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January 8, 2003

## HAND DEL

Karl D. Gleaves, Esq.  
Assistant General Counsel for Ocean Services  
National Oceanic and Atmospheric Administration  
1305 East West Highway  
Room 6111 SSMC4  
Silver Spring, MD 20910

**Re: Supplemental Comments of the Villages of Croton-on-Hudson and Briarcliff Manor, New York In the Federal Consistency Appeal of Millennium Pipeline Company, L.P.**

Dear Mr. Gleaves:

Please find enclosed an original and one copy of the Supplemental Comments of the Village of Croton-on-Hudson, New York, and the Village of Briarcliff Manor, New York, in support of the Objection of the New York State Department of State to the Millennium Pipeline Project.

The Villages thank the National Oceanic and Atmospheric Administration for the opportunity to submit comments on the appeal of the proposed Millennium Pipeline Project. Any comments or questions with respect to the Villages' submission may be addressed to either of the undersigned.

Sincerely,

  
Neil L. Levy  
Christian C. Semonsen

**Counsel for The Villages of Croton-on-Hudson,  
New York, and Briarcliff Manor, New York**

## Enclosures

Glen T. Bruening, Esq.  
Daniel Riesel, Esq.  
Mark P. McIntyre, Esq.  
Frederic G. Berner, Jr., Esq.

**United States Department Of Commerce  
National Oceanic And Atmospheric Administration**

**In The Consistency Appeal Of Millennium Pipeline Company, L.P.  
From An Objection By The New York State Department Of State  
Pursuant To The Coastal Zone Management Act**

**Supplemental Comments Of  
The Villages of Croton-on-Hudson and Briarcliff Manor, New York**

Pursuant to 15 C.F.R. § 930.128 (2002), and 67 Fed. Reg. 72,149 (Dec. 4, 2002), the Village of Croton-on-Hudson, New York and the Village of Briarcliff Manor, New York (collectively, “the Village”) respectfully submit to the Secretary of Commerce (“Secretary”) the following supplemental comments in support of the New York State Department of State’s (“NYSDOS”) finding that the Millennium Pipeline Company, L.P.’s (“Millennium”) proposed pipeline is inconsistent with the Coastal Zone Management Act (“CZMA”). In light of the Village’s outstanding request for permission to file an *amicus* reply brief, these comments and the attached documents address only certain limited additional information germane to this proceeding which have come to the Village’s attention subsequent to the filing of the Village’s Initial Brief on October 23, 2002. With the Secretary’s permission, the Village intends to provide a comprehensive response to certain federal agency and public comments, as well to any new data that may be submitted by Millennium, as part of an *amicus* reply brief.<sup>2</sup>

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Amicus Brief of the Village of Croton-on-Hudson, New York, and Public Comments of the Village of Briarcliff Manor, New York, to the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, In the Federal Consistency Appeal of Millennium Pipeline Company, L.P., October 23, 2002.

In particular, the Village would provide a technical response to certain comments filed in opposition to the proposed Palisades/Dobbs Ferry Alternative, which the Village notes appear to be based on pure conjecture,  
(Continued...)

## A. Village Wellfield and Water Supply

In its Initial Brief, Millennium prefaced its discussion of impacts to the Croton-on-Hudson public water supply by listing certain “issues regarding the Wellfield -- all of which have been resolved by the [Federal Energy Regulatory Commission (“FERC”)] and Millennium...”<sup>3</sup> Tellingly, Millennium neglected to include in its list one issue that the Village has cited from the outset to be perhaps the most significant underlying problem with Millennium’s proposal to cross the Wellfield: Millennium’s “no impact” conclusion is based entirely on speculation and generalized assumptions about conditions at the site, not on any site-specific studies or assessments, as it should be.

In contrast, the Village’s concerns are based on several site-specific studies of the aquifer and Wellfield conducted by four different engineering firms over the last 15 years,<sup>4</sup> *all* of which support the conclusion that major construction activities in this area would likely have significant, adverse impacts on the quality and quantity of the Village’s water supply. Based directly on the recommendations of the first two Geraghty & Miller studies, and pursuant to the

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rather than on any thorough comparative analysis of the relative impacts of the various alternatives -- as were the Village’s Initial Brief and engineering report. In addition it is noteworthy that all of the commenting federal agencies that have specific jurisdiction over natural resource matters have voiced concerns similar to the position of NYSDOS and the Village that the pipeline must be re-routed around Haverstraw Bay. For example, the Department of the Army filed comments, on behalf of the Honorable Donald Rumsfeld, Secretary of Defense, stating that the “alternatives recommended by DOS that would avoid the necessity for crossing the Hudson River could largely address [the Army’s] concerns.” Letter from George Dunlop, Deputy Secretary of the Army, to Scott Gudes, NOAA, dated Nov. 21, 2002.

<sup>3</sup> Initial Brief of the Millennium Pipeline Company, L.P. on Appeal from the Objection of the State of New York, Department of State, to the Millennium Pipeline Project, August 12, 2002 at 70 (emphasis added) (hereinafter “Millennium Initial Brief”).

<sup>4</sup> Geraghty & Miller, 1988, 1989, 1992; Reynolds, 1988; O’Brien & Gere, 2001 (Submitted to NOAA as part of the Village’s Initial Brief), and URS Corporation, 2002 (attached hereto as Exhibit 1).

provisions of the federal Safe Drinking Water Act (“SDWA”),<sup>5</sup> Croton-on-Hudson enacted its Wellhead Protection Law *specifically prohibiting all pipeline construction* and other development activity in the designated “Zone 1” Wellhead Protection Area (the very area through which the proposed pipeline would cross), except to the extent specifically required for public water supply purposes.<sup>6</sup> In 2001, O’Brien & Gere concluded that the proposed pipeline would “pose a real and significant risk to the Village water supply.”<sup>7</sup> Attached to these supplemental comments and described more fully below are new studies and documents (produced subsequent to the date of the Village’s Initial Brief), which provide additional support for the NYSDOS’ objection to the proposed crossing of the Croton-on-Hudson Wellfield. This growing body of evidence flies in the face of Millennium’s unsupported claim in this proceeding that “there is *no evidence* supporting the NYSDOS’s objection to the proposed crossing of the Wellfield.”<sup>8</sup> In fact, it is Millennium that has failed to provide even a shred of independent, site-specific data in support of its own claims.

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Requiring states to identify “wellhead protection areas” and establish programs and control measures to protect the water supply within such areas. SDWA § 1428, 42 U.S.C. § 300h-7.

<sup>6</sup> Village Local Law No. 5 of 1989.

Village Initial Brief, Exhibit 3, Tab 5 (OBG Consistency Report) at 24.

Millennium Initial Brief at 74.

1. Draft Source Water Assessment

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by the New York State Department of Health (“NYSDOH”) for the Croton-on-Hudson public water system (Exhibit 1). The RSWA was prepared as part of an ongoing state-wide assessment pursuant to the requirements of the SDWA of the susceptibility of public drinking water supplies to contamination and associated public health risks. The attached RSWA report was prepared by URS Corporation, an environmental engineering firm and contractor for NYSDOH.

The RSWA sets forth the state’s initial findings with regard to the susceptibility of the Village’s water supply to contamination by certain pollutants, such as petroleum products, herbicides, and other industrial chemicals. The primary outcome of the assessment is to assign to each water supply system a “sensitivity rating” as an indicator of how vulnerable the water supply is and how easily contaminants can move through the subsurface into the wellheads. Significantly, the RSWA assigns all of the wellheads in the Village Wellfield a sensitivity rating of “High,” indicating that any release of contaminants in the Wellhead Protection Area would pose a high risk of migrating quickly into the wellheads and contaminating the Village’s water supply.

The RSWA provides clear additional support for the Village’s position that the proposed pipeline absolutely must not cross through the Village’s Wellfield. The pipeline, while not specifically addressed in the RSWA, raises many of the same concerns that are addressed in the assessment. Pipeline construction and operation activities would introduce to the Wellfield major potential sources of pollution, would significantly change land use patterns and vegetative cover in the Wellhead Protection Area (a parameter of significance to the susceptibility analysis), and would also change the nature of the subsurface, potentially altering surface water infiltration

and ground water flow patterns. Among other potential impacts, the Village Engineer notes that the pipeline bedding and cover materials could create a “curtain drain” effect, whereby contaminated storm water runoff would collect in the pipeline trenches along the banks of the Croton Gorge and would be channeled directly into the vicinity of the wellheads, thereby adversely affecting water quality.<sup>9</sup>

In sum, the conclusions of the review by NYSDOH, provide compelling evidence that constructing and operating the pipeline in the middle of the most critical portion of the Wellhead Protection Area is **inappropriate and imposes an unacceptable level of risk on the Village’s only source of municipal drinking water.**

## 2. Constraints on Future Wellfield Expansion Plans

As the Village noted in its Initial Brief, installation of the pipeline would place significant constraints on the Village’s ability to expand Wellfield capacity by building additional wells needed to meet growing water demands. Attached to these comments and **discussed in brief herein is a memorandum from the Village Engineer, Daniel O’Connor,** concerning the implications of the proposed pipeline for the Village’s Wellfield expansion plans.<sup>10</sup> In short, the Village Engineer’s primary conclusions are that: (a) growing demand for water will require the construction of additional wells; (b) the most appropriate location for such an additional well is the northern portion of the Wellfield; (c)

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<sup>9</sup> Memorandum from Daniel O’Connor, Village Engineer, to Mayor Elliot and Village Board of Trustees, Nov. 12, 2002 (Exhibit 2) (hereinafter “Village Engineer Memorandum”).

<sup>10</sup> Village Engineer Memorandum, attached as Exhibit 2.

installation of the pipeline and its associated setback requirements would eliminate critical supply areas from consideration for future well development; and (d) test borings and a site-specific analysis by a hydrologist should be conducted to determine the extent to which the pipeline would affect the Wellfield and the Village's expansion plans.

