Engineering Report

POTABLE WATER
Corrosion Control Study

Croton-on-Hudson (V)
Westchester County, NY

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THE Chazen COMPANIES

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1.0 INTRODUCTION

The Village of Croton-on-Hudson (Village) operates a public water supply system within Westchester County, permitted by the New York State Department of Health (PWS ID# NY5903425). The Village's main water source is a well field located on the bank of the Croton River, downstream from the New Croton Dam and spillway. Water is pumped directly from three (3) wells into the distribution system, which consists of a network of water mains, four storage tanks (reservoirs), booster pump stations, and other water-related infrastructure. The village's total potable water storage capacity is 2.3 million gallons. The water withdrawn from the wells is disinfected with chlorine before it is sent into the distribution system.

A previous report prepared by The Chazen Companies (Chazen) in 2007 recommended to add a form of liquid zinc orthophosphate [$Zn_3(PO_4)^2$] to the water supply to control corrosion. At that time the recommendation was based on the desire for the village to be pro-active in mitigating corrosion. Zinc orthophosphate is classified as a bimetallic phosphate. Both constituents of the chemical, zinc and orthophosphate, will bind to the inner wall of the pipe and, to some degree, isolate the pipe from the water. After public informational meetings were held on this recommendation, it appeared that the residents were concerned over chemicals added to their water supply and it was decided that Zinc orthophosphate was not acceptable and another alternative should be explored. The purpose of this report is to discuss more recent sampling and provide an alternative corrosion control additive.

The 2013 Annual Drinking Water Quality Report (ADWQR) of the Village Department of Water (included in Appendix A) indicates that the 90th percentile copper concentration was over the allowable limit. The Spring 2014 samples for lead and copper had 90th percentile levels of 1.71 mg/L for copper and 6.6 μg/L for lead; the copper level was over the Action Level of 1.3 mg/L.

The Village is now required by the WCDOH to reduce the concentrations of copper. The violation letter is included in Appendix E.

The Village retained Chazen to provide another report and recommendation to address corrosion issues (brown water) as well as copper issues in the system.

The purpose of this report is to review the most recent sampling data from the system and to re-evaluate options and provide a new recommendation to control corrosion in the system. There are currently

no restrictions on the use of the Village's water source. This report concludes the following:

1. Corrosion continues to be significant and a control strategy should be implemented.

2. The Village is required by the Westchester County Department of Health (WCDOH) to take action to reduce copper levels in this water system. Sampling for lead is also mandated.

3. Replacement or cement lining of old unlined cast iron pipe should continue.

4. A blended phosphate should be added to address high copper levels and the WCDOH requirement. This chemical should also help reduce iron and lead levels and brown water incidents.

5. A UniDirectional Flushing (UDF) program should be developed to hasten the protection provided by the corrosion control chemical.

1.1 Service Area Description

The Village water system supplies approximately 8,060 users. Water use is primarily for residences, but there are also commercial and industrial users; accounting for approximately 2,500 service connections. During 2013, the total amount of water withdrawn from the aquifer was approximately 404 million gallons. The daily average volume of water treated and pumped into the distribution system in 2013 was 1.1-million gallons per day (MGD). Winter use is typically lower than average while summertime use is higher than average (0.85 MGD and 1.6 MGD respectively). Approximately 93% of the total water supplied was billed directly to consumers. The balance, or unaccounted for water, went to firefighting, hydrant flushing, leaks in the distribution system, and unauthorized use. Industry standards indicate that any level above 90% is acceptable. It shall be assumed for this report that the above remained relatively consistent for 2014.

The Village's service area is divided into two operational zones: the larger lower zone, which includes the older center of the Village, and an upper zone serving a relatively new area of development of the Village. The lower zone is supplied directly from the source wells and from the North Highland above-grade storage tank. The upper zone is supplied from the Hessian Hills tank and a tank located within the Hudson National Golf Club, which are both fed by the North Highland booster pump station located adjacent to the North Highland tanks.

The Village supplies water to the golf course, which is expected to have a substantial water demand, due primarily to irrigation requirements during the summer. Water to the course is conveyed through the North Highland booster pump station via the upper village distribution zone.

1.2 Distribution System Description

The Village's water distribution system is comprised of a mixture of pipe materials, of varying age, as is typical of older systems that have been expanded over a period of time. The distribution mains within the system are unlined cast iron and cement-lined ductile iron pipe. Lesser quantities of water distribution mains in the system are galvanized steel. Service connections are generally galvanized steel or copper pipe.

The oldest distribution pipes are generally located in the lower water service area, which includes the older areas of the Village. As indicated by the Water Department staff, this lower portion of the distribution system has the highest rate of "brown" water complaints. Figures 2 and 3 on the following page show the likely cause of this issue to be corrosion of the piping.

There are four water storage tanks used to maintain system pressure and provide fire protection flow within the distribution system. Two of the tanks (the above-grade North Highland Tank and the Hessian Hills Tank) provide the majority of usable storage capacity in the system. The below-grade North Highland Tank volume is sustained by use of an altitude valve located on the pipe connecting the tank to the lower service area, and the below-grade tank is used primarily to supply the North Highland booster pump station, which is used to supply the northern portion of the Village, the Hessian Hills tank, and the Golf Course Tank.

Table 1: Schedule of Storage Tanks

Tank ID	Volume (mg)	Effective Tank Depth (ft.)	Operating Range (ft.)	Tank Description
N. Highland, Above-grade	1.25	24	18-23	Steel Tank, Welded
N. Highland, Below-grade	0.40	15	9-15	Concrete Tank
Hessian Hills	0.50	15	10-13	Concrete Tank
Golf Course	0.15	30	17-25	Glass-coated Steel, Bolted

Figure 2 - Unlined cast iron pipe, with effects of corrosion shown, taken from within the Harmon Water Main Replacement Project area in the Village, 2005

Figure 3 – Galvanized steel water service pipe with corrosion hole in center of picture, encountered during the Harmon Water Main Replacement Project area in the Village, 2005

2.0 SAMPLING PROGRAM

2.1 Sampling Program Description

The Water Department regularly performs the requisite sampling at the specified time intervals, as stipulated in 10 NYCRR Part 5, Subpart 5-1, *Public Water Systems,* for the Village water supply system. The results of the regularly mandated sampling are presented in a summary format in the Annual Report of the Village Department of Water, last issued for testing done through December 2013. A copy of this report is included in Appendix A.

In addition to sampling required by NYSDOH, the Village has acquired and analyzed additional samples from the water supply wells and locations within the distribution system to support this evaluation effort. Comprehensive tabular results for the sampling conducted under this project are presented in tables located in Appendix A.

Also, Chazen performed field measurements of several water quality parameters within the Village's above-ground North Highland and Hessian Hills water storage tanks in 2005.

A brief summary of each sampling parameter is presented in the sections below. The sampling parameters at the wellhead sites are summarized in Table 2 below. Individual sampling parameters are discussed here:

- Alkalinity plays a complex role in corrosion of pipes. The alkalinity concentration affects the stability of dissolved and solid species within the water, the kinetics of reactions, and, is a general indicator of water's ability to resist changes in pH.

- Lower pH values (pH<7, acidic) indicate that the water can be more corrosive and may result in a water system having more difficulty in complying with the EPA Lead and Copper Rule (LCR). Acidic water causes an increase in leaching of lead and copper from the walls of service lines and indoor plumbing.

- Total Dissolved Solids (TDS) indicates the mineral content in a water supply. This is typically a factor in corrosion rates at very high or very low concentrations.

- Turbidity is a measure of the clarity of a water supply. Higher turbidity values correspond to cloudier water as more light is scattered as it tries to pass through.

- Dissolved oxygen (DO) will occur in any water body exposed to the atmosphere. Because groundwater supplies are not exposed to significant concentrations of free oxygen, the initial DO concentration of water pumped directly out of wells is nearly zero. Through the distribution process the dissolved oxygen concentration can be expected to increase. Oxygen is then available for a great many chemical and biological reactions that may occur, including corrosion processes.

- Oxidation-Reduction Potential (ORP) is also sometimes referred to as redox potential. It indicates the potential for a specific type of chemical reaction to occur. There are many common reactions, such as rusting of metal. Disinfection of water by use of chlorine is another. Therefore, the presence of chlorine, particularly in the form it takes (HOCl) at lower (acidic) pH levels will result in higher redox potentials. A "neutral" redox potential is a value of approximately +250 mV. Higher redox values indicate the presence of more oxidizing agents, and lower redox values (<0 mV) indicate the presence of reducing agents.

- The presence of metals in the water supply is not unexpected, particularly for ground water. However, elevated concentrations may be indicative of distribution system pipe issues and a corrosion-favorable environment. In this system, lead and copper in particular are of concern. The Environmental Protection Agency provides the following health effect language, noting that the health effects language is not intended to catalog all possible health effects for these contaminants. Rather, it is intended to inform consumers of some of the possible health effects associated with them in drinking water when the rule was finalized:

    - Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.

    - Some people who drink water containing copper in excess of the action level may, with short term exposure, experience gastrointestinal distress, and with long-term exposure may experience liver or kidney damage. People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level.

- Temperature has an impact on the rate of chemical reactions and the likelihood of biological activity. The higher the temperature, the more rapidly reactions will occur.

- Specific conductivity is interrelated to TDS. Water having a high TDS concentration will also likely have a high specific conductivity.

Table 2: Sampling Parameters

Sampling Parameter	Units
Alkalinity as Calcium Carbonate ($CaCO_3$)	mg/L(1)
pH	pH Units
Total Dissolved Solids (TDS)	mg/L
Dissolved Oxygen (DO) (6)	mg/L
Oxidation-Reduction Potential (ORP) (7)	mV(2)
Physical Parameters	
Turbidity	NTU(3)
Metals	
Calcium (Ca)	mg/L
Iron (Fe)	mg/L
Magnesium (Mg)	mg/L
Manganese (Mn)	mg/L
Dissolved Metals	
Iron (Fe)	mg/L
Manganese (Mn)	mg/L
Field Parameters	
Temperature	º C(4)
Specific Conductivity	µS/cm(5)

(1) milligrams/Liter
(2) milliVolts
(3) Nephelometric Turbidity Units
(4) degrees Centigrade
(5) microSiemens per centimeter
(6) Dissolved Oxygen sampled at storage tanks
(7) ORP sampled at storage tanks

2.1.1 Supply Well Sampling

The Village collects samples routinely to monitor the quality. This report reviewed samples at the wells and within the water distribution system on select dates in May through September 2005 in the previous report. This report takes those samples into account along with further sampling that occurred in June 2013 with the two most recent sampling performed in February and June of 2014.

Included in the testing were samples at each well, prior to the water being treated and entering the distribution system. Those sample results indicate the raw water quality prior to treatment to help identify potential sources for corrosion. Samples taken in the distribution system are treated water samples after varying amounts of time within the piping network.

2.1.2 Distribution System Sampling

In 2005 the three (3) distribution system samples were collected from fire hydrants located at Grand Street, Piney Point Road, and Wolf Road, as shown on Figure 1. In 2014 the samples were taken from Grand Street, Van Wyck Street, and Nordica Drive.

The Water Department collected samples within the distribution system on the same dates as the well sampling (May 9, June 16, July 21, August 11, and September 15, 2005). The constituents listed in Table 2 were also analyzed for the samples taken from the distribution system.

2.1.3 Tank Water Quality Measurements

Field water quality measurements from within the North Highland above-grade and Hessian Hills storage tanks were made by Chazen on October 6 and November 3, 2005. The goal of this effort was to develop a vertical profile of water quality for specific parameters through the full depth of the tanks. Although the plan was to take measurements from all four tanks, it was determined after evaluating the available tank access points with the Water Department, that two of the tanks would not be suitable. The below-grade North Highland Tank was inaccessible for measurements, and the Golf Course tank was isolated from the rest of the water distribution system by a one-way direction of flow valve. Therefore, only the above-grade North Highland tank and the Hessian Hills tank would be evaluated.

The above-grade North Highland Tank had two man-way access hatches, one on the southwest side where the tank is exposed to environmental changes in temperature, and one on the northeast side, which is partially

buried into the hill. The two access points are horizontally separated by approximately 75 feet, and exposed to differing levels of environmental temperature change. Therefore field measurements were made at both locations to determine if there were also horizontal variations in water quality.

Field measurements collected within the tanks included: temperature, specific conductivity, dissolved oxygen, and pH. In addition, the oxidation-reduction potential (ORP) was also measured in the two tanks. The ORP indicates the potential for a particular type of chemical reaction to occur in which one species loses elemental oxygen and a second species acquires the oxygen; corrosion processes are one of these reactions. Disinfection by chlorine is another such reaction.

The sampling results show consistency, and therefore it is assumed that the findings above would continue to be valid through 2014.

2.2 Sampling Program Results

A complete set of the sampling results (include a well sample result table and distribution sample result table) are presented in the tables included in Appendix A. In general, the raw water quality from the Village groundwater supply is good, and meets all applicable New York State Department of Health (NYSDOH) standards. Sampling results by location are discussed in the sections below.

2.2.1 Wellhead Sampling

The Water Department collected samples from the supply wells on the dates noted above, which were analyzed for the parameters listed in Table 2.

The following is a brief summary of a few noted parameters:

- The raw water pH value is nearly optimal.
- Alkalinity appears low when compared to other groundwater based systems.
- Total Dissolved Solids are well within the recommended limit.
- The concentration of metals and dissolved metals are well within applicable limits.
- The water temperature indicated for the supply well samples is slightly higher then average. A higher temperature will increase

the rate of chemical reactions within the distribution system; some of which are inevitably corrosion reactions.

2.2.2 Distribution System Sampling

The Water Department collected samples within the water distribution system on the same dates that the supply wells were sampled. As with the supply well samples, the distribution system samples were also analyzed for the parameters listed in Table 2.

Sample results from the distribution system have similar values to those from the wells, except a higher concentration of iron was observed at the Piney Point Road and Wolf Road sampling points. At Wolf Road in 2005, iron concentrations greater than 4 mg/L were obtained, while even higher concentrations were found on Piney Point Road. The maximum allowable concentration set by the NYSDOH for iron is 0.3 mg/L. Iron is one of many elements that when oxidized, may directly influence the color of water. Oxidation takes place in a distribution system mainly through the presence of oxygen. In households, use of bleach or other cleaning agents may create discolored water. In 2005, levels of iron were measured as high as 4 mg/L. The Water Department has an on-going flushing program to minimize incidents of discolored water. As the replacement and cement lining of pipes continues, the location and frequency of flushing should be re-evaluated. The sampling event in 2014 did not include iron, however brown water continues to be encountered during flushing, indicating that corrosion is likely continuing.

These higher iron concentrations found within the distribution system are higher than found in the source water, providing indication of corrosion occurring within the distribution system pipes. Tuberculation from the inner wall of the pipes (as shown in Figure 2) appears to confirm this conclusion, and is likely being conveyed through the system. A higher flow velocity within the pipe causes turbulent flow, particularly within the more heavily tuberculated pipes, which can cause oxidized iron to be scoured from the pipe surface and conveyed through the system.

The same corrosion mechanism is also likely to be creating the brown water issues observed throughout the system as well as elevated levels of copper and lead as the water passes through copper piping and older lead based soldered joints that may be typical of household plumbing.

Copper samples from 2013 had a 90th percentile level of 1.58 mg/L and in 2014 a 90th percentile level of 1.71 mg/L was measured; both over the Action Level of 1.3 m/L. As stated previously, levels exceeding standards

for copper were found and as such the WCDOH now requires the Village to implement a corrosion control program.

2.2.3 Tank Water Quality Measurements

Chazen staff made field water quality measurements of two of the Village's water storage tanks on October 6th and November 3rd of 2005. Sampling was done at both access points on the above-grade North Highland Tank. Data was collected at two (2) foot increments of depth from the water surface to the bottom of the tanks. A site plan of this tank is included in Appendix C.

Field water quality measurements at the Hessian Hills Tank yielded no unexpected results. Measurements were all within the normally expected ranges.

Field water quality measurements from the above-grade North Highland Tank yielded some observations of interest. The dissolved oxygen (DO) concentration in the tank is unusually low and drops with increased depth within the tank, for the October sampling event, only. Appendix B includes tabular data summary as well as graphs of some variables of interest for the above-grade North Highland Tank.

The ORP in the above-grade North Highland Tank also varies significantly with depth; initially ORP increases with depth, and then ORP drops sharply near the bottom of the tank. One possible reason for this is that chemical processes are occurring in the tank until available DO is depleted. This may be an indication of excessive water age or stagnation in the water tank.

Some horizontal variation was observed within the above-grade North Highland Tank. Most notably, the ORP was approximately 10% higher at Sample Point 2 (the southwest portion of the tank). There were also less pronounced differences between the water temperature and dissolved oxygen measurements from the two sampling points within the North Highland Tank. These differences may be an indication of incomplete mixing in the tank, or a result of the differences in exposure to environmental temperature changes between the exposed and buried portions of the tank.

No changes to the tanks have been performed since the sampling, and it is therefore assumed that the conclusions above continue to be valid.

3.0 RECOMMENDATIONS

The replacement of copper service lines is not felt to be practical. Therefore the corrosion aspects discussed above create challenges that may be mitigated in three principle ways:

1. Replacement or cement lining of distribution piping that is unlined.
2. Introduce chemical additives to protect the piping by modifying the corrosive nature of the water or shielding the material from the water, or a combination of both.
3. Sequester the iron that is currently dissolved in the water to reduce brown water incidents.

3.1 Corrosion Control Program

The revised data indicates that a corrosion control program remains the best solution to address the WCDOH mandate and should be implemented and used until piping can get replaced. The addition of a corrosion control additive to the distribution system would aid in the reduction of brown-water events and also reduce lead and copper concentrations in the distribution system.

