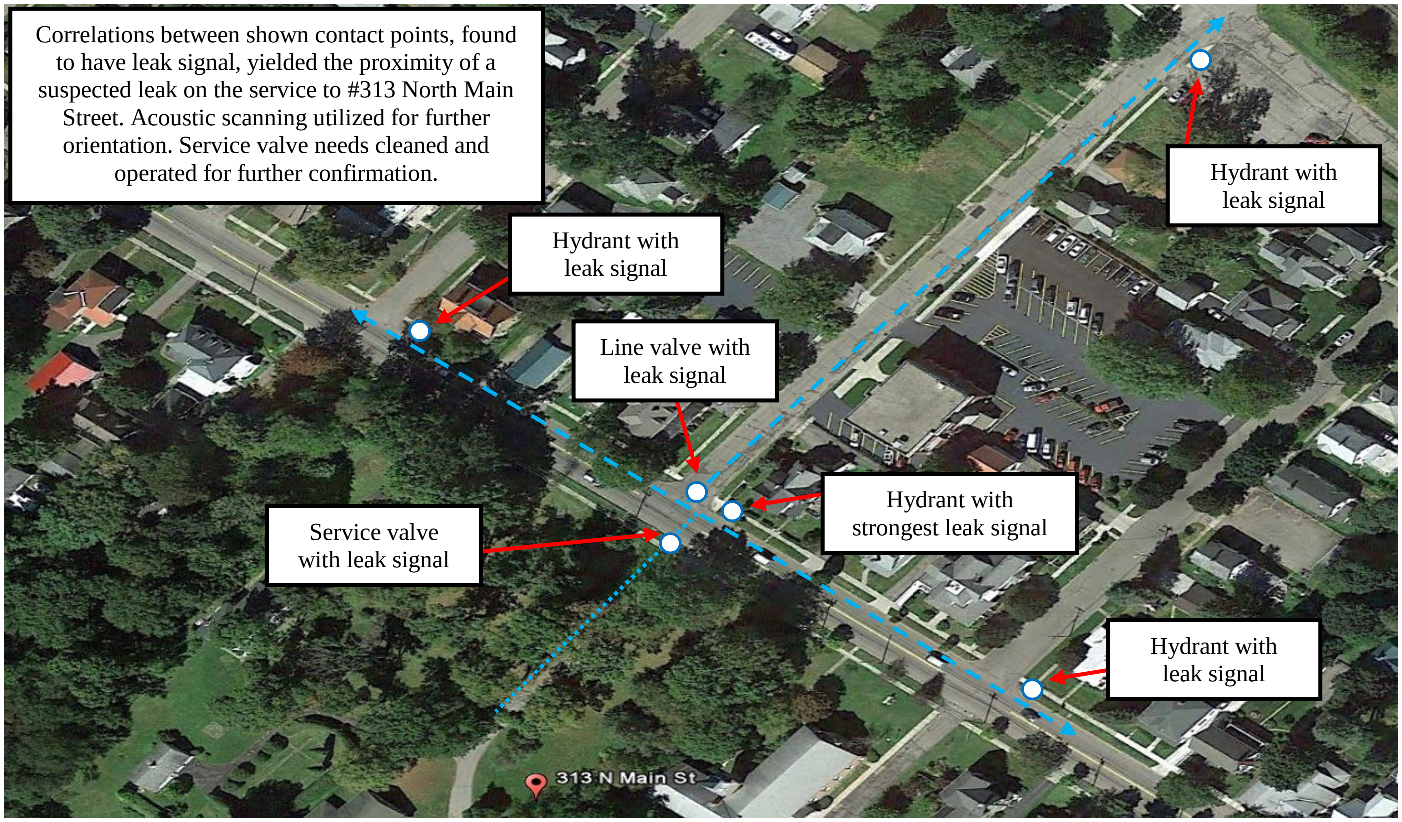
10,000

| | |
|---|---|
| Main Valve | X |
| Curb Valve | X |
| Meter Box | |
| Hydrant | X |
| Other | |

**Leak Appears To Be On**

| | |
|---|---|
| Main | |
| Service | X |
| Joint Connection | |
| Hydrant | |
| Valve | |
| Other | |

| | |
|---|---|
| Concrete | |
| Asphalt | X |
| Brick | |
| Gravel | |
| Soil | X |
| Other | |



Correlations between shown contact points, found to have leak signal, yielded the proximity of a suspected leak on the service to #313 North Main Street. Acoustic scanning utilized for further orientation. Service valve needs cleaned and operated for further confirmation.

Recognizing that underground leak detection and utilities locating is an art as well as a science, and that there are innumerable variables in achieving the desired results, NYLD does not guarantee accuracy in locating underground leaks or utilities and disclaims all liability for any damages based on information provided by NYLD.

NYLD strives to provide the highest quality service possible with the experience of the technicians and equipment used. It is our desire that our work provides our clients and customers with the information they need without adverse consequences.

**NYLD Infrastructure**
NEW YORK LEAK DETECTION, INC.

# Field Report

**NYLD**

**New York Leak Detection, Inc.**

LEAKAGE CONTROL REPORT

**(Drawings Not To Scale)**

Date: 04-14-2016
Leak/Work Order: # 11
Leak Priority Classification: 1

Technician: George Williams

Client: HUNT Engineers, Architects & Land Surveyors, PC

Street Address: 38 Rauber Street, Wellsville NY

| | |
|---|---|
| Sonic | X |
| Surfaced Water | X |
| Other | |

**Estimation of Leak (GPD)**

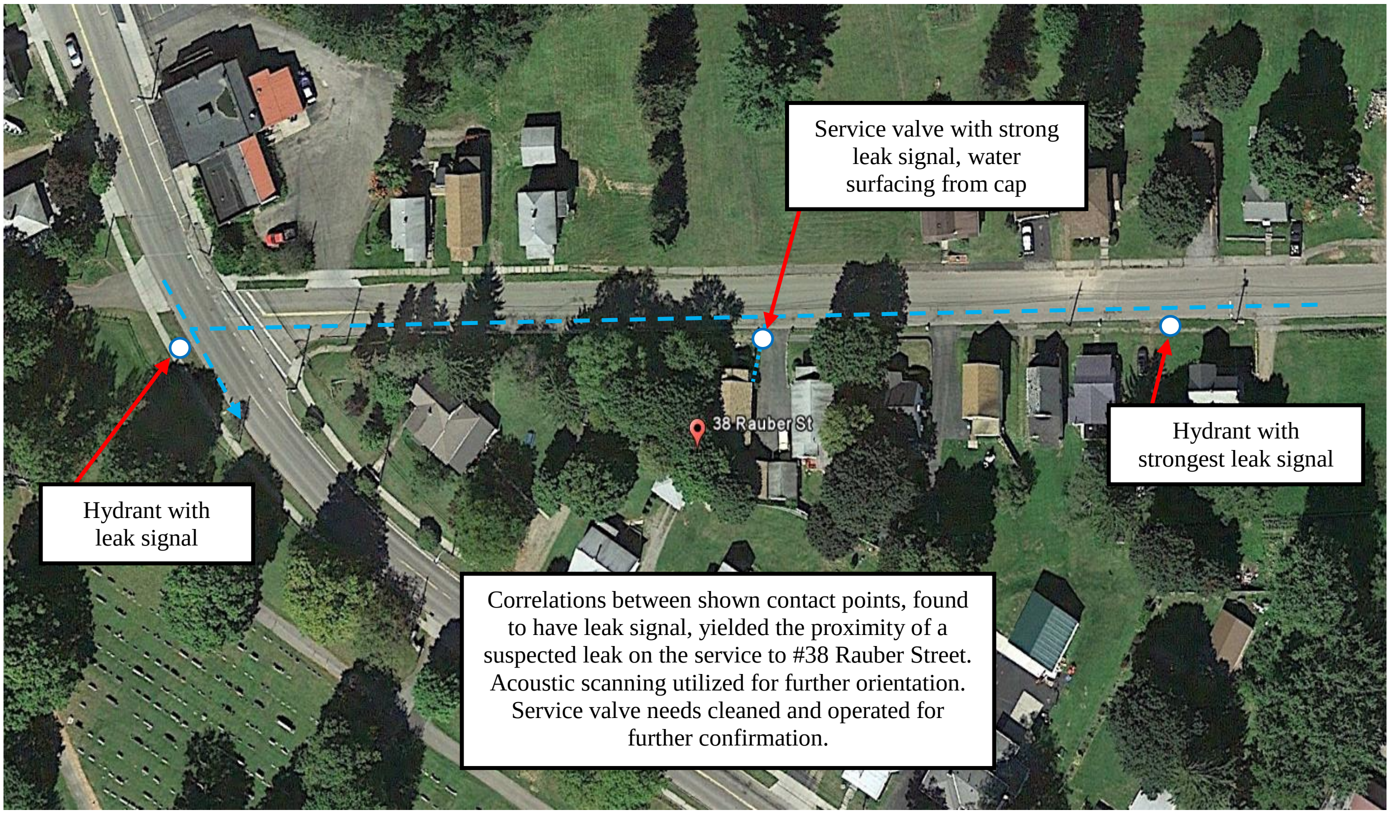
20,000

| | |
|---|---|
| Main Valve | |
| Curb Valve | X |
| Meter Box | |
| Hydrant | X |
| Other | |

**Leak Appears To Be On**

| | |
|---|---|
| Main | |
| Service | X |
| Joint Connection | |
| Hydrant | |
| Valve | |
| Other | |

| | |
|---|---|
| Concrete | |
| Asphalt | X |
| Brick | |
| Gravel | |
| Soil | X |
| Other | |



Service valve with strong leak signal, water surfacing from cap

Hydrant with strongest leak signal

Hydrant with leak signal

Correlations between shown contact points, found to have leak signal, yielded the proximity of a suspected leak on the service to #38 Rauber Street. Acoustic scanning utilized for further orientation. Service valve needs cleaned and operated for further confirmation.

