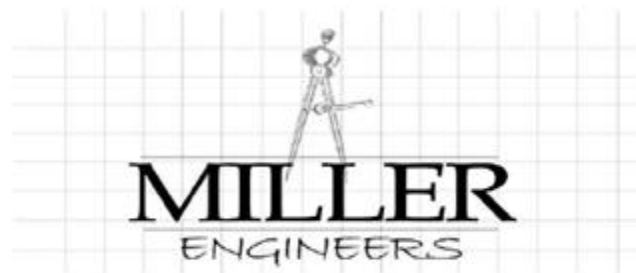


February 2023

Lewis County, New York  
Central Lewis County  
Regional Water Supply Study  
Supplemental Report



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## Contents

<b>Executive Summary</b> .....	<b>1</b>
Scope of Work.....	1
Supplemental Authorization .....	1
Favorable Zone Evaluation.....	1
Identify Potential Wholesale Customers .....	2
Conceptual Designs and Project Cost Estimates for Interconnections.....	2
<b>Section 1 – Hydrogeologic Investigations</b> .....	<b>4</b>
1.1 Groundwater References Used.....	4
1.2 Summary of Available Data.....	4
1.3 Primary Resources Used for Conclusions.....	5
1.4 Conclusions Reached .....	6
<b>Section 2 – Identifying Wholesale Opportunities</b> .....	<b>7</b>
2.1 Method/Approach .....	7
2.2 Summary of Community Responses.....	7
2.3 Conclusions .....	8
<b>Section 3 – Project Opportunities</b> .....	<b>9</b>
3.1 Introduction .....	9
3.2 Specific Projects .....	9
<b>Section 4 – Conclusions and Recommendations</b> .....	<b>12</b>
4.1 Conclusions .....	12

## Tables

Table 1	Summary of Findings: Water Demand and Wholesale Opportunities
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## Figures

Figure 1	Lewis County Regions
Figure 2	Project 1
Figure 3	Project 2
Figure 4	Project 2A
Figure 5	Project 3
Figure 6	Project 4
Figure 7	Project 5
Figure 8	Project 6

## Appendices

Appendix A Annotated Bibliography of Lewis County Public Water System Reports Available as of August 2022

Appendix B Summary of Data Gathered for Each Community

## Abbreviations

DANC	Development Authority of the North Country
EFC	New York State Environmental Facilities Corporation
Gpd	Gallons Per Day
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PER	Preliminary Engineering Report
PWS	Public Water System
SCADA	Supervisory Control and Data Acquisition
WWR	Water Withdrawal Reports

## Data Link

[THIS LINK](#) Raw Data Gathered from Various Groundwater Sources

## Executive Summary

### Scope of Work

Miller Engineers (Miller) issued a January 2022 Report in which it evaluated key aspects of the central Lewis County (the County) municipal public water systems (PWSs) in the Towns of Lowville, Watson, Denmark, and Martinsburg. The largest single system, the Village of Lowville, chose not to participate. The Study contained an evaluation of existing conditions of the PWS's including the age of infrastructure, capacity, demand, historical and current improvements, current water rates, debt service, yearly budget, and potential community interconnections to promote and sustain beneficial economic development as well as promote sustainable population growth in areas that are currently not served.

The January 2022 Report recommended that, in the long-term, municipal water systems should consider relying on new groundwater resources for future increased supply needs. Previous studies indicated that groundwater resources in Lewis County have sufficient capacity to provide a high-quality water to meet the demands for the foreseeable future. A common shared water supply between the municipalities within the Study Area could potentially offer reduced supply costs to each municipal user.

The January 2022 Report recommended that the County investigate the quantity and quality of groundwater in Zone A and Zone B, zones previously identified in a study prepared in 2008. These two zones are the most centrally located to the Study Area and based upon previous reports, appeared to offer the potential for the largest sustainable yield. Anticipating a new source from Zone A or Zone B, a new well field would need to be developed. The January 2022 Report also recommended an interconnection to the Town of Watson distribution system and then to proposed interconnections with the Towns of Lowville and Martinsburg which would facilitate delivery of what could be considered an unlimited quantity of water for consumption in any or all of the Towns.

Miller further recommended relatively inexpensive regional interconnection projects which could resolve some current supply limitations while increasing revenue to the selling communities. It was recommended that the regional concept projects be implemented at the County level as they would serve multiple Towns and would provide access to greater resources minimizing the short-term financial impact of capital project implementation. These projects would be facilitated with the formation of a County led Cooperative. The January 2022 Report identified five projects that would provide existing system interconnection to allow for expansion of service to areas currently not served or underserved.

### Supplemental Authorization

As follow-up to the January 2022 Report, Lewis County authorized Miller to prepare this supplemental report to:

- investigate the recommended favorable zones for potential water supply volume and quality,
- revisit southern communities for the potential for opportunities for wholesale purchase, and
- assess the potential for the County to serve as a wholesaler for new and expanded service areas.

### Favorable Zone Evaluation

Miller gathered and evaluated several available engineering/scientific reports produced since the 2008 report along with available boring logs, yield testing and water quality data available from well drillers.

The work was supplemented with conversations with current system owners/operators, and some field reconnaissance. The data gathered not only allowed Miller to evaluate Favorable Zones A and B but to revisit Zones C, E and F as well.

The evaluation of new data concluded that Favorable Zones A, B, C, E and F were generally characterized by relatively lower yield, less than 50 gallons per minute (gpm), and produced in the shallow depth overburden. The geologic systems are underlain by fractured rock where higher yields could be found. While increased supply using multiple, shallow, low yield wells is possible, the requirement for dedicated land for well head protection needed to be balanced. Wells located in the deeper rock fractures often lead to surface water influences making for high yield but also susceptible to contamination and summer drought (current example: Copenhagen). Similar to current conditions in the northern portions of the study area, conditions experienced by Copenhagen, the shallow overburden and higher yield fractured rock conditions in all of these zones presents significant potential for water quality to be impacted by surficial land use (primarily agriculture).

The available data and our field work also allowed us to evaluate a broader area for potential water supply including “Favorable Zones” which had been identified in the southern area of the County in previous reports. The evaluation concluded that the Tug Hill region west of Rt. 26 and Rt. 12 has very poor high yield potential, but possibly higher yield in localized fractures. Exploring bedrock water sources, however, for reasons stated above is not recommended.

The best places for high groundwater yields were determined to be east of the NY Power Authority Transmission Line and west of Adirondack Blue Line where glacial outwash deposits occur. A source on the western side of the Town of Lowville was also identified and could potentially provide access to additional groundwater resources located in the western portion of the Town. The yield in this location is currently unknown, however based on anticipated geology, yield could be between 50 gpm and 100 gpm. Southern County favorable zones align with existing communities.

### Identify Potential Wholesale Customers

We investigated areas of the County that could become wholesale water customers. The areas included the: Town of Watson, Carthage/West Carthage, Town of Lowville, Martinsburg/Glenfield, the Villages of Constableville, Lyons Falls, Port Leyden, and Turin. The Towns of Lewis, Leyden, and Lyonsdale were also included.

The January 2022 report identified the need for additional water in Copenhagen/Denmark and in the Town of Lowville. This most recent investigation indicates Port Leyden is a potential purchaser. The remaining communities appear to have sufficient capacity for their needs or are simply not interested in participating in a regional concept. While there may be a desire to have water service in the Towns of Lewis, Leyden and Lyonsdale the cost of service would be prohibitive on a per user basis.

### Conceptual Designs and Project Cost Estimates for Interconnections

Between the January 2022 Report and this Supplemental Investigation seven (7) projects which could facilitate sharing of resources were identified. The projects were developed to first make use of excess capacity from existing systems since a portion of the infrastructure and investment is already in place (Projects 1, 3, 4, 5 and 6). In the case of the western side of the Town of Lowville (Project 2 and 2A - West Lowville - Lomeo wellfield), based on mapped geology and known attributes of existing hydrogeology, a

new aquifer was identified and a well field could potentially be developed. The projects are identified as follows.

- Project 1: Interconnection between the Town of Denmark/Village of Copenhagen and the Village of West Carthage (January 2022 Report – Project 4) - \$4.5 million.
- Project 2: Development of the Lomeo Wellfield to supply to the west side of the Town of Lowville - \$0.75million.
- Project 2: Optional 2A: To provide a water supply to the west side of Town of Lowville and to Tug Hill Estates - \$1.48 million.
- Project 3: Interconnect the Village of Port Leyden to the Village of Lyons Falls - \$1.54 million
- Project 4: Interconnection between the Town of Watson and Town of Lowville (January 2022 Report - Project 1) - \$1.6 million.
- Project 5: Interconnection between the Town of Lowville and Town of Martinsburg (January 2022 Report - Project 2) - \$2.5 million.
- Project 6: Interconnection between Martinsburg and Glenfield (January 2022 Report - Project 3) - \$1.3 million.

With the exception of the Town of Lowville and the Village of Lowville, the ability to “share” excess resources currently does not exist. While current water supply owners were willing to consider the idea of sharing resources, none were willing to commit without first demonstrating the value to their communities.

Based upon the potential involvement in each of these projects by more than one local governmental entity it was recommended that the County consider serving as the mechanism for planning and project development to prove out the feasibility of each project, acting in a role as the transmission entity or wholesaler. For each Project the County could, as a first step, serve as the facilitator for project development providing the Preliminary Engineering Report (PER) and Financial Assessment/Financing Plan to facilitate the project. Project implementation and cost recovery for the capital project would be defined in the PER/Financing Plan.

Initial Cost of PER and Financing Plans for each project are as follows:

- Project 1: \$20,000
- Project 2 and/or 2A:
  - Wellfield Development: \$50,000
  - PER: \$20,000
- Project 3: \$20,000
- Project 4: \$25,000
- Project 5: \$20,000
- Project 6: \$20,000

## Section 1 – Hydrogeologic Investigations

### 1.1 Groundwater References Used

Groundwater is a significant contributor to existing public water systems in Lewis County and has the potential to provide additional capacity. To evaluate groundwater sources for public supply Miller initially focused on the “Favorable Zones” identified in a 2008 Report. Based on an initial evaluation of the available of the “Favorable Zones” the study area was expanded county-wide. The evaluation involved a review of available resource mapping, scientific literature, consultant reports, existing water system reporting, and interviews with water system regulators and operators.