3.1.1 Corrosion Control Program Description

When considering a corrosion control program for a water system, the first step is to evaluate the existing physical and chemical condition of the system. For the Village water system, the physical condition of the distribution pipes is the primary cause of the current system quality problems, and the ongoing replacement or cement lining of system piping will resolve the majority of the current issues.

Some water quality issues are a result of the type of service piping used by individual customers. Corrosion inhibitors will aid in the reduction of metals leaching from customer service connections.

As noted above, the quality of the Village supply is of excellent quality. It appears therefore that there is deterioration of water quality that is occurring in the distribution system, service lines, and interior plumbing systems of customers. The pH and alkalinity are both slightly lower than optimal. However, the level for these parameters did not play a significant role in the current condition of the distribution system. Therefore it is not recommended that additives be used to modify pH or alkalinity at this time.

It is recommended that the Village continue to replace or reline the older portion of the distribution piping, which should ensure continued reliability in conjunction with the corrosion control program. The cement lining of unlined pipe or replacement of the unlined pipe with cement-lined ductile iron pipe may both cause a slight increase in the pH and alkalinity of the water, as the water comes in contact with the cement lining. All wetted components of a potable water system as well as all chemicals used in treatment must be certified to the ANSI/NSF Safety Standard, meaning they are safe for potable water use.

Chemical additives have been used to aid in corrosion control of drinking water systems for more than 50 years. Differing formulations and blends have been developed, however additives used are generally phosphates, silicates, or phosphate-silicate blends. Commonly used additives include:

1. Phosphates
    a. Orthophosphates
    b. Molecularly dehydrated polyphosphates
    c. Bimetallic phosphates
    d. Phosphate blends
2. Silicates
3. Phosphate-silicate blends

Zinc Orthophosphate is a bimetallic phosphate that was recommended in Chazen's 2007 report, and that recommendation was not preferred by the Village.

Sampling results were sent to the Carus Corporation, a leading phosphate manufacturing company worldwide with many years of experience in corrosion control in potable water systems. With the understanding that Zinc Orthophosphate was not preferred, they recommended a phosphate blend identified as Carus™ 8600. This proprietary chemical is utilized not only in the potable water industry (NSF certified), but also in the food industry (Kosher approval also noted). Chazen has reviewed this recommendation as well as using phosphoric acid and reviewed effects and whether additional chemicals would be needed in addition to the corrosion control chemical. Chazen concurs with the recommendation from Carus that given the water chemistry and the issues currently present, the Carus 8600 is a good choice and should perform well with no other chemicals required to supplement it.

There is no need for an initial higher dose as with other additives, but an initial higher dose may result in a faster coating formation. For design purposes the chemical would be injected at a flow proportioned rate to achieve the typically optimal of 1.0 mg/L residual of orthophosphate throughout the distribution system. Feed pumps would be sized to provide higher dose if needed. Carus has provided some preliminary information which estimates that 3.2 gallons of chemical would be used for every 1,000,000 gallons of water treated.

A Material Safety Data Sheet (MSDS) for Carus™ 8600 is included in Appendix D of this report along with the recommendation from Carus and the Data Sheet.

3.1.2 Corrosion Control Limitations

The addition of a corrosion control additive to the water supply causes favorable changes to the system with respect to the water condition. The additive also can have less favorable impacts on other important water quality parameters, most notably the pH and chlorine residual. These parameters will require additional monitoring during the early implementation of a corrosion control program.

Corrosion control additives can be expected to limit corrosion of pipes and the leaching of copper and lead into the water column. However, corrosion is a complex process, influenced by many factors. Particularly for pipes already having severe tuberculation, it cannot be guaranteed that a corrosion control additive will completely eliminate brown-water events. However it is expected that the frequency of these events would be reduced over time. Addition of the phosphate also does not always eliminate iron corrosion; it should however slow the rate of corrosion. Phosphates are expected to reduce levels of iron, copper, and lead within the system. Further, lead and copper levels should be reduced to levels that meet NYSDOH and WCDOH requirements. For these reasons it is recommended that the Village continue to replace or cement line older piping and routinely flush the system. The chemical dose and ultimate continued use may depend on the extent of replacement and the materials used in the replacement process. Replacement or cement lining of piping are the only remedial paths felt to help achieve long term elimination of brown water incidents.

3.1.3 Long-term Monitoring Requirements

The addition of a corrosion control additive requires more careful monitoring of the distribution system water quality. Some items of concern include:

1. pH – addition of the proposed corrosion control additive may result in a minor reduction in the pH value, however given the water chemistry shown in the sampling results no additional pH control chemicals are expected to be necessary.

   The pH value also has some bearing on the efficacy of the corrosion control program. The corrosion control additive works best for a pH in the range of 6-8.5. Higher pH values reduce the efficiency of the additive.

2. Disinfection – The addition of the corrosion control additive may also require that the disinfection dosage be modified. The additive may affect the chlorine residual. The Water Department should carefully monitor the chlorine residual throughout the system during the initial phase to look for impacts and adjust the chlorination system accordingly.

3.1.4 Corrosion Control Costs

At this conceptual stage the probable cost of implementing a corrosion control system is difficult to accurately predict, however some general costs are provided below.

The capital costs associated with the implementation of a corrosion control system would include the purchase and installation of flow-paced metering pumps and chemical storage units. A meter is currently being installed and contains output that the metering pumps should be able to utilize for flow pacing. The corrosion control additive is somewhat vulnerable to lower temperatures, and it would be recommended that the building in which this system is housed be maintained at a temperature above 55° F.

The corrosion control system could be housed in the existing Well House #3 located at the Village's well field with some minor modifications. This building is in close proximity to the main transmission line leading to the water distribution system. However, the compatibility of the corrosion control system with the current use of this building needs to be evaluated with regard to available space, safety, floodplain and other potential issues.

Alternately, the Village could erect a small equipment building next to Well House #3 to house the metering pump and chemical storage units. This would require the additional expense of the equipment building and the extension of electrical power for both the metering pump and a unit heater.

Operation and maintenance costs would include the cost of the corrosion control additive, electrical power costs, additional monitoring costs, preventative equipment maintenance, and periodic repairs. The chemical cost as of the date of this report for Carus 8600 is based on the usage calculated above and is estimated at $35.50/day/MG of water treated. Costs were provided by Slack Chemical Company, the local distributor for the recommended chemical. For comparison, costs for other common corrosion control products were obtained from Slack and are as follows (prices change over time, trending upward):

- Zinc Orthophosphate (Non-passivation): $35.00/day/MG (using the same 3 mg/L as orthophosphate dose as used in Chazen's 2007 report.)
- Phosphoric Acid: $46.00/day/MG (2.0 mg/L dose as orthophosphate is a typical dose).

Note that Zinc Orthophosphate was previously determined to be unfavorable but is included to compare this to other chemicals under present day costs. Phosphoric Acid is also not recommended due to the safety concerns in handling, as well as effectiveness compared to the recommended chemical.

Other phosphate manufacturing companies are likely to have products able to compete with the recommended chemical. Therefore, it is recommended that supply of any chemical to be used at this facility be chosen after a competitive bidding process to ensure the Village gets the best pricing.

Other routine operational costs for the proposed system, exclusive of sampling, include electricity for the chemical feed pump, which should be minimal. Once the sampling results show consistent compliance the WCDOH may allow the Village to reduce their sampling frequency, reducing sampling costs. Anticipated costs for the proposed system are shown in the Table below:

	Using Existing Building
Equipment Capital Costs(1)	$12,000
Equipment Housing(2)	$50,000
Annual O & M Costs	$15,000

(1) Includes a pre-packaged feed pump skid and containment assumed to be in the existing building.
(2) Modifications to existing building to accommodate chemical storage and feed.

3.2 North Highland Storage Tank

Based on the water quality measurements taken from within two of the Village's storage tanks, combined with anecdotal information obtained from the Water Department, it appears that the above-grade North Highland Tank may be experiencing excessive water age or stagnation. The water quality measurements indicate the water quality in the above-grade tank varies with depth. Additionally, the Water Department indicated that during periods in the summer the water temperatures in the lower portion of the water distribution system, which are feed from the North Highland Tank, become elevated. This suggests that there is insufficient mixing of the water held in the tank, which has an exposed southern face. This may be the cause of any increase in water temperature.

The potential for stagnation in this tank is further confirmed by a review of the available design drawings for the above-ground North Highland Tank, the general plan of which is included in Appendix C. The tank, designed in 1964, has a single 12" diameter inlet/outlet pipe located in the southwest portion of the tank. This combined with the large storage volume relative to daily demand limits the amount of mixing that would be expected under normal operation. It has been shown in other studies that, without thorough mixing, the water within even moderate sized storage tanks can become stagnant under normal operation. Then, during a period of high peak demand such as a fire flow, water main break, or heavy irrigation flow, the stagnant water can be released into the distribution system, creating a period of reduced water quality and increased customer complaints.

As a follow up to this evaluation the Village should consider operational and/or equipment modifications to the above-ground North Highland Tank to address apparent water stagnation problems.

- According to the Water Department, the last time the North Highland above-ground tank was inspected was in June 2007, and is scheduled to be inspected again in 2014. Based on the tank inspection findings, preventative maintenance such as cleaning or coating repairs may be necessary. Although no measurement of thickness was made, a sediment layer was noted during the storage tank water quality measurement exercise. This sediment layer may be agitated during periods of high demand, potentially re-suspending solids into the water distribution system.

- The Village should alter the level controls in the tank to vary the water storage volume, reducing the age of water stored within the tank. However, since the storage volume in the tank is dictated by fire protection requirements, the Water Department has indicated there is minimal ability to fluctuate the tank level.

- An evaluation of the feasibility of modifying the inlet/outlet pipe configuration to promote water circulation in the tank. Conceptually, this may include installing an extended inlet/outlet pipe equipped with a series of oriented uni-directional diffuser ports that would project across the floor of the tank such as seen with the Tideflex® Mixing System by Red Valve, or equal. This type of a retrofit has been shown to promote mixing within existing tanks during normal operation and the above system has been approved by the NYSDOH due to the modeling Red Valve performs.

- As an alternate to a modification of the inlet/outlet pipe, the Village should evaluate the option of installing a recirculation line from the North Highland booster pump station to the northeast portion of the tank to allow for periodic mixing. A control unit could divert flow into the North Highland Tank after receiving a high level cutoff at the end of a fill cycle for the Hessian Hills tank. This would provide a minimal level of burst mixing in the tank to improve water quality. Alternately, a separate recycling pump could be added to help keep the larger North Highland Tank from having stagnation issues that will affect water quality. Another alternative is to install a mechanical mixing system.

3.3 Distribution System Maintenance

There are also several alternatives available to the Village that may both extend the service life of the water distribution system and reduce the frequency of "brown" water complaints. A detailed evaluation of the potential of these maintenance alternatives is beyond the scope of this project, therefore, only a brief description of the alternatives that may be considered by the Village in the future is presented.

Mechanical cleaning physically cleans the interior surfaces of pipe to remove buildup that results from either sedimentation or corrosion. Mechanical cleaning can be accomplished using a series of "pigs" or shaped scrubbers placed in the water main and driven by upstream water pressure to scrub the inside of the pipes. Pigs may be launched, and recovered, from disassembled fire hydrants

Another form of mechanical cleaning utilizes a chain of metal scrapers that are either pushed through a pipe hydraulically, or pulled through a

pipe using a winch. Metal scrapers can remove large amounts of heavy solids in a single pass, however, both type of scraper units require that an entry and exit point be cut into the water main. A picture of some pipe scrapers is shown below:

Chemical cleaning uses a liquid cleaning agent, targeted to the type of deposits found in a pipe, to dissolve and breakdown the solids. To use chemical cleaning, a section of water main is isolated and the cleaning solution introduced and allowed to react for a period of typically 24 hours. The section of line is then flushed at high velocity to remove the dissolved and suspended solids.

Surface applied pipe lining is typically used following a program of heavy cleaning to remove severe corrosion in order to minimize the reoccurrence of corrosion. Once the pipe section has been cleaned, the pipe can be lined with cement or epoxy lining, the linings are usually spun cast to the interior of the pipe, providing a corrosion resistant coating that can extend the life of pipe. Due to the many factors that can affect project costs, including age, condition, and location of the pipe, surface applied linings must be evaluated for cost effectiveness on a project specific basis. A picture of a recently lined pipe showing the lining is below:

Alternately, if a pipe section has a high leakage rate, a structural lining system such as fold-and-form or cured-in-place pipe lining might be considered. These systems differ in how the lining works with the existing pipe to improve structural integrity and eliminate leaks, but the installation method is very similar. A section of pipe is removed from service and cleaned, and the lining is then introduced into the pipe. The lining is formed to the inside of the original pipe using steam or hot water. Typically the minor loss of interior pipe diameter is compensated by the lower friction losses associated with the lining materials (PVC, HDPE, or Epoxy resins.)

The Village is currently in the process of a major water distribution system improvement project for the Harmon, Wolf/Cook, Loconto Street, and Munson Street areas of the Village. This project includes cement lining older cast iron water mains, installation of new mains, valves, and hydrants. Some of the new mains are installed to eliminate dead ends within the distribution system, which should also improve water quality in those areas. More information on this project is included in Appendix F.

3.4 Distribution System Functional Improvements

Periodic improvements are required to maintain a water distribution systems functional capacity, or its ability to adequately serve current and future demands. In certain instances, such as when distribution piping is beyond its expected service life and does not have the capacity to meet current or future needs, phased pipe replacement should also be considered as a viable alternative. This is presently being done in the Harmon section of the Village, where aged, undersized portions of the distribution system are being replaced to improve both the quality and quantity of water provided to this neighborhood. A picture of a pipe installation is shown below:

In addition to periodic replacement of functionally obsolete portions of the distribution system, the Water Department should implement a program to eliminate all dead-end pipe runs, as is currently being planned for the dead ends at Piney Point, Nordica Drive, Wolf Road, and Wayne Street. Dead end sections are prone to water quality problems, due to the lack of circulation and are also more vulnerable to service interruptions, as there is only one supply point. By looping, or connecting dead end section to other nearby distribution piping, water is allowed to constantly flow through the piping and minimize the potential for water quality issues related to stagnation. Looping would also allow

these dead end sections to be served from multiple points, which could be used to maintain service during repairs or maintenance activities.

3.5 Distribution System Modeling

Chazen also recommends that the Water Department develop a computer-simulation model of the entire water supply system. A model of the system is a valuable tool that can assist in the planning, operation and maintenance of a water system. These models can be used to determine the potential impacts of a proposed modification, identify impacts of maintenance activities, assist Planning Board due diligence reviews, identify potential problems within the system by comparing actual monitoring data to predicted results, and help optimize water quality by modeling water age and concentrations within the system.

A distribution system model would assist in the evaluation of the effect of the above-ground North Highland tank being temporarily out of service, and other similar system alterations. In addition, it is possible that future Homeland Security requirements may require that additional information about the distribution system kinetics be available.

The Village has currently initiated the development of such a Water Distribution System model.

3.6 UniDirectional Flushing

It is strongly recommended that the Village utilize UniDirectional Flushing (UDF) program after the proposed corrosion control chemical is introduced. This program moves new water in one direction through the distribution system by flushing out existing water out of hydrants. Segments of the system are isolated one at a time to perform a UDF. The benefits of such a program are as follows:

1. Ensure the chemical reaches every portion of the distribution system.
2. Hasten the transport of the chemical to all areas of the distribution system.
3. Help convey sediment in one direction which may lessen the time between flushings and reduce brown water complaints.
4. Typically have higher flushing velocities which should increase the amount of sediment removed during flushing.
5. Typically use significantly less (30-40%) water than conventional flushing.
6. Typically all valves and many hydrants are utilized during a UDF. Some of which may only be used in an emergency such as a fire or main break. A UDF will allow operators to identify and replace

valves or hydrants that may have failed, increasing system fire protection reliability and system isolation effectiveness in conjunction with the other typical benefits above.

Once developed, a UDF program can be used at any time the Village wants to flush the system.