Recognizing that underground leak detection and utilities locating is an art as well as a science, and that there are innumerable variables in achieving the desired results, NYLD does not guarantee accuracy in locating underground leaks or utilities and disclaims all liability for any damages based on information provided by NYLD.

NYLD strives to provide the highest quality service possible with the experience of the technicians and equipment used. It is our desire that our work provides our clients and customers with the information they need without adverse consequences.

**NYLD Infrastructure**
NEW YORK LEAK DETECTION, INC.

# Field Report

**NYLD**

**New York Leak Detection, Inc.**

LEAKAGE CONTROL REPORT

**(Drawings Not To Scale)**

Date: 04-15-2016
Leak/Work Order: # 12
Leak Priority Classification: 2

Technician: George Williams

Client: HUNT Engineers, Architects & Land Surveyors, PC

Street Address: 131 Miller Street, Wellsville NY

| | |
|---|---|
| Sonic | X |
| Surfaced Water | |
| Other | |

**Estimation of Leak (GPD)**

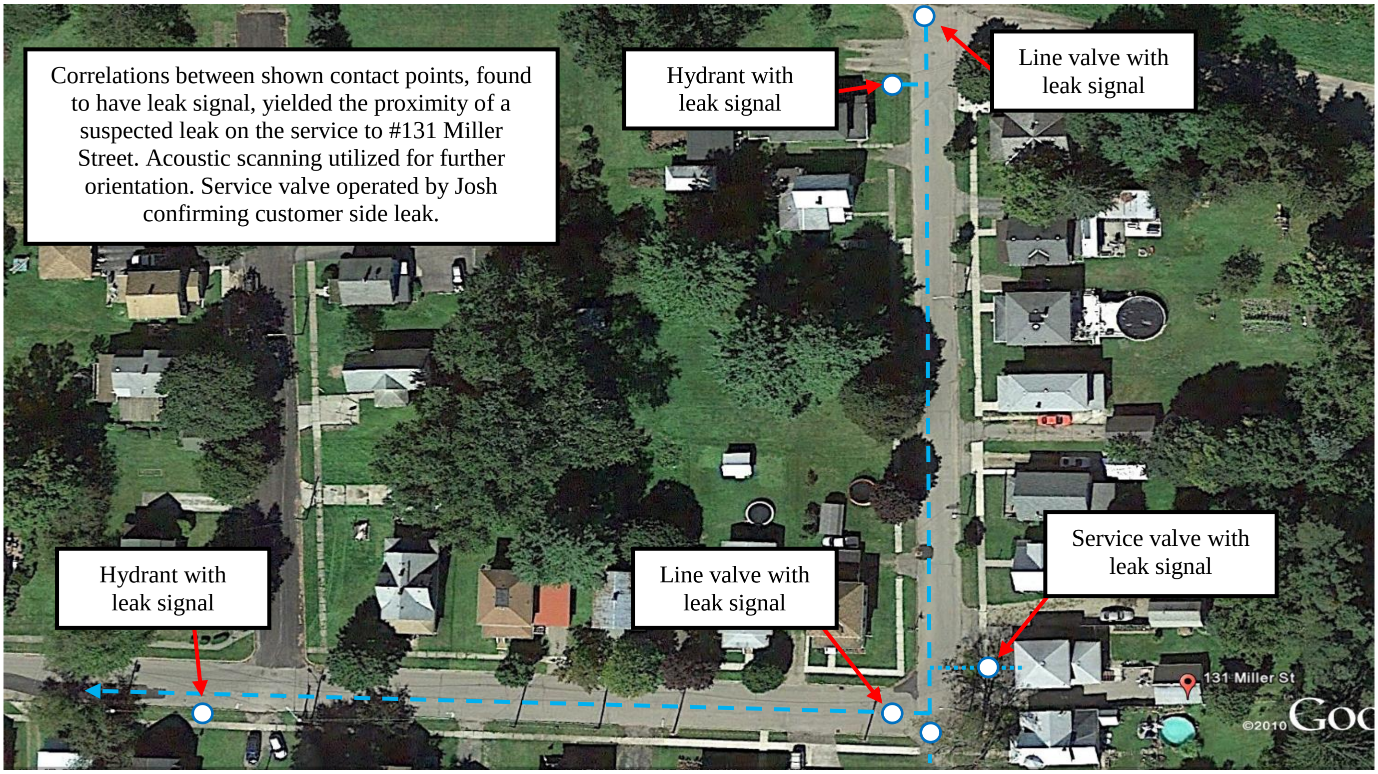
8,000

| | |
|---|---|
| Main Valve | X |
| Curb Valve | X |
| Meter Box | |
| Hydrant | X |
| Other | |

**Leak Appears To Be On**

| | |
|---|---|
| Main | |
| Service | X |
| Joint Connection | |
| Hydrant | |
| Valve | |
| Other | |

| | |
|---|---|
| Concrete | |
| Asphalt | |
| Brick | |
| Gravel | |
| Soil | X |
| Other | |



Correlations between shown contact points, found to have leak signal, yielded the proximity of a suspected leak on the service to #131 Miller Street. Acoustic scanning utilized for further orientation. Service valve operated by Josh confirming customer side leak.

Recognizing that underground leak detection and utilities locating is an art as well as a science, and that there are innumerable variables in achieving the desired results, NYLD does not guarantee accuracy in locating underground leaks or utilities and disclaims all liability for any damages based on information provided by NYLD.

NYLD strives to provide the highest quality service possible with the experience of the technicians and equipment used. It is our desire that our work provides our clients and customers with the information they need without adverse consequences.

# APPENDIX O
# WATER METER TESTING REPORTS

Cold Spring Environmental
3248 Buffalo Rd., Varysburg, N.Y. 14167
Ph: 716-863-7052

May 17, 2016

Hunt Engineers Architects Surveyors
Mr. Tim Steed
100 Hunt Center
Horseheads, NY 14845-1019

Ref: Wellsville Water Plant Flow Meter Report

Dear Mr. Steed,

Below are the meter description and results.

Calibration Date: May 13, 2016
Site location: Treated Water Flow meter
Equipment Model: Water Specialties 7-TR15-S
Equipment type: Closed Pipe Turbine Flow Meter
Equipment S/N: 20083093
Measuring device: 12 inch Pipe
Output type: 4-20 mA: 0-3000 GPM
Totalizer multiplier: X1000, 1 revolution = 1000 gallons
Displayed level/flow rate: 1130-1140 GPM
Measured Level/flow rate: 1120-1130 GPM
Percent Difference: ≤ 1%
Adjustment: No

Calibration Date: May 13, 2016
Site location: Clearwell Inlet Flow meter
Equipment Model: Water Specialties TR15
Equipment type: Closed Pipe Turbine Flow Meter
Equipment S/N: 20081718-12
Measuring device: 12 inch Pipe
Output type: 4-20 mA: 0-2250 GPM
Totalizer multiplier: X1000, 1 revolution = 1000 gallons
Displayed level/flow rate: 1400-1410 GPM
Measured Level/flow rate: 1390-1400 GPM
Percent Difference: ≤ 1%
Adjustment: No

Calibration Date: May 13, 2016
Site location: Treated Water Chart Recorder
Equipment Model: Honeywell DR45AT
Equipment type: 7 day round chart
Equipment S/N: C4000000466114
Measuring device: output from flow meter
Maximum flow rate: 2250 GPM
Input type: 4-20 mA
Totalizer multiplier: 100 gallons

Displayed level/flow rate Input: 1345 GPM
Measured Level/flow rate Input: 1345 GPM
Percent Difference: 0%
Adjustment: No

Calibration Date: May 13, 2016
Site location: Clearwell Inlet Chart Recorder
Equipment Model: Honeywell DR45AT
Equipment type: 7 day round chart
Equipment S/N: C4000000466113
Measuring device: output from flow meter
Maximum flow rate: 2250 GPM
Input type: 4-20 mA
Totalizer multiplier: 100 gallons

Displayed level/flow rate Input: 1419 GPM
Measured Level/flow rate Input: 1419 GPM
Percent Difference: 0%
Adjustment: No

Please contact me with any questions.