The proposed pipeline would be installed across the northern portion of the "Zone 1" Wellhead Protection Area the very same area that has long been identified by the Village as the ideal location for future well development. As a result of the pipeline's required setback limitations, a 50-foot wide swath of land crossing the entire northern portion of the Wellfield would be permanently removed from any potential future wellhead development a fact that Millennium acknowledges in its Initial Brief.<sup>11</sup> Yet, incredibly, Millennium still claims that 'virtually the entire Wellfield is available for future development.'<sup>12</sup> Millennium questions the rationale for the Village's plans to build in the north end of the Wellfield, stating that, "the greatest yield occurs from the deeper depths of the aquifer and the wells at the south end of the Wellfield, not from the shallow zone where the pipeline would be installed at the northern end of the Wellfield."<sup>13</sup>

The Village Engineer Memorandum, citing to the numerous prior engineering studies conducted on the Wellfield, describes several specific reasons why the northern end of the

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<sup>11</sup> Millennium Initial Brief at 74.

<sup>12</sup> *Id.*

<sup>13</sup> Millennium Initial Brief at 71. The Village notes that neither of the two sources cited by Millennium purportedly in support of this statement, namely, the "LMS Study Addendum" and the Final Environmental Impact Statement ("FEIS"), refute or otherwise discuss the bases of the Village's wellhead expansion plans.

Wellfield is the most appropriate location for future wellhead development. First, the Village does not dispute Millennium's statement that the greatest yield would occur from the "deeper depths of the aquifer." In fact, building a deep aquifer well in the northern end of the Wellfield is precisely the Village's intention. But this is beside the point; the pipeline's setback limitations would eliminate large portions of the northern end of the Wellfield from use entirely, regardless of whether shallow or deep wells are to be built. Second, the 1988 Geraghty & Miller report on availability of ground water resources in the Wellfield concluded, based on the results of a modeling analysis, that placing the new well in the northern portion of the Wellfield would create a better distribution of pumping centers and increase the overall yield of the Wellfield.<sup>14</sup>

Third, the northern portions of the Wellfield are hydraulically upgradient from the more developed southern portions. Upgradient wells would gain an additional level of protection from any releases or contamination occurring to the south, which would flow southward and downgradient away from the wellheads.<sup>15</sup> Fourth, the Village Engineer also describes the soils in the northern portions of the Wellfield as consisting of finer materials, which would serve as a more effective filter for surface water infiltration.

Finally, the area available for any potential water well development is geologically restricted to the narrow valley between the Croton River and the Village boundary with Croton Gorge Park, and could be further limited by subsurface geological features as well. The Village Engineer concludes that "detailed test borings and analysis by a hydrologist" are needed to

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<sup>14</sup> See Village Engineer Memorandum at 2.

<sup>15</sup> *Id.* at 3.

“determine if the pipeline and its setback areas area eliminating critical areas of the Village well field that are suitable for the installation of additional high capacity wells.”<sup>16</sup> In the absence of such site-specific analyses proving otherwise, the Secretary should conclude that the pipeline will permanently eliminate from consideration the section of the Wellfield identified as the most appropriate location for the future development of critically necessary new wells. For these reasons, the proposed pipeline must not cross through the Village’s Wellfield.

### 3. Absence of Alternative Water Supplies

The following are additional factors the Secretary should take into consideration regarding the availability of alternative water supplies should pipeline construction or operation contaminate or otherwise disrupt the Village’s current water supply system.

(a) The Village has no functioning backup well in this location or any other. As described above, the pipeline would cross the area within the Wellfield that has long been designated as the best location for a future supply well; the pipeline reduces the Village’s future Wellfield options on an already small site.

(b) The Village has one water interconnection with an adjacent municipality, the Town of Cortlandt. However, Cortlandt’s water system can only deliver water to the north end of the Village, leaving the majority of the Village’s residents and businesses unserved.

(c) New York City and many neighboring districts draw water from the nearby Croton Reservoir. But the Village’s current water system is not designed for the more

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<sup>16</sup> *Id.*

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phosphorous -- **treatment that the Village water supply system cannot provide.**

(d) **Some communities north of Croton-on-Hudson filter Hudson River water for municipal use. Poughkeepsie, Waterford and Rhinebeck consume Hudson River water by means of filtration plants. Poughkeepsie, the closest municipality to the Village, lies 35 miles upriver from Croton-on-Hudson.**

(e) Supplying the Village with enough water by truck to meet even half of its daily needs, or roughly 500,000 gallons, would require 85 water trucks per day. This delivery method is highly impractical given the cost and narrow access roads to the Village pump station and uphill retaining tanks.

**In conclusion, the proposed pipeline does not adequately protect the Village's highly vulnerable public drinking water supply, would severely limit or eliminate the Village's ability to develop additional water supply wells to meet future demand, and providing alternative water supplies in the event of a disruption of the Wellfield would be problematic and costly. The Village urges the Secretary to uphold the NYSDOS decision and find that the risks associated with allowing the pipeline to traverse the Village's only source of public drinking water far outweigh the potential benefits, particularly in light of the availability of alternative routes.**

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<sup>17</sup> The aquifer supplying Croton's wells yields water with low turbidity, low chemical treatment needs and low facility operating costs. Croton's drinking water is regarded as among the best in the State. *See, e.g., Area Water Loses Out in Taste Test*, The Journal News, August 6, 2002, p. 5B.

<sup>18</sup> Poughkeepsie, Waterford and Rhinebeck consume Hudson River water by means of filtration plants. Poughkeepsie, the closest municipality to the Village, lies 35 miles upriver from Croton-on-Hudson.

#### 4. Flooding in the Croton River Gorge

Another concern regarding the proposed crossing of the Croton River and Wellfield is the impact of a heavy rain event during or soon after construction activities. Information on this issue was submitted previously in the attachments to the Village's Initial Brief,<sup>19</sup> but the Village deemed it prudent to highlight the issue as part of its express comments here. The entire Croton River Gorge, including the area Millennium proposes to cross, becomes completely flooded on a fairly regular basis. Hurricanes are not uncommon during the proposed work period; Hurricane Floyd was a September storm event. If a major storm event was to occur during construction operations in the Gorge, the rain could flood equipment and cause the releases of hazardous substances such as fuel, chemicals, and blasting materials stored in the area. Such a storm event would also cause severe erosion in the large cleared workspace areas on both banks and would release large quantities of silt and sediment into the Croton River. Similarly, a post-construction flood would also effectively destroy any revegetation and other restoration work.

#### **B. PCBs in U.S. Gypsum Channel**

Acco  
Gypsum plant's navigation channel in Haverstraw Bay, sediments in the channel were found to contain polychlorinated biphenyls ("PCBs") at levels of 128 parts per billion (ppb), exceeding applicable federal criteria.<sup>20</sup> The Village has commented from the outset that PCBs in Haverstraw Bay represented one of the most significant "gaps" in the public record regarding the

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<sup>19</sup> See Village Initial Brief, Exhibit 3, Tab 4 (Village LWRP Findings) at 18, and Tab 5 (O'Brien & Gere Consistency Report) at 27.

<sup>20</sup> *Dredged Spoils OK For Links*, The Journal News, Oct. 14, 2002.

proposed pipeline Millennium has continued to maintain that no PCBs at levels of any significance exist in Haverstraw Bay, based on a limited number of samples that Millennium reportedly collected which were non-detect for PCBs. Millennium's assertions, however, simply contradict a large body of sampling and analytical data conducted over the years that has demonstrated that PCBs are present in Haverstraw Bay at levels that exceed the U.S. Environmental Protection Agency's (EPA) maximum concentration limits (MCLs) for PCBs in sediment. The U.S. EPA has stated that "PCB concentrations in sediment are a good indicator of PCB contamination in the water column and are protective of the environment."<sup>21</sup> This more recent information from the U.S. Gypsum case both reconfirms that PCBs are present at elevated levels in Haverstraw Bay, and highlights the yet-unresolved issue of what Millennium will do with contaminated sediments it dredges out of the pipeline trench.<sup>22</sup> Millennium should not, under any of the alternative routes across the Hudson River, be allowed to dump this contaminated dredge material back into the Hudson River.

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<sup>21</sup> U.S. Environmental Protection Agency, Ecological Risk Assessment Addendum: Future Risks in the Lower Hudson River (Dec. 1999), available at <http://www.epa.gov/hudson/addendum.htm>.

<sup>22</sup> The U.S. Gypsum case should not, however, be cited in support of Millennium's claim that dredging in Haverstraw Bay should be allowed. As the Village has pointed out in prior filings, U.S. Gypsum is a pre-existing navigation channel that was created prior to the enactment of the CZMA and New York State's designation of Haverstraw Bay as a protected significant habitat. Therefore, maintenance dredging of the U.S. Gypsum channel is a "grandfathered" activity that has no bearing whatsoever on Millennium's proposal to dredge an entirely new utility channel in a previously untouched segment of the significant habitat.

**EXHIBIT 1**

Andrew J. Spano  
County Executive

Department of Health

Joshua Lipsman, M.D., M.P.H.  
Commissioner

December 12, 2002

Mr. Richard Herbek  
Croton On Hudson Water Supply  
Croton On Hudson Village  
One Van Wyck Street  
Croton On Hudson, NY 10520

RE: **REVISED DRAFT**  
Public Water Supply  
Croton On Hudson Water Supply  
PWS ID: 5903425

Dear Mr. Herbek:

A copy of the Revised Draft Source Water Assessment for your Public Water System is enclosed for your review. Please confirm that the facts about the system are correct and that the report is a good representation of the setting of the system. The time available for review of these reports is short and your comments must be returned to this office no later than 2 weeks from letter date in order for them to be incorporated into the final report. Your knowledge of the details of your water system is invaluable to ensure that the reports are the best possible, so we hope you will be able to give the report a careful review. If appropriate, please pass the report to the Water Operator or other person(s) with knowledge about the system.

When congress amended Safe Drinking water Act in 1996, the Source Water Assessment Program (SWAP) was one of the requirements. Each state had to develop a program to assess sources of public drinking water and make the results available to the public. The New York State Health Department (NYSDOH) is implementing SWAP in New York State. The program was developed with input from other government agencies and private and public interests. You may obtain a copy of the program plan from the NYSDOH or view it online at <http://www.health.state.ny.us/nysdoh/water/swapp.pdf>. Each assessment consists of several components that provide information on the potential contaminant threats to public drinking water sources. Each assessment:

- Determines where water used for public drinking water comes from (source area delineation);
  - Inventories potential sources of contamination that may impact public drinking water sources (contaminant source inventory); and
- Assesses the likelihood of a source water area becoming contaminated (susceptibility analysis).