Appendix A: Summary of Village Water Sampling Results and the 2013 Annual Drinking Water Quality Report

Record of Sample Sities

Supply Name: Village of Croton-on-Hudson

Address: 1 Van Wyck St
Croton-on-Hudson N.Y. 10520

County: Westchester, New York

Phone: (914) 271-3775

Federal I.D.: NY5903425

Operators Name: John A. Spatta

Monitoring Period: Spring 2014

Popualtion Served: 8,000

Circle One: CWS or NTNCWS

DATE	Copper MG/L	Sample site Address	Location	Line	Tier
3/18/2014	2.33	130 Grand St	Lab	Copper	1
3/18/2014	2.24	20 Arlington Dr	Kitchen	"	1
3/25/2014	1.84	7 Palmer Ave	Kitchen	"	1
3/18/2014	1.83	89 Elmore Ave	Kitchen	"	1
3/18/2014	**1.71**	**48 Radnor Ave**	**Kitchen**	**"**	**1**
3/18/2014	1.68	16 Young Ave	Kitchen	"	1
3/18/2014	1.62	50 Emerson Ave	Kitchen	"	1
3/18/2014	1.53	124 Maple St	Kitchen	"	1
3/18/2014	1.44	4 Van Cortlandt Pl	Kitchen	"	1
3/18/2014	1.4	22 Loundsbury Rd	Kitchen	"	1
3/19/2014	1.38	85 Maple St	Bathroom	"	1
3/18/2014	1.37	341 Grand St	Kitchen	"	1
3/18/2014	1.28	2 Sunset Trail	Kitchen	"	1
3/18/2014	1.21	27 Cleveland Dr	Kitchen	"	1
3/18/2014	1.19	82 Brook St	Kitchen	"	1
3/18/2014	1.09	13 Radnor Ave	Kitchen	"	1
3/18/2014	0.99	30 Ridge Rd	Kitchen	"	1
3/18/2014	0.92	4 Wells Ave	Kitchen	"	1
3/18/2014	0.9	94 Maple St	Kitchen	"	1
3/18/2014	0.85	72 Oneida Ave	Kitchen	"	1
3/21/2014	0.82	17 Franklin Ave	Kitchen	"	1
3/18/2014	0.73	133 Scenic Dr West	Kitchen	"	1
3/26/2014	0.71	35 Melrose Ave	Bathroom	"	1
3/18/2014	0.68	217 Grand St	Kitchen	"	1
3/28/2014	0.66	18 Church St	Kitchen	"	1
3/19/2014	0.66	7 Farrington Rd	Kitchen	"	1
3/18/2014	0.57	64 Amber Dr	Kitchen	"	1
3/18/2014	0.57	59 Sunset Dr	Bathroom	"	1
3/19/2014	0.44	8 Ackerman Ct	Bathroom	"	1
3/18/2014	0.36	340 Grand St	Kitchen	"	1
3/18/2014	0.36	53 Irving Ave	Kitchen	"	1
3/18/2014	0.36	6 Mt Green Rd	Kitchen	"	1
3/18/2014	0.33	41 Morningside Dr	Kitchen	"	1
3/18/2014	0.33	61 Truesdale Dr	Kitchen	"	1
3/28/2014	0.27	77 Hastings Ave	Kitchen	"	1
3/18/2014	0.22	66 Bari Manor	Kitchen	"	1
3/25/2014	0.16	6 Bank St	Kitchen	"	1
3/18/2014	0.14	129 Hastings Ave	Kitchen	"	1
3/20/2014	0.2	6 Park Trail	Kitchen	"	1
3/18/2014	<0.05	1 Hunter Pl	Kitchen	"	1

Record of Sample Sities

Supply Name: Village of Croton-on-Hudson

Address: 1 Van Wyck St
Croton-on-Hudson N.Y. 10520

County: Westchester, New York

Phone: (914) 271-3775

Federal I.D.: NY5903425

Operators Name: John A. Spatta

Monitoring Period: Spring 2014

Popualtion Served: 8,000

Circle One: CWS or NTNCWS

DATE	Lead ppb	Sample site Address	Location	Line	Tier
3/18/2014	43.8	61 Truesdale Dr	Kitchen	Lead	1
3/18/2014	11.5	20 Arlington Dr	Kitchen	"	1
3/18/2014	8.7	82 Brook St	Kitchen	"	1
3/18/2014	8.6	124 Maple St	Kitchen	"	1
3/18/2014	**6.6**	**94 Maple St**	**Kitchen**	**"**	**1**
3/18/2014	6	22 Loundsbury Rd	Kitchen	"	1
3/19/2014	5.5	85 Maple St	Bathroom	"	1
3/18/2014	5.1	50 Emerson Ave	Kitchen	"	1
3/20/2014	4.8	6 Park Trail	Kitchen	"	1
3/18/2014	3.6	4 Van Cortlandt Pl	Kitchen	"	1
3/28/2014	3.5	18 Church St	Kitchen		1
3/18/2014	3.4	89 Elmore Ave	Kitchen	"	1
3/18/2014	3.1	130 Grand St	Lab	"	1
3/25/2014	3	7 Palmer Ave	Kitchen	"	1
3/18/2014	2.6	30 Ridge Rd	Kitchen	"	1
3/18/2014	2.3	27 Cleveland Dr	Kitchen	"	1
3/18/2014	2.2	59 Sunset Dr	Bathroom	"	1
3/18/2014	1.9	48 Radnor Ave.	Kitchen	"	1
3/26/2014	1.7	35 Melrose Ave	Bathroom	"	1
3/18/2014	1.6	129 Hastings Ave	Kitchen	"	1
3/18/2014	1.6	72 Oneida Ave	Kitchen	"	1
3/19/2014	1.5	8 Ackerman Ct	Bathroom	"	1
3/19/2014	1.5	7 Farrington Rd	Kitchen	"	1
3/18/2014	1.4	6 Mt. Green Rd	Kitchen	"	1
3/18/2014	1.4	1 Hunter Pl	Kitchen	"	1
3/18/2014	1.4	2 Sunset Trail	Kitchen	"	1
3/25/2014	1.3	6 Bank St	Kitchen	"	1
3/18/2014	1.1	4 Wells Ave	Kitchen	"	1
3/18/2014	1	64 Amber Dr	Kitchen	"	1
3/21/2014	1	17 Franklin Ave	Kitchen	"	1
3/18/2014	<1.0	133 Scenic Dr. West	Kitchen	"	1
3/18/2014	<1.0	41 Morningside Dr	Kitchen	"	1
3/18/2014	<1.0	53 Irving Ave	Kitchen	"	1
3/18/2014	<1.0	340 Grand St	Kitchen	"	1
3/18/2014	<1.0	16 Young Ave	Kitchen	"	1
3/18/2014	<1.0	217 Grand St	Kitchen	"	1
3/18/2014	<1.0	341 Grand St	Kitchen	"	1
3/18/2014	<1.0	13 Radnor Ave	Kitchen	"	1
3/28/2014	<1.0	77 Hastings Ave	Kitchen	"	1
3/18/2014	<1.0	66 Bari Manor	Kitchen	"	1

Village of Croton-on-Hudson
Potable Water Distribution System Analysis
Table A-1: Field sampling results

Location	1A - Grand St.				
Date	5/9/2005	6/16/2005	7/21/2005	8/11/2005	9/15/2005
Chemistry Parameters					
Alkalinity as CaCO3 (mg/l)	110	108	NA	109	106
pH (pH Units)	7.1	7.33	NA	7.48	7.59
Total Dissovled Solids (mg/l)	188	296	NA	238	249
Physical Parameters					
Turbidity (NTU)	<1	<0.200	NA	<0.200	<0.200
Metals					
Calcium (mg/l)	36.0	37	NA	38	34
Iron (mg/l)	0.06	<0.050	NA	<0.050	<0.050
Magnesium (mg/l)	12.5	12	NA	12	9.7
Manganese (mg/l)	0.018	<0.0050	NA	0.014	0.010
Dissolved Metals					
Iron (mg/l)	<0.060	<0.050	NA	<0.050	<0.050
Manganese (mg/l)	<0.010	<0.0050	NA	<0.0050	<0.0050
Field Parameters					
Temperature (°C)	11.9	NA	15.8	19.8	19.5
Conductivity	435	NA	464	450	450

NOTES:
NA - Not Analyzed
All samples were collected by the Village of Croton-on-Hudson Water Department

Village of Croton-on-Hudson
Potable Water Distribution System Analysis
Table A-1: Field sampling results

Location	2A - Piney Point				
Date	5/9/2005	6/16/2005	7/21/2005	8/11/2005	9/15/2005
Chemistry Parameters					
Alkalinity as CaCO3 (mg/l)	110	103	NA	112	110
pH (pH Units)	7.3	7.36	NA	7.48	7.6
Total Dissovled Solids (mg/l)	196	234	NA	243	214
Physical Parameters					
Turbidity (NTU)	1.2	51.00	NA	60.0	55
Metals					
Calcium (mg/l)	33.6	37	NA	38	33
Iron (mg/l)	0.586	33	NA	46	37
Magnesium (mg/l)	12.5	11	NA	11	9.2
Manganese (mg/l)	0.024	0.13	NA	0.10	0.088
Dissolved Metals					
Iron (mg/l)	<0.060	1.1	NA	1.0	<0.050
Manganese (mg/l)	0.012	<0.0050	NA	0.0080	0.017
Field Parameters					
Temperature (°C)	13.6	NA	21.4	24.0	22.0
Conductivity	438	NA	461	459	450

NOTES:
NA - Not Analyzed
All samples were collected by the Village of Croton-on-Hudson Water Department

Village of Croton-on-Hudson
Potable Water Distribution System Analysis
Table A-1: Field sampling results

Location	3A - Wolf Road				
Date	5/9/2005	6/16/2005	7/21/2005	8/11/2005	9/15/2005
Chemistry Parameters					
Alkalinity as CaCO3 (mg/l)	110	108	NA	112	118
pH (pH Units)	7.3	7.37	NA	7.46	7.59
Total Dissovled Solids (mg/l)	184	256	NA	256	222
Physical Parameters					
Turbidity (NTU)	<1	7.6	NA	3.50	1.00
Metals					
Calcium (mg/l)	33.6	42	NA	38	33
Iron (mg/l)	0.23	4.2	NA	1.2	0.31
Magnesium (mg/l)	11.5	13	NA	12	9.6
Manganese (mg/l)	0.012	0.057	NA	0.15	0.0470
Dissolved Metals					
Iron (mg/l)	<0.060	0.015	NA	<0.050	<0.050
Manganese (mg/l)	<0.010	0.0078	NA	0.0067	0.0076
Field Parameters					
Temperature (°C)	13.9	NA	21.6	22.6	22.6
Conductivity	429	NA	463	459	454

NOTES:
NA - Not Analyzed
All samples were collected by the Village of Croton-on-Hudson Water Department

Village of Croton-on-Hudson
Potable Water Distribution System Analysis
Table A-1: Field sampling results

Location	AA-Well #1				
Date	5/9/2005	6/16/2005	7/21/2005	8/11/2005	9/15/2005
Chemistry Parameters					
Alkalinity as CaCO3 (mg/l)	100	103	NA	106	105
pH (pH Units)	7.1	7.48	NA	7.65	7.63
Total Dissovled Solids (mg/l)	184	214	NA	262	240
Physical Parameters					
Turbidity (NTU)	<1	0.300	NA	<0.200	<0.200
Metals					
Calcium (mg/l)	34.4	33	NA	35	31
Iron (mg/l)	0.107	<0.050	NA	<0.050	<0.050
Magnesium (mg/l)	13.0	11	NA	11	9.2
Manganese (mg/l)	<0.010	<0.0050	NA	<0.0050	<0.0050
Dissolved Metals					
Iron (mg/l)	<0.060	<0.050	NA	<0.050	<0.050
Manganese (mg/l)	<0.010	<0.0050	NA	<0.0050	<0.0050
Field Parameters					
Temperature (°C)	9.6	NA	17.1	19.5	21.8
Conductivity	415	NA	439	446	438

NOTES:
NA - Not Analyzed
All samples were collected by the Village of Croton-on-Hudson Water Department

Village of Croton-on-Hudson
Potable Water Distribution System Analysis
Table A-1: Field sampling results

Location	BB-Well #3				
Date	5/9/2005	6/16/2005	7/21/2005	8/11/2005	9/15/2005
Chemistry Parameters					
Alkalinity as CaCO3 (mg/l)	94.0	106	NA	101	102
pH (pH Units)	7.1	7.38	NA	7.50	7.5
Total Dissovled Solids (mg/l)	186	257	NA	231	234
Physical Parameters					
Turbidity (NTU)	<1	<0.200	NA	<0.200	<0.200
Metals					
Calcium (mg/l)	33.6	39	NA	35	32
Iron (mg/l)	<0.060	<0.050	NA	<0.050	<0.050
Magnesium (mg/l)	15.8	11	NA	10	9.0
Manganese (mg/l)	0.018	0.019	NA	0.0320	0.0380
Dissolved Metals					
Iron (mg/l)	<0.060	<0.050	NA	<0.050	<0.050
Manganese (mg/l)	0.018	0.019	NA	0.023	0.026
Field Parameters					
Temperature (°C)	11.3	NA	19.5	21.5	21.8
Conductivity	424	NA	455	447	445

NOTES:
NA - Not Analyzed
All samples were collected by the Village of Croton-on-Hudson Water Department

Village of Croton-on-Hudson
Potable Water Distribution System Analysis
Table A-1: Field sampling results

Location	CC-Well #4				
Date	5/9/2005	6/16/2005	7/21/2005	8/11/2005	9/15/2005
Chemistry Parameters					
Alkalinity as CaCO3 (mg/l)	116	120	NA	121	115
pH (pH Units)	7.1	7.28	NA	7.37	7.47
Total Dissovled Solids (mg/l)	194	261	NA	256	246
Physical Parameters					
Turbidity (NTU)	<1	<0.200	NA	<0.200	<.200
Metals					
Calcium (mg/l)	40.0	44	NA	<5.0	37
Iron (mg/l)	<0.060	<0.050	NA	<0.050	<0.050
Magnesium (mg/l)	15.8	13.0	NA	12	10
Manganese (mg/l)	0.018	0.0083	NA	0.0077	0.0074
Dissolved Metals					
Iron (mg/l)	<0.060	<0.050	NA	<0.050	<0.050
Manganese (mg/l)	0.018	<0.0050	NA	<0.0050	0.0057
Field Parameters					
Temperature (°C)	10.8	NA	13.6	15.2	16.7
Conductivity	448	NA	458	457	453

NOTES:
NA - Not Analyzed
All samples were collected by the Village of Croton-on-Hudson Water Department

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.401860 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 06/09/14 10:35
DATE/TIME REC'D: 06/09/14 02:15
REPORT DATE: 06/17/14
PHONE: (914)-271-5270

SAMPLING SITE: WELL #1
: SAMPLE TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: HNO3
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
06/16/14			LEAD	<1.0 ppb	0-15ppb	SM 18-19 3113B
06/17/14			COPPER (Cu)	<0.05 MG/L	0-1.0 mg/l	SM 18-20 3111B

COMMENTS:
Pb/Cu LEAD limits for public schools are set at 15 ppb.
EPA Lead & Copper Rule for Public Systems requires that no more than 10% of their distribution points have a LEAD value of more than 15 ppb and a COPPER value of 1.3 mg/L, else water treatment must be undertaken to reduce the waters corrosive potential.

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.401861 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 06/09/14 10:45
DATE/TIME REC'D: 06/09/14 02:15
REPORT DATE: 06/17/14
PHONE: (914)-271-5270

SAMPLING SITE: WELL #3
: SAMPLE TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: HNO3
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
06/16/14			LEAD	<1.0 ppb	0-15ppb	SM 18-19 3113B
06/17/14			COPPER (Cu)	<0.05 MG/L	0-1.0 mg/l	SM 18-20 3111B

COMMENTS:
Pb/Cu LEAD limits for public schools are set at 15 ppb.
EPA Lead & Copper Rule for Public Systems requires that no more than 10% of their distribution points have a LEAD value of more than 15 ppb and a COPPER value of 1.3 mg/L, else water treatment must be undertaken to reduce the waters corrosive potential.

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.401862 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 06/09/14 10:55
DATE/TIME REC'D: 06/09/14 02:15
REPORT DATE: 06/17/14
PHONE: (914)-271-5270

SAMPLING SITE: WELL #4
: SAMPLE TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: HNO3
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
06/16/14			LEAD	<1.0 ppb	0-15ppb	SM 18-19 3113B
06/17/14			COPPER (Cu)	<0.05 MG/L	0-1.0 mg/l	SM 18-20 3111B

COMMENTS:
Pb/Cu LEAD limits for public schools are set at 15 ppb.
EPA Lead & Copper Rule for Public Systems requires that no more than 10% of their distribution points have a LEAD value of more than 15 ppb and a COPPER value of 1.3 mg/L, else water treatment must be undertaken to reduce the waters corrosive potential.

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.304812 CLIENT #: 8025 NON STAT PROC

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 12/30/13 01:20
DATE/TIME REC'D: 12/30/13 03:20
REPORT DATE: 01/15/14
PHONE: (914)-271-5270

SAMPLING SITE: 340 GRAND ST, CROTON, NY
: WELL #1
COL'D BY: B. CAMPANA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: HNO3
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
01/13/14			LEAD	<1.0 ppb	0-15ppb	SM 18-19 3113B
01/14/14			COPPER (Cu)	<0.05 MG/L	0-1.0 mg/l	SM 18-20 3111B

COMMENTS:
Pb/Cu LEAD limits for public schools are set at 15 ppb.
EPA Lead & Copper Rule for Public Systems requires that no more than 10% of their distribution points have a LEAD value of more than 15 ppb and a COPPER value of 1.3 mg/L, else water treatment must be undertaken to reduce the waters corrosive potential.

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.304813 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 12/30/13 01:30
DATE/TIME REC'D: 12/30/13 03:20
REPORT DATE: 01/15/14
PHONE: (914)-271-5270

SAMPLING SITE: 340 GRAND ST, CROTON, NY
: WELL #3
COL'D BY: B. CAMPANA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
01/13/14			LEAD	<1.0 ppb	0-15ppb	SM 18-19 3113B
01/14/14			COPPER (Cu)	<0.05 MG/L	0-1.0 mg/l	SM 18-20 3111B

COMMENTS:
Pb/Cu LEAD limits for public schools are set at 15 ppb.
EPA Lead & Copper Rule for Public Systems requires that no more than 10% of their distribution points have a LEAD value of more than 15 ppb and a COPPER value of 1.3 mg/L, else water treatment must be undertaken to reduce the waters corrosive potential.

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.304814 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 12/30/13 01:45
DATE/TIME REC'D: 12/30/13 03:20
REPORT DATE: 01/15/14
PHONE: (914)-271-5270

SAMPLING SITE: 340 GRAND ST, CROTON, NY
: WELL #4
COL'D BY: B. CAMPANA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: HNO3
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
01/13/14			LEAD	1.7 ppb	0-15ppb	SM 18-19 3113B
01/14/14			COPPER (Cu)	<0.05 MG/L	0-1.0 mg/l	SM 18-20 3111B

COMMENTS:
Pb/Cu LEAD limits for public schools are set at 15 ppb.
EPA Lead & Copper Rule for Public Systems requires that no more than 10% of their distribution points have a LEAD value of more than 15 ppb and a COPPER value of 1.3 mg/L, else water treatment must be undertaken to reduce the waters corrosive potential.