Sincerely, Jon Wolak

Jon Wolak

jonwolak@yahoo.com

Cold Spring Environmental
3248 Buffalo Rd., Varysburg, N.Y. 14167
Ph: 716-863-7052

June 16, 2016

Hunt Engineers Architects Surveyors
Mr. Tim Steed
100 Hunt Center
Horseheads, NY 14845-1019

Ref: Wellsville Flow Meter Report

Dear Mr. Steed,

Because of the varying flows we measured the totalizers over a 15 minute period, below are the meter description and results. The portable meter used was purchased new one month ago.

Verification Date: June 15, 2016
Site location: High School Flow meter, (across from water plant)
Equipment Model: Sensus 4”-6”
Equipment type: Closed Pipe Turbine Flow Meter
Equipment S/N: 61294023
Measuring device: 4 inch copper pipe
Output type: none
Totalizer multiplier: X1, 1 revolution = 1 CF
Measured Total over 15 minutes (above meter): 28 CF
Measured Total over 15 minutes (portable meter): 28 CF
Percent Difference: ≤ 1%

Verification Date: June 15, 2016
Site location: Elementary School Flow meter
Equipment Model: Sensus 4”-6”
Equipment type: Closed Pipe Turbine Flow Meter
Equipment S/N: No S/N
Measuring device: 4 inch copper pipe
Output type: none
Totalizer multiplier: X1, 1 revolution = 1 CF
Measured Total over 15 minutes (above meter): 44 CF
Measured Total over 15 minutes (portable meter): 45 CF
Percent Difference: ≤ 1%

Verification Date: June 15, 2016
Site location: Argentari Laundry Flow meter
Equipment Model: Rockwell 4”
Equipment type: Closed Pipe Turbine Flow Meter
Equipment S/N: 1313296
Measuring device: 4 inch galvanized pipe
Output type: none
Totalizer multiplier: X100, 1 revolution = 100 CF
Measured Total over 15 minutes (above meter): 2 CF
Measured Total over 15 minutes (portable meter): 45 CF
Percent Difference: greater than 100%
Note: no movement for a long time, less than one revolution

Verification Date: June 15, 2016
Site location: Hospital Flow meter
Equipment Model: Rockwell 4”
Equipment type: Closed Pipe Turbine Flow Meter
Equipment S/N: 1313296
Measuring device: 6 inch copper pipe
Output type: none
Totalizer multiplier: X100, 1 revolution = 100 CF
Measured Total over 15 minutes (above meter): 35 CF
Measured Total over 15 minutes (portable meter): 135 CF
Percent Difference: greater than 100%
Note: no movement when the flow was below 2.7 CFM, The second meter in the Hospital was shut off, all valves around it were in the off position, only used for a by-pass for the above meter during repairs so we did not check this one

Verification Date: June 15, 2016
Site location: Manor Care Center Flow meter,(next to old runway)
Equipment Model: Spectrun 260, 2” meter
Equipment type: Closed Pipe Turbine Flow Meter
Equipment S/N: 01-3045-17FT3
Measuring device: 4 inch copper pipe
Output type: none
Totalizer multiplier: X100, 1 revolution = 1 CF
Measured Total over 15 minutes (above meter): 34 CF
Measured Total over 15 minutes (portable meter): 34 CF
Percent Difference: ≤ 1%

Verification Date: June 15, 2016
Site location: Manor Care Center Flow meter, (behind WWTP)
Equipment Model: Rockwell 2”-3”
Equipment type: Closed Pipe Turbine Flow Meter
Equipment S/N: 1294518
Measuring device: 4 inch copper pipe
Output type: none
Totalizer multiplier: X10, 1 revolution = 10 CF
Measured Total over 15 minutes (above meter): 15 CF
Measured Total over 15 minutes (portable meter): 15 CF
Percent Difference: ≤ 1%

Please contact me with any questions.

Sincerely, Jon Wolak

Jon Wolak

jonwolak@yahoo.com

# APPENDIX P
# COST ESTIMATES

# Opinion of Probable Cost
# Water Meter Replacement

HUNT

## Village of Wellsville
## Wellsville, NY

| | |
|---|---|
| Date: 1/30/2017 | HUNT Project Number: 1861.034 |
| Design Stage: PER | Calculated By: AEV |
| Revision: 1 | Checked By: TKS |

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 2,328.24*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 1,455.15 | $ 1,455.15 | |
| 2 | Supervision (0.5%) | 1 | LS | $ 291.03 | $ 291.03 | |
| 3 | Mobilization (1%) | 1 | LS | $ 582.06 | $ 582.06 | |
| | ***WATER METER REPLACEMENT*** | | | | | ***$ 58,206.00*** |
| 4 | Commercial Water Meter 2" Ultrasonic | 2 | EA | $ 1,716.00 | $ 3,432.00 | |
| 5 | Commercial Water Meter 3" Badger CSM | 1 | EA | $ 3,954.00 | $ 3,954.00 | |
| 6 | Commercial Water Meter 4" Badger FS with bypass | 2 | EA | $ 9,600.00 | $ 19,200.00 | |
| 6 | Commercial Water Meter 4" Badger Install Only | 1 | EA | $ 1,440.00 | $ 1,440.00 | |
| 7 | Commercial Water Meter 6" Badger FS with bypass | 2 | EA | $ 15,090.00 | $ 30,180.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 12,106.85 | $ 12,106.85 | ***$ 12,106.85*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 72,641.09** |

# Opinion of Probable Cost

## Treatment Plan Pump Replacement and Control Improvements

**Village of Wellsville**
**Wellsville, NY**

Date: 1/5/2017
Design Stage: PER
Revision:
HUNT Project Number: 1861.034
Calculated By: AEV
Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 16,492.00*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 5,890.00 | $ 5,890.00 | |
| 2 | Supervision (2%) | 1 | LS | $ 4,712.00 | $ 4,712.00 | |
| 3 | Mobilization (2%) | 1 | LS | $ 4,712.00 | $ 4,712.00 | |
| 4 | Temporary Facilities (0.5%) | 1 | LS | $ 1,178.00 | $ 1,178.00 | |
| | ***WATER TREATMENT PUMP AND CONTROLS*** | | | | | ***$ 235,600.00*** |
| 5 | 25HP Raw Water Submersible Pump | 2 | EA | $ 23,000.00 | $ 46,000.00 | |
| 6 | 15HP Raw Water | 2 | EA | $ 21,800.00 | $ 43,600.00 | |
| 7 | 25HP VFD | 2 | EA | $ 9,050.00 | $ 18,100.00 | |
| 8 | 15HP VFD | 2 | EA | $ 8,000.00 | $ 16,000.00 | |
| 9 | 60HP VFD | 1 | EA | $ 13,300.00 | $ 13,300.00 | |
| 10 | 125HP VFD | 2 | EA | $ 20,300.00 | $ 40,600.00 | |
| 11 | Custom Pump Control Panel for High Service | 1 | EA | $ 48,000.00 | $ 48,000.00 | |
| 12 | Removal of Existing Equipment and Relocations | 1 | LS | $ 10,000.00 | $ 10,000.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 50,418.40 | $ 50,418.40 | ***$ 50,418.40*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 302,510.40** |