The enclosed assessment report for your system was prepared by URS Corp., a NYSDOH contractor, according to the Source Water Assessment Program Plan. The maps showing the locations of the wells will not be released to the public at this time, but are included with your copy because they are necessary for reviewing the facts of the assessment. By the end of 2003, Westchester County Department of Health will provide a summary of the assessment to community water systems for use in Annual Water Quality Reports beginning in 2004.

If you have questions about SWAP or this report, please contact Emmanuel Phillips at (914) 813-5148.

cc: Michael Burke, P.E. - NYSDOH  
George Philip, P.E. - NYSDOH  
Kimberly Evans - NYSDOH

File  
145 Huguenot Street, 8th Floor  
New Rochelle, N.Y. 10801



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I remain,  
  
Michael J. Sakala, P.E.  
Assistant Commissioner  
Bureau of Environmental Quality

**SOURCE WATER ASSESSMENT**  
**System: CROTON-ON-HUDSON VILLAGE**  
**System Number: NY5903425**

**County:** WESTCHESTER COUNTY  
**Municipality:** CORTLANDT (T)  
**System Type:** Community  
**Date:** November 26, 2002

**Introduction**

This report results from a statewide program called the Source Water Assessment Program (SWAP), in which each source of water that is used for public drinking water is evaluated for possible and actual threats to its quality. The Source Water Assessment Program is designed to compile, organize and evaluate information to make better decisions regarding protecting sources of public drinking water. The information compiled for the assessments will assist the State in overseeing public water systems and protecting their source water quality. The assessments are also intended to assist owners and operators of public water supplies within protecting sources of public drinking water.

The New York State Department of Health (NYSDOH) contracted with various organizations to develop the source water assessments. It is important to note that all source water assessment reports strictly address *sources* of drinking water, not finished water. The source water assessment reports are based on reasonable available information, primarily from statewide databases. The assessment area should be viewed as only approximations of the actual land area, which contribute water (and potential contamination) to the drinking water sources. In most cases, more in-depth hydrogeologic analyses could improve the accuracy of these assessment areas. Furthermore, it must be stressed that this program *estimates* the potential for contamination of a drinking water source. Also, although efforts have been made to check these reports for accuracy, the nature of the available data makes the elimination of all errors from these reports nearly impossible.

Assessment Summary

This assessment evaluates the potential for contaminants to enter the groundwater pumped at the following well(s):

Well Number	Well Name
2570027	DRILLED WELL #1
2570028	DRILLED WELL #3
2570029	DRILLED WELL #4

Listed below is a summary of the significant potential sources of contamination to the well(s).

Well Number 2570027			
Contaminants of Concern	Potential Land Cover Sources of Contamination	Potential Discrete Sources of Contamination	Potential Impact to Water Source

**No significant potential sources of contamination were identified for this well.**

Well Number 2570028			
Contaminants of Concern	Potential Land Cover Sources of Contamination	Potential Discrete Sources of Contamination	Potential Impact to Water Source

**No significant potential sources of contamination were identified for this well.**

Well Number 2570029			
Contaminants of Concern	Potential Land Cover Sources of Contamination	Potential Discrete Sources of Contamination	Potential Impact to Water Source

**No significant potential sources of contamination were identified for this well.**

The map(s) which are included in the appendix shows the well location and the assessment area that includes an inner and an outer zone. The assessment area is the estimated surface area that contributes recharge to the pumping well that was evaluated for potential and actual sources of contamination. The potential contaminant sources located in the inner assessment zones are given more weight.

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The susceptibility of the well to contamination (i.e. how likely it could become contaminated) was determined by reviewing:

1. land use patterns and
2. specific activities and facilities that could potentially release contaminants in the assessment area (see map).

Also, an assessment was made of how easily contaminants can move through the subsurface to the wellhead. This evaluation resulted in a "sensitivity rating" for the well. This is documented in the table below.

Well Number: 2570027					
Contaminant Category	Contaminant Prevalence Rating			Sensitivity	Susceptibility
	Land Cover Rating	Discrete Source Rating	Higher/Final Rating		
Halogenated Solvents	Low	Low	Low	High	Medium-High
Petroleum Products	Low	Low	Low	High	Medium-High
Herbicides/Pesticides	Low	Low	Low	High	Medium-High
Other Industrial Organics	Low	Low	Low	High	Medium-High
Metals	Low	Low	Low	High	Medium-High
Nitrates	Low	NR	Low	High	Medium-High
Protozoa	Low	Low	Low	High	Medium-High
Enteric Bacteria	Low	NR	Low	High	Medium-High
Enteric Viruses	Medium	NR	Medium	High	High
Cations/Anions (Salts, Sulfate)	Low	Low	Low	High	Medium-High

Well Number 2570028					
Contaminant Category	Contaminant Prevalence Rating			Sensitivity	Susceptibility
	Land Cover Rating	Discrete Source Rating	Higher/Final Rating		
Halogenated Solvents	Low	Low	Low	High	Medium-High
Petroleum Products	Low	Low	Low	High	Medium-High
Herbicides/Pesticides	Low	Low	Low	High	Medium-High
Other Industrial Organics	Low	Low	Low	High	Medium-High
Metals	Low	Low	Low	High	Medium-High
Nitrates	Low	NR	Low	High	Medium-High
Protozoa	Low	Low	Low	High	Medium-High
Enteric Bacteria	Low	NR	Low	High	Medium-High
Enteric Viruses	Medium	NR	Medium	High	High
Cations/Anions (Salts, Sulfate)	Low	Low	Low	High	Medium-High

Well Number 2570029					
Contaminant Category	Contaminant Prevalence Rating			Sensitivity	Susceptibility
	Land Cover Rating	Discrete Source Rating	Higher/Final Rating		
Halogenated Solvents	Low	Low	Low	High	Medium-High
Petroleum Products	Low	Low	Low	High	Medium-High
Herbicides/Pesticides	Low	Low	Low	High	Medium-High
Other Industrial Organics	Low	Low	Low	High	Medium-High
Metals	Low	Low	Low	High	Medium-High
Nitrates	Low	NR	Low	High	Medium-High
Protozoa	Low	Low	Low	High	Medium-High
Enteric Bacteria	Low	NR	Low	High	Medium-High
Enteric Viruses	Medium	NR	Medium	High	High
Cations/Anions (Salts, Sulfate)	Low	Low	Low	High	Medium-High

**Assessment Methodology**

The following sections describe the methodology used for conducting this source water assessment and present some of the intermediate results.

**Well Info**

Well Number	Capacity (gpd)	Yielding (gpm)	Well Diameter (in)	Pump Type	Screen Material	Screen Depth
2570027	720000	500	12	Vertical Turbine	Unknown	Unknown
2570028	684000	475	10	Vertical Turbine	Unknown	Unknown
2570029	756000	525	10	Vertical Turbine	Unknown	Unknown

**Delineation**

The methods used to delineate the inner and outer zones for the well(s) within this system are summarized below:

Well Number	Inner Zone Method	Inner Zone Radius (ft)	Outer Zone Method	Outer Zone Radius (ft)
2570027	Combined	3623	Combined	5745
2570028	Combined	3682	Combined	5780
2570029	Combined	3682	Combined	5801

**Sensitivity**

The sensitivity of a well to potential sources of contamination is determined by evaluating specific well information, contaminant detections and hydrogeologic factors.

<b>Well Number:</b>	<b>Class:</b>	<b>Sensitivity:</b>	<b>Reason(s):</b>
	Chemical	High	Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.
	Microbial	High	Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.
<b>2570028</b>	Chemical	High	Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.
	Microbial	High	Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.
<b>2570029</b>	Chemical	High	Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.
	Microbial	High	Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.

**Contaminant**

The contaminant inventory was determined using both land cover/land use, and discrete sources of potential contamination within the delineated assessment area. Land cover sources are those potential sources arising from various land covers outlined in the following table(s).

Well Number: 2570027		
Land Cover Classification	Inner Assessment Zone % Land Cover	Outer Assessment Zone % Land Cover
Water	1.82	1.36
Low Intensity Residential	8.14	17.22
High Intensity Residential	1.33	1.46
High Intensity Commercial	1.49	3.23
Pasture	0.25	1.34
Row Crop	0.14	0.14
Forest Evergreen	14.94	11.74
Forest Mixed	54.58	49.68
Forest Deciduous	16.54	12.36
Woody Wetlands	0.00	0.00
Barren (Bare rock and sand)	0.00	0.00
Barren (Quarries, mines, pits)	0.00	0.00
Barren (Transitional, clearcut)	0.00	0.00

Well Number: 2570028		
Land Cover Classification	Inner Assessment Zone % Land Cover	Outer Assessment Zone % Land Cover
Water	1.82	1.36
Low Intensity Residential	8.14	17.22
High Intensity Residential	1.33	1.46
High Intensity Commercial	1.49	3.23
Pasture	0.25	1.34
Row Crop	0.14	0.14
Forest Evergreen	14.94	11.74
Forest Mixed	54.58	49.68
Forest Deciduous	16.54	12.36
Woody Wetlands	0.00	0.00
Barren (Bare rock and sand)	0.00	0.00
Barren (Quarries, mines, pits)	0.00	0.00
Barren (Transitional, clearcut)	0.00	0.00

Well Number: 2570029		
Land Cover Classification	Inner Assessment Zone % Land Cover	Outer Assessment Zone % Land Cover
Water	1.82	1.36
Low Intensity Residential	8.14	17.22
High Intensity Residential	1.33	1.46
High Intensity Commercial	1.49	3.23
Pasture	0.25	1.34
Row Crop	0.14	0.14
Forest Evergreen	14.94	11.74
Forest Mixed	54.58	49.68
Forest Deciduous	16.54	12.36
Woody Wetlands	0.00	0.00
Barren (Bare rock and sand)	0.00	0.00
Barren (Quarries, mines, pits)	0.00	0.00
Barren (Transitional, clearcut)	0.00	0.00

**Contaminant Prevalence**

Contaminant prevalence is determined by considering percent land cover that is likely to contribute contamination and by considering the location and significance of discrete potential sources of contamination.