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.304806 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 12/30/13 01:40
DATE/TIME REC'D: 12/30/13 03:20
REPORT DATE: 01/22/14
PHONE: (914)-271-5270

SAMPLING SITE: 340 GRAND ST, CROTON, NY
: WELL #1
COL'D BY: B. CAMPANA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT		NORMAL - RANGE	METHOD
01/08/14 0330	01/08/14 0333	*	pH	7.1	UNITS	6.5-8.5	SM18-20 4500HB
01/16/14			ALKALINITY (A	104	MG/L	N/A	SM 18-20 2320B
01/07/14			HARDNESS,CALC	92	MG/L	N/A	SM18-193500CaD
01/17/14			CONDUCTIVITY	433.2	umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.304807 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 12/30/13 01:35
DATE/TIME REC'D: 12/30/13 03:20
REPORT DATE: 01/22/14
PHONE: (914)-271-5270

SAMPLING SITE: 340 GRAND ST, CROTON, NY
: WELL #3
COL'D BY: B. CAMPANA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT		NORMAL - RANGE	METHOD
01/08/14 0335	01/08/14 0338	*	pH	7.4	UNITS	6.5-8.5	SM18-20 4500HB
01/16/14			ALKALINITY (A	110	MG/L	N/A	SM 18-20 2320B
01/07/14			HARDNESS,CALC	92	MG/L	N/A	SM18-193500CaD
01/17/14			CONDUCTIVITY	418.0	umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.304808 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 12/30/13 01:50
DATE/TIME REC'D: 12/30/13 03:20
REPORT DATE: 01/22/14
PHONE: (914)-271-5270

SAMPLING SITE: 340 GRAND ST, CROTON, NY
: WELL #4
COL'D BY: B. CAMPANA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT		NORMAL - RANGE	METHOD
01/08/14 0340	01/08/14 0343	*	pH	7.5	UNITS	6.5-8.5	SM18-20 4500HB
01/16/14			ALKALINITY (A	106	MG/L	N/A	SM 18-20 2320B
01/07/14			HARDNESS,CALC	84	MG/L	N/A	SM18-193500CaD
01/17/14			CONDUCTIVITY	392.8	umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.304809 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 12/30/13 01:00
DATE/TIME REC'D: 12/30/13 03:20
REPORT DATE: 01/22/14
PHONE: (914)-271-5270

SAMPLING SITE: 340 GRAND ST
: KITCHEN SINK
COL'D BY: B. CAMPANA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT		NORMAL - RANGE	METHOD
01/08/14 0345	01/08/14 0348	*	pH	7.5	UNITS	6.5-8.5	SM18-20 4500HB
01/16/14			ALKALINITY (A	108	MG/L	N/A	SM 18-20 2320B
01/07/14			HARDNESS,CALC	94	MG/L	N/A	SM18-193500CaD
01/17/14			CONDUCTIVITY	426.8	umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.304810 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 12/30/13 02:15
DATE/TIME REC'D: 12/30/13 03:20
REPORT DATE: 01/22/14
PHONE: (914)-271-5270

SAMPLING SITE: 1 VAN WYCK ST
: KITCHEN SINK
COL'D BY: B. CAMPANA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
01/08/14 0350	01/08/14 0353	*	pH	7.7 UNITS	6.5-8.5	SM18-20 4500HB
01/16/14			ALKALINITY (A	108 MG/L	N/A	SM 18-20 2320B
01/07/14			HARDNESS,CALC	90 MG/L	N/A	SM18-193500CaD
01/17/14			CONDUCTIVITY	408.4 umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.304811 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 12/30/13 02:00
DATE/TIME REC'D: 12/30/13 03:20
REPORT DATE: 01/22/14
PHONE: (914)-271-5270

SAMPLING SITE: 62 NORDICA DR
: SAMPLE PORT
COL'D BY: B. CAMPANA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT		NORMAL - RANGE	METHOD
01/08/14 0355	01/08/14 0358	*	pH	7.7	UNITS	6.5-8.5	SM18-20 4500HB
01/16/14			ALKALINITY (A	106	MG/L	N/A	SM 18-20 2320B
01/07/14			HARDNESS,CALC	86	MG/L	N/A	SM18-193500CaD
01/17/14			CONDUCTIVITY	429.6	umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

SAMPLE COLLECTION / CHAIN OF CUSTODY RECORD

YORKTOWN MEDICAL LABS INC
321 KEAR STREET, BOX 99
YORKTOWN HEIGHTS, NY 10598
AREA 914 245-3203

CLIENT: Village of Croton on Hudson, NY
ADDRESS: 340 Grand St
CITY, STATE, ZIP: Croton on Hudson NY 10520
PHONE / FAX: 914 271-5270

PAGE 1 OF 1
P.O. #:
JOB #:
LAB NUMBER:

#	DATE	TIME	SAMPLE Potbl	SAMPLE Non Pot	MATRIX S	MATRIX L	MATRIX G	SAMPLE ORIGIN	Sampling Point		ANALYSIS	#	
1	12/30/12	1:40PM	✓			✓		340 Grand St Croton NY	WELL #1	F	1.304806	1	60°
2	12/30/13	1:35PM	✓			✓		340 Grand St Croton NY	WELL #3	C	1.304807	2	55°
3	12/30/13	1:50PM	✓			✓		340 Grand St Croton NY	WELL #4	U	1.304808	3	58°
4	12/30/13	1PM	✓			✓		340 Grand St.	~~340 Grand St~~ Kitchen Sink		1.304809	4	40°
5	12/30/13	2:15	✓			✓		1 Von Wyck St	~~1 Von Wyck St~~ Kitchen Sink		1.304810	5	56
6	12/30/13	2PM	✓			✓		62 Nordica Dr.	~~62 Nordica Dr.~~ Sample Port		1.304811	6	46
7												7	
8												8	
9												9	
10								Test each for =	pH A/K Cat'd +		Cond	10	

AMPLED BY: B. Campana
RELINQUISHED BY:
DATE: 12/30/13 TIME:
RELINQUISHED BY:
DATE: TIME:

SPECIAL INSTRUCTIONS:
RECEIVED BY:
DATE: 12/30/13 TIME:
RECEIVED BY:
DATE: TIME:

RECIEVED AT LAB BY: [signature]
DATE: 12/30/13 TIME: 3:20

SHIPPING CONTAINER CONDITION: GOOD ✓ FAIR ___ POOR ___
PACKED IN ICE? YES ✓ NO ___

SAMPLE COLLECTION / CHAIN OF CUSTODY RECORD

YORKTOWN MEDICAL LABS INC
321 KEAR STREET, BOX 99
YORKTOWN HEIGHTS, NY 10598
AREA 914 245-3203

CLIENT: Village of Croton on Hudson, NY
ADDRESS: 1 Van Wyck St
CITY, STATE, ZIP: Croton on Hudson NY 10520
PHONE / FAX: 914-271-5270

PAGE 1 OF 1
P.O. #:
JOB #:
LAB NUMBER:

#	DATE	TIME	SAMPLE Potbl	SAMPLE Non Pot	MATRIX S	MATRIX L	MATRIX G	SAMPLE ORIGIN	Sampling Point	ANALYSIS	#
1	12/30/13	1:30 PM	✓			✓		340 Grand St Croton NY	WELL #1	1.304812	1
2	12/30/13	1:30 PM	✓			✓		340 Grand St Croton NY	WELL #3	1.304813	2
3	12/30/13	1:45 PM	✓			✓		340 Grand St Croton NY	WELL #4	1.304814	3
4											4
5											5
6											6
7											7
8											8
9											9
10											10

Test each for = Pb + Cu

AMPLED BY:
ELINQUISHED BY:
ATE: TIME:
ELINQUISHED BY:

SPECIAL INSTRUCTIONS:
RECEIVED BY:
DATE: TIME:
RECEIVED BY:

RECIEVED AT LAB BY:
DATE: 12-30-13 TIME: 3 20
SHIPPING CONTAINER CONDITION: Good
PACKED IN ICE? Ok

H 2 M labs

575 Broad Hollow Rd. , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Croton On Hudson Village
One Van Wyck Street
Croton on Hudson, NY 10520-2501
Attn To : Tom Brann
Federal ID : NY5903425
Collected : 06/20/2013 10:05 AM Point No
Received : 06/20/2013 6:55 PM Location:
Collected By : CLIENT

Lab No. : 1306B99-001A
Client Sample ID. : WELL 1-WL0001

Analytical Method: E300.0 : IOC — Analyst: bka

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Chloride	60.8	D	5	mg/L	250	07/01/2013 8:10 PM	Container-01 of 01
Fluoride	< 0.10		1	mg/L	2.2	06/27/2013 7:17 PM	Container-01 of 01
Sulfate	10.1		1	mg/L	250	06/27/2013 7:17 PM	Container-01 of 01

Analytical Method: SM2120B : IOC — Analyst: EM

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Color	< 5		1	units	15	06/21/2013 5:07 AM	Container-01 of 01

Analytical Method: SM2150B : IOC — Analyst: EM

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Odor at 60°C	0		1	units	3	06/21/2013 5:16 AM	Container-01 of 01

Result(s) reported meet(s) NYS Regulatory Limit(s)
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Date Reported : 7/2/2013

H 2 M labs

575 Broad Hollow Rd., Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Croton On Hudson Village
One Van Wyck Street
Croton on Hudson, NY 10520-2501
Attn To : Tom Brann
Federal ID : NY5903425
Collected : 06/20/2013 10:05 AM Point No
Received : 06/20/2013 6:55 PM Location:
Collected By : CLIENT

Lab No. : 1306B99-001B
Client Sample ID. : WELL 1-WL0001

Analytical Method: E200.7 : IOC — Analyst: Aba

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Aluminum	< 0.20		1	mg/L		06/28/2013 3:33 PM	Container-01 of 01
Iron	< 0.02		1	mg/L	0.3	06/28/2013 3:33 PM	Container-01 of 01
Manganese	< 0.01		1	mg/L	0.3	06/28/2013 3:33 PM	Container-01 of 01
Silver	< 0.01		1	mg/L	0.1	06/28/2013 3:33 PM	Container-01 of 01
Sodium	35.6		1	mg/L		06/28/2013 3:33 PM	Container-01 of 01
Zinc	< 0.02		1	mg/L	5	06/28/2013 3:33 PM	Container-01 of 01

Analytical Method: E200.8 : IOC — Analyst: Aba

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Antimony	< 0.400		1	ug/l	6	06/27/2013 7:00 PM	Container-01 of 01
Arsenic	< 1.40		1	ug/l	10	06/27/2013 7:00 PM	Container-01 of 01
Barium	0.0295		1	mg/l	2	06/27/2013 7:00 PM	Container-01 of 01
Beryllium	< 0.300		1	ug/l	4	06/27/2013 7:00 PM	Container-01 of 01
Cadmium	< 1.00		1	ug/l	5	06/27/2013 7:00 PM	Container-01 of 01
Chromium	< 0.0070		1	mg/l	0.1	06/27/2013 7:00 PM	Container-01 of 01
Mercury	< 0.200		1	ug/l	2	06/27/2013 7:00 PM	Container-01 of 01
Nickel	< 0.0005		1	mg/l		06/27/2013 7:00 PM	Container-01 of 01
Selenium	< 2.00		1	ug/l	50	06/27/2013 7:00 PM	Container-01 of 01
Thallium	< 0.300		1	ug/l	2	06/27/2013 7:00 PM	Container-01 of 01

Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

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Date Reported : 7/2/2013

H 2 M labs

575 Broad Hollow Rd. Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Croton On Hudson Village
One Van Wyck Street
Croton on Hudson, NY 10520-2501
Attn To : Tom Brann
Federal ID : NY5903425
Collected : 06/20/2013 10:05 AM Point No
Received : 06/20/2013 6:55 PM Location:
Collected By : CLIENT

Lab No. : 1306B99-001C
Client Sample ID. : WELL 1-WL0001

Analytical Method: SM4500-CN E : Prep Method: SM4500-CN E Prep Date: 6/21/2013 10:50:00 AM Analyst: HT

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Cyanide	< 10		1	µg/L		06/21/2013 4:27 PM	Container-01 of 01

Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
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r = Reporting limit > MDL and < LOQ
J = Estimated value - below calibration range
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Joann M. Slavin
Laboratory Manager

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H 2 M labs

575 Broad Hollow Rd., Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Croton On Hudson Village
One Van Wyck Street
Croton on Hudson, NY 10520-2501
Attn To : Tom Brann
Federal ID : NY5903425
Collected : 06/20/2013 10:18 AM Point No
Received : 06/20/2013 6:55 PM Location:
Collected By : CLIENT

Lab No. : 1306B99-002A
Client Sample ID. : WELL 3-WL0003

Analytical Method: E300.0 : IOC — Analyst: bka

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Chloride	59.8	D	5	mg/L	250	07/01/2013 8:24 PM	Container-01 of 01
Fluoride	< 0.10		1	mg/L	2.2	06/27/2013 7:30 PM	Container-01 of 01
Sulfate	9.70		1	mg/L	250	06/27/2013 7:30 PM	Container-01 of 01

Analytical Method: SM2120B : IOC — Analyst: EM

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Color	5		1	units	15	06/21/2013 5:08 AM	Container-01 of 01

others 25

Analytical Method: SM2150B : IOC — Analyst: EM

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Odor at 60°C	0		1	units	3	06/21/2013 5:17 AM	Container-01 of 01

Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
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r = Reporting limit > MDL and < LOQ
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound

Joann M. Slavin
Laboratory Manager

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Date Reported : 7/2/2013

H 2 M labs

575 Broad Hollow Rd. Melville, NY 11747
TEL (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10476

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Croton On Hudson Village
One Van Wyck Street
Croton on Hudson, NY 10520-2501
Attn To : Tom Brann
Federal ID : NY5903425
Collected : 06/20/2013 10:18 AM Point No
Received : 06/20/2013 6:55 PM Location:
Collected By : CLIENT

Lab No. : 1306B99-002B
Client Sample ID. : WELL 3-WL0003

Analytical Method: E200.7 : IOC — Analyst: Aba

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Aluminum	< 0.20		1	mg/L		06/28/2013 3:37 PM	Container-01 of 01
Iron	< 0.02		1	mg/L	0.3	06/28/2013 3:37 PM	Container-01 of 01
Manganese	0.11		1	mg/L	0.3	06/28/2013 3:37 PM	Container-01 of 01
Silver	< 0.01		1	mg/L	0.1	06/28/2013 3:37 PM	Container-01 of 01
Sodium	35.0		1	mg/L		06/28/2013 3:37 PM	Container-01 of 01
Zinc	< 0.02		1	mg/L	5	06/28/2013 3:37 PM	Container-01 of 01

Analytical Method: E200.8 : IOC — Analyst: Aba

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Antimony	< 0.400		1	ug/l	6	06/27/2013 7:05 PM	Container-01 of 01
Arsenic	< 1.40		1	ug/l	10	06/27/2013 7:05 PM	Container-01 of 01
Barium	0.0284		1	mg/l	2	06/27/2013 7:05 PM	Container-01 of 01
Beryllium	< 0.300		1	ug/l	4	06/27/2013 7:05 PM	Container-01 of 01
Cadmium	< 1.00		1	ug/l	5	06/27/2013 7:05 PM	Container-01 of 01
Chromium	< 0.0070		1	mg/l	0.1	06/27/2013 7:05 PM	Container-01 of 01
Mercury	< 0.200		1	ug/l	2	06/27/2013 7:05 PM	Container-01 of 01
Nickel	< 0.0005		1	mg/l		06/27/2013 7:05 PM	Container-01 of 01
Selenium	< 2.00		1	ug/l	50	06/27/2013 7:05 PM	Container-01 of 01
Thallium	< 0.300		1	ug/l	2	06/27/2013 7:05 PM	Container-01 of 01

Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
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r = Reporting limit > MDL and < LOQ
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound

Joann M. Slavin
Laboratory Manager

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Date Reported : 7/2/2013

H 2 M labs

575 Broad Hollow Rd., Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Croton On Hudson Village
One Van Wyck Street
Croton on Hudson, NY 10520-2501
Attn To : Tom Brann
Federal ID : NY5903425
Collected : 06/20/2013 10:18 AM Point No
Received : 06/20/2013 6:55 PM Location:
Collected By : CLIENT

Lab No. : 1306B99-002C
Client Sample ID. : WELL 3-WL0003

Analytical Method: SM4500-CN E Prep Method: SM4500-CN E Prep Date: 6/21/2013 10:50:00 AM Analyst: HT

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Cyanide	< 10		1	µg/L		06/21/2013 4:28 PM	Container-01 of 01

Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
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Laboratory Manager

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Date Reported : 7/2/2013

H 2 M labs

575 Broad Hollow Rd., Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Croton On Hudson Village
One Van Wyck Street
Croton on Hudson, NY 10520-2501
Attn To : Tom Brann
Federal ID : NY5903425
Collected : 06/20/2013 10:55 AM Point No
Received : 06/20/2013 6:55 PM Location:
Collected By : CLIENT

Lab No. : 1306B99-003A
Client Sample ID. : WELL 4-WL0004

Analytical Method: E300.0 : IOC — Analyst: bka

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Chloride	52.9	D	5	mg/L	250	07/01/2013 8:37 PM	Container-01 of 01
Fluoride	< 0.10		1	mg/L	2.2	06/27/2013 7:44 PM	Container-01 of 01
Sulfate	9.77		1	mg/L	250	06/27/2013 7:44 PM	Container-01 of 01

Analytical Method: SM2120B : IOC — Analyst: EM

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Color	< 5		1	units	15	06/21/2013 5:09 AM	Container-01 of 01

Analytical Method: SM2150B : IOC — Analyst: EM

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Odor at 60°C	0		1	units	3	06/21/2013 5:18 AM	Container-01 of 01