# Opinion of Probable Cost
## Water Replacement Madison Hill Rd.

HUNT

**Village of Wellsville**
**Wellsville, NY**

Date: 1/5/2017
HUNT Project Number: 1861.034
Design Stage: PER
Calculated By: AEV
Revision:
Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 50,484.60*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 13,285.42 | $ 13,285.42 | |
| 2 | Supervision (2%) | 1 | LS | $ 10,628.34 | $ 10,628.34 | |
| 3 | Mobilization (3%) | 1 | LS | $ 15,942.51 | $ 15,942.51 | |
| 4 | Maintenance and Protection of Traffic (1.5%) | 1 | LS | $ 7,971.25 | $ 7,971.25 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 2,657.08 | $ 2,657.08 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 2,000.00*** |
| 6 | Inlet Protection | 16 | EA | $ 125.00 | $ 2,000.00 | |
| | ***EARTHWORK*** | | | | | ***$ 12,285.19*** |
| 7 | Import and Place Topsoil | 230 | CY | $ 40.00 | $ 9,185.19 | |
| 8 | Fine Grade Topsoil | 12400 | SF | $ 0.25 | $ 3,100.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 181,914.67*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 2521 | SY | $ 52.00 | $ 131,074.67 | |
| 10 | Concrete Sidewalk with Subbase | 2480 | SF | $ 10.00 | $ 24,800.00 | |
| 11 | Granite Curb | 620 | LF | $ 38.00 | $ 23,560.00 | |
| 12 | Seeding & Mulching | 12400 | SF | $ 0.20 | $ 2,480.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 335,217.00*** |
| 13 | Connection to Existing System | 7 | EA | $ 2,000.00 | $ 14,000.00 | |
| 14 | 8" Ductile Iron Watermain | 1171 | LF | $ 62.00 | $ 72,602.00 | |
| 15 | 14" Ductile Iron Watermain | 1140 | LF | $ 121.00 | $ 137,940.00 | |
| 17 | 8" Gate Valve and Box | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 18 | 8" Elbow/Tee | 5 | EA | $ 695.00 | $ 3,475.00 | |
| 19 | 14" Elbow/Tee | 8 | EA | $ 2,450.00 | $ 19,600.00 | |
| 20 | Fire Hydrant Unit | 7 | EA | $ 5,000.00 | $ 35,000.00 | |
| 21 | 1-1/2" Water Service Direct Bury | 1440 | LF | $ 20.00 | $ 28,800.00 | |
| 22 | Coupler to Tie onto Existing Water Service | 55 | EA | $ 50.00 | $ 2,750.00 | |
| 23 | Curb Stop and Box | 55 | EA | $ 310.00 | $ 17,050.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 116,380.29 | $ 116,380.29 | ***$ 116,380.29*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 698,281.74** |

# Opinion of Probable Cost
# Water Replacement Brooklyn Ave.

**HUNT**

## Village of Wellsville
## Wellsville, NY

Date: 1/5/2017
Design Stage: PER
Revision:
HUNT Project Number: 1861.034
Calculated By: AEV
Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 57,354.22*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 15,093.21 | $ 15,093.21 | |
| 2 | Supervision (2%) | 1 | LS | $ 12,074.57 | $ 12,074.57 | |
| 3 | Mobilization (3%) | 1 | LS | $ 18,111.86 | $ 18,111.86 | |
| 4 | Maintenance and Protection of Traffic (1.5%) | 1 | LS | $ 9,055.93 | $ 9,055.93 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 3,018.64 | $ 3,018.64 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 2,000.00*** |
| 6 | Inlet Protection | 16 | EA | $ 125.00 | $ 2,000.00 | |
| | ***EARTHWORK*** | | | | | ***$ 15,059.26*** |
| 7 | Import and Place Topsoil | 281 | CY | $ 40.00 | $ 11,259.26 | |
| 8 | Fine Grade Topsoil | 15200 | SF | $ 0.25 | $ 3,800.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 232,949.33*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 3281 | SY | $ 52.00 | $ 170,629.33 | |
| 10 | Concrete Sidewalk with Subbase | 3040 | SF | $ 10.00 | $ 30,400.00 | |
| 11 | Granite Curb | 760 | LF | $ 38.00 | $ 28,880.00 | |
| 12 | Seeding & Mulching | 15200 | SF | $ 0.20 | $ 3,040.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 353,720.00*** |
| 13 | Connection to Existing System | 4 | EA | $ 2,000.00 | $ 8,000.00 | |
| 15 | 8" Ductile Iron Watermain | 3632 | LF | $ 65.00 | $ 236,080.00 | |
| 17 | 8" Gate Valve and Box | 4 | EA | $ 2,000.00 | $ 8,000.00 | |
| 18 | 8" Elbow/Tee | 12 | EA | $ 695.00 | $ 8,340.00 | |
| 19 | Fire Hydrant Unit | 6 | EA | $ 5,000.00 | $ 30,000.00 | |
| 20 | 1-1/2" Water Service Direct Bury | 1905 | LF | $ 20.00 | $ 38,100.00 | |
| 21 | Coupler to Tie onto Existing Water Service | 70 | EA | $ 50.00 | $ 3,500.00 | |
| 22 | Curb Stop and Box | 70 | EA | $ 310.00 | $ 21,700.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 132,216.56 | $ 132,216.56 | ***$ 132,216.56*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 793,299.37** |

# Opinion of Probable Cost
# Water Replacement Early St.

HUNT

## Village of Wellsville
## Wellsville, NY

| | |
|---|---|
| Date: 1/5/2017 | HUNT Project Number: 1861.034 |
| Design Stage: PER | Calculated By: AEV |
| Revision: | Checked By: TKS |

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 37,637.11*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 9,904.50 | $ 9,904.50 | |
| 2 | Supervision (2%) | 1 | LS | $ 7,923.60 | $ 7,923.60 | |
| 3 | Mobilization (3%) | 1 | LS | $ 11,885.40 | $ 11,885.40 | |
| 4 | Maintenance and Protection of Traffic (1.5%) | 1 | LS | $ 5,942.70 | $ 5,942.70 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 1,980.90 | $ 1,980.90 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 1,000.00*** |
| 6 | Inlet Protection | 8 | EA | $ 125.00 | $ 1,000.00 | |
| | ***EARTHWORK*** | | | | | ***$ 13,474.07*** |
| 7 | Import and Place Topsoil | 252 | CY | $ 40.00 | $ 10,074.07 | |
| 8 | Fine Grade Topsoil | 13600 | SF | $ 0.25 | $ 3,400.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 158,096.00*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 1968 | SY | $ 52.00 | $ 102,336.00 | |
| 10 | Concrete Sidewalk with Subbase | 2720 | SF | $ 10.00 | $ 27,200.00 | |
| 11 | Granite Curb | 680 | LF | $ 38.00 | $ 25,840.00 | |
| 12 | Seeding & Mulching | 13600 | SF | $ 0.20 | $ 2,720.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 223,610.00*** |
| 13 | Connection to Existing System | 3 | EA | $ 2,000.00 | $ 6,000.00 | |
| 14 | 8" Ductile Iron Watermain | 1992 | LF | $ 65.00 | $ 129,480.00 | |
| 15 | 8" Gate Valve and Box | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 16 | 8" Elbow/Tee | 6 | EA | $ 695.00 | $ 4,170.00 | |
| 17 | Fire Hydrant Unit | 5 | EA | $ 5,000.00 | $ 25,000.00 | |
| 18 | 1-1/2" Water Service Direct Bury | 1614 | LF | $ 20.00 | $ 32,280.00 | |
| 19 | Coupler to Tie onto Existing Water Service | 63 | EA | $ 50.00 | $ 3,150.00 | |
| 20 | Curb Stop and Box | 63 | EA | $ 310.00 | $ 19,530.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 86,763.44 | $ 86,763.44 | ***$ 86,763.44*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 520,580.62** |

# Opinion of Probable Cost
## Water Replacement S. Main St.

HUNT

**Village of Wellsville**
**Wellsville, NY**

Date: 1/5/2017
HUNT Project Number: 1861.034
Design Stage: PER
Calculated By: AEV
Revision:
Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 66,383.59*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 12,293.26 | $ 12,293.26 | |
| 2 | Supervision (2%) | 1 | LS | $ 9,834.61 | $ 9,834.61 | |
| 3 | Mobilization (3%) | 1 | LS | $ 14,751.91 | $ 14,751.91 | |
| 4 | Maintenance and Protection of Traffic (5%) | 1 | LS | $ 24,586.51 | $ 24,586.51 | |
| 5 | Temporary Facilities (1%) | 1 | LS | $ 4,917.30 | $ 4,917.30 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 2,350.00*** |
| 6 | Silt Fence | 200 | LF | $ 3.00 | $ 600.00 | |
| 7 | Inlet Protection | 14 | EA | $ 125.00 | $ 1,750.00 | |
| | ***EARTHWORK*** | | | | | ***$ 3,962.96*** |
| 8 | Import and Place Topsoil | 74 | CY | $ 40.00 | $ 2,962.96 | |
| 9 | Fine Grade Topsoil | 4000 | SF | $ 0.25 | $ 1,000.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 161,289.33*** |
| 10 | S-Duty Asphalt Pavement with Subbase | 333 | SY | $ 45.00 | $ 15,000.00 | |
| 11 | Heavy Duty Asphalt Pavement with Subbase | 2061 | SY | $ 52.00 | $ 107,189.33 | |
| 12 | Concrete Sidewalk with Subbase | 2500 | SF | $ 10.00 | $ 25,000.00 | |
| 13 | Granite Curb | 350 | LF | $ 38.00 | $ 13,300.00 | |
| 14 | Seeding & Mulching | 4000 | SF | $ 0.20 | $ 800.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 324,128.00*** |
| 15 | Connection to Existing System | 8 | EA | $ 2,000.00 | $ 16,000.00 | |
| 16 | 4" Ductile Iron Service | 250 | LF | $ 50.00 | $ 12,500.00 | |
| 17 | 10" Ductile Iron Watermain | 2392 | LF | $ 84.00 | $ 200,928.00 | |
| 18 | 4" Gate Valve and Box | 10 | EA | $ 1,200.00 | $ 12,000.00 | |
| 20 | 10" Gate Valve and Box | 2 | EA | $ 4,500.00 | $ 9,000.00 | |
| 21 | 10" Elbow/Tee | 10 | EA | $ 1,700.00 | $ 17,000.00 | |
| 22 | Fire Hydrant Unit | 6 | EA | $ 5,000.00 | $ 30,000.00 | |
| 23 | 1-1/2" Water Service Direct Bury | 705 | LF | $ 20.00 | $ 14,100.00 | |
| 24 | Coupler to Tie onto Existing Water Service | 35 | EA | $ 50.00 | $ 1,750.00 | |
| 25 | Curb Stop and Box | 35 | EA | $ 310.00 | $ 10,850.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 111,622.78 | $ 111,622.78 | ***$ 111,622.78*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 669,736.66** |