Reference material that was reviewed included the following.

- Geologic mapping on a regional scale
  - New York State Museum and Science Service Bedrock Geologic Map – Adirondack Sheet
  - New York State Geological Survey Surficial Geologic Map – Adirondack Sheet
  - United States Geological Survey – Potential Yields of Wells in Unconsolidated Aquifers in Upstate New York – Adirondack Sheet
- Review of Regulatory documents
  - NYSDEC Database of water supply wells
  - NYSDEC Public Water Supply Permits
  - NYSDEC Water Withdrawal Authorization
  - NYSDOH Water Supply Approvals
  - Annual Water Quality Reports
  - Water Withdrawal reports
  - Violation Notices
- Review of Consultant Studies
  - Lewis County regional groundwater studies
  - Public Water system reports commissioned by, and provided to, Lewis County municipalities including engineer’s reports, hydrogeologic reports and well driller’s well logs and well yield testing results.

### 1.2 Summary of Available Data

Each of the sources listed above provided unique data that was used to interpret the potential for groundwater availability across the County. This data was also used to interpret the potential water quality that could be expected in certain geologic settings. A summary of the type of information available from each reference source is provided below. A bibliography including reference citations and summary notes is provided as Appendix A.

#### New York State Museum and Science Service Bedrock Geologic Map – Adirondack Sheet

Bedrock geologic maps provided information about the type of bedrock that exists throughout the County. Bedrock may exist at ground surface and is always found in the subsurface. The type of bedrock indicates anticipated groundwater characteristics. In general, limestone in the region contains solution cavities and fractures which can store and transmit large volumes of groundwater. Shale, on the other hand, generally yields lower volumes of water and lower rates of yield.

### New York State Geological Survey Surficial Geologic Map – Adirondack Sheet

Surficial geologic maps provided information on the geologic materials that overlie bedrock and are exposed at ground surface. The mapping provided useful information about the potential for groundwater yield. Sands and gravels yield larger volumes of water and transmit water at relatively high rates. Silts, clays, and glacial till typically do not transmit groundwater in useful quantities.

### United States Geological Survey – Potential Yields of Wells in Unconsolidated Aquifers in Upstate New York – Adirondack Sheet

The aquifer maps rely on reports of existing water well information including depth to water, well yield, and geologic material encountered to identify areas of similar characteristics. Aquifer maps were used to assess information about the expected well yield.

### NYSDEC Database of water supply wells

This database was very useful as it provided information on water wells drilled by licensed well drillers since 2000. The database provides information about depth and location of well, depth of geologic units encountered, well construction details, well yield and the well driller. This information is more specific and localized compared to the mapping described above. Most data in this database includes individual homeowner wells. The database was especially useful for indicating depth to water and geologic formations encountered, however, since homeowner wells require lower yields and volumes than public supply wells, reported well yields may only reflect the amount of water needed, not the full potential of water available.

### NYSDEC Public Water Supply Permits, NYSDEC Water Withdrawal Authorizations and NYSDOH Water Supply Approvals

These documents are required for the development and use of public water systems. Public water systems require higher yields than homeowner wells and must meet water quality requirements for consumer safety. Public water supply permits require detailed investigation of the water source including mapping, well yield testing and water chemistry testing. Often, the permit application contains engineering reports, hydrogeology reports, well logs and pumping test data. This information is useful for evaluating maximum potential for water system yields, the anticipated demands for water and the potential need for water treatment.

### Annual Water Quality Reports and Water Withdrawal Reports

These annual reports are required of existing, permitted, public water supply systems. They provide an indication of reliability of the system over time and the ability of well yields to meet water usage demands. They can also indicate the potential for excess available water to accommodate future uses or population growth.

### Violation Notices

Violation notices provide insights into the operation and maintenance of the public water systems including well yield and water treatment. The nature of violations provides insights into the potential for expanding a system or increasing existing yields.

Raw data that was gathered by Miller from various sources has been assembled and can be accessed through [THIS LINK](#) (Data Link).

## 1.3 Primary Resources Used for Conclusions

All the references described above were important for determining and understanding county-wide groundwater resources. Once the regional picture was determined, the most valuable information



included local data for existing public supply systems. The primary resources for final recommendations were water supply permit information and consultant and driller reports. This information provided specific data at specific locations. Annual water withdrawal and annual quality reports confirm through actual usage the conclusions of the consultant reports.

#### 1.4 Conclusions Reached

This study identified existing and potential sources of groundwater that could be utilized to supplement drinking water supply shortages and/or to accommodate future growth and increased long-term water demand. In conducting this review, the potential new sources were qualitatively determined based on ease of developing increased water production. The preferred order being:

1. use of excess capacity from existing systems since the infrastructure is already in place,
2. developing increased capacity for aquifers and well fields that are already proven to have high yields and then,
3. developing new aquifers and well fields based on mapped geology and known attributes of existing systems.

Miller aligned the evaluation with population centroids. Our study organized identified water sources into three regions of the County (North, Central and South) where favorable aquifers may be developed in support of new population and industrial growth while minimizing the distance from sources to treatment facilities and end users. The designated regions are shown on Figure 1.

Miller's evaluation concluded the following:

1. The best places for high yields of groundwater are east of the NY Power Authority Transmission Line and west of Adirondack Blue Line where glacial outwash deposits occur (Figure 1). Each region of the County (North, Central, South) has access to these areas. Croghan (groundwater), Lowville (groundwater and springs), Watson (groundwater) and Port Leyden (springs) all get water from this area. As a result, Croghan (North), Lowville (Central), Watson (Central) and Port Leyden (South) could access additional groundwater capacity above their current capabilities.

While certain reporting can sometimes be inaccurate and values provided by system operators conflict with Water Supply Authorizations and hydrogeologic reports of aquifer test results, the information, from a planning standpoint, is a strong indicator of potential.

2. The Tug Hill from Rt 26 and Rt 12 west, has poor high yield potential, but possibly higher yield in localized fractures. Miller does not, however, recommend exploring bedrock water sources. There is a high likelihood of low yield, and fractures often lead to surface water influences making for high yield but also making the sources susceptible to contamination and summer drought (example: Stoddard Wells in Copenhagen).
3. Turin is the only system west of Black River that uses a glacial aquifer for supply. This aquifer is the best supply for Tug Hill area. The possibility of small, high yield aquifers which could be readily expanded exist at the intersection of Black River valley and Tug Hill near Turin and Snow Ridge, and west Lowville near intersection of Rt 12 and Co. RT 177.

## Section 2 – Identifying Wholesale Opportunities

### 2.1 Method/Approach

Miller identified and investigated areas of the County that could potentially become wholesale water customers. The January 2022 Report contained several recommendations. As a matter of course, Miller included a brief revisiting and updating of responses and attitudes made for the: Town of Watson, Town of Lowville, Town of Martinsburg (Martinsburg and Glenfield Systems), and the Village of Copenhagen/Town of Denmark.

Communities with water systems previously evaluated in the Southern Lewis County Study, conducted in 2018, were subsequently revisited. The Villages of Constableville, Lyons Falls, Port Leyden, and Turin were contacted to establish their current position or desire to participate as a wholesale customer. Additional communities were also added to the survey based upon location and existence of public water systems. These communities included the Village of Castorland, Town of Croghan/Village of Beaver Falls/Village of New Bremen, and Town of Diana/Village of Harrisville.

### 2.2 Summary of Community Responses

A summary of results of the efforts to contact each community as well as a summary of the conversations is presented below. Data was gathered from each community on average daily water consumption and available capacity to identify the potential for water sale or water purchase. Responses to calls and emails to each community are summarized as follows. The data is included as Appendix B and summarized in the Table 1 below.

#### Town of Watson: Jeff Hoch, Supervisor (Interim)

Mr. Hoch indicated that we could connect with C2EA for the info. He stated the Town was not at all interested in coalition or wholesale opportunities. Calls to C2EA went unanswered. Data was used from the initial study completed in January of 2022 and is included in Appendix B.

#### Town of Lowville: Bob Mullin, Supervisor

The Town continues to express interest in expanding water services and is prepared to consider alternatives. Data was used from the initial study completed in January of 2021.

#### Lowville (Village): Joe Beagle, Mayor, Paul Denise, Public Works Supervisor

Mayor Beagle indicated that we would need to confirm with Mr. Denise that a request for data would have to go in front of the Board. Mr. Denise confirmed that this procedure was needed. The request was placed on the Board's July agenda and subsequently approved. Data was provided.

#### Martinsburg/Glenfield: Terry Thisse, Supervisor, Tyler Jones, Highway Superintendent (Martinsburg)

No additional data was provided. Return calls and emails indicated that Miller Engineers already had all the information they could provide. Data made available during the preparation of the January 2022 report was utilized.

#### Copenhagen (V)/Denmark (T): Mark Souva, Mayor, Kim Vogt, Deputy Mayor

Calls were returned by Ms. Vogt provided additional data. Data gathered for the January 2022 study was also used.

Constableville: Joe Genter (former Mayor), Samantha Brown, Mayor

Connected quickly and eager to help. They were willing to participate if it was mutually beneficial.

Lyons Falls: Donna Dolhof, Mayor, Shane Rogers

Mayor returned call promptly and we were connected with Shane who obtained and provided data. They Mayor indicated they would be interested in participating if there was mutual benefit.

Port Leyden

Date was provided on water usage and permitted withdrawal rates. The Village indicated they were willing to participate as long as it had benefit to them as well.

Turin: Josh Leviker, Mayor

Connected quickly with Mayor Leviker who was more than willing to help. Between emailed data and meeting with the Mayor, available data was received.

Castorland: Mervin Moser, Mayor

Emails/emails were not returned. No data was available. The community was not investigated further.