Result(s) reported meet(s) NYS Regulatory Limit(s)
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
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TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Croton On Hudson Village
One Van Wyck Street
Croton on Hudson, NY 10520-2501
Attn To : Tom Brann
Federal ID : NY5903425
Collected : 06/20/2013 10:55 AM Point No
Received : 06/20/2013 6:55 PM Location:
Collected By : CLIENT

Lab No. : 1306B99-003B
Client Sample ID. : WELL 4-WL0004

Analytical Method: E200.7 : IOC — Analyst: Aba

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Aluminum	< 0.20		1	mg/L		06/28/2013 3:42 PM	Container-01 of 01
Iron	< 0.02		1	mg/L	0.3	06/28/2013 3:42 PM	Container-01 of 01
Manganese	0.01		1	mg/L	0.3	06/28/2013 3:42 PM	Container-01 of 01
Silver	< 0.01		1	mg/L	0.1	06/28/2013 3:42 PM	Container-01 of 01
Sodium	27.8		1	mg/L		06/28/2013 3:42 PM	Container-01 of 01
Zinc	< 0.02		1	mg/L	5	06/28/2013 3:42 PM	Container-01 of 01

Analytical Method: E200.8 : IOC — Analyst: Aba

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Antimony	< 0.400		1	ug/l	6	06/27/2013 7:32 PM	Container-01 of 01
Arsenic	< 1.40		1	ug/l	10	06/27/2013 7:32 PM	Container-01 of 01
Barium	0.0364		1	mg/l	2	06/27/2013 7:32 PM	Container-01 of 01
Beryllium	< 0.300		1	ug/l	4	06/27/2013 7:32 PM	Container-01 of 01
Cadmium	< 1.00		1	ug/l	5	06/27/2013 7:32 PM	Container-01 of 01
Chromium	< 0.0070		1	mg/l	0.1	06/27/2013 7:32 PM	Container-01 of 01
Mercury	< 0.200		1	ug/l	2	06/27/2013 7:32 PM	Container-01 of 01
Nickel	< 0.0005		1	mg/l		06/27/2013 7:32 PM	Container-01 of 01
Selenium	< 2.00		1	ug/l	50	06/27/2013 7:32 PM	Container-01 of 01
Thallium	< 0.300		1	ug/l	2	06/27/2013 7:32 PM	Container-01 of 01

Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Qualifiers: E = Value above quantitation range
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Joann M. Slavin
Laboratory Manager

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H 2 M labs

575 Broad Hollow Rd. , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Croton On Hudson Village
One Van Wyck Street
Croton on Hudson, NY 10520-2501
Attn To : Tom Brann
Federal ID : NY5903425
Collected : 06/20/2013 10:55 AM Point No
Received : 06/20/2013 6:55 PM Location:
Collected By : CLIENT

Lab No. : 1306B99-003C
Client Sample ID. : WELL 4-WL0004

Analytical Method: SM4500-CN E : Prep Method: SM4500-CN E Prep Date: 6/21/2013 10:50:00 AM Analyst: HT

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Cyanide	< 10		1	µg/L		06/21/2013 4:29 PM	Container-01 of 01

Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
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J = Estimated value - below calibration range
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Laboratory Manager

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Date Reported : 7/2/2013

H2M labs

H2M LABS INC
575 Broad Hollow Rd.
Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
Website: www.h2mlabs.com

Sample Receipt Checklist

Client Name COH

Date and Time Received: 6/20/2013 6:55:00 PM

Work Order Number: 1306B99 RcptNo: 1

Received by Linda Siciliano

Completed by:

Reviewed by:

Completed Date: 6/20/2013 7:50:03 PM

Reviewed Date: 6/24/2013 6:35:07 PM

Carrier name: H2M Pickup

Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Are matrices correctly identified on Chain of custody?	Yes ☑	No ☐		
Is it clear what analyses were requested?	Yes ☑	No ☐		
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present	☑
Samples in proper container/bottle?	Yes ☑	No ☐		
Were correct preservatives used and noted?	Yes ☑	No ☐	NA	☐
Preservative added to bottles:				
Sample Condition?	Intact ☑	Broken ☐	Leaking	☐
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
Were container labels complete (ID, Pres, Date)?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Was an attempt made to cool the samples?	Yes ☑	No ☐	NA	☐
All samples received at a temp. of > 0° C to 6.0° C?	Yes ☑	No ☐	NA	☐
Response when temperature is outside of range:				
Sample Temp. taken and recorded upon receipt?	Yes ☑	No ☐	2.4 To	1.9 °
Water - Were bubbles absent in VOC vials?	Yes ☐	No ☐	No Vials	☑
Water - Was there Chlorine Present?	Yes ☐	No ☐	NA	☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	No Water	☐
Are Samples considered acceptable?	Yes ☑	No ☐		
Custody Seals present?	Yes ☐	No ☑		
Airbill or Sticker?	Air Bil ☐	Sticker ☐	Not Present	☑

Airbill No:

Case Number: SDG: SAS:

Any No response should be detailed in the comments section below, if applicable.

Client Contacted? ☐ Yes ☑ No Person Contacted:

Contact Mode: ☐ Phone: ☐ Fax: ☐ Email: ☐ In Person:

Client Instructions:

Date Contacted: Contacted By:

Regarding:

Comments:

CorrectiveAction:

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.400600 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 02/26/14 07:30
DATE/TIME REC'D: 02/26/14 09:25
REPORT DATE: 03/03/14
PHONE: (914)-271-5270

SAMPLING SITE: WELL #1
: SAMPLE TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
WQP						
02/27/14			* pH	7.3 UNITS	6.5-8.5	SM18-20 4500HB
02/28/14			ALKALINITY (A	124 MG/L	N/A	SM 18-20 2320B
02/26/14			HARDNESS,CALC	114 MG/L	N/A	SM18-193500CaD
02/27/14			CONDUCTIVITY	448.0 umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.400601 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 02/26/14 07:45
DATE/TIME REC'D: 02/26/14 09:25
REPORT DATE: 03/03/14
PHONE: (914)-271-5270

SAMPLING SITE: WELL #3
: SAMPLE TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT		NORMAL - RANGE	METHOD
WQP							
02/27/14			* pH	7.3	UNITS	6.5-8.5	SM18-20 4500HB
02/28/14			ALKALINITY (A	106	MG/L	N/A	SM 18-20 2320B
02/26/14			HARDNESS,CALC	120	MG/L	N/A	SM18-193500CaD
02/27/14			CONDUCTIVITY	468.0	umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.400602 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 02/26/14 07:00
DATE/TIME REC'D: 02/26/14 09:25
REPORT DATE: 03/03/14
PHONE: (914)-271-5270

SAMPLING SITE: WELL #4
: SAMPLE TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT		NORMAL - RANGE	METHOD
WQP							
02/27/14			* pH	7.4	UNITS	6.5-8.5	SM18-20 4500HB
02/28/14			ALKALINITY (A	106	MG/L	N/A	SM 18-20 2320B
02/26/14			HARDNESS,CALC	124	MG/L	N/A	SM18-193500CaD
02/27/14			CONDUCTIVITY	464	umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.400603 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 02/26/14 07:15
DATE/TIME REC'D: 02/26/14 09:25
REPORT DATE: 03/03/14
PHONE: (914)-271-5270

SAMPLING SITE: 340 GRAND ST
: KITCHEN TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
WQP						
02/27/14			* pH	7.4 UNITS	6.5-8.5	SM18-20 4500HB
02/28/14			ALKALINITY (A	112 MG/L	N/A	SM 18-20 2320B
02/26/14			HARDNESS,CALC	130 MG/L	N/A	SM18-193500CaD
02/27/14			CONDUCTIVITY	447.0 umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.400604 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 02/26/14 08:10
DATE/TIME REC'D: 02/26/14 09:25
REPORT DATE: 03/03/14
PHONE: (914)-271-5270

SAMPLING SITE: 1 VAN WYCK ST
: LUNCH ROOM
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
WQP						
02/27/14			* pH	7.4 UNITS	6.5-8.5	SM18-20 4500HB
02/28/14			ALKALINITY (A	104 MG/L	N/A	SM 18-20 2320B
02/26/14			HARDNESS,CALC	120 MG/L	N/A	SM18-193500CaD
02/27/14			CONDUCTIVITY	459.0 umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.400605 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 02/26/14 08:30
DATE/TIME REC'D: 02/26/14 09:25
REPORT DATE: 03/03/14
PHONE: (914)-271-5270

SAMPLING SITE: 62 NORDICA DR
: SINK
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: NONE
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT		NORMAL - RANGE	METHOD
WQP							
02/27/14			* pH	7.6	UNITS	6.5-8.5	SM18-20 4500HB
02/28/14			ALKALINITY (A	106	MG/L	N/A	SM 18-20 2320B
02/26/14			HARDNESS,CALC	98	MG/L	N/A	SM18-193500CaD
02/27/14			CONDUCTIVITY	420	umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.401863 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 06/09/14 10:30
DATE/TIME REC'D: 06/09/14 02:15
REPORT DATE: 06/23/14
PHONE: (914)-271-5270

SAMPLING SITE: WELL #1
: SAMPLE TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: HNO3
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
WATER QUALITY PARAMETERS						
06/12/14 0400	06/12/14 0403	*	pH	7.9 UNITS	6.5-8.5	SM18-20 4500HB
06/16/14			ALKALINITY (A	104 MG/L	N/A	SM 18-20 2320B
06/18/14			HARDNESS,CALC	86 MG/L	N/A	SM18-193500CaD
06/20/14			CONDUCTIVITY	469.0 umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.401864 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 06/09/14 10:40
DATE/TIME REC'D: 06/09/14 02:15
REPORT DATE: 06/23/14
PHONE: (914)-271-5270

SAMPLING SITE: WELL #3
: SAMPLE TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: HNO3
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
WATER QUALITY PARAMETERS						
06/12/14 0405	06/12/14 0408	*	pH	7.7 UNITS	6.5-8.5	SM18-20 4500HB
06/16/14			ALKALINITY (A	112 MG/L	N/A	SM 18-20 2320B
06/18/14			HARDNESS,CALC	98 MG/L	N/A	SM18-193500CaD
06/20/14			CONDUCTIVITY	452.0 umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.401865 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 06/09/14 10:50
DATE/TIME REC'D: 06/09/14 02:15
REPORT DATE: 06/23/14
PHONE: (914)-271-5270

SAMPLING SITE: WELL #4
: SAMPLE TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: HNO3
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
WATER QUALITY PARAMETERS						
06/12/14 0410	06/12/14 0413		* pH	7.6 UNITS	6.5-8.5	SM18-20 4500HB
06/16/14			ALKALINITY (A	112 MG/L	N/A	SM 18-20 2320B
06/18/14			HARDNESS,CALC	96 MG/L	N/A	SM18-193500CaD
06/20/14			CONDUCTIVITY	413.0 umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.401866 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 06/09/14 11:15
DATE/TIME REC'D: 06/09/14 02:15
REPORT DATE: 06/23/14
PHONE: (914)-271-5270

SAMPLING SITE: 1 VAN WYCK ST
:
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: HNO3
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
WATER QUALITY PARAMETERS						
06/12/14 0415	09/12/14 0418		* pH	7.6 UNITS	6.5-8.5	SM18-20 4500HB
06/16/14			ALKALINITY (A	112 MG/L	N/A	SM 18-20 2320B
06/18/14			HARDNESS,CALC	102 MG/L	N/A	SM18-193500CaD
06/20/14			CONDUCTIVITY	470.5 umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.401867 CLIENT #: 8025 NON STAT PROC PAGE: 1 of 1

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 06/09/14 12:45
DATE/TIME REC'D: 06/09/14 02:15
REPORT DATE: 06/23/14
PHONE: (914)-271-5270

SAMPLING SITE: 340 GRAND ST
: KITCHEN TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: HNO3
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
WATER QUALITY PARAMETERS						
06/12/14 0420	06/12/14 0423	*	pH	7.5 UNITS	6.5-8.5	SM18-20 4500HB
06/16/14			ALKALINITY (A	114 MG/L	N/A	SM 18-20 2320B
06/18/14			HARDNESS,CALC	114 MG/L	N/A	SM18-193500CaD
06/20/14			CONDUCTIVITY	411.5 umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

YML ENVIRONMENTAL SERVICES
321 Kear Street
Yorktown Heights, N.Y. 10598
(914) 245-2800
Albert H. Padovani, Director
** TEST REPORT **

LAB #: 1.401868 CLIENT #: 8025 NON STAT PROC

VILLAGE OF CROTON ON H
1 VAN WYCK ST
ATTN: JOHN SPATTA
CROTON-ON-HUDSON, NY 10520

DATE/TIME TAKEN: 06/09/14 01:00
DATE/TIME REC'D: 06/09/14 02:15
REPORT DATE: 06/23/14
PHONE: (914)-271-5270

SAMPLING SITE: 62 NORDICA DR
: SAMPLE TAP
COL'D BY: JOHN SPATTA
NOTES...:

SAMPLE TYPE..: POTABLE
PRESERVATIVES: HNO3
TEMPERATURE..: <20 >4.0C
COLIFORM METH: N/A

START DATE/TIME	END DATE/TIME	FLAG	PROCEDURE	RESULT	NORMAL - RANGE	METHOD
WATER QUALITY PARAMETERS						
06/12/14 0425	06/12/14 0428	*	pH	7.9 UNITS	6.5-8.5	SM18-20 4500HB
06/16/14			ALKALINITY (A	110 MG/L	N/A	SM 18-20 2320B
06/18/14			HARDNESS,CALC	98 MG/L	N/A	SM18-193500CaD
06/20/14			CONDUCTIVITY	434 umho/cm	N/A	SM 18-20 2510B

COMMENTS:

* pH pH SCALE IN WATER RANGES FROM 1-14. MEASUREMENT OF pH IS ONE OF THE IMPORTANT AND FREQUENTLY USED TESTS IN WATER CHEMISTRY. WATER WITH A LOW pH MIGHT BE CORROSIVE TO METAL PIPES AND FIXTURES. THE NORMAL RANGE OF pH IS 6.5 TO 8.5. pH IS A FIELD MEASUREMENT AND IS TESTED OUTSIDE THE HOLDING TIME. pH REPORTED FOR REFERENCE ONLY.

ALK (ALKALINITY REPORTED AT pH 4.5)

THE ABOVE TEST PROCEDURES MEET ALL REQUIREMENTS OF NELAC, AND RELATE ONLY TO THESE SAMPLES RECEIVED BY THE LAB

SUBMITTED BY: _____
Albert H. Padovani, M.T.(ASCP)
Director

ELAP# 10323

Annual

WATER QUALITY REPORT

Reporting Year 2013

Presented By

Croton-on-Hudson

PWS ID#: 5903425

There When You Need Us

We are once again proud to present our annual water quality report covering all testing performed between January 1 and December 31, 2013. Over the years, we have dedicated ourselves to producing drinking water that meets all State and Federal standards. We continually strive to adopt new methods for delivering the best-quality drinking water to you. As new challenges to drinking water safety emerge, we remain vigilant in meeting the goals of source water protection, water conservation, and community education while continuing to serve the needs of all our water users.

Please remember that we are always available to assist you should you ever have any questions or concerns about your water.

Community Participation

You are invited to participate in our public forum and voice your concerns about your drinking water. The Village Board of Trustees meets on the first and third Mondays of each month beginning at 8:00 p.m. at the Stanley H. Kellerhouse Municipal Building, One Van Wyck Street, Croton-on-Hudson, NY 10520.

Facility Modification and System Improvements

The refurbishment of wells 1, 3 and 4 by Subsurface Technologies, Inc., is in progress. This work will result in greater output from the wells and increased well pump efficiency.

The water main improvement project for the Harmon and Wolf Road/Cook Lane areas has been awarded and work is expected to begin in May/June and continue through 2014 and into 2015.

The water main improvement project for the Farrington Road and Hunter Place areas is expected to be bid in early summer with construction by early fall.

Improvements at the well field to increase chlorine contact time are in design with construction planned for later in 2014.

Design work has begun on a corrosion control treatment system to reduce copper levels at the tap.

Facts and Figures

The water system supplies approximately 8,060 people, primarily in residences but also in businesses and industries, through approximately 2,500 service connections. During 2013, the total amount of water withdrawn from the aquifer was approximately 404-million gallons. The daily average volume of water treated and pumped into the distribution system was slightly more than 1.0-million gallons per day. Approximately 93% of the total water produced was billed directly to consumers. The balance, or unaccounted-for water, was used for firefighting, hydrant use, distribution system leaks, and unauthorized use. The 2013 billing charge has six tiers. Tier 1 which is base service up to 6,700 gallons is a base rate of $45.23 per billing cycle. Tier 2 which is 901 cubic ft. to 100,000 cubic ft. a year is $7.87 per 1,000 gallons. Tier 3 is 100,001 cubic ft. per year to 500,000 cubic ft. per year is $8.66 per 1,000 gallons. Tier 4 is 501,000 cubic ft. per year to 1,000,000 cubic ft. per year is $8.82 per 1,000 gallons. Tier 5 is 1,000,001 cubic ft. per year to 1,500,000 cubic ft. per year is $9.05 per 1,000 gallons. Tier 6 is over 1.5 million or more cubic ft. per year is $9.45 per 1,000 gallons.

Substances That Could Be in Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activities. Contaminants that may be present in source water include: **Microbial Contaminants**; **Inorganic Contaminants**; **Pesticides and Herbicides**; **Organic Chemical Contaminants**; and **Radioactive Contaminants**.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. In order to ensure that tap water is safe to drink, the State and the U.S. EPA prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The State Health Department's and the U.S. FDA's regulations establish limits for contaminants in bottled water that must provide the same protection for public health. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at (800) 426-4791.

Where Does My Water Come From?