# Opinion of Probable Cost
# Water Replacement State St.

HUNT

## Village of Wellsville
## Wellsville, NY

Date: 1/5/2017
Design Stage: PER
Revision: 1

HUNT Project Number: 1861.034
Calculated By: AEV
Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 64,442.42*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 12,392.77 | $ 12,392.77 | |
| 2 | Supervision (2%) | 1 | LS | $ 9,914.22 | $ 9,914.22 | |
| 3 | Mobilization (3%) | 1 | LS | $ 14,871.33 | $ 14,871.33 | |
| 4 | Maintenance and Protection of Traffic (5%) | 1 | LS | $ 24,785.55 | $ 24,785.55 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 2,478.55 | $ 2,478.55 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 1,500.00*** |
| 6 | Inlet Protection | 12 | EA | $ 125.00 | $ 1,500.00 | |
| | ***EARTHWORK*** | | | | | ***$ 10,898.15*** |
| 7 | Import and Place Topsoil | 204 | CY | $ 40.00 | $ 8,148.15 | |
| 8 | Fine Grade Topsoil | 11000 | SF | $ 0.25 | $ 2,750.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 225,037.78*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 3391 | SY | $ 52.00 | $ 176,337.78 | |
| 10 | Concrete Sidewalk with Subbase | 2750 | SF | $ 10.00 | $ 27,500.00 | |
| 11 | Granite Curb | 500 | LF | $ 38.00 | $ 19,000.00 | |
| 12 | Seeding & Mulching | 11000 | SF | $ 0.20 | $ 2,200.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 258,275.00*** |
| 13 | Connection to Existing System | 3 | EA | $ 2,000.00 | $ 6,000.00 | |
| 14 | 4"Ductile Iron Service | 60 | LF | $ 50.00 | $ 3,000.00 | |
| 15 | 8" Ductile Iron Watermain | 2611 | LF | $ 65.00 | $ 169,715.00 | |
| 16 | 4" Gate Valve and Box | 1 | EA | $ 1,200.00 | $ 1,200.00 | |
| 17 | 8" Gate Valve and Box | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 18 | 8" Elbow/Tee | 8 | EA | $ 695.00 | $ 5,560.00 | |
| 19 | Fire Hydrant Unit | 5 | EA | $ 5,000.00 | $ 25,000.00 | |
| 20 | 1-1/2" Water Service Direct Bury | 1290 | LF | $ 20.00 | $ 25,800.00 | |
| 21 | Coupler to Tie onto Existing Water Service | 50 | EA | $ 50.00 | $ 2,500.00 | |
| 22 | Curb Stop and Box | 50 | EA | $ 310.00 | $ 15,500.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 112,030.67 | $ 112,030.67 | ***$ 112,030.67*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 672,184.02** |

# Opinion of Probable Cost
# Water Replacement State St.
# East of Brooklyn

**HUNT**

## Village of Wellsville
## Wellsville, NY

Date: 1/5/2017
HUNT Project Number: 1861.034
Design Stage: PER
Calculated By: AEV
Revision: 1
Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 23,756.64*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 3,959.44 | $ 3,959.44 | |
| 2 | Supervision (2%) | 1 | LS | $ 3,167.55 | $ 3,167.55 | |
| 3 | Mobilization (3%) | 1 | LS | $ 4,751.33 | $ 4,751.33 | |
| 4 | Maintenance and Protection of Traffic (7%) | 1 | LS | $ 11,086.43 | $ 11,086.43 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 791.89 | $ 791.89 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 500.00*** |
| 6 | Inlet Protection | 4 | EA | $ 125.00 | $ 500.00 | |
| | ***EARTHWORK*** | | | | | ***$ 1,981.48*** |
| 7 | Import and Place Topsoil | 37 | CY | $ 40.00 | $ 1,481.48 | |
| 8 | Fine Grade Topsoil | 2000 | SF | $ 0.25 | $ 500.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 68,711.11*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 1144 | SY | $ 52.00 | $ 59,511.11 | |
| 10 | Concrete Sidewalk with Subbase | 500 | SF | $ 10.00 | $ 5,000.00 | |
| 11 | Granite Curb | 100 | LF | $ 38.00 | $ 3,800.00 | |
| 12 | Seeding & Mulching | 2000 | SF | $ 0.20 | $ 400.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 87,185.00*** |
| 13 | Connection to Existing System | 3 | EA | $ 2,000.00 | $ 6,000.00 | |
| 14 | 4"Ductile Iron Service | 60 | LF | $ 50.00 | $ 3,000.00 | |
| 15 | 8" Ductile Iron Watermain | 880 | LF | $ 65.00 | $ 57,200.00 | |
| 16 | 4" Gate Valve and Box | 1 | EA | $ 1,200.00 | $ 1,200.00 | |
| 17 | 8" Gate Valve and Box | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 18 | 8" Elbow/Tee | 3 | EA | $ 695.00 | $ 2,085.00 | |
| 19 | Fire Hydrant Unit | 1 | EA | $ 5,000.00 | $ 5,000.00 | |
| 20 | 1-1/2" Water Service Direct Bury | 255 | LF | $ 20.00 | $ 5,100.00 | |
| 21 | Coupler to Tie onto Existing Water Service | 10 | EA | $ 50.00 | $ 500.00 | |
| 22 | Curb Stop and Box | 10 | EA | $ 310.00 | $ 3,100.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 36,426.85 | $ 36,426.85 | ***$ 36,426.85*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 218,561.08** |

# Opinion of Probable Cost
# Water Replacement Stevens St.

HUNT

## Village of Wellsville
## Wellsville, NY

Date: 1/5/2017
Design Stage: PER
Revision:
HUNT Project Number: 1861.034
Calculated By: AEV
Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 41,672.50*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 10,966.45 | $ 10,966.45 | |
| 2 | Supervision (2%) | 1 | LS | $ 8,773.16 | $ 8,773.16 | |
| 3 | Mobilization (3%) | 1 | LS | $ 13,159.74 | $ 13,159.74 | |
| 4 | Maintenance and Protection of Traffic (1.5%) | 1 | LS | $ 6,579.87 | $ 6,579.87 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 2,193.29 | $ 2,193.29 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 1,250.00*** |
| 6 | Inlet Protection | 10 | EA | $ 125.00 | $ 1,250.00 | |
| | ***EARTHWORK*** | | | | | ***$ 13,672.22*** |
| 7 | Import and Place Topsoil | 256 | CY | $ 40.00 | $ 10,222.22 | |
| 8 | Fine Grade Topsoil | 13800 | SF | $ 0.25 | $ 3,450.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 172,990.67*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 2239 | SY | $ 52.00 | $ 116,410.67 | |
| 10 | Concrete Sidewalk with Subbase | 2760 | SF | $ 10.00 | $ 27,600.00 | |
| 11 | Granite Curb | 690 | LF | $ 38.00 | $ 26,220.00 | |
| 12 | Seeding & Mulching | 13800 | SF | $ 0.20 | $ 2,760.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 250,745.00*** |
| 13 | Connection to Existing System | 3 | EA | $ 2,000.00 | $ 6,000.00 | |
| 14 | 8" Ductile Iron Watermain | 2308 | LF | $ 65.00 | $ 150,020.00 | |
| 15 | 8" Gate Valve and Box | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 16 | 8" Elbow/Tee | 7 | EA | $ 695.00 | $ 4,865.00 | |
| 17 | Fire Hydrant Unit | 6 | EA | $ 5,000.00 | $ 30,000.00 | |
| 18 | 1-1/2" Water Service Direct Bury | 1659 | LF | $ 20.00 | $ 33,180.00 | |
| 19 | Coupler to Tie onto Existing Water Service | 63 | EA | $ 50.00 | $ 3,150.00 | |
| 20 | Curb Stop and Box | 63 | EA | $ 310.00 | $ 19,530.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 96,066.08 | $ 96,066.08 | ***$ 96,066.08*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 576,396.47** |