Croghan/Beaver Falls/New Bremen: Julie Robinson, Mayor

Croghan provides water to Beaver Falls. New Bremen is part of the Beaver Falls system. Connected quickly but the Mayor indicated in a nice way they were not interested in participating in project.

Diana/Harrisville: Zach Smith, Supervisor

Supervisor Smith indicated information could be obtained from DANC. We then obtained data from DANC. No further interest was expressed.

Table 1. Summary of Findings: Water Demand and Wholesale Opportunities

Village/Town	Source (wells/SW)	Max Daily Withdrawal (GPD)	Authorized Withdrawal (GPD)	Excess (GPD)	Notes/Comments
Watson	2 wells	55,300	128,480	73,180	Not interested in cooperating. Water Supply Application Capacity of Well Field 396,000 GPD
Village Lowville/Town Lowville	3 springs	1,550,000	1,600,000	50,000	Town Water Supply can be Restrictred/Town Interrested in Additional Water
Martinsburg	5 wells	100,000	175,000	75,000	January Report Adresses Potential Interconnection
Glenfield	2 wells + backup	75,000	30,000	-45,000	January Report Adresses Potential Interconnection
Copenhagen/Denmark	5 wells	180,000	180,000	0	Water Shortages Reported/Very Willing to Participate
Constableville	Springs	130,000	N/A	N/A	Willing to Participate if Favorable to the Village
Lyons Falls	2 wells	177,100	313,000	135,900	Willing to Participate if Favorable to the Village
Port Leyden	Springs	225,000	120,000	-105,000	Willing to Participate if Favorable to the Village
Turin	2 wells	78,100	167,000	88,900	Willing to Participate if Mutually Beneficial
Castorland	2 wells	82,273	144,000	61,727	Cannot Gauge Did Not Return Calls. No further investigation.
Croghan/Beaver Falls/New Breman	2 wells	300,000	250,000	-50,000	Does Not Wish To Participate
Diana/Village of Harrisville	3 Wells	149,933	598,800	448,867	Information obtained from DANC. Expressed no further interest

## 2.3 Conclusions

The January 2022 report identified the need for additional water in Copenhagen/Denmark and in the Town of Lowville. There is no change in the level of interest by those communities. The most recent investigation indicates the Village of Port Leyden is a potential purchaser with a potential need identified. The Village could potentially expand its current spring fed water supply or, given the apparent excess available from their nearest neighbor, Village of Lyons Falls, share resources. The remaining communities appear to have sufficient capacity for their needs. While there may be a desire to have water service expanded from these southern Village systems into the Towns of Lewis, Leyden and Lyonsdale the cost of service would be prohibitive on a per user basis given the limited number of potential users.

## Section 3 – Project Opportunities

### 3.1 Introduction

The projects identified were developed to first make use of excess capacity from existing systems since a portion of the infrastructure and investment is already in place (Projects 1, 3, 4, 5 and 6). In the case of the western side of the Town of Lowville (Project 2, 2A - West Lowville - Lomeo wellfield) a new aquifer and well field required development based on mapped geology and known attributes of existing hydrogeology. The projects are described below.

### 3.2 Specific Projects

#### Project 1 - Interconnection between Copenhagen and West Carthage (January 2022 Report - Project 1)

The January 2022 report recommended that the Town of Denmark/Village of Copenhagen pursue interconnection with the Village of West Carthage for the supply of supplemental water. The cost of interconnection between the Town of Denmark/Village of Copenhagen and West Carthage is \$4.5 million. Shown on Figure 2.

Capital Cost: \$4.5M

Implementation Time: 36 Months

#### Project 2 – New Lomeo Well to West Side of Town

The opportunity to provide the Town of Lowville with a new water supply to the west side of Town and potentially portions of the Town of Martinsburg through the development of the Lomeo Wellfield is identified in this supplemental report. Development of the well, purchase of the well field and construction of a production well, well house and chlorination, and construction of approximately 4,600 feet of transmission main to connect to the western side of the Town distribution system is shown in concept on Figure 3.

Capital Cost: \$0.75M

Implementation Time: 39 Months

#### Project 2A: New Lomeo Well w/Interconnection between West Side of Town to Tug Hill Estates

The opportunity was identified to provide a water supply to the west side of the Town from the limits of the existing Town distribution system to Tug Hill Estates through the development of the Lomeo Wellfield. Development of the well, purchase of the well field and construction of a production well, well house and chlorination system, and construction of approximately 12,400 feet of transmission main to connect to the Lomeo Wellfield to Tug Hill Estates is shown in concept on Figure 4.

Capital Cost: \$1.48M

Implementation Time: 39 Months

#### Project 3 – Interconnection Port Leyden to Lyons Falls

As an alternative to expansion of the spring fed supply, an opportunity identified in this supplemental report would be to provide the Village of Port Leyden with up to an additional 105,000 gpd from the sale of excess available from the Village of Lyons Falls. Water would be conveyed via a pump station and

approximately 10,600 feet of transmission main along Rt. 12 to a Port Leyden interconnection. The concept is shown on Figure 5.

Capital Cost: \$1.54M

Implementation Time: 36 Months

#### Projects 4, 5, and 6 (January 2022 Report – Projects 1, 2 and 3)

What was evident from the January 2022 Study is that the Town of Watson could provide excess water after completing the Water District #4 Extension #1 project. Further, the analysis shows that the Town of Martinsburg Water District #1 and the Glenfield Water District have excess capacity and could also share water, thereby generating revenue. The Town of Lowville on the other hand, from time to time, is limited. Interconnection between the Town of Lowville and the Town of Watson was considered in the past but not carried forward. This concept should be reconsidered with potential of an interconnection with the Town of Martinsburg Water District #1 as well. A brief discussion on the interconnection concepts is provided below.

#### Project 4 - Interconnection between Watson and Lowville (January 2022 Report - Project 1)

This project would involve the construction of a new 8-inch transmission main of approximately 13,910 linear feet between the Town of Watson and the Town of Lowville. This new transmission main would connect to the existing Town of Watson water distribution system at its western limit on Number Four Road, run south on Markowski Road, and connect to the Town of Lowville water line at the Village of Lowville border on State Route 12. Fire hydrants as well as gate valves would be installed at intervals along the length of the transmission line. The concept is shown on Figure 6.

Capital Cost: \$1.6M

Implementation Time: 36 Months

#### Project 5 - Interconnection between Lowville and Martinsburg (January 2022 Report - Project 2)

This project would involve the construction of a new 8-inch transmission main of approximately 22,035 linear feet between the Town of Lowville and the Town of Martinsburg. This new transmission main would connect to the existing Town of Lowville water main on W. Martinsburg Road, run southeast on B Arthur Road and south on State Route 26 and connect to the Town of Martinsburg water distribution system at its northern limit on State Route 26. Segment 2 also includes connections to the existing water mains from the Town of Lowville that extend into the Town of Martinsburg on State Route 26 and Ross Road (Water District #2). Fire hydrants as well as gate valves would be installed at intervals along the length of the transmission line. The concept is shown on Figure 7.

Capital Cost: \$2.5M

Implementation Time: 36 Months

#### Project 6 - Interconnection between Martinsburg and Glenfield (January 2022 Report - Project 3)

This project would involve the construction of a new 8-inch transmission main of approximately 18,860 linear feet between the Town of Martinsburg to the Hamlet of Glenfield. This new transmission main would connect to the Town of Martinsburg water distribution system at the eastern limit along Glendale Road and run southeast until it connects to the Hamlet of Glenfield's water distribution system on

Glendale Road. Fire hydrants as well as gate valves would be installed at intervals along the length of the transmission line. The concept is shown on Figure 8.

Capital Cost: \$1.3M

Implementation Time: 36 Months

### 3.3 Implementation Plan

With the exception of the Town of Lowville and the Village of Lowville, the ability to “share” excess resources between communities currently does not exist. While current water supply owners were willing to consider the idea of sharing resources, none were willing to commit without first demonstrating the value to their communities. The County should serve as the mechanism for implementation and facilitate the sharing the excess resources by acting as the transmission entity or wholesaler.

As a first step in project development, the Preliminary Engineering Report (PER) and Financial Assessment/Financing Plan would be needed to facilitate the project. Project implementation and cost recovery for the capital projects would be defined in the PER/Financing Plans for each project.

Initial Cost of PER and Financing Plans for each project are as follows:

Project 1: \$20,000

Project 2 or 2A:

- Wellfield Development: \$50,000
- PER: \$20,000

Project 3: \$20,000

Project 4: \$25,000

Project 5: \$20,000

Project 6: \$20,000

For Projects 1, 3, 4, 5 and 6, an allotment of three months for the preparation of a PER would be reasonable leaving 33 months for design, approvals, and construction. For Project 2 or 2A, allow for an additional three months for wellfield development and permitting.

## Section 4 – Conclusions and Recommendations

### 4.1 Conclusions

1. Favorable Zones identified in previous reports do not contain optimal hydrogeologic conditions for high volume yield and should not be considered as first choices for locations of new water supplies.
2. High yielding groundwater sources are found east of the NY Power Authority Transmission Line and west of Adirondack Blue Line where glacial outwash deposits occur. Each region of the County (North, Central, South) has access to these areas.
3. The Tug Hill from Rt 26 and Rt 12 west should be considered as having limited yield potential, with the exception of localized fractures. Fractures often lead to surface water influences making for high yield but also making the supply susceptible to contamination and summer drought. These sources are not recommended.
4. Turin is the only system west of Black River that uses a glacial aquifer for supply. This aquifer is the best supply for Tug Hill area. The possibility of small, high yield aquifers which could be readily expanded exist at the intersection of Black River valley and Tug Hill near Turin and Snow Ridge, and West Lowville near the intersection of Rt 12 and Co. RT 177.
5. Given the close proximity of the West Lowville source to the Town of Lowville's existing distribution system further investigation into well development is warranted.
6. The January 2022 report identified the need for additional water in Copenhagen/Denmark and in the Town of Lowville. There is no change in the level of interest by those communities for additional water.
7. This investigation indicates the Village of Port Leyden is a potential purchaser with a potential need identified. As an alternate to expanding spring fed sources, often subject surficial contamination, obtaining excess available from their nearest neighbor, the Village of Lyons Falls, could be viable. The remaining communities appear to have sufficient capacity for their needs.
8. While there may be a desire to have water service in the Towns of Lewis, Leyden and Lyonsdale the cost of service would be prohibitive on a per user basis given the limited number of potential users.
9. The January 2022 study and this Supplemental Investigation identify six potentially viable projects that could advance the concept of shared resources to the benefit of both the seller and the user.
10. The majority of these projects require the involvement/cooperation of more than one municipal entity. An overarching cooperative could more easily accommodate the financial burdens of project implementation and could open more opportunities for funding.