The Village of Croton-on-Hudson's main water source is a well system located in the Croton River Valley downstream from the New Croton Dam. Treated water is pumped directly from the well field into the distribution system, which consists of a network of water mains, four storage tanks (reservoirs), control valves, booster pump stations, hydrants, and other water-related infrastructure. The Village's total distribution system storage capacity is 2.3 million gallons. Most residents receive water from the municipal water system; the remainder use private wells, which are not covered by this report.

Important Health Information

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

If present, elevated levels of lead can cause serious health problems, especially for pregnant women, infants, and young children. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. Lead in drinking water is primarily from materials used in your home's plumbing. We are responsible for providing high-quality drinking water, but we cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (800) 426-4791 or at www.epa.gov/safewater/lead.

How Is My Water Treated?

Groundwater pumped from the sand and gravel aquifer is treated with chlorine at the water treatment plant for disinfection purposes. We carefully monitor the amount of chlorine, adding the quantity necessary to protect the safety of our water without compromising taste or other water-quality parameters.

Water Conservation Tips

You can play a role in conserving water and save yourself money in the process by becoming conscious of the amount of water your household is using and by looking for ways to use less whenever you can. It is not hard to conserve water. Here are few tips:

- Automatic dishwashers use 15 gallons for every cycle, regardless of how many dishes are loaded. So get a run for your money and load it to capacity.
- Turn off the tap when brushing your teeth.
- Check every faucet in your home for leaks. Just a slow drip can waste 15 to 20 gallons a day. Fix it and you can save almost 6,000 gallons per year.
- Check your toilets for leaks by putting a few drops of food coloring in the tank. Watch for a few minutes to see if the color shows up in the bowl. It is not uncommon to lose up to 100 gallons a day from an invisible toilet leak. Fix it and you save more than 30,000 gallons a year.
- Use your water meter to detect hidden leaks. Simply turn off all taps and water-using appliances. Then check the meter after 15 minutes. If it moved, you have a leak.

Questions?

For more information about this report, or for any questions relating to your drinking water, please call John Spatta, Water Foreman, at (914) 271-3775 or Westchester County Department of Health at (914) 813-5000 or visit www.westchestergov.com/health.

Source Water Assessment

The New York State Department of Health (NYS DOH) has completed a Source Water Assessment for this system. Based on available information, potential and actual threats to this drinking water source were evaluated. The State Source Water Assessment includes a susceptibility rating based on the risk posed by each potential source of contamination and how easily contaminants can move through the subsurface to the wells. The susceptibility rating is an estimate of the potential for contamination of the source water; it does not mean that the water delivered to consumers is, or will become contaminated. See the section "Sampling Results" for a list of the contaminants that have been detected. The source water assessments provide resource managers with additional information for protecting source waters into the future.

The Source Water Assessment has rated our three wells as having a medium-high susceptibility to microbials. These ratings are due primarily to the fact that the wells are high-yielding wells, drawing from a possible unconfined aquifer, which is a shallow aquifer that occurs immediately below the ground surface and has no overlying protective layer to prevent contamination from potential sources. While the Source Water Assessment rates our wells as being susceptible to microbials, please note that our water is disinfected to ensure that the finished water delivered into your home meets New York State's drinking water standards for microbial contamination.

A copy of the Source Water Assessment can be obtained for a fee by contacting the Village Engineering Department at (914) 271-4783.

Nondetected Substances

As required by State regulations, we routinely test our drinking water for numerous contaminants. In 2013 and previous years, the following substances were tested for and were not detected: Alachlor, Aldicarb, Aldicarb Sulfoxide, Aldicarb Sulfone, Arsenic, Atrazine, Carbofuran, Chlordane,Dibromochloropropane, 2,4-D, Diquat, Endrin, Ethylene Dibromide, Heptachlor, Heptachlor Epoxide, Lindane, Methoxychlor, PCBs, Pentachlorophenol, Toxaphene, 2,4,5-TP (Silvex), Aldrin, Benzo(a)pryrene, Butachlor, Carbaryl, Dalapon, Di-(2-ethylhexyl)adipate, Di-(2-ethylhexyl)phthalate, Dicamba, Dieldrin, Dinoseb, Endothall, Glyphosate, Hexachlorobenzene, Hexachlorocyclopentadiene, 3-Hydroxycarbofuran, Methomyl, Metolachlor, Metribuzin, Oxamyl(vydate), Picloram, Propachlor, Simazine, 2,3,7,8-TCDD (Dioxin), Cyanide, Cadmium, Chromium, Mercury, Selenium, Antimony, Beryllum, Organolhalide, Toxaphene, Dalapon, Microextractables, Benzene, Bromobenzene, Bromomethane, n-Butylbenzene, Bromochloromethane, sec-Butylbenzene, tert-Butylbenzene, Carbon Tetrachloride, Chlorobenzene, Chloroethane, Chloromethane, 2-Chlorotoluene, 4-Chlorotoluene, Dibromomethane, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Dichlorodifluoromethane, 1,1-Dichloroethane, 1,2-Dichloroethane, cis-1,2-Dichloroethene, 1,2-Dichloropropane, 2,2-Dichloropropane, 1,1-Dichloropropene, cis-1,3- Dichloropropene, trans-1,3-Dichloropropene, hexachlorobutadiene, isopropylbenzene, p-isopropyltoluene, methylene chloride, n-propylbenzene, styrene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, tetrachloroethene, toluene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, trichlorofluoromethane, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, p/m-xylene, o-xylene, vinyl chloride, methyl tert butyl ether, trans-1,2-Dichloroethene, monochloroacetic acid, monobromoacetic acid, dibromoacetic acid, fluoride, ethylbenzene, Odor, Silver, Thallium, and Nitrite.

About Our Violations

Violation	Violation Type	Explanation	Date and Length of Violation	Steps Taken to Correct Violation	Health Effects
Treatment Technique	Groundwater Rule	Inadequate chlorine contact time for compliance	Chlorine contact time violation dated August 24, 2010; length is ongoing.	Chlorine contact time violation partially corrected. Free chlorine residual was increased from 0.6 to 1.1 mg/L at entry point; full compliance by December 31, 2014. Westchester County Health Department has reviewed design plans submitted by Chazen Engineering; comments from the WCHD are being addressed.	Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.
Action Level	Lead & Copper Rule	The copper sampling 90th percentile value for the 40 samples collected was 1.58 mg/L, which exceeded the action level of 1.3 mg/L.	Copper Action Level exceeded April 2013; length is ongoing.	Chazen Engineering is being retained to design a corrosion control treatment system that will reduce copper levels at consumer taps.	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctors.
Sampling	Lead & Copper	40 samples required; 20 samples collected	Jan.–June 2013	40 samples collected between July-Dec 2013; now in compliance	NA
Sampling	Lead & Copper Water Parameters	Water quality parameters were not collected from sources and distribution system	Jan.–June 2013	Water Quality parameters collected in December 2013 and early 2014; now in compliance	NA
Sampling	Lead & Copper	Source water Lead & Copper samples not collected	Jan.–June 2013	Source Water lead and copper samples collected Dec 2013; now in compliance	NA

Sampling Results

During the past year, we have taken hundreds of water samples in order to determine the presence of any radioactive, biological, inorganic, volatile organic, or synthetic organic contaminants. The tables below show only those contaminants that were detected in the water. The State requires us to monitor for certain substances less often than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

REGULATED SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	DATE SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Barium (ppm)	06/20/2013	2	2	0.0364	0.0284–0.0364	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Beta Particle/Photon Activity [from man-made radionuclides][1] (pCi/L)	06/20/2013	50	0	1.51	0.612–1.51	No	Decay of natural deposits and man-made emissions
Chloride (ppm)	06/20/2013	250	NA	60.8	52.9–60.8	No	Naturally occurring or indicative of road salt contamination
Chlorine (ppm)	2013	[4]	[4]	1.1	0.1–1.1	No	Water additive used to control microbes
Color (Units)	06/20/2013	15	NA	5	ND–5	No	Large quantities of organic chemicals, inadequate treatment, high disinfectant demand, potential for excess amounts of disinfectant by-products, presence of metals like copper, iron and manganese; decaying leaves, plants, and soil organic matter
Combined Radium [226 and 228]	06/20/2013	5	0	0.3	ND–0.3	No	Erosion of natural deposits
Gross Alpha Activity [including radium 226 but excluding radon and uranium] (pCi/L)	06/20/2013	15	0	0.185	ND–0.185	No	Erosion of natural deposits
Haloacetic Acids–Stage 1[2] (ppb)	08/01/2013	60	NA	7.7	5.3–7.7	No	By-product of drinking water disinfection needed to kill harmful organisms
Manganese (ppb)	06/20/2013	300	NA	0.11	ND–0.11	No	Naturally occurring; Indicative of landfill contamination
Nitrate (ppm)	04/25/2013	10	10	0.46	0.25–0.46	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Sodium[3] (ppm)	06/20/2013	(see footnote)	NA	35.6	27.8–35.6	No	Naturally occurring; Road salt; Water softeners; Animal waste
Sulfate (ppm)	06/20/2013	250	NA	10.1	9.7–10.1	No	Naturally occurring
TTHMs [Total Trihalomethanes]–Stage 1[4] (ppb)	08/01/2013	80	NA	22	15.1–22	No	By-product of drinking water chlorination needed to kill harmful organisms; Formed when source water contains large amounts of organic matter

Tap water samples were collected for lead and copper analyses from sample sites throughout the community

SUBSTANCE (UNIT OF MEASURE)	DATE SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH%TILE)	RANGE LOW-HIGH	SITES ABOVE AL/TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	July–Dec 2013	1.3	1.3	1.58	ND–1.79	15/40	Yes	Corrosion of household plumbing systems; Erosion of natural deposits; leaching from wood preservatives
Lead (ppb)	July–Dec 2013	15	0	12.7	ND–31.7	4/40	No	Corrosion of household plumbing systems; Erosion of natural deposits

[1] The State considers 50 pCi/L to be the level of concern for beta particles.
[2] The Haloacetic Acids detected were Dichloroacetic acid, Trichloroacetic acid, and Chloroacetic acid.
[3] Water containing more than 20 ppm of sodium should not be used for drinking by people on severely restricted sodium diets. Water containing more than 270 ppm of sodium should not be used for drinking by people on moderately restricted sodium diets.
[4] The Trihalomethanes detected were Bromodichloromethane, Chloroform, Dibromochloromethane, and Bromoform.

Definitions

90th percentile: The levels reported for lead and copper represent the 90th percentile of the total number of sites tested. A percentile is a value on a scale of 100 that indicates the percent of a distribution that is equal to or below it. The 90th percentile is equal to or greater than 90% of the lead and copper values detected at your water system.

AL (Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as possible.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MRDL (Maximum Residual Disinfectant Level): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG (Maximum Residual Disinfectant Level Goal): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA: Not applicable

ND (Not detected): Indicates that the substance was not found by laboratory analysis.

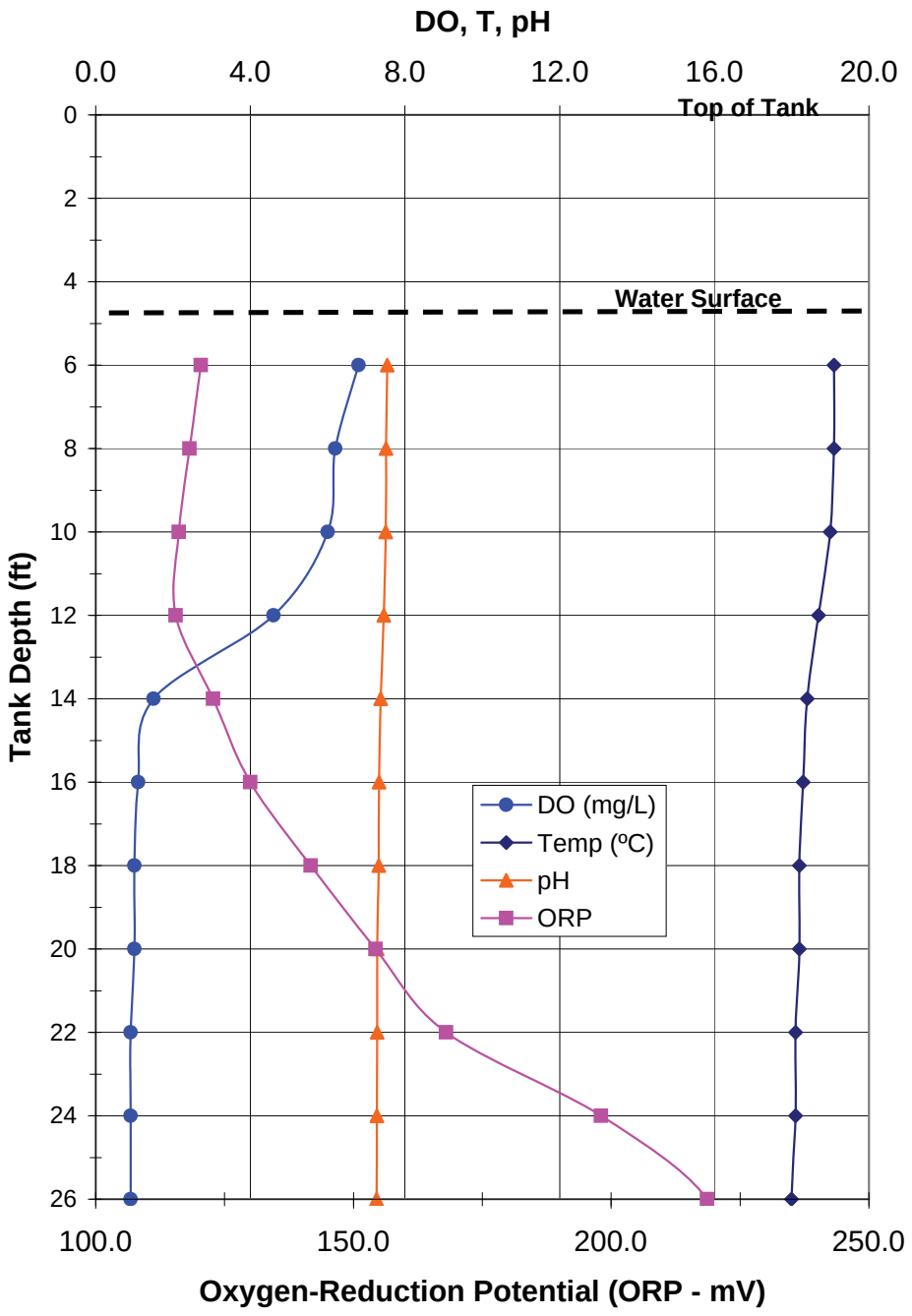
pCi/L (picocuries per liter): A measure of radioactivity.

ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).

ppm (parts per million): One part substance per million parts water (or milligrams per liter).

Appendix B:
Field Water Quality Measurements

Village of Croton-on-Hudson
Potable Water Distribution System
Above Ground Tank Sampling Results for September 25, 2008



The Chazen Companies
October 2008

Village of Croton-on-Hudson
Potable Water Distribution System
Above Ground Tank Sampling Results for September 25, 2008

Weather
Temp 72, humid, overcast
Water Elevation at Time of Sampling: 22.9'

North Highland Above Ground Tank - Sampling Point No. 1

Parameter	Depth in Feet (approximate)											
	6	8	10	12	14	16	18	20	22	24	26	28
Temp °C	19.1	19.1	19.0	18.7	18.4	18.3	18.2	18.2	18.1	18.1	18.0	18.0
Cond. (mS/cmC)	0.448	0.447	0.447	0.447	0.447	0.446	0.446	0.447	0.447	0.441	0.453	0.444
DO mg/L	6.0	5.9	5.8	3.5	1.2	1.2	1.1	1.0	1.0	1.0	0.9	0.9
pH	7.54	7.51	7.50	7.45	7.37	7.33	7.32	7.28	7.28	7.27	7.26	7.23
ORP (mV)	89.0	86.4	85.8	88.3	93.8	98.6	104.5	117.0	127.8	145.3	159.1	158.8

North Highland Above Ground Tank - Sampling Point No. 2

Water Elevation at Time of Sampling: 22.9'

Parameter	Depth in Feet (approximate)											
	6	8	10	12	14	16	18	20	22	24	26	28
Temp °C	19.0	19.0	19.0	18.9	18.4	18.3	18.2	18.2	18.1	18.1	18.0	18.0
Cond. (mS/cmC)	0.448	0.446	0.448	0.447	0.447	0.446	0.444	0.445	0.433	0.437	0.441	0.441
DO mg/L	6.8	6.2	6.0	4.6	1.5	1.1	1.0	1.0	0.9	0.9	0.9	0.9
pH	7.41	7.40	7.43	7.44	7.35	7.32	7.29	7.27	7.27	7.25	7.24	7.23
ORP (mV)	120.4	118.2	116.1	115.5	122.8	130.0	141.7	154.3	168.0	198.0	218.6	220.8

Village of Croton-on-Hudson
Potable Water Distribution System
Above Ground Tank Sampling Results for November 3, 2005

Table A-3: Tank Sampling Results for November 3, 2005

Weather - (Central Park Obs.)
High 65, Low 46, hazy sun

North Highland Above Ground Tank - Sampling Point No. 1

Water Elevation at Time of Sampling: 21.5'

	Depth in Feet (approximate)										
Parameter	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**
Temp °C	15.90	15.89	15.90	15.90	15.90	15.90	15.89	15.89	15.82	15.85	15.82
mS/cmC	0.426	0.426	0.426	0.426	0.426	0.426	0.426	0.426	0.428	0.425	0.426
DO mg/L	3.21	3.23	3.23	3.23	3.24	3.23	3.24	3.24	3.26	3.34	3.34
pH	7.71	7.71	7.71	7.72	7.71	7.71	7.70	7.69	7.69	7.67	7.66
ORP	417.0	457.3	448.5	432.7	415.8	401.9	382.3	359.5	329.1	343.4	351.0

North Highland Above Ground Tank - Sampling Point No. 2

Water Elevation at Time of Sampling: 21.5'