# Opinion of Probable Cost
# Replace Asbestos Lines at Fairview and John St.

HUNT

**Village of Wellsville**
**Wellsville, NY**

Date: 1/5/2017
HUNT Project Number: 1861.034
Design Stage: PER
Calculated By: AEV
Revision:
Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 16,288.08*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 4,286.34 | $ 4,286.34 | |
| 2 | Supervision (2%) | 1 | LS | $ 3,429.07 | $ 3,429.07 | |
| 3 | Mobilization (3%) | 1 | LS | $ 5,143.60 | $ 5,143.60 | |
| 4 | Maintenance and Protection of Traffic (1.5%) | 1 | LS | $ 2,571.80 | $ 2,571.80 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 857.27 | $ 857.27 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 750.00*** |
| 6 | Inlet Protection | 6 | EA | $ 125.00 | $ 750.00 | |
| | ***EARTHWORK*** | | | | | ***$ 4,161.11*** |
| 7 | Import and Place Topsoil | 78 | CY | $ 40.00 | $ 3,111.11 | |
| 8 | Fine Grade Topsoil | 4200 | SF | $ 0.25 | $ 1,050.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 67,157.33*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 1275 | SY | $ 52.00 | $ 66,317.33 | |
| 10 | Seeding & Mulching | 4200 | SF | $ 0.20 | $ 840.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 99,385.00*** |
| 11 | Connection to Existing System | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 12 | 6" Ductile Iron Watermain | 1283 | LF | $ 50.00 | $ 64,150.00 | |
| 13 | 8" Elbow/Tee (10% Increase Per Inch 6" = $450) | 5 | EA | $ 695.00 | $ 3,475.00 | |
| 14 | Fire Hydrant Unit | 2 | EA | $ 5,000.00 | $ 10,000.00 | |
| 15 | 1-1/2" Water Service Direct Bury | 510 | LF | $ 20.00 | $ 10,200.00 | |
| 16 | Coupler to Tie onto Existing Water Service | 21 | EA | $ 50.00 | $ 1,050.00 | |
| 17 | Curb Stop and Box | 21 | EA | $ 310.00 | $ 6,510.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 37,548.30 | $ 37,548.30 | ***$ 37,548.30*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 225,289.83** |

# Opinion of Probable Cost

## Replace Asbestos Lines at King St.

HUNT

**Village of Wellsville**
**Wellsville, NY**

| | | | |
|---|---|---|---|
| Date: | 1/5/2017 | HUNT Project Number: | 1861.034 |
| Design Stage: | PER | Calculated By: | AEV |
| Revision: | | Checked By: | TKS |

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 6,979.22*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 1,836.64 | $ 1,836.64 | |
| 2 | Supervision (2%) | 1 | LS | $ 1,469.31 | $ 1,469.31 | |
| 3 | Mobilization (3%) | 1 | LS | $ 2,203.96 | $ 2,203.96 | |
| 4 | Maintenance and Protection of Traffic (1.5%) | 1 | LS | $ 1,101.98 | $ 1,101.98 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 367.33 | $ 367.33 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 500.00*** |
| 6 | Inlet Protection | 4 | EA | $ 125.00 | $ 500.00 | |
| | ***EARTHWORK*** | | | | | ***$ 1,981.48*** |
| 7 | Import and Place Topsoil | 37 | CY | $ 40.00 | $ 1,481.48 | |
| 8 | Fine Grade Topsoil | 2000 | SF | $ 0.25 | $ 500.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 35,024.00*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 482 | SY | $ 52.00 | $ 25,064.00 | |
| 10 | Concrete Sidewalk with Subbase | 500 | SF | $ 10.00 | $ 5,000.00 | |
| 11 | Granite Curb | 120 | LF | $ 38.00 | $ 4,560.00 | |
| 12 | Seeding & Mulching | 2000 | SF | $ 0.20 | $ 400.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 35,960.00*** |
| 13 | Connection to Existing System | 1 | EA | $ 2,000.00 | $ 2,000.00 | |
| 14 | 6" Ductile Iron Watermain | 423 | LF | $ 55.00 | $ 23,265.00 | |
| 15 | 6" Gate Valve and Box | 1 | EA | $ 1,600.00 | $ 1,600.00 | |
| 16 | 6" Elbow/Tee | 1 | EA | $ 695.00 | $ 695.00 | |
| 17 | 1-1/2" Water Service Direct Bury | 240 | LF | $ 20.00 | $ 4,800.00 | |
| 18 | Coupler to Tie onto Existing Water Service | 10 | EA | $ 50.00 | $ 500.00 | |
| 19 | Curb Stop and Box | 10 | EA | $ 310.00 | $ 3,100.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 16,088.94 | $ 16,088.94 | ***$ 16,088.94*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 96,533.64** |

# Opinion of Probable Cost

## Replace Asbestos Line at Trapping Brook

HUNT

**Village of Wellsville**
**Wellsville, NY**

Date: 1/30/2017
HUNT Project Number: 1861.034
Design Stage: PER
Calculated By: AEV
Revision:
Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 9,050.46*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 2,154.87 | $ 2,154.87 | |
| 2 | Supervision (2%) | 1 | LS | $ 1,723.90 | $ 1,723.90 | |
| 3 | Mobilization (3%) | 1 | LS | $ 2,585.84 | $ 2,585.84 | |
| 4 | Maintenance and Protection of Traffic (2.5%) | 1 | LS | $ 2,154.87 | $ 2,154.87 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 430.97 | $ 430.97 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 250.00*** |
| 6 | Inlet Protection | 2 | EA | $ 125.00 | $ 250.00 | |
| | ***EARTHWORK*** | | | | | ***$ 1,981.48*** |
| 7 | Import and Place Topsoil | 37 | CY | $ 40.00 | $ 1,481.48 | |
| 8 | Fine Grade Topsoil | 2000 | SF | $ 0.25 | $ 500.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 41,673.33*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 473 | SY | $ 52.00 | $ 24,613.33 | |
| 10 | Concrete Sidewalk with Subbase | 350 | SF | $ 40.00 | $ 14,000.00 | |
| 11 | Granite Curb | 70 | LF | $ 38.00 | $ 2,660.00 | |
| 12 | Seeding & Mulching | 2000 | SF | $ 0.20 | $ 400.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 42,290.00*** |
| 13 | Connection to Existing System | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 14 | 6" Ductile Iron Watermain | 500 | LF | $ 55.00 | $ 27,500.00 | |
| 15 | 6" Gate Valve and Box | 1 | EA | $ 1,600.00 | $ 1,600.00 | |
| 16 | 6" Elbow/Tee | 2 | EA | $ 695.00 | $ 1,390.00 | |
| 17 | 1-1/2" Water Service Direct Bury | 264 | LF | $ 20.00 | $ 5,280.00 | |
| 18 | Coupler to Tie onto Existing Water Service | 7 | EA | $ 50.00 | $ 350.00 | |
| 19 | Curb Stop and Box | 7 | EA | $ 310.00 | $ 2,170.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 19,049.05 | $ 19,049.05 | ***$ 19,049.05*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 114,294.32** |

# Opinion of Probable Cost Replace Asbestos Lines at Meadowbrook Ct

HUNT

**Village of Wellsville**
**Wellsville, NY**

Date: 1/5/2017
HUNT Project Number: 1861.034
Design Stage: PER
Calculated By: AEV
Revision:
Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 11,956.99*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 3,146.58 | $ 3,146.58 | |
| 2 | Supervision (2%) | 1 | LS | $ 2,517.26 | $ 2,517.26 | |
| 3 | Mobilization (3%) | 1 | LS | $ 3,775.89 | $ 3,775.89 | |
| 4 | Maintenance and Protection of Traffic (1.5%) | 1 | LS | $ 1,887.95 | $ 1,887.95 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 629.32 | $ 629.32 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 500.00*** |
| 6 | Inlet Protection | 4 | EA | $ 125.00 | $ 500.00 | |
| | ***EARTHWORK*** | | | | | ***$ 2,774.07*** |
| 7 | Import and Place Topsoil | 52 | CY | $ 40.00 | $ 2,074.07 | |
| 8 | Fine Grade Topsoil | 2800 | SF | $ 0.25 | $ 700.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 52,824.00*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 802 | SY | $ 52.00 | $ 41,704.00 | |
| 10 | Concrete Sidewalk with Subbase | 600 | SF | $ 10.00 | $ 6,000.00 | |
| 11 | Granite Curb | 120 | LF | $ 38.00 | $ 4,560.00 | |
| 12 | Seeding & Mulching | 2800 | SF | $ 0.20 | $ 560.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 69,765.00*** |
| 13 | Connection to Existing System | 1 | EA | $ 2,000.00 | $ 2,000.00 | |
| 14 | 6" Ductile Iron Watermain | 783 | LF | $ 55.00 | $ 43,065.00 | |
| 15 | 6" Gate Valve and Box | 1 | EA | $ 1,600.00 | $ 1,600.00 | |
| 16 | 6" Elbow/Tee | 4 | EA | $ 695.00 | $ 2,780.00 | |
| 17 | Fire Hydrant Unit | 2 | EA | $ 5,000.00 | $ 10,000.00 | |
| 18 | 1-1/2" Water Service Direct Bury | 300 | LF | $ 20.00 | $ 6,000.00 | |
| 19 | Coupler to Tie onto Existing Water Service | 12 | EA | $ 50.00 | $ 600.00 | |
| 20 | Curb Stop and Box | 12 | EA | $ 310.00 | $ 3,720.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 27,564.01 | $ 27,564.01 | ***$ 27,564.01*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 165,384.08** |