## 4.2 Recommendations

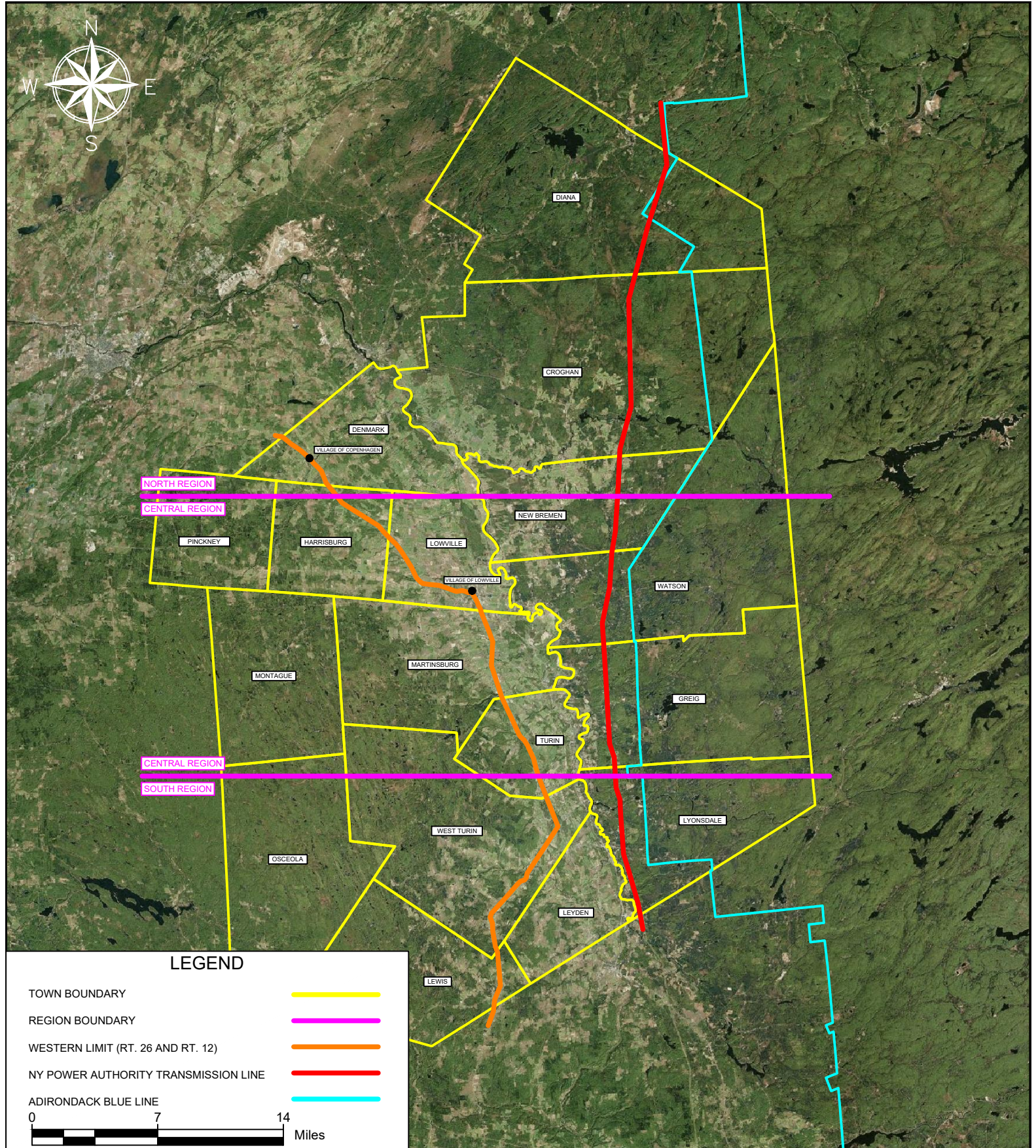
1. The County should continue to consider the formation of a Regional or County led Cooperative to facilitate the intermunicipal shared service agreements, physical interconnections, and source supply investigations and pursue the preparation of the PERs identified in this report.
2. The County on behalf of the towns and villages should pursue grants available through the Regional Economic Development Council URI and the consolidated funding application process, to fund the development of the projects identified.



## *Figures*

*Figure 1*





NORTH REGION

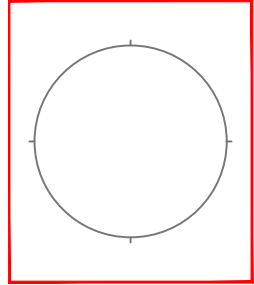
CENTRAL REGION

CENTRAL REGION

SOUTH REGION

**LEGEND**

- TOWN BOUNDARY
- REGION BOUNDARY
- WESTERN LIMIT (RT. 26 AND RT. 12)
- NY POWER AUTHORITY TRANSMISSION LINE
- ADIRONDACK BLUE LINE



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PROJECT TITLE & LOCATION:

**LEWIS COUNTY  
REGIONAL WATER SUPPLY STUDY  
LEWIS COUNTY  
NEW YORK**

DRAWING INFORMATION	
Scale	1" = 7 MILES
Drawn	GMN
checked	TAS
date	02-24-23
job no.	089.015

REVISIONS	

DRAWING TITLE

**LEWIS COUNTY  
REGIONS**

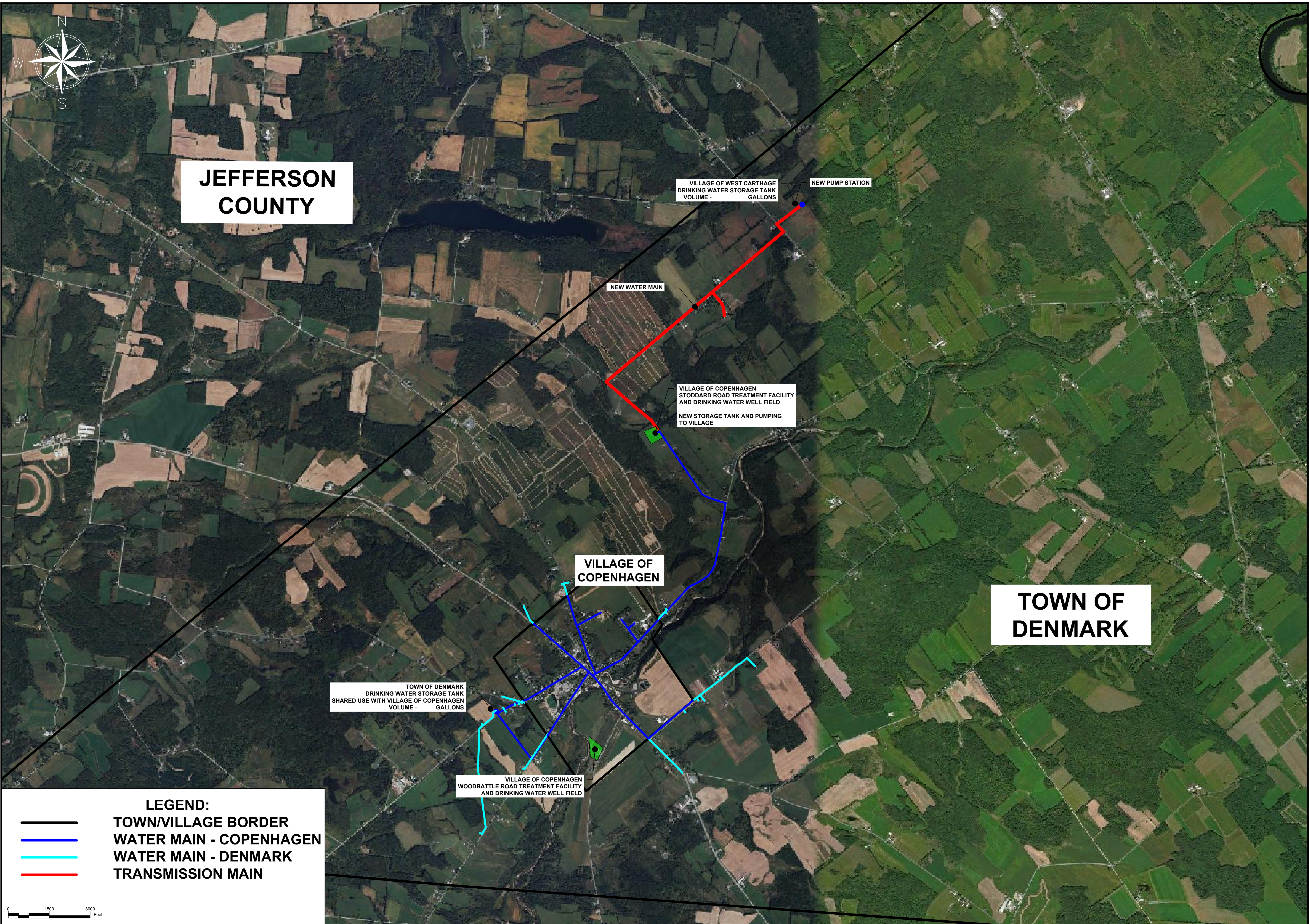
FIGURE NUMBER

**1**



*Figure 2*





**JEFFERSON  
COUNTY**

VILLAGE OF WEST CARTHAGE  
DRINKING WATER STORAGE TANK  
VOLUME - GALLONS

NEW PUMP STATION

NEW WATER MAIN

VILLAGE OF COPENHAGEN  
STODDARD ROAD TREATMENT FACILITY  
AND DRINKING WATER WELL FIELD  
NEW STORAGE TANK AND PUMPING  
TO VILLAGE