The following table(s) summarize(s) the potential sources of contamination for the well(s) located within this system, for both the inner and outer assessment zones.

Contaminant Category	Inner Assessment Zone				Outer Assessment Zone				Overall Rating	Driver for Medium/High Rating
	Major		Minor		Major		Minor			
	Number of PCLs	Rating	Number of PCLs	Rating	Number of PCLs	Rating	Number of PCLs	Rating		
Halogenated Solvents	None	NR	None	NR	None	NR	1	Low	Low	
Petroleum Products	None	NR	None	NR	None	NR	1	Low	Low	
Herbicides/Pesticides	None	NR	None	NR	None	NR	1	Low	Low	
Other Industrial Organics	None	NR	None	NR	None	NR	2	Low	Low	
Metals	None	NR	None	NR	None	NR	1	Low	Low	
Nitrates	None	NR	None	NR	None	NR	None	NR	NR	
Protozoa	None	NR	None	NR	None	NR	1	Low	Low	
Enteric Bacteria	None	NR	None	NR	None	NR	None	NR	NR	
Enteric Viruses	None	NR	None	NR	None	NR	None	NR	NR	
Cations/Anions (Salts, Sulfate)	None	NR	None	NR	None	NR	1	Low	Low	

Contaminant Category	Inner Assessment Zone				Outer Assessment Zone				Overall Rating	Driver for Medium/High Rating
	Major		Minor		Major		Minor			
	Number of PCLs	Rating	Number of PCLs	Rating	Number of PCLs	Rating	Number of PCLs	Rating		
Halogenated Solvents	None	NR	None	NR	None	NR	1	Low	Low	
Petroleum Products	None	NR	None	NR	None	NR	1	Low	Low	
Herbicides/Pesticides	None	NR	None	NR	None	NR	1	Low	Low	
Other Industrial Organics	None	NR	None	NR	None	NR	2	Low	Low	
Metals	None	NR	None	NR	None	NR	1	Low	Low	
Nitrates	None	NR	None	NR	None	NR	None	NR	NR	
Protozoa	None	NR	None	NR	None	NR	1	Low	Low	
Enteric Bacteria	None	NR	None	NR	None	NR	None	NR	NR	
Enteric Viruses	None	NR	None	NR	None	NR	None	NR	NR	
Cations/Anions (Salts, Sulfate)	None	NR	None	NR	None	NR	1	Low	Low	

Well Number	Infer Assessment Zone		Super Assessment Zone		Major Assessment Zone		Minor Assessment Zone		Overall Rating	Driver for Medium/High Rating
	Major		Minor		Major		Minor			
	Number of PCBs	Rating								
2570070	None	NR	None	NR	None	NR	1	Low	Low	
Halogenated Solvents	None	NR	None	NR	None	NR	1	Low	Low	
Petroleum Products	None	NR	None	NR	None	NR	1	Low	Low	
Herbicides/Pesticides	None	NR	None	NR	None	NR	1			
Other Industrial Organics	None	NR	None	NR	None	NR	2			
Metals	None	NR	None	NR	None	NR	1			
Nitrates	None	NR	None	NR	None	NR	None			
Protozoa	None	NR	None	NR	None	NR	1			
Enteric Bacteria	None	NR	None	NR	None	NR	None			
Enteric Viruses	None	NR	None	NR	None	NR	None			
Cations/Anions (Salt, Sulfate)	None	NR	None	NR	None	NR	1			

**Susceptibility Determination**

A susceptibility determination takes into consideration the sensitivity of the drinking water source (well) and contaminant prevalence. This determination uses the standard assessment methodology and does not include any review and/or refinement by NYSDOH.

Description of Appendices

**1. L**

The information is documented by local health departments in the public water system database. Also noted is any additional information used specifically for this assessment.

**2. C**

This includes a database of potential contaminant sources for each well zone including land cover/land use findings, discrete source identifiers and referenced potential contaminant source databases. For each discrete potential contaminant source there is an evaluation of contaminant prevalence.

**3. S**

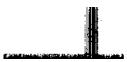
The appendix includes a database documenting the determination of the sensitivity rating. It also includes any information reviewed by NYSDOH as part of the susceptibility review and refinement.

**4. M**

This appendix includes relevant GIS maps used to document the trimming of assessment zones and land cover/land use maps within delineated assessment zones.

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**LIST OF AVAILABLE INFORMATION**



GIS Coverages and Databases Used in Assessments

Coverage	Abbreviation	Discrete Potential Contaminant Source Identifying Field Name	Coverage Owner	Coordinate System	Projection	Scale	Metadata Available	Availability
<b>PWS Data Bases/Coverages</b>								
NYSDOH Public Water System (PWS) Database: SDWS	SDWS	NA, but TNWSF_ID is the unique identifying field	NYSDOH and Local Health Departments	Latitude/Longitude	NAD 83	Varies	Yes	NYSDOH
NYSDOH Public Water System (PWS) Database: SWAP Add-on	SWAPO	NA, but TNWSF_ID is the unique identifying field	NYSDOH and Local Health Departments	Latitude/Longitude	NAD 83	Varies	Yes	NYSDOH
NYSDOH Public Water System (PWS) Database: SWAP data processed by NYSDOH	SWAPOOH	NA, but TNWSF_ID is the unique identifying field	NYSDOH and Local Health Departments	Latitude/Longitude	NAD 83	Varies	Yes	NYSDOH
<b>Hydrography/Hydrology Data Bases/Coverages</b>								
Hydrography Data	Hydrog	NA	NYSDOH	UTM Zone 18	NAD 83	1:250,000	Yes	NYSDOH
Geology	Geo	NA	NYSDOH/ NYSED	UTM Zone 18	NAD 27	1:100,000	Yes	www.nysg.state.ny.us
Geology (Surficial) for selected USGS quadrangle maps	SurfGeo	NA	NYSDOH	UTM Zone 18	NAD 83	1:24,000	Yes	NYSDOH
Primary Aquifers	NA	NA	NYSDOH	UTM Zone 18	NAD 27	1:24,000	Yes	NYSDOH
Soil Surveys at 1:24,000 scale	NA	NA	NYS	UTM Zone 18	NAD 83	1:24,000	Yes	NYSDOH
Topographic Maps (United States Geological Service Quadrangles)	Topo	NA	NYSDOH, original data from USGS	UTM Zone 18	NAD 83	1:24,000	Yes	NYSDOH, NYSDOH, NYSGIS
Unconsolidated Aquifer	Usq	NA	NYSDOH	UTM Zone 18	NAD 83	1:250,000	Yes	DSC
<b>Potential Contaminant Sources Data Bases/Coverages</b>								
CERCLIS, Federal Superfund Sites	CERCLIS	PROGRAM_ID	USEPA	UTM Zone 18	NAD 83	Unknown	Yes	www.epa.gov/region2/
Chemical & Petroleum Spills (HSEES)	HSEES	EVENT_ID	NYSDOH	UTM Zone 18	NAD 83	Varies	Yes	NYSDOH
Chemical Bulk Storage (Aboveground)	CBS-A	CBSNO	NYSDOH	UTM Zone 18	NAD 83	1:24,000	Yes	NYSDOH
Chemical Bulk Storage (Underground)	CBS-U	CBSNO	NYSDOH	UTM Zone 18	NAD 83	1:24,000 approx.	Yes	NYSDOH
Digital Orthophotos (DOQQ)	Ortho	NA	Multiple Agencies	UTM Zone 18	NAD 27/83	1:12,000	Yes	NYSDOH, NYSDOH, www.epa.gov/region2/
Hazardous Waste Treatment, Storage & Disposal Facilities (RCRA Facilities)	RCRA	PROGRAM_ID	USEPA	UTM Zone 18	NAD 83	Unknown	Yes	www.epa.gov/region2/
Inactive Hazardous Waste Disposal Sites	HW	scode	NYSDOH	Latitude/Longitude	NAD 83	1:24,000	Yes	CUGR
Landfills (Active)	LF	FACNUMBER	NYSDOH	UTM Zone 18	NAD 83	Unknown	Yes	NYSDOH
Mines	MINE	MINE_ID	NYSDOH	UTM Zone 18	NAD 83	Unknown	Yes	NYSDOH, http://andco.ver.usgs.gov/mine/mine.html
New York Land Cover Dataset (NLCD), formerly MRLC	NLCD	NA	Multiple Agencies	UTM Zone 18	NAD 83	30 meter pixel	Yes	www.usgs.gov/mrlc/mrlc.html
Oil and Gas Wells (Active)	OGW	WELL_ID	NYSDOH	UTM Zone 18	NAD 83	Unknown	Yes	NYSDOH
Petroleum Bulk Storage (MOBP)	PBS	MOBPNO	NYSDOH	UTM Zone 18	NAD 83	Unknown	Yes	NYSDOH
SPODES Permitted Discharge Facilities including Publicly Owned Sewage Treatment Works (Permit Compliance System)	PCS-SPOGS	SPOGS	NYSDOH	UTM Zone 18	NAD 83	Varies	Yes	NYSDOH
Toxic (Chemical) Release Inventory	TRI	TRID	NYSDOH/USEPA	UTM Zone 18	NAD 83	Unknown	Yes	NYSDOH