	Depth in Feet (approximate)									
Parameter	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**
Temp °C	15.92	15.90	15.90	15.90	15.90	15.90	15.89	15.86	15.86	15.25
mS/cmC	0.426	0.426	0.426	0.426	0.426	0.426	0.426	0.424	0.425	0.426
DO mg/L	3.20	3.20	3.21	3.21	3.23	3.25	3.28	3.32	3.56	
pH	7.69	7.66	7.68	7.68	7.69	7.69	7.76	7.67	7.68	7.68
ORP	512.4	508.3	499.3	484.7	485.4	478.2	454.2	435.6	435.4	432.3

Hessian Hills Tank Water Elevation at Time of Sampling: 10.7'

	Depth in Feet (approximate)				
Parameter	**0**	**6**	**8**	**10**	**12**
Temp °C	15.84	15.84	15.84	15.84	15.81
mS/cmC	0.430	0.429	0.429	0.428	0.429
DO mg/L	4.07	4.08	4.09	4.18	4.37
pH	7.75	7.76	7.76	7.77	7.77
ORP	374.7	376.0	377.0	376.7	364.4

Village of Croton-on-Hudson
Potable Water Distribution System
Above Ground Tank Sampling Results for October 6, 2005

Weather - (Central Park Obs.)
High 77, Low 64, hazy sun

North Highland Above Ground Tank - Sampling Point No. 1

Water Elevation at Time of Sampling: 22.9'

	Depth in Feet (approximate)										
Parameter	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**
Temp °C	19.82	19.66	19.43	19.05	18.79	18.74	18.74	18.73	18.73	18.72	18.71
mS/cmC	0.41	0.41	0.41	0.407	0.408	0.407	0.407	0.407	0.407	0.407	0.405
DO mg/L	6	4.96	3.35	1.02	0.22	0.85	0.76	0.52	0.63	0.63	0.69
pH	7.59	7.49	7.40	7.28	7.27	7.27	7.26	7.26	7.27	7.28	7.31
ORP	452.6	465.1	474.8	498.7	542	554.6	533.5	514.3	523.7	512.6	442.7

North Highland Above Ground Tank - Sampling Point No. 2

Water Elevation at Time of Sampling: 22.9'

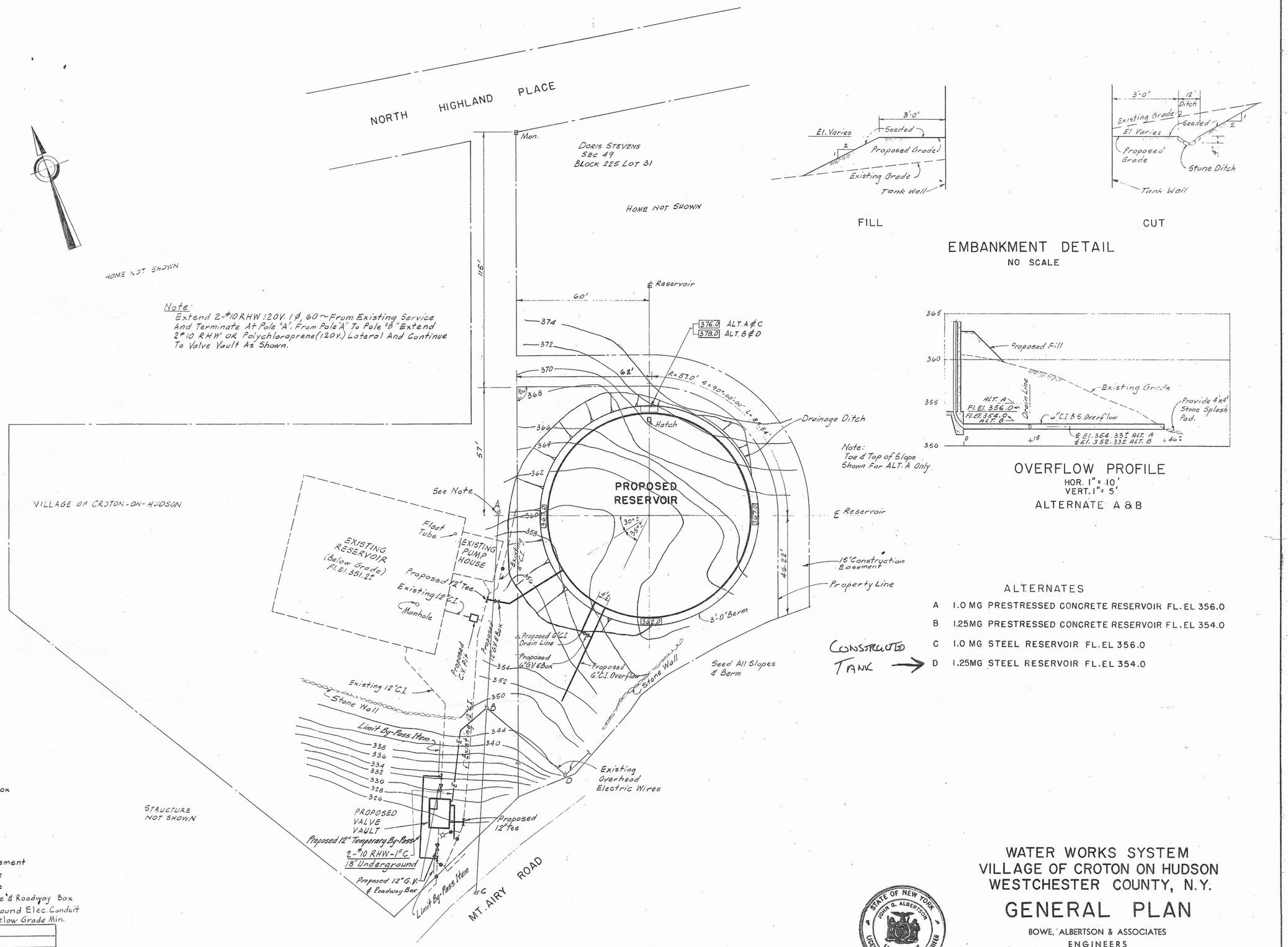
	Depth in Feet (approximate)										
Parameter	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**
Temp °C	19.75	19.62	19.5	18.91	18.81	18.77	18.75	18.73	18.72	18.70	18.45
mS/cmC	0.409	0.409	0.408	0.407	0.407	0.407	0.407	0.407	0.407	0.407	0.403
DO mg/L	5.90	5.22	3.47	1.36	0.49	1.00	0.48	0.99	0.91	0.98	0.90
pH	7.56	7.52	7.42	7.32	7.31	7.31	7.32	7.31	7.32	7.34	7.39
ORP	502.1	516.9	532.3	593.2	573.9	576.9	585.7	583.9	587.1	555.1	508.9

Hessian Hills Tank Water Elevation at Time of Sampling: 11'

	Depth in Feet (approximate)			
Parameter	**6**	**8**	**10**	**12**
Temp °C	18.59	18.59	18.59	18.66
mS/cmC	0.407	0.407	0.407	0.408
DO mg/L	7.37	8.01	9.54	12.50
pH	7.40	7.42	7.45	7.49
ORP	411.8	410.4	407.8	404.0

The Chazen Companies
August 2006

Appendix C:
General Plan of Highland Tank Site



NO.	DATE	REVISIONS
1	7-64	General

Appendix D: Carus 8600 MSDS, Data Sheet, Recommendation Letter

Section 1 Identification of the Substance/Preparation and of the Company/Undertaking

SUBSTANCE/PREPARATION NAME:	CARUS™ 8600 Water Treatment Chemical
PRODUCT NAME:	CARUS™ 8600 Water Treatment Chemical
TRADE NAME:	CARUS™ 8600 Water Treatment Chemical
SYNONYMS:	Blended Phosphate Solution
USES OF SUBSTANCE:	CARUS™ 8600 Water Treatment Chemical is a premiere corrosion inhibitor and sequestrant for use in potable and industrial water systems.

COMPANY NAME (Europe): CARUS EUROPE	**COMPANY ADDRESS:**	C/ Secundino Roces, 3-Planta 1ª – Oficina 14, 33428 Cayes – Llanera, Asturias - Spain
	INFORMATION:	(34) 985-785-513
	EMERGENCY TELEPHONE:	(34) 985-785-513
COMPANY NAME (US): CARUS CORPORATION	**COMPANY ADDRESS:**	315 Fifth Street Peru, IL 61354, USA
	INFORMATION:	(815) 223-1500 (815) 224-6816 (FAX) www.caruscorporation.com (Web) salesmkt@caruscorporation.com (Email)
	EMERGENCY TELEPHONE:	(800) 435 –6856 (USA) (815) 223-1500 (Other countries) (800) 424-9300 (CHEMTREC®, USA) (703) 527-3887 (CHEMTREC®, Other countries)

Section 2 Hazards Identification

GLOBAL HARMONIZED SYSTEM (GHS) OF CLASSIFICATION OF THE PREPARATION

None

GHS LABEL ELEMENTS, INCLUDING PRECAUTIONARY STATEMENTS

Signal Word: None
Label Codes: None
Hazard Statements: None

OTHER HAZARDS

INHALATION

May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath.

INGESTION

Phosphates are slowly and incompletely absorbed when ingested, and seldom result in systemic effects. Such effects, however, have occurred. Symptoms may include vomiting, lethargy, diarrhea, blood chemistry effects, heart disturbances and central nervous system effects. The toxicity of phosphates is due to their ability to sequester calcium.

SKIN CONTACT

May cause irritation. May cause inflammation and pain on prolonged contact, especially with moist skin.

Section 2 Hazards Identification (contd.)

EYE CONTACT
May cause irritation, redness and pain.

CHRONIC EXPOSURE
May sequester calcium and cause calcium phosphate deposits in the kidneys.

AGGRAVATION OF PRE-EXISTING CONDITIONS
No information found.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS) RATINGS
Health: 1 - Slight
Flammability: 0 - None
Reactivity: 0 - None
Personnel Protective Equipment: goggles, face shield, apron, respirator and proper gloves.

Section 3 Composition/Information on Ingredients

INGREDIENTS	CAS.NO.	EINECS	%	PEL	TLV
Non-hazardous ingredients	N/A	N/A	100	No Data	No Data

EU LABEL

HAZARD SYMBOLS
None

RISK PHRASES
None

SAFETY PHRASES
None

Section 4 First Aid Measures

EYES
Immediately flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface.

SKIN
Immediately wash contaminated areas with water. Remove contaminated clothing and footwear. Wash clothing and decontaminate footwear before reuse.

INHALATION
Remove person from contaminated area to fresh air.

INGESTION
Never give anything by mouth to an unconscious or convulsing person. If person is conscious, give large quantities of water or milk. Seek medical attention immediately.

Section 5 Fire Fighting Measures

NFPA* HAZARD SIGNS

Health Hazard	1	=	Materials that under emergency conditions, can cause significant irritation. Materials that on the skin could cause irritation.
Flammability Hazard	0	=	Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone and sand.
Instability Hazard	0	=	Materials that in themselves are normally stable, even under fire conditions.
Special Hazard		=	None

***National Fire Protection Association 704 (USA)**

FIRST RESPONDERS

Wear protective gloves, boots, goggles, and respirator. In case of fire, wear positive pressure breathing apparatus. Approach incident with caution.

FLASH POINT

None

FLAMMABLE OR EXPLOSIVE LIMITS

Lower: Nonflammable Upper: Nonflammable

EXTINGUISHING MEDIA

Use large quantities of water. Dike to contain.

Section 6 Accidental Release Measures

PERSONNEL PRECAUTIONS

Personnel should wear protective clothing suitable for the task.

ENVIRONMENTAL PRECAUTIONS

Do not flush into sanitary sewer system or surface water. If accidental release into the environment occurs, inform the responsible authorities. Keep the product away from drains, sewers, surface and ground water and soil.

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Contain spill by collecting the liquid in a pit or holding behind a dam (sand or soil). Absorb with inert media and dispose of properly. Disposal of all materials shall be in full and strict compliance with all federal, state, and local regulations pertaining to phosphates. Flush area with large amounts of water.

Section 7 Handling and Storage

WORK/HYGIENE PRACTICES

Wash hands thoroughly with soap and water after handling phosphate solution, and before eating or smoking. Wear proper protective equipment. Remove clothing if it becomes contaminated.

VENTILATION REQUIREMENTS

Provide sufficient mechanical and/or local exhaust.

CONDITIONS FOR SAFE STORAGE

Protect containers from physical damage. Store in a cool, dry area in closed containers.

Section 8 Exposure Controls and Personal Protection

RESPIRATORY PROTECTION

In cases where overexposure to mist may occur, the use of an approved NIOSH-MSHA mist respirator or an air supplied respirator is advised. Engineering or administrative controls should be implemented to control mist.

EYE

Face shield, goggles, or safety glasses with side shields should be worn. Provide eyewash in working area.

GLOVES

Rubber or plastic gloves should be worn.

OTHER PROTECTIVE EQUIPMENT

Normal work clothing covering arms and legs, and rubber, or plastic apron should be worn. Caution: If clothing becomes contaminated, wash off immediately.

Section 9 Physical and Chemical Properties

APPEARANCE	Colorless solution
ODOR	Odorless
pH OF THE PREPARATION	5.0 ± 0.5
BOILING POINT/BOILING RANGE	>101 °C at 760 mm Hg
FLASH POINT	Does not flash
FLAMMABILITY (SOLID, GAS)	Not flammable
EXPLOSIVE PROPERTIES	Not applicable
OXIDIZING PROPERTIES	Not applicable
VAPOR PRESSURE	Not available
RELATIVE DENSITY (AT 20°C)	1.37 ± 0.03
SOLUBILITY	
WATER SOLUBILITY	Miscible in all proportions
PARTITION COEFFICIENT: n-OCTONAL/WATER	
VISCOSITY	Not available
VAPOUR DENSITY	Not applicable
EVAPORATION RATE	Same as water
MELTING POINT	Not applicable
FREEZING POINT	< 0 °C

Section 10 Stability and Reactivity

STABILITY

Under normal conditions, the material is stable.

CONDITIONS TO AVOID

Do not expose to extreme temperatures.

MATERIALS TO AVOID

Soluble calcium salt solutions and hydrofluoric or hydrofluosilicic acid could cause precipitations.

Section 10 Stability and Reactivity (contd.)

HAZARDOUS DECOMPOSITION PRODUCTS
When involved in a fire, the material may form toxic fumes of phosphorous oxides.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION
Material is not known to polymerize.

Section 11 Toxicological Information

EXPOSURE SYMPTOMS DESCRIPTION

INHALATION
Inhalation of the mist may cause respiratory tract irritation. Symptoms may include coughing and shortness of breath.

INGESTION
Phosphates are slowly and incompletely absorbed when ingested, and seldom result in systemic effects. However, such effects have occurred. May cause gastrointestinal tract irritation with nausea, vomiting, and diarrhea.

SKIN CONTACT
Irritating to body tissue with which it comes into contact.

EYE CONTACT
May cause eye irritation.

ACUTE TOXICITY
Phosphate toxicity can occur with over dosage. Severe phosphate toxicity can result in hypocalcemia, and in various symptoms resulting from low plasma calcium levels.

CHRONIC TOXICITY
No known cases of chronic poisoning due to phosphate solutions have been reported. May sequester calcium and cause calcium phosphate deposits in the kidneys. Systemic metabolic acidosis may result as this material is believed to be hydrolyzed to ortho phosphates when ingested (before absorption).

CARCINOGENICITY
None of the components have been classified as a carcinogen by OSHA, NTP, and IARC.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
Phosphate solution will cause further irritation of tissue, open wounds, burns or mucous membranes.

Section 12 Ecological Information

ECO TOXICITY
Not available.

MOBILITY
Miscible in water.

PERSISTENCE AND DEGRADABILITY
Possible short term degradation products are not likely. However, in long term orthophosphate formation may occur.

Section 12 Ecological Information (contd.)

BIOACCULUMATIVE POTENTIAL
Not available.

OTHER ADVERSE EFFECTS
Not available.

Section 13 Disposal Considerations

WASTE DISPOSAL
Disposal of all materials shall be in full and strict compliance with all federal, state, and local regulations pertaining to phosphates. This product when it becomes a waste is considered as a non-hazardous waste. However, chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 Transport Information

Not regulated by United States DOT, Canada TDG, UN, IMDG, IATA and ADR/RID regulations

Section 15 Regulatory Information

EUROPEAN AND INTERNATIONAL REGULATIONS

MARKINGS ACCORDING TO EU GUIDELINES
The product has not been classified as dangerous in accordance with EU directives/ordinances on hazardous materials.

EU LABEL
HAZARD SYMBOLS
None

RISK PHRASES
None

SAFETY PHRASES
None
WGK (WATER DANGER/PROTECTION)
None

CANADA - DSL/NDSL
All components are listed on Canada's DSL List

CANADA – WHMIS
None of the components in this product could be classified as hazardous in accordance with the hazard criteria of the Controlled Products Regulations.

CANADIAN INGREDIENT DISCLOSURE LIST
None of the components in this product are listed on the Canadian Ingredient Disclosure List.

Section 15 Regulatory Information (contd.)

INTERNATIONAL INVENTORIES
All substances in this preparation are listed in the chemical inventories of Australia, China, EINICS, Japan, Korea, and New Zealand.

US FEDERAL REGULATIONS

TSCA
All substances in this preparation are listed on the TSCA inventory.

HEALTH & SAFETY REPORTING LIST
None of the substances in this preparation are on the Health & Safety Reporting List.

CHEMICAL TEST RULES
None of the substances in this preparation are under a Chemical Test Rule.

TSCA SECTION 12b
None of the substances in this preparation are listed under TSCA Section 12b.

TSCA SIGNIFICANT NEW USE RULE
None of the substances in this preparation have a SNUR under TSCA.