VILLAGE OF  
COPENHAGEN

**TOWN OF  
DENMARK**

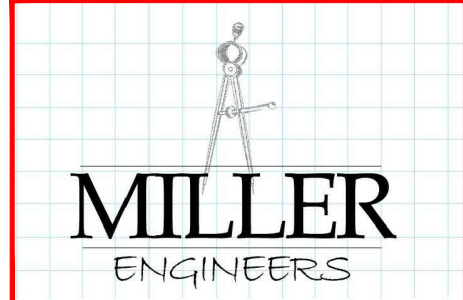
TOWN OF DENMARK  
DRINKING WATER STORAGE TANK  
SHARED USE WITH VILLAGE OF COPENHAGEN  
VOLUME - GALLONS

VILLAGE OF COPENHAGEN  
WOODBATTLE ROAD TREATMENT FACILITY  
AND DRINKING WATER WELL FIELD

**LEGEND:**

-  TOWN/VILLAGE BORDER
-  WATER MAIN - COPENHAGEN
-  WATER MAIN - DENMARK
-  TRANSMISSION MAIN

0 1500 3000  
Feet



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LEWIS COUNTY  
WATER SUPPLY STUDY  
LEWIS COUNTY  
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REGIONAL

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FIGURE TITLE

*Project 1*

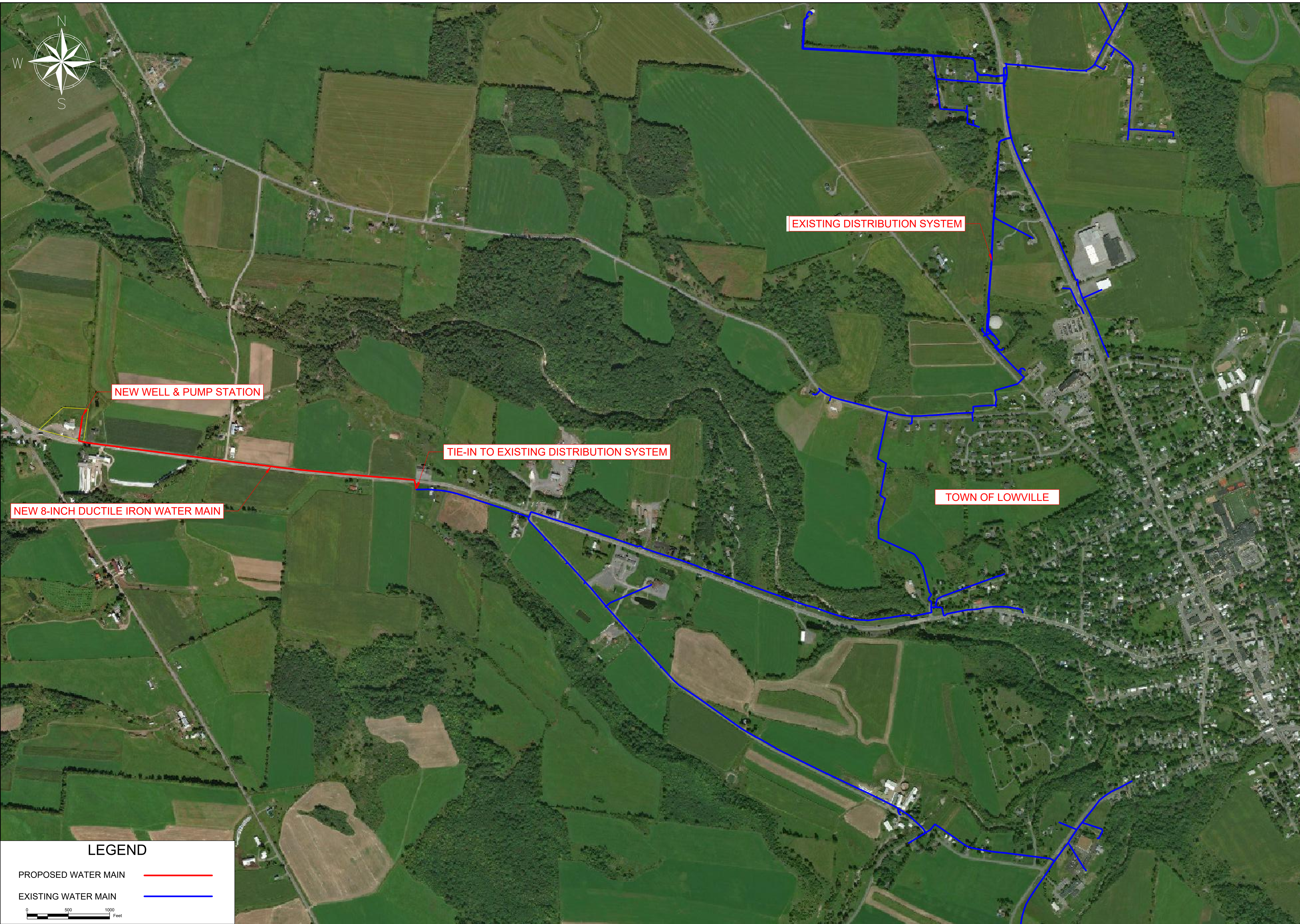
FIGURE NUMBER

**2**



*Figure 3*





NEW WELL & PUMP STATION

TIE-IN TO EXISTING DISTRIBUTION SYSTEM

NEW 8-INCH DUCTILE IRON WATER MAIN

EXISTING DISTRIBUTION SYSTEM

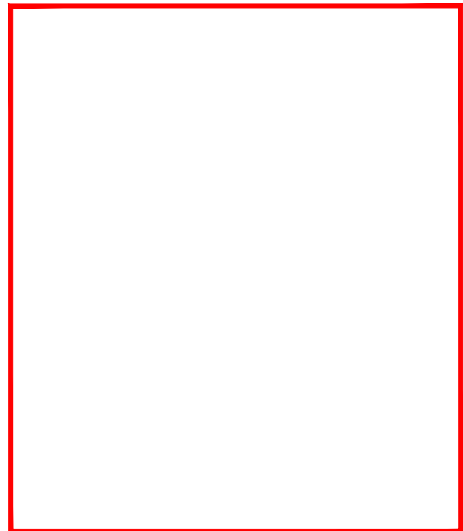
TOWN OF LOWVILLE

**LEGEND**

PROPOSED WATER MAIN —

EXISTING WATER MAIN —

0 500 1000 Feet



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LEWIS COUNTY  
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 LEWIS COUNTY  
 NEW YORK  
 REGIONAL WATER SUPPLY STUDY

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DRAWING TITLE

*Project 2*

FIGURE NUMBER

3



*Figure 4*





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LEWIS COUNTY  
NEW YORK

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DRAWING TITLE  
*Project 2A*

FIGURE NUMBER  
**4**



SERVICE CONNECTION FOR TUG HILL VINEYARDS

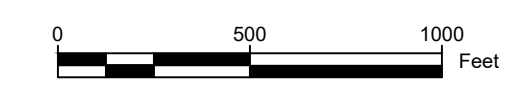
TOWN OF LOWVILLE

NEW 8-INCH DUCTILE IRON WATER MAIN

TIE-IN TO PROPOSED DISTRIBUTION SYSTEM

LEGEND

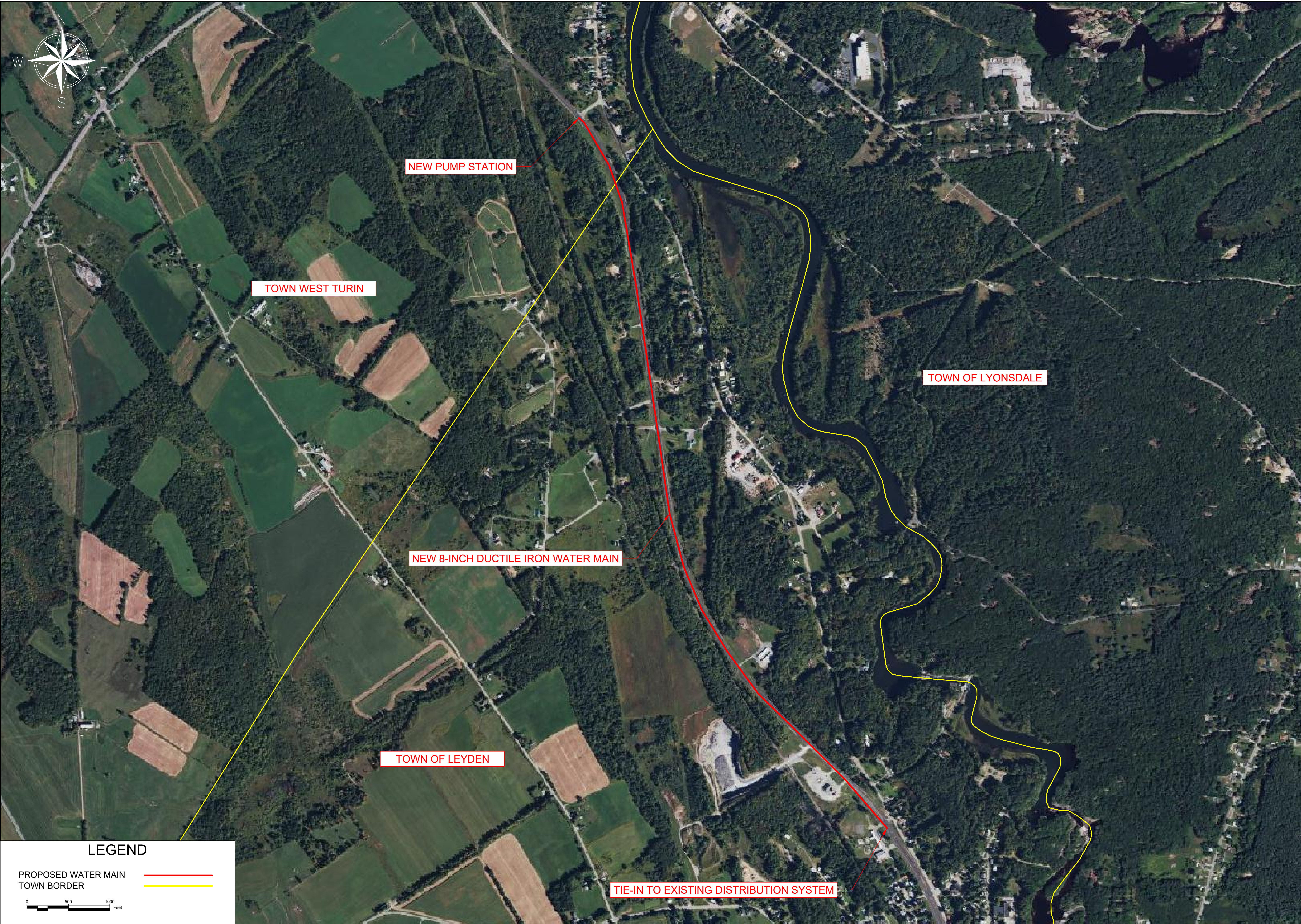
PROPOSED WATER MAIN ———  
TOWN BORDER ———