# Opinion of Probable Cost Replace Asbestos Lines at Witter Ave.

HUNT

**Village of Wellsville**
**Wellsville, NY**

| | |
|---|---|
| Date: 1/5/2017 | HUNT Project Number: 1861.034 |
| Design Stage: PER | Calculated By: AEV |
| Revision: | Checked By: TKS |

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 8,077.80*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 2,125.74 | $ 2,125.74 | |
| 2 | Supervision (2%) | 1 | LS | $ 1,700.59 | $ 1,700.59 | |
| 3 | Mobilization (3%) | 1 | LS | $ 2,550.88 | $ 2,550.88 | |
| 4 | Maintenance and Protection of Traffic (1.5%) | 1 | LS | $ 1,275.44 | $ 1,275.44 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 425.15 | $ 425.15 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 500.00*** |
| 6 | Inlet Protection | 4 | EA | $ 125.00 | $ 500.00 | |
| | ***EARTHWORK*** | | | | | ***$ 2,377.78*** |
| 7 | Import and Place Topsoil | 44 | CY | $ 40.00 | $ 1,777.78 | |
| 8 | Fine Grade Topsoil | 2400 | SF | $ 0.25 | $ 600.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 35,026.67*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 577 | SY | $ 52.00 | $ 29,986.67 | |
| 10 | Granite Curb | 120 | LF | $ 38.00 | $ 4,560.00 | |
| 11 | Seeding & Mulching | 2400 | SF | $ 0.20 | $ 480.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 47,125.00*** |
| 12 | Connection to Existing System | 1 | EA | $ 2,000.00 | $ 2,000.00 | |
| 13 | 6" Ductile Iron Watermain | 505 | LF | $ 55.00 | $ 27,775.00 | |
| 14 | 6" Gate Valve and Box | 1 | EA | $ 1,600.00 | $ 1,600.00 | |
| 15 | 6" Elbow/Tee | 2 | EA | $ 695.00 | $ 1,390.00 | |
| 16 | Fire Hydrant Unit | 1 | EA | $ 5,000.00 | $ 5,000.00 | |
| 17 | 1-1/2" Water Service Direct Bury | 270 | LF | $ 20.00 | $ 5,400.00 | |
| 18 | Coupler to Tie onto Existing Water Service | 11 | EA | $ 50.00 | $ 550.00 | |
| 19 | Curb Stop and Box | 11 | EA | $ 310.00 | $ 3,410.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 18,621.45 | $ 18,621.45 | ***$ 18,621.45*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 111,728.69** |

# Opinion of Probable Cost Replace Asbestos Line at North End SR 19 and at Tracks

HUNT

## Town of Wellsville
## Wellsville, NY

Date: 1/5/2017

HUNT Project Number: 1861.034

Design Stage: PER

Calculated By: AEV

Revision:

Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 63,513.22*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 16,714.00 | $ 16,714.00 | |
| 2 | Supervision (2%) | 1 | LS | $ 13,371.20 | $ 13,371.20 | |
| 3 | Mobilization (3%) | 1 | LS | $ 20,056.81 | $ 20,056.81 | |
| 4 | Maintenance and Protection of Traffic (1.5%) | 1 | LS | $ 10,028.40 | $ 10,028.40 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 3,342.80 | $ 3,342.80 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 2,500.00*** |
| 6 | Inlet Protection | 20 | EA | $ 125.00 | $ 2,500.00 | |
| | ***EARTHWORK*** | | | | | ***$ 8,718.52*** |
| 7 | Import and Place Topsoil | 163 | CY | $ 40.00 | $ 6,518.52 | |
| 8 | Fine Grade Topsoil | 8800 | SF | $ 0.25 | $ 2,200.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 193,326.67*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 2567 | SY | $ 52.00 | $ 133,466.67 | |
| 10 | Concrete Gutter with Subbase | 390 | LF | $ 40.00 | $ 15,600.00 | |
| 11 | Concrete Sidewalk with Subbase | 4250 | SF | $ 10.00 | $ 42,500.00 | |
| 12 | Seeding & Mulching | 8800 | SF | $ 0.20 | $ 1,760.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 464,015.00*** |
| 13 | Connection to Existing System | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 14 | 10" Ductile Iron Watermain | 5100 | LF | $ 70.00 | $ 357,000.00 | |
| 15 | 10" Gate Valve and Box | 2 | EA | $ 3,500.00 | $ 7,000.00 | |
| 16 | 10" Elbow/Tee | 5 | EA | $ 1,295.00 | $ 6,475.00 | |
| 17 | Fire Hydrant Unit | 7 | EA | $ 5,000.00 | $ 35,000.00 | |
| 18 | 1-1/2" Water Service Direct Bury | 1110 | LF | $ 20.00 | $ 22,200.00 | |
| 19 | 1-1/2" Water Service (For HDD) | 660 | LF | $ 25.00 | $ 16,500.00 | |
| 20 | Coupler to Tie onto Existing Water Service | 44 | EA | $ 50.00 | $ 2,200.00 | |
| 21 | Curb Stop and Box | 44 | EA | $ 310.00 | $ 13,640.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 146,414.68 | $ 146,414.68 | ***$ 146,414.68*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 878,488.08** |

# Opinion of Probable Cost
# 8" Connect - Highland to Florida

**Village of Wellsville**
**Wellsville, NY**

| | |
|---|---|
| Date: 1/5/2017 | HUNT Project Number: 1861.034 |
| Design Stage: PER | Calculated By: AEV |
| Revision: | Checked By: TKS |

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 9,042.40*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 2,055.09 | $ 2,055.09 | |
| 2 | Supervision (2%) | 1 | LS | $ 1,644.07 | $ 1,644.07 | |
| 3 | Mobilization (3%) | 1 | LS | $ 2,466.11 | $ 2,466.11 | |
| 4 | Maintenance and Protection of Traffic (3%) | 1 | LS | $ 2,466.11 | $ 2,466.11 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 411.02 | $ 411.02 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 300.00*** |
| 6 | Silt Fence | 100 | LF | $ 3.00 | $ 300.00 | |
| | ***EARTHWORK*** | | | | | ***$ 7,709.72*** |
| 8 | Import and Place Topsoil | 136 | CY | $ 40.00 | $ 5,422.22 | |
| 9 | Fine Grade Topsoil | 9150 | SF | $ 0.25 | $ 2,287.50 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 15,058.89*** |
| 10 | S-Duty Asphalt Pavement with Subbase | 153 | SY | $ 45.00 | $ 6,900.00 | |
| 11 | Heavy Duty Asphalt Pavement with Subbase | 56 | SY | $ 52.00 | $ 2,888.89 | |
| 12 | Concrete Sidewalk with Subbase | 100 | SF | $ 10.00 | $ 1,000.00 | |
| 13 | Concrete Curb | 20 | LF | $ 22.00 | $ 440.00 | |
| 14 | Seeding & Mulching | 9150 | SF | $ 0.20 | $ 1,830.00 | |
| 15 | Large Plants | 8 | EA | $ 250.00 | $ 2,000.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 59,135.00*** |
| 16 | Connection to Existing System | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 17 | 8" Ductile Iron Watermain | 820 | LF | $ 62.00 | $ 50,840.00 | |
| 18 | 6" Gate Valve and Box | 1 | EA | $ 1,600.00 | $ 1,600.00 | |
| 19 | 8" Gate Valve and Box | 1 | EA | $ 2,000.00 | $ 2,000.00 | |
| 20 | 8" Elbow/Tee | 1 | EA | $ 695.00 | $ 695.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 18,249.20 | $ 18,249.20 | ***$ 18,249.20*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 109,495.21** |

# Opinion of Probable Cost
# 6" Connect Under Madison St. Overpass at RR Tracks

**Village of Wellsville**
**Wellsville, NY**

| | | | |
|---|---|---|---|
| Date: | 1/5/2017 | HUNT Project Number: | 1861.034 |
| Design Stage: | PER | Calculated By: | AEV |
| Revision: | | Checked By: | TKS |

| Item No. | Item | Quantity | Unit | COSTS $/Unit | COSTS Total | Subtotals |
|---|---|---|---|---|---|---|
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 15,786.67*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 2,466.67 | $ 2,466.67 | |
| 2 | Supervision (2%) | 1 | LS | $ 1,973.33 | $ 1,973.33 | |
| 3 | Mobilization (3%) | 1 | LS | $ 2,960.00 | $ 2,960.00 | |
| 4 | Maintenance and Protection of Traffic (8%) | 1 | LS | $ 7,893.33 | $ 7,893.33 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 493.33 | $ 493.33 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 4,666.67*** |
| 6 | Crusher Run Stone Surfacing | 167 | SY | $ 28.00 | $ 4,666.67 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 94,000.00*** |
| 7 | Connection to Existing System | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 8 | 6" Watermain (For HDD) | 360 | LF | $ 250.00 | $ 90,000.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 22,890.67 | $ 22,890.67 | ***$ 22,890.67*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 137,344.00** |