CERCLA HAZARDOUS SUBSTANCES AND CORRESPONDING RQS
None of the substances in this preparation have an RQ.

SARA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES
None of the substances in this preparation have a TPQ.

SARA CODES
Acute

SARA SECTION 313
None of the substances in this preparation are reportable under Section 313.

CLEAN AIR ACT
This preparation does not contain any hazardous air pollutants.
This preparation does not contain any Class 1 or Class 2 Ozone depletors.

CLEAN WATER ACT
None of the substances in this preparation product are listed as Hazardous Substances under the CWA.
None of the substances in this preparation are listed as Priority Pollutants or as Toxic Pollutants under the CWA.

OSHA
None of the substances in this preparation are considered highly hazardous by OSHA.

STATE
None of the substances in this preparation are present on state lists from CA, PA, WI, MA, or NJ.

CALIFORNIA PROPOSITION 65
California No Significant Risk Level: None of the substances in this preparation are listed.

Section 16 Other Information

ADR/RID	Agreement on Dangerous Goods by Road /Regulations Concerning the International Transport of Dangerous Goods by Rail
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EINECS	Inventory of Existing Chemical Substances (European)
DOT	Department of Transportation
DSL/NDSL	The Domestic Substances and the Non-Domestic Substances List (Canada)
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
OSHA	Occupational Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
MSHA	Mine Safety and Health Administration
PEL	Permissible Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
TDG	Transport Dangerous Goods (Canada)
TSCA	Toxic substances control Act
TLV-TWA	Threshold Limit Value-Time Weighted Average
UN	United Nations
WHMIS	Workplace Hazardous Materials Information System

The information contained herein is accurate to the best of our knowledge. However, data, safety standards and government regulations are subject to change and, therefore, holders and users should satisfy themselves that they are aware of all current data and regulations relevant to their particular use of product. CARUS CORPORATION DISCLAIMS ALL LIABILITY FOR RELIANCE ON THE COMPLETENESS OR ACCURACY OR THE INFORMATION INCLUDED HEREIN. CARUS CORPORATION MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTIABILITY OR FITNESS FOR PARTICULAR USE OR PURPOSE OF THE PRODUCT DESCRIBED HEREIN. All conditions relating to storage, handling, and use of the product are beyond the control of Carus Corporation, and shall be the sole responsibility of the holder or user of the product.

This safety data sheet was reviewed according to Annex II of the regulation of the European Parliament and European Council (EC) No. 1907/2006-REACH and 1272/2008.

CARUS CORPORATION, 315 5TH STREET, PERU, ILLINOIS 61354, USA
CARUS EUROPE IS A DIVISION OF CARUS CORPORATION

Chithambarathanu Pillai (S.O.F.)
February 2010

RESPONSIBLE CARE®
OUR COMMITMENT TO SUSTAINABILITY

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CARUS™ 8600 Water Treatment Chemical

DATA SHEET

CARUS™ 8600 water treatment chemical is an effective corrosion inhibitor and sequesterant for use in potable and industrial water systems. The product is a liquid concentrate of exceptional purity, clarity, and stability utilizing a broad spectrum of phosphates for better sequestering and corrosion control.

BENEFITS OF CARUS™ 8600

•Inhibits corrosion of steel distribution system water lines, iron and galvanized piping, and lead and copper plumbing

•Decreases iron tuberculation, to extend the life of the distribution system

•Inhibits lead and copper leaching, resulting in lower lead and copper levels in the delivered potable water

•Minimizes the occurrence of microbial-influenced corrosion providing longer life system

•Controls iron and manganese minimizing rusty and dirty water in the system

•Reduces discoloration, staining, and mineral build-up resulting in fewer customer complaints

•Diminshes calcium scale depostis typically seen in hot water lines and heaters

•Saves money by reducing corrosion and scale; lowering chlorine demand and decreasing hydrant flushing, leaks and failures.

PROPERTIES AND CERTIFICATIONS

Description: Clear homogenous liquid
Freezing Point: Do not Freeze
Specific Gravity: 1.34-1.40
pH (1% w:w): 5.0 ± 0.5
NSF Maximum Feed Rate: 23 mg/L
NSF/ANSI Standard 60, Kosher Appproved

Certified
Kosher Pareve

HANDLING AND STORAGE

CARUS™ 8600 water treatment chemical should be handled with care. Wear proper protective equipment including goggles, face shield, apron, respirator and proper gloves when handling this product.

Protect containers from physical damage. Store in a cool, dry area in closed containers. In case of accidental release: contain spill by collecting the liquid in a pit or holding behind a dam (sand or soil). Absorb with inert media and dispose of properly. Disposal of all materials shall be in full and strict compliance with federal, state, and local regulations Consult the MSDS for additional safety information.

SHIPPING

CARUS™ 8600 water treatment chemical is generally considered to be safe and is not classified as hazardous according the US Department of Transportation, Canada TDG, UN, IMDG, or IATA regulations.

COMPATIBILITY INFORMATION

CARUS™ 8600 water treatment chemical can be stored in high-medium density polyethylene, cross-linked polyethylene, fiberglass reinforced plastic, 316 stainless steel, glass lined /epoxy lined steel tanks. Piping materials may include schedule 80 PVC/CPVC piping, clear PVC, and white polyethylene tubing. Pump materials may include ceramic, Teflon, viton, hypalon and PVC liquid end pump materials.

Metering equipment can include diaphragm and peristaltic type metering pumps and other pumps meeting compatibility requirements.

It is not compatible with black iron, mild steel, galvanized metals, aluminum, zinc, copper, lead. brass, bronze, tin, and other base metals.

Carus Corporation
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1 800 435 6856 (Toll free US Only)
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Certified Company

Web: www.caruscorporation.com
E-Mail: salesmkt@caruscorporation.com

Responsible Care®
Good Chemistry at Work

DATA SHEET

SHIPPING CONTAINERS

5-gallon (57-lb) Jerrican
(UN Specification: UN3H1/Y1.8/100) Made of high density polyethylene (HDPE). Weighs 3.0 lb (1.36 kg). **The net weight is 57 lb (25.85 kg).**

15-gallon (171-lb) Drum
(UN Specification: UN1H1/Y1.8/100) Made of high density polyethylene (HDPE). Weighs 6.5 lb (3.0 kg). **The net weight is 171 lb (77.6 kg).**

30-gallon (342-lb) Drum
(UN Specification: UN1H1/Y1.8/100) Made of high density polyethylene (HDPE). Weighs 14 lb (6.35 kg). **The net weight is 342 lb (155.1 kg).**

55-gallon (627-lb) Drum
(UN Specification: UN1H1/Y1.8/100) Made of high density polyethylene (HDPE). Weighs 21 lb (9.5 kg). **The net weight is 627 lb (284.4 kg).**

SHIPPING CONTAINERS CONT.

275-gallon IBC (Intermediate Bulk Container)
(UN Specification: UN31HA1/Y1.9/100) Weighs 129 lb (58.5 kg). The net weight is 3135 lb (1422 kg). The IBC has a 2 in. butterfly valve with NPT threads in bottom sump.

Bulk Quantities up to 4150 gallons are available.

Other containers may be available, contact Carus Corporation at 800-435-6856 for details.

CARUS VALUE ADDED

LABORATORY SUPPORT

Carus Corporation has technical assistance available to answer questions, evaluate treatment alternatives, and perform laboratory testing. Our laboratory capabilities include: Consulting, Treatability Studies, Feasibility Studies, and Analytical Services.

FIELD SERVICES

As an integral part of our technical support, Carus provides extensive on-site treatment assistance. We offer full application services, including technical expertise, supervision, testing, and feed equipment design and installation in order to accomplish a successful evaluation and/or application.

CARUS CORPORATION

During its more than 90-year history Carus' ongoing emphasis on research and development, technical support, and customer service has enabled the company to become the world leader in permanganate, manganese, oxidation, and base-metal catalyst technologies.

The information contained herein is accurate to the best of our knowledge. However, data, safety standards and government regulations are subject to change; and the conditions of handling, use or misuse of the product are beyond our control. Carus Corporation makes no warranty, either expressed or implied, including any warranties of merchantability and fitness for a particular purpose. Carus also disclaims all liability for reliance on the completeness or confirming accuracy of any information included herein. Users should satisfy themselves that they are aware of all current data relevant to their particular use(s).

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Fax (815) 224-6697
darin.skutt@caruscorporation.com

To: The Chazen Companies

From: Darin Skutt

Date: 08/26/14

Subject: Carus™ 8600 Recommendation

The primary use of Carus 8600 is for potable and industrial water systems. Carus 8600 has both corrosion inhibition and sequestration properties. To dose a 1 mg/L of orthophosphate residual in the distribution system you will need to use 3.20 gallons of Carus 8600 per million gallons of water. This is the typical factor recommendation we use in the field. The Carus blended ortho/polyphosphate will sequester the hardness factor, iron and manganese content, and inhibit corrosion by forming a microscopic film on the inside surface of the distribution piping throughout the system. Carus 8600 is N.S.F. certified for potable water. Carus 8600 is a liquid and is introduced with a chemical injection pump. The easiest way to check if you have the correct dose is to measure orthophosphate residuals in the distribution system. A Hach Test kit is used to measure orthophosphate in the system. The typical field kit is #2248-00, and the customer service number for Hach is 800-227-4224.

Based on the most recent water quality analysis, the recommended dose is given below:

1.00 mg/L as orthophosphate residual x 3.20 (factor) = 3.20 gal/MGD

If you have any additional questions, please feel free to give me a call.

Darin Skutt
B.S. Chemistry, ACS Certified
Technical Service Manager
Carus Corporation

Appendix E:
WCDOH Violation Letter

Westchestergov.com

Robert P. Astorino
County Executive

Sherlita Amler, M.D.
Commissioner of Health

May 7, 2014

Village of Croton-on-Hudson
1 Van Wyck Street
Croton-on-Hudson, NY 10520
Attn: Abraham J. Zambrano, Village Manager

RE: Notice of Copper Action Level Exceedance
Croton-on-Hudson Public Water Supply
Croton-on-Hudson (V)
PWS ID: 5903425

Dear Mr. Zambrano:

A review of the first draw lead and copper tap sample test results submitted for the above referenced public water supply for the January – June 2014 monitoring period revealed that the 90th percent copper level was 1.58 mg/L, which, exceeds the Copper Action Level of 1.3 mg/l in violation of Part 5, Subpart 5-1, Section 5-1.41 (b) of the New York State Sanitary Code (NYSSC).

Due to the Copper Action Level exceedance, you were required to recommend a corrosion control treatment as stated in the September 11, 2012 notice, and complete final design of the corrosion control facilities and submit plans and specifications to the State for approval. The corrosion control facilities shall be installed and operational within 24-months after State designation of optimal corrosion control treatment in accordance with Part 5, Subpart 5-1, Section 5-1.46(d) of the NYSSC. To date, this Department has not received any submission for corrosion control treatment to review.

In addition, the public water supply must continue lead and copper monitoring at the standard number of sampling sites every six months. Also, the public water supply shall continue Water Quality Parameter Monitoring in accordance with Part 5, Subpart 5-1, Section 5-1.43 of the NYSSC.

Further, the public water supply must conduct source water monitoring for lead and copper within six months of the Copper Action Level exceedance in accordance with Part 5, Subpart 5-1, Section 5-1.47 of the NYSSC.

In light of the above, please plan to attend an office conference at 10:00 a.m. on Monday, May 19, 2014, at 25 Moore Avenue, Mt. Kisco to discuss corrosion control treatment design as well as groundwater rule treatment design progression.

If you have any questions, please contact the undersigned at 914-864-7296 or Heather McVeigh at 914-864-7336.

Very truly yours,

Delroy Taylor, P.E.
Associate Engineer
Bureau of Environmental Quality

DT:HM:jlp
cc: Dan O'Connor, P.E., Village Engineer
John Spatta, Designated Operator
Anna Stamm, P.E. - NYSDOH
File

Department of Health
25 Moore Avenue, 1st Floor
Mount Kisco, NY 10549

Telephone: (914) 864-7296

REDUCE REUSE RECYCLE

Appendix F: Water Main Relining and Replacement Project, Harmon Area, Wolf/Cook Lane, and Munson and Loconto Streets Informational Brochure

Village of Croton-on-Hudson
Stanley H. Kellerhouse Municipal Building
One Van Wyck Street
Croton-on-Hudson, N.Y. 10520

Village of Croton-on-Hudson

Planned Improvements to your Water Supply

Please Read the Following Public Service Announcement

Improving Your Water Supply

Water Main Relining and Replacement Project, Harmon Area, Wolf/Cook Lane, and Munson and Loconto Streets.

Informational Meeting to be held on Thursday June 26th, 2014 at 8PM, at the Harmon Fire House.

An informational meeting for residents who will be affected by the project will be held at the Harmon Fire House.

Village officials and Contractor Representatives will be present to review the project and answer questions. More information follows.

Leo A. W. Wiegman, Mayor

Kevin W. Davis, Trustee

Ann H. Gallelli, Trustee

Andrew C. Levitt, Trustee

Maria F. Slippen, Trustee

Abraham J. Zambrano, Village Manager

Village of Croton-on-Hudson

Improving Your Water Supply

Water Main Relining/Replacement Program Harmon/Wolf/Cook Areas.

The Village Board has chosen Heitkamp Inc. as the lowest responsible bidder for the project following a competitive bidding process. Heitkamp Inc. has extensive experience in cleaning and cement lining and installing water mains throughout the country, and has performed similar work for a number of towns and villages in Westchester.

The work includes installing 7,200 feet of new ductile iron water main as well as cleaning and cement lining 24,100 feet of existing unlined cast iron water main. About 45 new hydrants and 133 valves will be replaced or added.

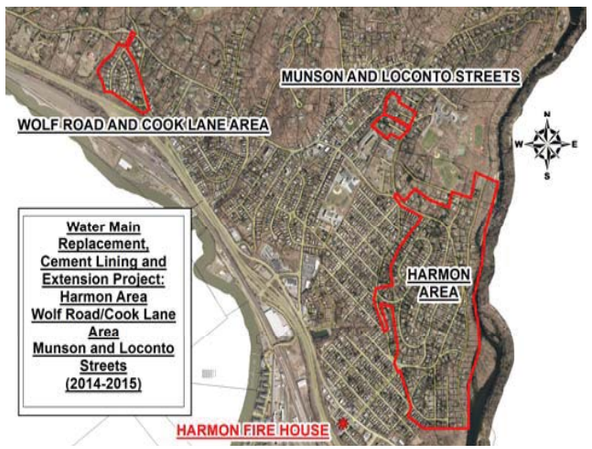
Coordination During construction, residents can expect some disruptions in water service as well as some inconveniences with construction activity on the roads and right-of-ways. The lining process requires use of a temporary water system and may require access to your home. The Village and the contractor will strive to keep inconveniences to a minimum and will maintain a supply of water to your home with outages not to exceed four hours in length.

The Village will also make a concerted effort to advise residents of planned shutdowns in advance utilizing the Village web site, and news media. We will also coordinate road work with the school bus schedule to minimize disruption.

The Village will also establish an email list for notification. Forward your email address to engineering@crotononhudson-ny.gov, if you wish to be contacted.

As part of the project the Village will be installing some added drainage, and when the work is completed, patching and resurfacing roads.

Project Area



Map indicates affected areas in Harmon between Nordica and Cleveland, Wolf/Cook Lane Area, and Munson and Loconto Streets.

Because of the need for a temporary supply, work will be done in phases. Each affected area will be notified as the work progresses. A map is available with the proposed phasing areas and estimated dates. This is preliminary and subject to change as work progresses.

Benefits: The new and relined mains willprovide residents with substantial improvements in water quality, fire protection, as well as improved operations and extend the life of the system.

Your Service Line

We would like to encourage consumers in the Harmon area with older, non-copper service lines to consider replacement. When the water system was originally installed in the 1910's – 40's, galvanized pipe was utilized for many service lines. Over time, this galvanized pipe has deteriorated and presently contributes to reduced flow to your home as well as discolored water and frequent leaks. Galvanized pipe becomes severely restricted through a build up of rust inside the pipe that can restrict flows to a fraction of what a new copper service line can deliver.

The present water main replacement program provides an opportunity to allow for coordinating the installation of a new service line from the curb-box at your property line to your home. While the cost and arrangement for such an installation is the responsibility of the homeowner, the fact that a number of contractors may be performing such work in the Harmon area should provide economies of scale that will reduce the cost for individual homeowners.

Similarly, some homes constructed in the 1940's –60's have bituminous sewer services. It is likely that this type of piping material has also reached the end of its service life. Residents should consider replacing old bituminous pipe sewer laterals while the water main repair work is ongoing and the streets have not yet been re-paved.

In order to provide some assistance to residents who decide to proceed with replacement work, the Village will waive This savings will hopefully be passed along to the homeowner.

If you have a question as to what type of water service line you have to your home, take a look at the water pipe as it enters the house before the water meter. If you still have a question, the water department will be happy to take a look and identify the piping material for you. You can call 914-271-3775 to schedule an inspection.

The type of sewer lateral you have is more difficult to determine. It is recommended that you request the assistance of a local contractor for this identification.

A list of reputable contractors who perform such work is available at the Village Engineer's Office. Contractors can also be found in the yellow pages. The Village does not recommend a particular contractor and provides the list only to assist the homeowner.

For record keeping purposes the contractor will be required to complete an application form for service line or sewer lateral replacement, however, as stated previously, no fee will be charged.

Schedule

We expect the project to last about 26 months commencing in July 2014. A map with the proposed phasing will be available and we will provide progress reports and outage notices on the Village's web site as the work progresses.

Please plan to attend the informational meeting on June 26th, at 8 PM, at the Harmon Fire House. If you have any additional questions, contact the Village Engineering Department 271-4783.

Dan O'Connor, Village Engineer