GIS Coverages and Databases Used in Assessments

Coverage	Comments	Update Interval	Most recent update	Standard Symbol	Use Required for SWAP	Data used for SWAP Task 1
<b>PWS Data Bases/Coverages</b>						
NYSDOH Public Water System (PWS) Database: SOWB	SDWS/State Data Base Data provided by Local	Quarterly	October 2001	Blue Circle	YES	4/5/2002
NYSDOH Public Water System (PWS) Database: SWAP Add-on	Health Department for SWAP	Occasional	October 2001	N/A	YES	4/5/2002
NYSDOH Public Water System (PWS) Database: SWAP data processed by NYSDOH	Data developed by NYSDOH for assessments	Not anticipated	October 2001	N/A	YES	4/5/2002
<b>Hydrography/Hydrology Data Bases/Coverages</b>						
Hydrography Data		Ongoing	May 2000	N/A	YES	June 1999
Geology		Not anticipated	2001	varies	YES	7/14/1999
Geology (Surficial) for selected USGS quadrangle maps	Surficial Geology for 16 quads, in draft form	Not anticipated	1999	N/A	Where Available	2/22/1999
Primary Aquifers		Not anticipated	February 2000	N/A	YES	July 1997
Soil Surveys at 1:24,000 scale	Not available in digital format for all counties	Ongoing	Varies	N/A	Where Available	1994, 1998-5/7/2001
Topographic Maps (United States Geological Service Quadrangles)		Not anticipated	Varies	N/A	YES	1996
Unconsolidated Aquifer	Based on USGS Unconsol. Aquifer maps, digitized by LLRWSC, attributes by NYSDOH	Not anticipated	July 2001	Pale Blue for high yield principal aquifer, green for lower yield	YES	1986
<b>Potential Contaminant Source Data Bases/Coverages</b>						
CERCLIS, Federal Superfund Sites		Periodic	February 1999	Red Triangle pointing up	YES	Unknown
Chemical & Petroleum Spills (HSEES)	Data incomplete, better for some years than others	Not anticipated	2000	Purple Triangle pointing down	YES	6/30/1996
Chemical Bulk Storage (Aboveground)		Not anticipated	2000	Pale Orange Triangle pointing down	YES	May 2002
Chemical Bulk Storage (Underground)		Not anticipated	2000	Pale Orange Triangle pointing up	YES	May 2002
Digital Orthophotos (DOQQ)	Nearly complete, statewide	Ongoing	Ongoing	N/A	YES	1994-1998
Hazardous Waste Treatment, Storage & Disposal Facilities (RCRA Facilities)		Yearly	February 1999	Dark Green Circle	YES	Unknown
Inactive Hazardous Waste Disposal Sites		Every April	April 1999	Red Triangle pointing down	YES	May 2002
Landfills (Active)		Yearly	June 1999	Pale Orange Square	YES	Unknown
Mines		Yearly	September 1999	Crossed Pick	YES	Unknown
New York Land Cover Dataset (NLCD), formerly MRLC		Not anticipated	January 1997	N/A	YES	1992
Oil and Gas Wells (Active)	No coverage available for many abandoned wells	Yearly	September 1998	Derrick	YES	Unknown
Petroleum Bulk Storage (MOSP)		Not anticipated	2000	Pale Orange Circle	YES	Unknown
SPOES Permitted Discharge Facilities Including Publicly Owned Sewage Treatment Works (Permit Compliance System)		Yearly	July 26, 2000	Dark Green Square	YES	Unknown
Toxic (Chemical) Release Inventory		Yearly	September 2000	Bright Green Diamond	YES	Unknown

**CONTAMINANT INVENTORY**

**SOURCE WATER ASSESSMENT  
CONTAMINANT INVENTORY**

Well System 731043

Well Number 2570027

Well Name DRILLED WELL #1

**Land Cover Tasks**

ArcView Spatial Analyst was used to calculate percent coverage of NLCD categories within each assessment zone. The NLCD categories were then re-classified using the SSMT provided by the NYSDOH.

Well Number: 2570027		
Land Cover Classification	Inner Assessment Zone % Land Cover	Outer Assessment Zone % Land Cover
Water	1.82	1.36
Low Intensity Residential	8.14	17.22
High Intensity Residential	1.33	1.46
High Intensity Commercial	1.49	3.23
Pasture	0.25	1.34
Row Crop	0.14	0.14
Forest Evergreen	14.94	11.74
Forest Mixed	54.58	49.68
Forest Deciduous	16.54	12.36
Woody Wetlands	0.00	0.00
Barren (Bare rock and sand)	0.00	0.00
Barren (Quarries, mines, pits)	0.00	0.00
Barren (Transitional, clearcut)	0.00	0.00

**Discrete Sources Tasks (GIS)**

The review of the potential contaminant sources (PCS) in the GIS linked databases resulted in the following list of PCS(s) for this well:

Type	Identifier	Distance & Direction	Zone
Petroleum Spill	NY0149195	5724 feet N	Outer
	NY0149195001	5692 feet N	
	3552200104	5719 feet N	

**PWS Database Tasks**

The review of the PCSs in the Health Department database resulted in the following list of PCS(s) for this well:

**No PCSs were noted within Zone 1 or Zone 2 of this well in the PWS Database.**

Source	Distance (ft)	Zone

**SOURCE WATER ASSESSMENT  
CONTAMINANT INVENTORY**

Well System 731043  
Well Number 2570028  
Well Name DRILLED WELL #3

**Land Cover Tasks**

ArcView Spatial Analyst was used to calculate percent coverage of NLCD categories within each assessment zone. The NLCD categories were then re-classified using the SSMT provided by the NYSDOH.

Well Number: 2570028		
Land Cover Classification	Inner Assessment Zone % Land Cover	Outer Assessment Zone % Land Cover
Water	1.82	1.36
Low Intensity Residential	8.14	17.22
High Intensity Residential	1.33	1.46
High Intensity Commercial	1.49	3.23
Pasture	0.25	1.34
Row Crop	0.14	0.14
Forest Evergreen	14.94	11.74
Forest Mixed	54.58	49.68
Forest Deciduous	16.54	12.36
Woody Wetlands	0.00	0.00
Barren (Bare rock and sand)	0.00	0.00
Barren (Quarries, mines, pits)	0.00	0.00
Barren (Transitional, clearcut)	0.00	0.00

**Discrete Sources Tasks (GIS)**

The review of the potential contaminant sources (PCS) in the GIS linked databases resulted in the following list of PCS(s) for this well:

Type	Identifier	Distance & Direction	Zone
Petroleum Spill	NY0149195	5726 feet N	Outer
	NY0149195001	5687 feet N	
	3552200104	5721 feet N	

**PWS Database Tasks**

The review of the PCSs in the Health Department database resulted in the following list of PCS(s) for this well:

**No PCSs were noted within Zone 1 or Zone 2 of this well in the PWS Database.**

Source	Distance (ft)	Zone

**SOURCE WATER ASSESSMENT  
CONTAMINANT INVENTORY**

**Well System** 731043  
**Well Number** 2570029  
**Well Name** DRILLED WELL #4

**Land Cover Tasks**

ArcView Spatial Analyst was used to calculate percent coverage of NLCD categories within each assessment zone. The NLCD categories were then re-classified using the SSMT provided by the NYSDOH.

Well Number: 2570029		
Land Cover Classification	Inner Assessment Zone % Land Cover	Outer Assessment Zone % Land Cover
Water	1.82	1.36
Low Intensity Residential	8.14	17.22
High Intensity Residential	1.33	1.46
High Intensity Commercial	1.49	3.23
Pasture	0.25	1.34
Row Crop	0.14	0.14
Forest Evergreen	14.94	11.74
Forest Mixed	54.58	49.68
Forest Deciduous	16.54	12.36
Woody Wetlands	0.00	0.00
Barren (Bare rock and sand)	0.00	0.00
Barren (Quarries, mines, pits)	0.00	0.00
Barren (Transitional, clearcut)	0.00	0.00

**Discrete Sources Tasks (GIS)**

The review of the potential contaminant sources (PCS) in the GIS linked databases resulted in the following list of PCS(s) for this well:

Type	Identifier	Distance & Direction	Zone
Petroleum Spill	NY0149195	5271 feet N	Outer
	NY0149195001	5243 feet N	
	3552200104	5266 feet N	

**PWS Database Tasks**

The review of the PCSs in the Health Department database resulted in the following list of PCS(s) for this well:

**No PCSs were noted within Zone 1 or Zone 2 of this well in the PWS Database.**

Source	Distance (ft)	Zone

**SOURCE WATER ASSESSMENT  
CONTAMINANT PREVALENCE**

Well System 731043  
Well Number 2570027  
Well Name DRILLED WELL #1

**Land Cover Tasks**

Based on the percent land coverage categories from Task 4, the following contaminant prevalence ratings were calculated using the SDMT logic.

Contaminant Category	Contaminant Prevalence Rating	Driving Land Use
Halogenated Solvents	Low	
Petroleum Products	Low	
Herbicides/Pesticides	Low	
Other Industrial Organics	Low	
Metals	Low	
Nitrates	Low	
Protozoa	Low	
Enteric Bacteria	Low	
Enteric Viruses	Medium	Low Intensity Residential (Zn1 - 8.14) & Low Intensity Residential (Zn2 - 17.22)
Cations/Anions (Salts, Sulfate)	Low	

**Discrete Sources Tasks**

Well Number: 2570027		Inner Assessment Zone				Outer Assessment Zone				Overall Rating	Driver for Minimum/High Rating
Contaminant Category	Number of PCS	Major		Minor		Major		Minor			
		Rating	Number of PCS	Rating	Number of PCS	Rating	Number of PCS	Rating	Number of PCS		
Halogenated Solvents	None	NR	None	NR	None	NR	1	Low	Low		
Petroleum Products	None	NR	None	NR	None	NR	1	Low	Low		
Herbicides/Pesticides	None	NR	None	NR	None	NR	1	Low	Low		
Other Industrial Organics	None	NR	None	NR	None	NR	2	Low	Low		
Metals	None	NR	None	NR	None	NR	1	Low	Low		
Nitrates	None	NR	None	NR	None	NR	None	NR	NR		
Protozoa	None	NR	None	NR	None	NR	1	Low	Low		
Enteric Bacteria	None	NR	None	NR	None	NR	None	NR	NR		
Enteric Viruses	None	NR	None	NR	None	NR	None	NR	NR		
Cations/Anions (Salts, Sulfate)	None	NR	None	NR	None	NR	1	Low	Low		

**Overall Susceptibility Rating**

The overall contaminant prevalence ratings are based on the maximum prevalence rating for each type of potential contaminant source:

Contaminant Category	Contaminant Prevalence Rating		
	Land Cover Rating	Discrete Source Rating	Higher Rating
Halogenated Solvents	Low	Low	Low
Petroleum Products	Low	Low	Low
Herbicides/Pesticides	Low	Low	Low
Other Industrial Organics	Low	Low	Low
Metals	Low	Low	Low
Nitrates	Low	NR	Low
Protozoa	Low	Low	Low
Enteric Bacteria	Low	NR	Low
Enteric Viruses	Medium	NR	Medium
Cations/Anions (Salts, Sulfate)	Low	Low	Low

**SOURCE WATER ASSESSMENT  
CONTAMINANT PREVALENCE**

Well System 731043  
Well Number 2570028  
Well Name DRILLED WELL #3

**Land Cover Tasks**

Based on the percent land coverage categories from Task 4, the following contaminant prevalence ratings were calculated using the SDMT logic.