*Figure 5*





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DRAWING TITLE  
**PROJECT 3**

FIGURE NUMBER  
**5**

**LEGEND**

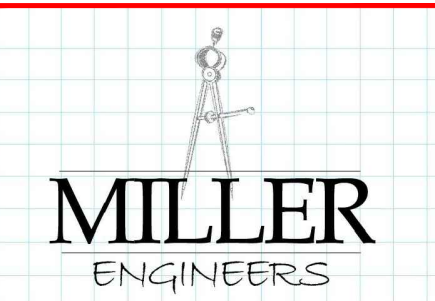
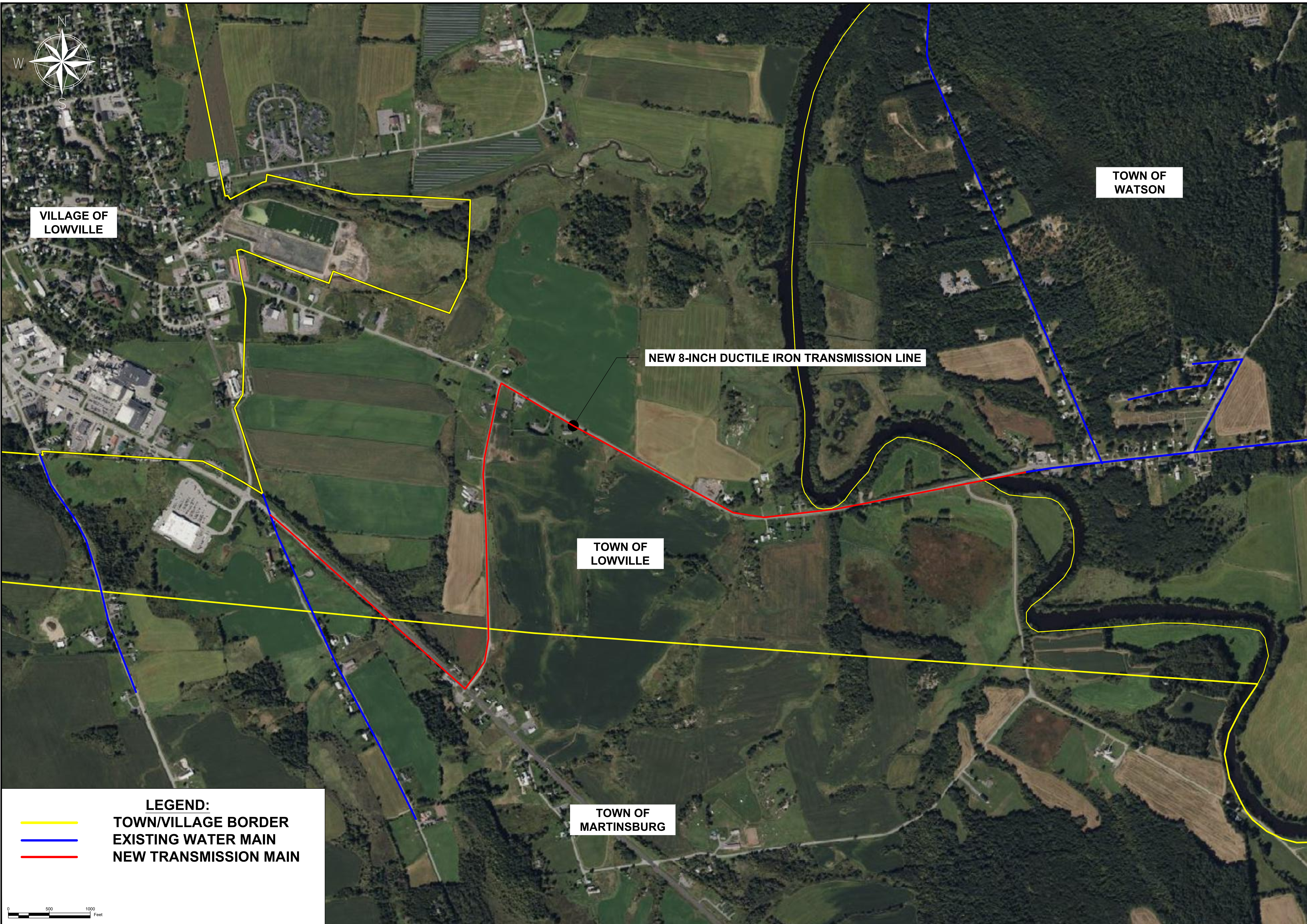
PROPOSED WATER MAIN —

TOWN BORDER —



*Figure 6*





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FIGURE TITLE  
*Project 4*

FIGURE NUMBER  
**6**

VILLAGE OF LOWVILLE

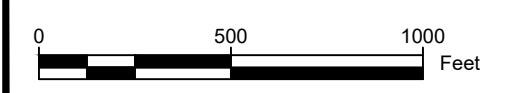
TOWN OF WATSON

NEW 8-INCH DUCTILE IRON TRANSMISSION LINE

TOWN OF LOWVILLE

TOWN OF MARTINSBURG

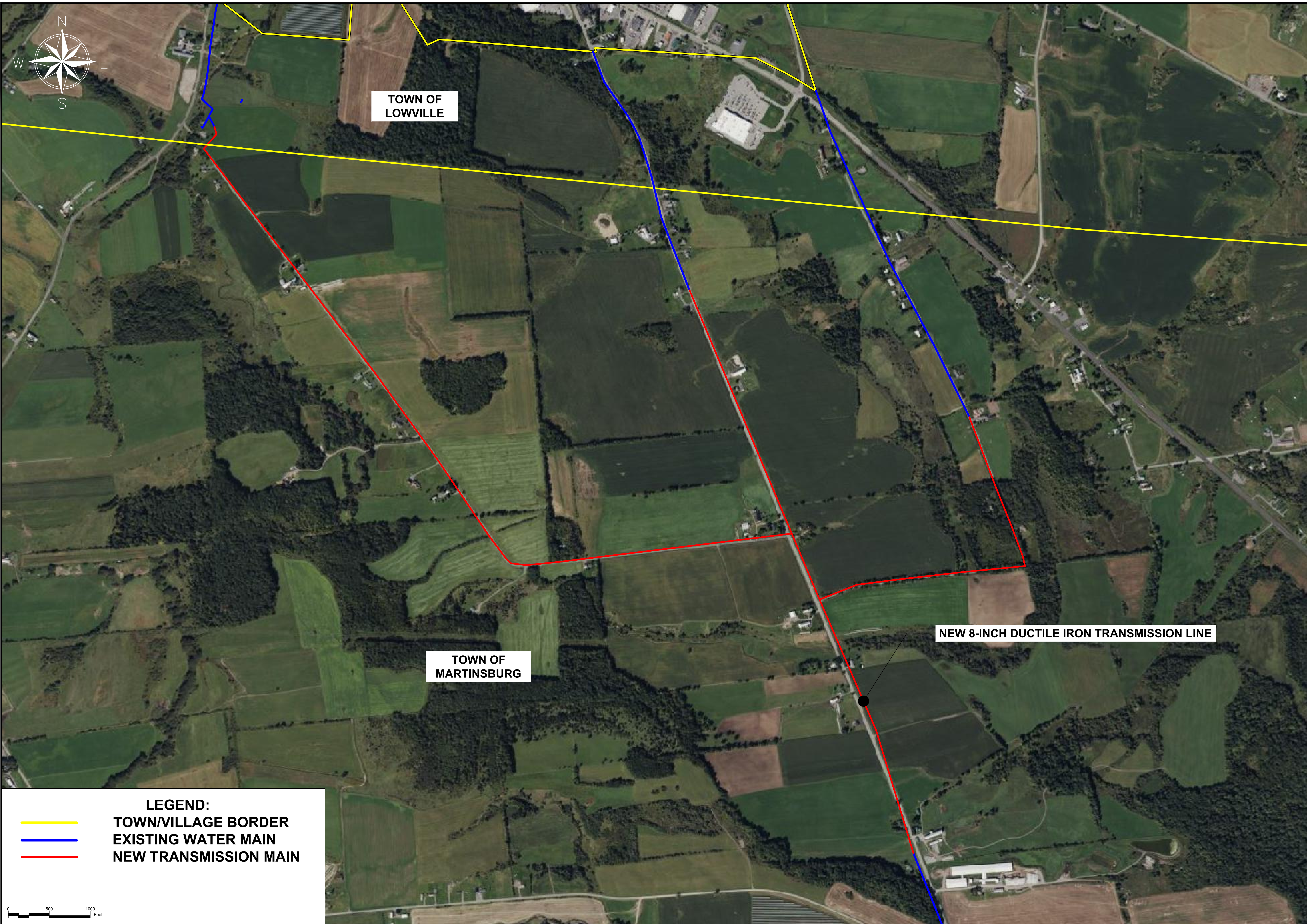
**LEGEND:**  
 TOWN/VILLAGE BORDER  
 EXISTING WATER MAIN  
 NEW TRANSMISSION MAIN