# Opinion of Probable Cost
# 6" Connect at S Broad St. Creek Crossing

HUNT

**Village of Wellsville**
**Wellsville, NY**

| | |
|---|---|
| Date: 1/5/2017 | HUNT Project Number: 1861.034 |
| Design Stage: PER | Calculated By: AEV |
| Revision: | Checked By: TKS |

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 4,499.29*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 1,022.56 | $ 1,022.56 | |
| 2 | Supervision (2%) | 1 | LS | $ 818.05 | $ 818.05 | |
| 3 | Mobilization (3%) | 1 | LS | $ 1,227.08 | $ 1,227.08 | |
| 4 | Maintenance and Protection of Traffic (3%) | 1 | LS | $ 1,227.08 | $ 1,227.08 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 204.51 | $ 204.51 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 600.00*** |
| 6 | Silt Fence | 200 | LF | $ 3.00 | $ 600.00 | |
| | ***EARTHWORK*** | | | | | ***$ 792.59*** |
| 7 | Import and Place Topsoil | 15 | CY | $ 40.00 | $ 592.59 | |
| 8 | Fine Grade Topsoil | 800 | SF | $ 0.25 | $ 200.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 4,760.00*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 80 | SY | $ 52.00 | $ 4,160.00 | |
| 10 | Concrete Curb | 20 | LF | $ 22.00 | $ 440.00 | |
| 11 | Seeding & Mulching | 800 | SF | $ 0.20 | $ 160.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 34,750.00*** |
| 12 | Connection to Existing System | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 13 | 6" Watermain (For HDD) | 205 | LF | $ 150.00 | $ 30,750.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 9,080.38 | $ 9,080.38 | ***$ 9,080.38*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 54,482.25** |

# Opinion of Probable Cost

## Water Replacement Scott Ave

HUNT

**Village of Wellsville**
**Wellsville, NY**

| | |
|---|---|
| Date: 1/5/2017 | HUNT Project Number: 1861.034 |
| Design Stage: PER | Calculated By: AEV |
| Revision: | Checked By: TKS |

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 31,208.85*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 8,212.86 | $ 8,212.86 | |
| 2 | Supervision (2%) | 1 | LS | $ 6,570.29 | $ 6,570.29 | |
| 3 | Mobilization (3%) | 1 | LS | $ 9,855.43 | $ 9,855.43 | |
| 4 | Maintenance and Protection of Traffic (1.5%) | 1 | LS | $ 4,927.71 | $ 4,927.71 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 1,642.57 | $ 1,642.57 | |
| | ***EROSION AND SEDIMENT CONTROL*** | | | | | ***$ 2,000.00*** |
| 6 | Inlet Protection | 16 | EA | $ 125.00 | $ 2,000.00 | |
| | ***EARTHWORK*** | | | | | ***$ 6,142.59*** |
| 7 | Import and Place Topsoil | 115 | CY | $ 40.00 | $ 4,592.59 | |
| 8 | Fine Grade Topsoil | 6200 | SF | $ 0.25 | $ 1,550.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 122,226.67*** |
| 9 | Heavy Duty Asphalt Pavement with Subbase | 1907 | SY | $ 52.00 | $ 99,146.67 | |
| 10 | Concrete Sidewalk with Subbase | 1120 | SF | $ 10.00 | $ 11,200.00 | |
| 11 | Granite Curb | 280 | LF | $ 38.00 | $ 10,640.00 | |
| 12 | Seeding & Mulching | 6200 | SF | $ 0.20 | $ 1,240.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 198,145.00*** |
| 13 | Connection to Existing System | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 14 | 8" Ductile Iron Watermain | 2260 | LF | $ 65.00 | $ 146,900.00 | |
| 15 | 8" Gate Valve and Box | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 16 | 8" Elbow/Tee | 3 | EA | $ 695.00 | $ 2,085.00 | |
| 17 | Fire Hydrant Unit | 3 | EA | $ 5,000.00 | $ 15,000.00 | |
| 18 | 1-1/2" Water Service Direct Bury | 804 | LF | $ 20.00 | $ 16,080.00 | |
| 19 | Coupler to Tie onto Existing Water Service | 28 | EA | $ 50.00 | $ 1,400.00 | |
| 20 | Curb Stop and Box | 28 | EA | $ 310.00 | $ 8,680.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 71,944.62 | $ 71,944.62 | ***$ 71,944.62*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 431,667.74** |

# Opinion of Probable Cost

## Water Replacement E Dyke and Miller Connection

HUNT

**Village of Wellsville**
**Wellsville, NY**

Date: 1/5/2017
HUNT Project Number: 1861.034
Design Stage: PER
Calculated By: AEV
Revision:
Checked By: TKS

| Item No. | Item | Quantity | Unit | COSTS | | Subtotals |
|---|---|---|---|---|---|---|
| | | | | $/Unit | Total | |
| | ***DIV 1 - GENERAL CONDITIONS*** | | | | | ***$ 12,538.02*** |
| 1 | Bonding (2.5%) | 1 | LS | $ 2,849.55 | $ 2,849.55 | |
| 2 | Supervision (2%) | 1 | LS | $ 2,279.64 | $ 2,279.64 | |
| 3 | Mobilization (3%) | 1 | LS | $ 3,419.46 | $ 3,419.46 | |
| 4 | Maintenance and Protection of Traffic (3%) | 1 | LS | $ 3,419.46 | $ 3,419.46 | |
| 5 | Temporary Facilities (0.5%) | 1 | LS | $ 569.91 | $ 569.91 | |
| | ***EROSION AND SEDIMENT CONTROL*** | 8 | | | | ***$ 800.00*** |
| 6 | Silt Fence | 100 | LF | $ 3.00 | $ 300.00 | |
| 7 | Inlet Protection | 4 | EA | $ 125.00 | $ 500.00 | |
| | ***EARTHWORK*** | | | | | ***$ 1,387.04*** |
| 8 | Import and Place Topsoil | 26 | CY | $ 40.00 | $ 1,037.04 | |
| 9 | Fine Grade Topsoil | 1400 | SF | $ 0.25 | $ 350.00 | |
| | ***DIV 32 - EXTERIOR IMPROVEMENTS*** | | | | | ***$ 31,020.00*** |
| 10 | Heavy Duty Asphalt Pavement with Subbase | 540 | SY | $ 52.00 | $ 28,080.00 | |
| 11 | Granite Curb | 70 | LF | $ 38.00 | $ 2,660.00 | |
| 12 | Seeding & Mulching | 1400 | SF | $ 0.20 | $ 280.00 | |
| | ***WATER DISTRIBUTION*** | | | | | ***$ 80,775.00*** |
| 13 | Connection to Existing System | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 14 | 8" Ductile Iron Watermain | 670 | LF | $ 65.00 | $ 43,550.00 | |
| 15 | 8" Watermain (For HDD) | 100 | LF | $ 150.00 | $ 15,000.00 | |
| 16 | 8" Gate Valve and Box | 2 | EA | $ 2,000.00 | $ 4,000.00 | |
| 17 | 8" Elbow/Tee | 3 | EA | $ 695.00 | $ 2,085.00 | |
| 18 | Fire Hydrant Unit | 1 | EA | $ 5,000.00 | $ 5,000.00 | |
| 19 | 1-1/2" Water Service Direct Bury | 231 | LF | $ 20.00 | $ 4,620.00 | |
| 20 | Coupler to Tie onto Existing Water Service | 7 | EA | $ 50.00 | $ 350.00 | |
| 21 | Curb Stop and Box | 7 | EA | $ 310.00 | $ 2,170.00 | |
| | Construction Contingency (20%) | 1 | LS | $ 25,304.01 | $ 25,304.01 | ***$ 25,304.01*** |
| | **TOTAL CONSTRUCTION COST** | | | | | **$ 151,824.07** |

# APPENDIX Q
## PROJECT IMPROVEMENTS MAP

HUNT
ENGINEERS/ARCHITECTS/SURVEYORS

AIRPORT CORPORATE PARK
100 HUNT CENTER
HORSEHEADS, N.Y. 14845
607 • 358 • 1000
FAX • 358 • 1800

HORSEHEADS, NY ROCHESTER, NY TOWANDA, PA

# POTENTIAL IMPROVEMENT MAP