Contaminant Category	Contaminant Prevalence Rating	Driving Land Use
Halogenated Solvents	Low	
Petroleum Products	Low	
Herbicides/Pesticides	Low	
Other Industrial Organics	Low	
Metals	Low	
Nitrates	Low	
Protozoa	Low	
Enteric Bacteria	Low	
Enteric Viruses	Medium	Low Intensity Residential (Zn1 - 8.14) & Low Intensity Residential (Zn2 - 17.22)
Cations/Anions (Salts, Sulfate)	Low	

**Discrete Sources Tasks**

Contaminant Category	Upper Assessment Zone				Lower Assessment Zone				Overall Rating for Medium/High Rating
	Major		Minor		Major		Minor		
	Number of PWS	Rating	Number of PWS	Rating	Number of PWS	Rating	Number of PWS	Rating	
Halogenated Solvents	None	NR	None	NR	None	NR	1	Low	Low
Petroleum Products	None	NR	None	NR	None	NR	1	Low	Low
Herbicides/Pesticides	None	NR	None	NR	None	NR	1	Low	Low
Other Industrial Organics	None	NR	None	NR	None	NR	2	Low	Low
Metals	None	NR	None	NR	None	NR	1	Low	Low
Nitrates	None	NR	None	NR	None	NR	None	NR	NR
Protozoa	None	NR	None	NR	None	NR	1	Low	Low
Enteric Bacteria	None	NR	None	NR	None	NR	None	NR	NR
Enteric Viruses	None	NR	None	NR	None	NR	None	NR	NR
Cations/Anions (Salts, Sulfate)	None	NR	None	NR	None	NR	1	Low	Low

**Overall Susceptibility Rating**

The overall contaminant prevalence ratings are based on the maximum prevalence rating for each type of potential contaminant source:

Contaminant Category	Contaminant Prevalence Rating		
	Land Cover Rating	Discrete Source Rating	Higher Rating
Halogenated Solvents	Low	Low	Low
Petroleum Products	Low	Low	Low
Herbicides/Pesticides	Low	Low	Low
Other Industrial Organics	Low	Low	Low
Metals	Low	Low	Low
Nitrates	Low	NR	Low
Protozoa	Low	Low	Low
Enteric Bacteria	Low	NR	Low
Enteric Viruses	Medium	NR	Medium
Cations/Anions (Salts, Sulfate)	Low	Low	Low

**SOURCE WATER ASSESSMENT  
CONTAMINANT PREVALENCE**

**Well System** 731043  
**Well Number** 2570029  


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**Well Name** DRILLED WELL #4

**Land Cover Tasks**

Based on the percent land coverage categories from Task 4, the following contaminant prevalence ratings were calculated using the SDMT logic.

<b>Contaminant Category</b>	<b>Contaminant Prevalence Rating</b>	<b>Driving Land Use</b>
Halogenated Solvents	Low	
Petroleum Products	Low	
Herbicides/Pesticides	Low	
Other Industrial Organics	Low	
Metals	Low	
Nitrates	Low	
Protozoa	Low	
Enteric Bacteria	Low	
Enteric Viruses	Medium	Low Intensity Residential (Zn1 - 8.14) & Low Intensity Residential (Zn2 - 17.22)
Cations/Anions (Salts, Sulfate)	Low	

**Discrete Sources Tasks**

Well Number: 2576029										
Contaminant Category	Land Use Assessment Zone				Other Assessment Zone				Overall Rating	Driver for Medium/High Rating
	Major		Minor		Major		Minor			
	Number of Sites	Rating	Number of Sites	Rating	Number of Sites	Rating	Number of Sites	Rating		
Halogenated Solvents	None	NR	None	NR	None	NR	1	Low	Low	
Petroleum Products	None	NR	None	NR	None	NR	1	Low	Low	
Herbicides/Pesticides	None	NR	None	NR	None	NR	1	Low	Low	
Other Industrial Organics	None	NR	None	NR	None	NR	2	Low	Low	
Metals	None	NR	None	NR	None	NR	1	Low	Low	
Nitrates	None	NR	None	NR	None	NR	None	NR	NR	
Protozoa	None	NR	None	NR	None	NR	1	Low	Low	
Enteric Bacteria	None	NR	None	NR	None	NR	None	NR	NR	
Enteric Viruses	None	NR	None	NR	None	NR	None	NR	NR	
Cations/Anions (Salts, Sulfate)	None	NR	None	NR	None	NR	1	Low	Low	

**Overall Susceptibility Rating**

The overall contaminant prevalence ratings are based on the maximum prevalence rating for each type of potential contaminant source:

Contaminant Category	Contaminant Prevalence Rating		
	Land Cover Rating	Discrete Source Rating	Higher Rating
Halogenated Solvents	Low	Low	Low
Petroleum Products	Low	Low	Low
Herbicides/Pesticides	Low	Low	Low
Other Industrial Organics	Low	Low	Low
Metals	Low	Low	Low
Nitrates	Low	NR	Low
Protozoa	Low	Low	Low
Enteric Bacteria	Low	NR	Low
Enteric Viruses	Medium	NR	Medium
Cations/Anions (Salts, Sulfate)	Low	Low	Low

SUSCEPTIBILITY

**SOURCE WATER ASSESSMENT  
SENSITIVITY ANALYSIS**

Well System 731043

~~Well Number 2570027~~

Well Name DRILLED WELL #1

**Chemical**

Rating:

Reason(s):

Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.

**Microbial**

Rating: High

Reason(s):

Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.

**SOURCE WATER ASSESSMENT  
SENSITIVITY ANALYSIS**

Well System 731043  
Well Number 2570028  
Name DRILLED WELL #3

**Chem**

Rating

Reason(s):

Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.

**Microbial**

Rating: High

Reason(s):

Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.

**SOURCE WATER ASSESSMENT  
SENSITIVITY ANALYSIS**

Well System 731043  
Well Number 2570029  
Well Name DRILLED WELL #4

**Chemical**

Rating: High

Reason(s):

Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.

**Microbial**

Rating: High

Reason(s):

Based on the data provided, the well draws from an unconfined aquifer of high hydraulic conductivity.

**SOURCE WATER ASSESSMENT  
SUSCEPTIBILITY**

**Well System** 731043  
**Well Number** 2570027  
**Well Name** DRILLED WELL #1

**Land Cover Tasks**

The susceptibility of a well is a function of the overall sensitivity rating (Task 5) and the hydrogeologic sensitivity as outlined in Table 4 of the Final SWAP Plan. Susceptibility for this well was determined using the logic outlined in NYSDOH's SWAP spreadsheet tool.

The following summarizes the potential contaminants and the land use/land cover types and discrete potential contaminant sources for this well.

Well Number 2570027					
Contaminant Category	Contaminant Prevalence Rating			Sensitivity	Susceptibility
	Land Cover Rating	Discrete Source Rating	Higher/Final Rating		
Halogenated Solvents	Low	Low	Low	High	Medium-High
Petroleum Products	Low	Low	Low	High	Medium-High
Herbicides/Pesticides	Low	Low	Low	High	Medium-High
Other Industrial Organics	Low	Low	Low	High	Medium-High
Metals	Low	Low	Low	High	Medium-High
Nitrates	Low	NR	Low	High	Medium-High
Protozoa	Low	Low	Low	High	Medium-High
Enteric Bacteria	Low	NR	Low	High	Medium-High
Enteric Viruses	Medium	NR	Medium	High	High
Cations/Anions (Salts, Sulfate)	Low	Low	Low	High	Medium-High

The following table summarizes the potential contaminants and the land use/land cover types and discrete potential contaminant sources for this well. ....

Well Number 2520027			
Contaminants of Concern	Potential Land Cover Sources of Contamination	Potential Discrete Sources of Contamination	Potential Impact to Water Source
No significant potential sources of contamination were identified for this well.			

**SOURCE WATER ASSESSMENT  
SUSCEPTIBILITY**

---Well System---731043---  
**Well Number** 2570028  
**Well Name** DRILLED WELL #3

**Land C**

The susceptibility of a well is a function of the overall sensitivity rating (Task 5) and the hydrogeologic sensitivity as outlined in Table 4 of the Final SWAP Plan. Susceptibility for this well was determined using the logic outlined in NYSDOH's SWAP spreadsheet tool.

The following summarizes the potential contaminants and the land use/land cover types and discrete potential contaminant sources for this well.

Well Number 2570028						
Contaminant Category	Contaminant Prevalence Rating			Sensitivity	Susceptibility	
	Land Cover Rating	Discrete Source Rating	Higher/Final Rating			
Halogenated Solvents	Low	Low	Low	High	Medium-High	
Petroleum Products	Low	Low	Low	High	Medium-High	
Herbicides/Pesticides	Low	Low	Low	High	Medium-High	
Other Industrial Organics	Low	Low	Low	High	Medium-High	
Metals	Low	Low	Low	High	Medium-High	
Nitrates	Low	NR	Low	High	Medium-High	
Protozoa	Low	Low	Low	High	Medium-High	
Enteric Bacteria	Low	NR	Low	High	Medium-High	
Enteric Viruses	Medium	NR	Medium	High	High	
Cations/Anions (Salts, Sulfate)	Low	Low	Low	High	Medium-High	

The following table summarizes the potential contaminants and the land use/land cover types and discrete potential contaminant sources for this well. ....

Well Number 2570028

Contaminants of Concern	Potential Land Cover Sources of Contamination	Potential Discrete Sources of Contamination	Potential Impact to Water Source
-------------------------	---	---	----------------------------------

No significant potential sources of contamination were identified for this well.