*Figure 7*





TOWN OF  
LOWVILLE

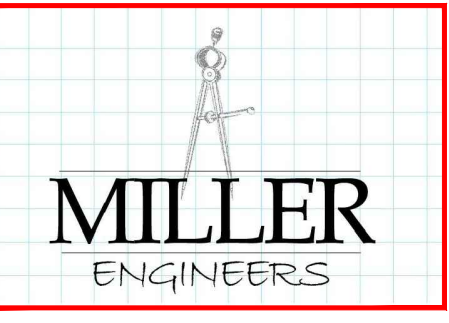
TOWN OF  
MARTINSBURG

NEW 8-INCH DUCTILE IRON TRANSMISSION LINE

**LEGEND:**

- TOWN/VILLAGE BORDER
- EXISTING WATER MAIN
- NEW TRANSMISSION MAIN

0 500 1000 Feet



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LEWIS COUNTY  
NEW YORK

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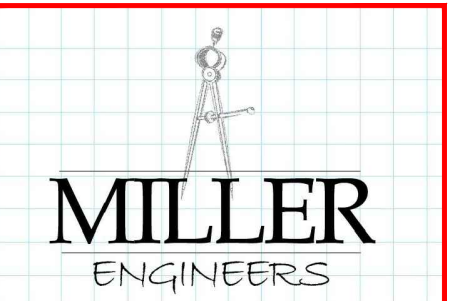
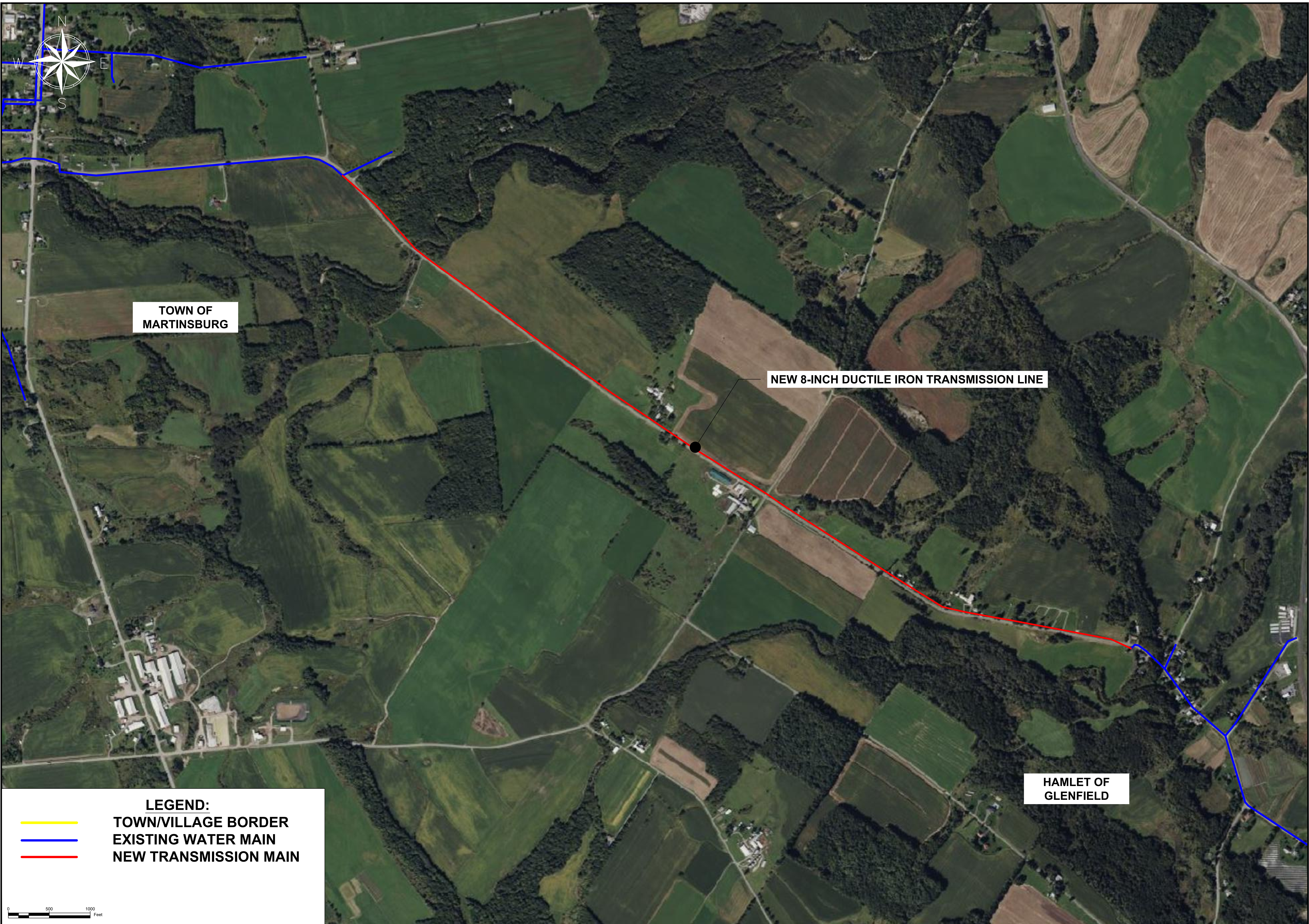
FIGURE TITLE  
*Project 5*

FIGURE NUMBER  
**7**



*Figure 8*





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 LEWIS COUNTY  
 NEW YORK

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FIGURE TITLE  
*Project 6*

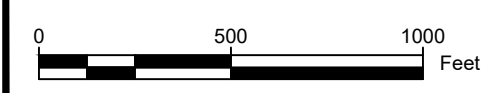
FIGURE NUMBER  
 8

TOWN OF  
 MARTINSBURG

NEW 8-INCH DUCTILE IRON TRANSMISSION LINE

HAMLET OF  
 GLENFIELD

**LEGEND:**  
 TOWN/VILLAGE BORDER  
 EXISTING WATER MAIN  
 NEW TRANSMISSION MAIN





## *Appendices*

## *Appendix A*

# **Appendix A**

## **Annotated Bibliography of Lewis County Public Water Systems Reports**

**Available as of August 2022**

*Revised 12/30/2022 by GG*

### **Abbreviations:**

AWQR - Annual Water Quality Report

Permit WW.WWW\_\_\_\_\_ - Water Supply Permit and index number as recorded with NYSDEC.

SDWIS – Safe Drinking Water Information System

WWR – Water Withdrawal Report

### **General References**

Bergman 2008. Groundwater Assessment and Recommendations Report for the Black River Watershed, NY.

Buddington, 1917. NYS Museum Bulletin no. 296. “Geologic Map of the Lowville Quadrangle.”

Buddington, 1954. Geologic Mapp of the Port Leyden Quadrangle.

Bugliosi, E.F., Trudell, R.A. and Casey, G. D. 1987. Potential Yields of Wells in Unconsolidated Aquifers in Upstate New York – Adirondack Sheet, US Geological Survey: WRI Report 87-4276.

Cadwell, D. H. and Pair, D.L., 1991. Surficial Geologic Map of New York: Adirondack Sheet. Albany, New York State Museum Geological Survey.

Clark Patterson Lee, February 2017. Southern Lewis County Regional Water Feasibility Study, Lewis Co., NY. 134 p.

HydroSource, May 2008. Phase I Report. Favorable Zone Delineation for Development of New groundwater Sources, Lewis County, NY. 13 p. 10 figures.

HydroSource, September 2008. Phase I Report. Favorable Zone Delineation for Development of New groundwater Sources, in Areas of the Villages of Port Leyden, Lyons Falls, Turin and Constableville, Lewis County, NY. 16 p. 10 figures.

Isachsen, Yngvar W., Fisher, D.W. 1970. Geologic Map of New York: Adirondack Sheet. Albany, New York State Museum Geological Survey.

## **Local references by Municipality**

### **Constableville**

Permit.WW.WW000005.1906-04-19.Constableville\_V\_\_final\_permit.

### **Copenhagen**

Barton and Loguidice 2020. Copenhagen Water Supply Eval.

Report evaluates 3 alternatives for providing back up water supply to Village. Alt 1. Rehab Woodbattle Road treatment facility, Alt. 2 - get raw water from Carthage Alt. 3 - Buy Treated water from W. Carthage. Reports Stoddard Well field info for PW-3, 4 and 5 from NGI reports. Notes that Pumping Test procedures weren't followed - pre-test water level and surface water levels were not recorded. Well Yields are 300 gpm. 45 and 133 gpm, respectively. Surface water influence. Hard water. Village shares water tower with T. of Denmark. Woodbattle Road wells have decreased in yield. Alt. 1 - Rehab Woodbattle Road wells and facility is recommended.

Bernier Carr 1990. Engineer Report Copenhagen.

Report on Woodbattle Road Wells. Terran research (Jim Young) did pumping test. A map of well locations is in Appendix A. Well one pumping test showed 100 gpm. high iron in water. some river influence.

Bernier Carr 2010. Letter to DOH summarizing well yields.

Hanson Van Vleet, April 2019. Stoddard Road Well Field Evaluation Final Report.

NGI, August 2006. Copenhagen Fracture Trace Rpt.

No surficial aquifers in Copenhagen. Fracture trace to optimize bedrock drilling. Copenhagen officials identified two springs which turned out to be on lineaments mapped in this report (but not shown on figures). 9 well locations were proposed for further study. Drilling of sites 1 -4 was recommended.

NGI, August 2009. FINAL REPORT Copenhagen Wells PW-3 and PW-4\_080609.

Test wells in upland areas were 400 ft and 800 ft deep - low yield or dry. PW-3 hit fractures at Stoddard Road and had high yield 300 gpm, but surface water influence. PW-4 45 gpm. PW-3 and 4 water is very hard.