**SOURCE WATER ASSESSMENT  
SUSCEPTIBILITY**

**Well System** 731043 . . . . .  
**Well Number** 2570029  
**Well Name** DRILLED WELL #4

**Land C**

The susceptibility of a well is a function of the overall sensitivity rating (Task 5) and the hydrogeologic sensitivity as outlined in Table 4 of the Final SWAP Plan. Susceptibility for this well was determined using the logic outlined in NYSDOH's SWAP spreadsheet tool.

The following summarizes the potential contaminants and the land use/land cover types and discrete potential contaminant sources for this well.

Well Number 2570029					
Contaminant Category	Contaminant Prevalence Rating			Sensitivity	Susceptibility
	Land Cover Rating	Discrete Source Rating	Higher Potential Rating		
Halogenated Solvents	Low	Low	Low	High	Medium-High
Petroleum Products	Low	Low	Low	High	Medium-High
Herbicides/Pesticides	Low	Low	Low	High	Medium-High
Other Industrial Organics	Low	Low	Low	High	Medium-High
Metals	Low	Low	Low	High	Medium-High
Nitrates	Low	NR	Low	High	Medium-High
Protozoa	Low	Low	Low	High	Medium-High
Enteric Bacteria	Low	NR	Low	High	Medium-High
Enteric Viruses	Medium	NR	Medium	High	High
Cations/Anions (Salts, Sulfate)	Low	Low	Low	High	Medium-High

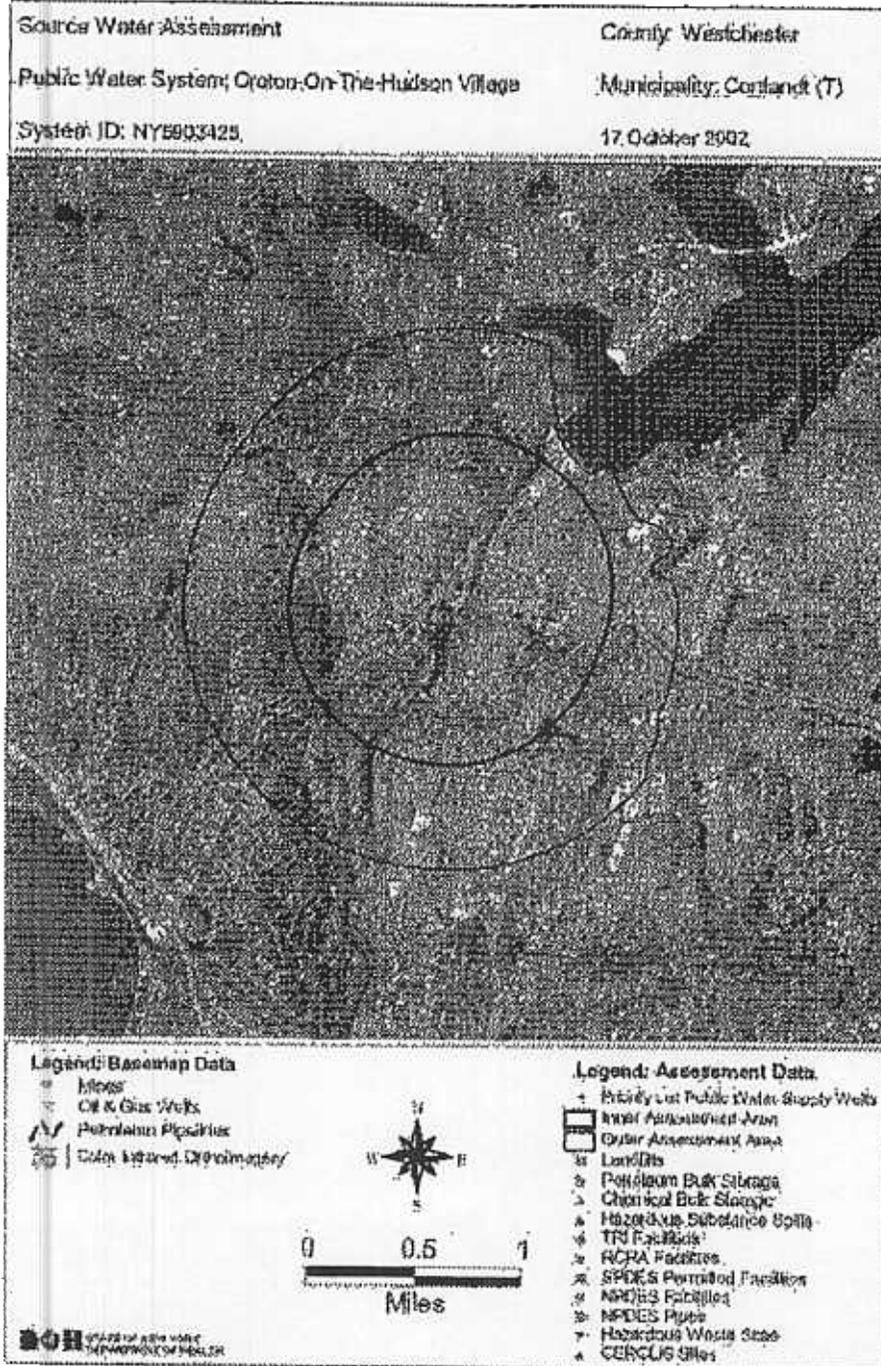
The following table summarizes the potential contaminants and the land use/land cover types and discrete potential contaminant sources for this well.

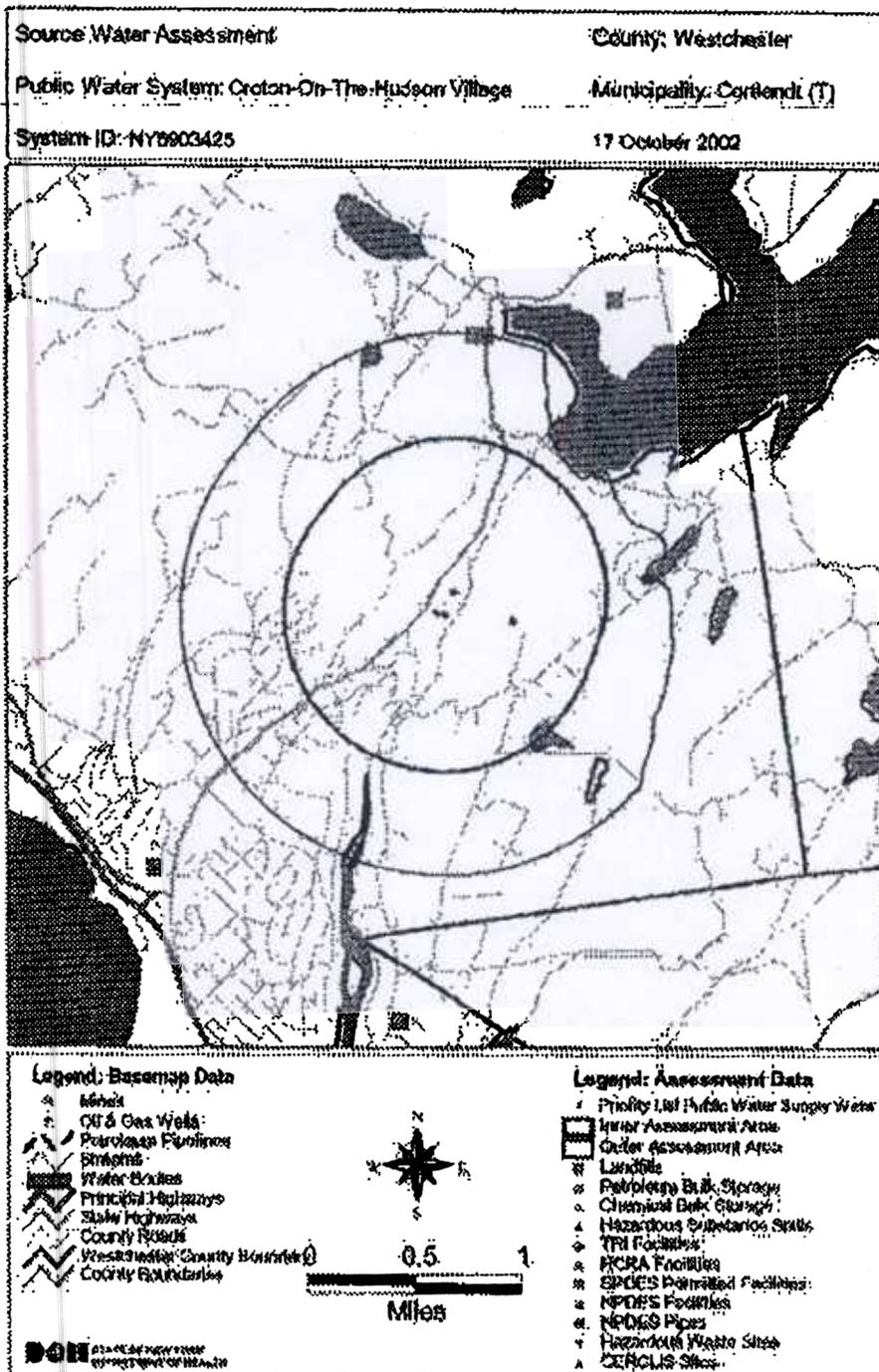
Well Number	Potential Land Cover Sources of Contamination	Potential Discrete Sources of Contamination	Potential Impact to Water Source
1570029			

No significant potential sources of contamination were identified for this well.

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**MAPS**





**EXHIBIT 2**

# Village of Croton-on-Hudson, New York



Stanley H. Kellerhouse Municipal Building  
One Van Wyck Street  
Croton-on-Hudson, NY 10520  
(914) 271- 4781 FAX 271 - 2836

**Mayor**  
ROBERT W. ELLIOTT  
**Trustees**  
GEORGIANNA K. GRANT  
DEBORAH Y McCARTHY  
GREGORY SCHMIDT  
LEO A. W. WIEGMAN

**Village Manager-Village Clerk**  
RICHARD F. HERBEK  
**Treasurer-Deputy Village Clerk**  
ROBERT T. REARDON  
**Attorney**  
SEYMOUR M. WALDMAN  
**Engineer**  
DANIEL O'CONNOR, PE

## MEMORANDUM

Mayor Elliott and Village Board of Trustees

**From:** Daniel O'Connor, P.E., Village Engineer

**Subject:** Millennium Pipe Line Impacts to Village Well Field

November 12, 2002

The following is offered in response to your request for additional information on the above referenced subject:

The Village should continue to plan for the construction of an additional well in the Village well field. This well is especially needed during the high demand summer period.

An established standard in water supply is to have the water supply sources meet the maximum day demand with the largest well out of service (well # 4, see analysis below). This assumption is made to assess the adequacy of the well field sources during a period of maximum demand, usually in the summer. The maximum and average day demands (from the operation reports) are noted below:

<u>Month/Year</u>	<u>Maximum Day Demand (MGD)</u>	<u>Avg. Day Demand (MGD)</u>
June 2002	1.31	0.99
July 2002	1.48	1.22
August 2002	1.50	1.16
September 2002	1.32	1.00

It must be noted that the maximum day demand is expected to increase as the 158 unit Discovery Cove project is build out and occupied and other projects in the Village are built. An increase of 0.15 – 0.20 MGD can be expected. Also, the above numbers represent water supply demands during a period when county-wide drought

restrictions were in place. Demand is expected to be higher in years with no drought restrictions in place.

The existing source capacity is as follows and is based on information supplied by the water department. An 18-hour pumping cycle was used in the calculations.

Well 1	441 GPM x 18 hrs. x 60 min./hr. =	476,280 GPD
Well 3	469 GPM x 18 hrs. x 60 min./hr. =	506,520 GPD
Well 4	516 GPM x 18 hrs. x 60 min./hr. =	<u>557,280 GPD</u>
	Total	1,540,080 GPD

An analysis with the largest well out of service is as follows. With the largest well (Well #4) out of service the remaining available capacity from wells 1 and 3 is 982,800 GPD, which was only 66% of the maximum day demand during August 2002. An additional well with a minimum capacity of 480 GPM is needed at this time to ensure that the maximum day demand can be supplied with the largest well out of service. It is also noted that wells 1 and 3 are also not capable of meeting the average day demand unless they are pumped for more than 18 hours per day. During July they would need to be pumped 22.3 hours to meet the average day demand; this may increase to 23.6 hours when Discovery Cove and other projects are built out.

Again based on the above analysis, the installation of an additional well is required to ensure that sufficient source capacity is available when the largest well is out of service due to mechanical, electrical or other problems.

The location of the new well was addressed in the 1988 report from Geraghty and Miller, Inc. titled "Availability of Ground Water Resources at the Croton-on-Hudson Well Field." The first recommendation of the report was:

"The two upper wells should be taken out of service and replaced with one deep, large-diameter production well in the upper [northern] part of the well field, near Well OW-5. This recommendation results from the inefficiency of the upper wells, the prolific geology near Well OW-5, and the results of the modeling analysis, which show that a better distribution of pumping centers will increase the yield of the well field. In addition, new piping directly to the main distribution system should accompany this new well in order to cut back on losses from the current piping system."

The report also states, "... the large volume of water (60 GPM) obtained from this 2.5" diameter well [OW-5] during development indicates that the aquifer material in this area is potentially capable of producing more water"

Another recommendation states, “distributing pumpage within the well field would significantly increase the volume of water that could be obtained from the aquifer over the long term”

The above noted recommendations indicate that the northern portion of the well field is a desirable location for an additional well.

Geraghty and Miller produced another report on the well field titled “Installation of well #4 Village of Croton-on-Hudson Well Field, April 1992”. This report documents the drilling and testing performed for well #4. Details are provided below.

A test boring (#8) was installed about 200' from the location (near OW-5) recommended in the 1988 report. Test boring #8 showed a high percentage of fines in the aquifer and was abandoned. A new test boring (#9) was installed only 20' from observation well #6. Test boring #9 showed acceptable aquifer material and production well #4 was installed at the location of test boring #9. It should be noted that a future test boring 20' from observation well #5 (OW-5) should show acceptable aquifer material based on the log results of OW-5.

The characteristics of sand and gravel aquifers can vary considerably in small areas. A recommended approach to determine if the location of the pipe line will interfere with the placement of future well(s) is to conduct additional test borings in the northern area of the village well field. Detailed test borings and analysis by a hydro-geologist would determine if the pipe line and its setback areas are eliminating critical areas of the village well field that are suitable for the installation of additional high capacity well(s).

It should be noted that recommendation #8 in the 1992 Geraghty and Miller report also recommends exploration of the ground water resources of the bedrock aquifer under the well field to determine if it is suitable for the installation of a production well.

The northern portion of the well field has other characteristics that must be considered in an impact analysis; a few are noted below.

The northern portion of the well field is hydraulically up gradient from the developed southern portion. If the southern portion were to become polluted the northern portion may remain unpolluted and be available for use without the need for expensive water treatment systems.

The regulatory requirements about ground water under the influence of surface water could make the northern portion of the aquifer, with finer materials, more desirable as an effective filter for any induced surface water infiltration. These finer aquifer materials are more efficient at filtering out any surface water microorganisms.

The report should also include analysis of other pipe line impacts, such as, pipe line bedding and cover materials to determine if they will create a “curtain drain” effect and channel outside water into the well field that would result in a degradation of water quality.

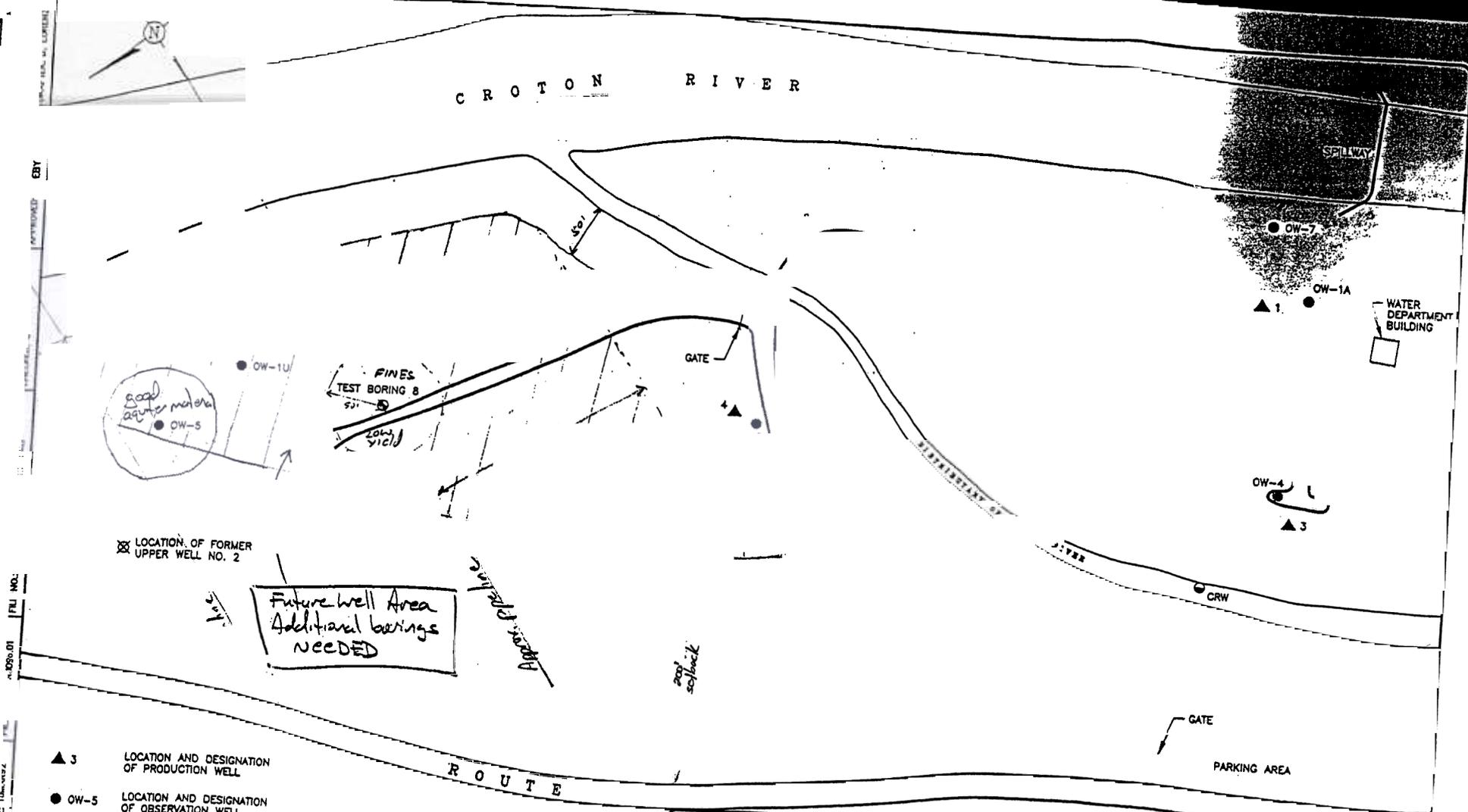
In conclusion, it appears that a detailed report on the impacts of the pipe line to the village well field is needed. The report should include the results and analysis of an array of test borings in the northern well field area. The impacts of the pipe line and its setback area on future well installations must be determined with extreme care to ensure the village has sufficient locations for new, cost effective, water supply wells to meet current and future water supply demands.

Enc. (well field sketch)

cc: Rick Herbek w/enc.  
Ken Kraft w/enc.  
Tom Brann w/enc.  
File w/enc.

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2



DATE: 11/10/07  
 FILE NO.: 0250.01

- ▲ 3 LOCATION AND DESIGNATION OF PRODUCTION WELL
- OW-5 LOCATION AND DESIGNATION OF OBSERVATION WELL
- SW-1 LOCATION AND DESIGNATION OF SURFACE WATER LEVEL MEASURING STATION

SCALE:  
 0 [ ] 80 FEET

**GERAGHTY & MILLER, INC.**  
 Environmental Services

**WELL FIELD OF THE VILLAGE OF CROTON-ON-HUDSON**

CROTON-ON-HUDSON, NEW YORK

FIGURE  
**2**