NGI, July 2010. FINAL REPORT-Test Well Drilling and Pumping Test report – Public Water Supply Well PW-5. Village of Copenhagen, NY.

Drilling of PW-5 as backup to PW-3. Aim for same fracture as PW-3. Yield is 133 gpm. Pumping test caused neighbor residential well to go dry. Coliform in well. Very hard water.

AWQR 2020 Copenhagen\_Annual-water-report-2020.doc"

AWQR 2021 Annual\_Water\_Quality\_Report\_Copenhagen\_V\_2021.doc"

NYS Rural Water Assoc, 2010. Copenhagen Well Head Protection Report.

Permit.WW.WW008571.1990-12-03.Copenhagen\_V\_\_1st\_permit\_only\_.

Permit.WW.WW011262.2009-10-21.Copenhagen\_V\_\_2nd\_permit\_only\_.

Permit.WW.WW011475.2020-08-07.VgCopenhagen.

WWR 2018 Copanhagen\_Report.WW.Multiple.2021-03-09.WWR0000331.2018Annual\_x.

WWR 2019 Copanhagen\_Report.WW.Multiple.2021-03-09.WWR0000331.2019Annual\_x.

WWR 2020 Copenhagen.

WWR 2021 Copenhagen.

### **Croghan**

Bernier and Carr, 1996 GPW 2 Proposed Well Design Croghan NY.

Bernier and Carr, 1996? Pumping test Line Graph of Pumping test GPW 2, Croghan NY.

Permit.WW.WW000058.1909-11-22.Croghan.

Permit.WW.WW000712.1932-10-19.Croghan.

Permit.WW.WW000806.1934-01-18.Croghan.

Permit.WW.WW009649-1998.Croghan.

### **Diana**

DANC 2019. Initial Water Withdrawal Application T. of Diana - Final Combined.

EDR 2022. New Water Project Technical Specs.

EDR May 2022. New Water Project Review Drawings.

EDR, 2021-10\_Preliminary Engineering Report Diana.

Permit.WW.WW012478.2020-09-22.DianaTnOf.

### **Glenfield**

Permit.WW.WW004381.1963-06-06.Glenfield.

Permit.WW.WW009254.2004-03-29 Glenfield\_WD\_permit\_only.

Permit.WW.WW009254.2004-03-29 Glenfield\_WD\_permit\_pkg.

SDWIS\_Glenfield - Martinsburg Violation Summary.

SDWIS\_Glenfield - Martinsburg\_ViolationSummary1.

WWR 2017 Glenfield\_Report.WW.Multiple.2018-02-09.WWR0000597.2017Annual\_x.

WWR 2019 Glenfield\_Report.WW.Multiple.2020-03-13.WWR0000597.2019Annual\_x.

**Lowville (Town)**

C2AE June 2014 - Town of Lowville & Watson Preliminary Planning Effort to Evaluate Various Water System Options - June 2014.

Report prepared to address THMs in Lowville and Oil Spill in Watson. Proposes new water source and system to better spend funds than addressing replacement water supplies for 6 spill victims in Watson. HydroSource did groundwater source evaluation report with recommendations. Town did not follow up w/geophysics. Hired Moravic drilling to drill test wells in one favorable Zone. Test wells did not indicate good water supply.

HydroSource, Oct 2009. Proposal for Geophysics at Lowville favorable Zones.

HydroSource, Sept. 28, 2008. Phase I Report - Favorable Zones for Town of Lowville.

Favorable Zones delineated in T. of Lowville. Most are in Village, low elevation, near river, small property parcels- see fig 6. One site is in West Lowville - glacial kame deposit - see Fig 7. paper lists possible contaminant sources in Town - see Fig 5. Names Lomeo as a volunteer with well on sand and gravel. Lomeo has limitations with regard to possible shallow thickness and potential contamination.

Thesier Engineers, May 2011. Ground Water Investigation, Town of Lowville-Moravic Well driller report.

2 test borings were drilled on Waters Road in Lowville. This location is on the west side of the Black river - elevation approx. 750 ft. TB-1 was 83 deep to bedrock - pink granitic gneiss. Lacustrine clay overlies rock - not good for water. TB-2 50 deep till over bedrock - not good for water.

Permit.WW.WW008881.1993-06-08.LowvilleWD4.

Permit.WW.WW009741.LowvilleWD9.

Permit.WW.WW010778.2005-11-30.Lowville\_ConsolidatedWD.

Permit.WW.WW008011.1988-04-27.LowvilleWD1.

Permit.WW.WW008548.1990-10-12.Lowville\_WD2.

Permit.WW.WW008661.1991-07-26.LowvilleWD3.

Permit.WW.WW008677.1991-07-26.LowvilleWD4.

Permit.WW.WW008678.1991-07-26.LowvilleWD5.

Permit.WW.WW008679.1991-07-26.LowvilleWD6.

Permit.WW.WW008680.1991-07-26.LowvilleWD7.

Permit.WW.WW008681.1991-07-26.LowvilleWD8.

### **Lowville (Village)**

NGI, Feb 2019 Village of Lowville GW Source Investigation 022719.

This report evaluates groundwater as a way to reduce disinfection of Lowville water supply. Small diameter test wells installed in 2010 were re re-evaluated and met treatment criteria. V. of Croghan wells were compared and found similar - low disinfection needs. 2 large diameter wells were recommended to be drilled with expectation of high well yields (> 400gpm). GW is recommended to be blended with surface water to reduce overall concentration of treatable organics.

NGI, Feb 2021 Village of Lowville Well 1 and Well 2 Const Testing FINAL Report.

2 wells pump tested with yields of 260 gpm and 200 gpm. pumping reduces small stream discharge near wells. combined safe pumping rate determined to be 360 gpm. water quality is good.

NGI, Sept 2021 Water Resources Study Village of Lowville FINALv2.

This report lists 2 new production wells PW-1 and PW-2 with yields of 260 and 200 gpm. It describes the current Lowville Village water supply system and the local geology influencing potential groundwater sources. 5 locations near the Lowville reservoir are recommended for further study.

Permit.WW.WW001499.1941-09-23.Lowville.

Permit.WW.WW001687.1946-02-05.Lowville.

Permit.WW.WW003993.1961-05-02.Lowville.

Permit.WW.WW006145.1972-06-03.Lowville.

Permit.WW.WW006578.1975-07-31.Lowville.

Lowville-V\_Report.WW.Multiple.2019-03-15.WWR0000933.2018Annual\_x.

Lowville-V\_Report.WW.Multiple.2020-03-09.WWR0000933.2019Annual\_x.

Lowville-V\_Report.WW.Multiple.2021-02-19.WWR0000933.2020Annual\_x.

### **Lyons Falls**

Permit.WW.WW003964.1961-05-02.Lyons\_Falls\_V\_\_permit\_only.

Permit.WW.WW009634.1998-04-30.Lyons\_Falls\_V\_\_permit\_w\_WCPF.

Permit.WW.WW009634.LyonsFalls.



### Lyons Falls Water System description.

Document received from Shane Rogers - DPW Super. Summarizes system and 1991 violations - surface water and springs with bacteria. Says WS permit app was approved in 2000 (NYSDEC records say 1998 and nothing newer. Two wells approved for yield of 78 and 140 gpm, each. Peak demand was 321,000 gpd. Permit conditions required hydro report, drawdown data, backup supply etc.

Permit.WW.WW000004.1906-03-28.Lyons\_Falls\_V\_\_permit\_only.

Permit.WW.WW003964.1961-05-02.Lyons\_Falls\_V\_\_permit\_only.

Permit.WW.WW009634.1998-04-30.Lyons\_Falls\_V\_\_permit\_w\_WCPF.

Permit.WW.WW009634.LyonsFalls.

### **Martinsburg**

Permit.WW.WW008724.1991-11-07.MartinsburgWD2.

Permit.WW.WW000026.1907-07-15.Martinsburg.

Permit.WW.WW007337.1983-03-14.Martinsburg.

### **Port Leydon**

Laberge, 1992 Preliminary Engineering Report Water System Improvements 102 p.

Permit.WW.WW009589.PortLeyden\_\_1\_\_Redacted.

Permit.WW.WW000119.1912-09-10.Port\_Leyden\_V\_\_permit\_w\_completed\_works.

Permit.WW.WW009589.1997-11-26.Port\_Leyden\_V\_\_permit\_only.

### **Turin**

Turin Water system map 2021-04-30.

NYS Rural Water Assoc, 1994. Turin WHP Plan 1994.

Permit.WW.WW000294.1922-07-20.Turin.

Permit.WW.WW005679.1969-06-05.Turin.

Permit.WW.WW009625.1998-01-16.Turin\_V\_\_permit\_w\_WCPF.

## Watson

C2AE June 2014 - Town of Lowville & Watson Preliminary Planning Effort to Evaluate Various Water System Options - June 2014.

HydroSource, Sept. 2008. Phase I Report, Identification of favorable Zones ...High-Yield Well Siting Surveys.

HydroSource, July 2009. Geophysical Survey Results T. of Watson.

HydroSource, April 2018. Watson NY Well Siting Geophysical Surveys Report 4-16-18.

Presents geophysical survey results from preferred area in Watson near the Black River. Favorable well sites were proposed for drilling.

HydroSource, Jun 2020. Watson Final Report C2AE 6-18-20.

HydroSource, Nov 2013. Test Well Results Town of Watson.

Permit.WW.WW008547.1990-11-09.WatsonWaterDistrict\_2.

Permit.WW.WW008726.1990-12-10.WatsonWaterDistrict\_3.

Permit.WW.WW008738.1992-05-29.WatsonWaterDistrict\_4.

Permit.WW.WW008739.1992-05-29.WatsonWaterDistrict\_5.

Permit.WW.WW008740.1992-05-29.WatsonWaterDistrict\_6.

Permit.WW.WW008741.1992-05-29.WatsonWaterDistrict\_7.

Permit.WW.WW008742.1992-05-29.WatsonWaterDistrict\_8.

Permit.WW.WW012572.2021-03-25.Watson\_T\_.

## *Appendix B*

**Appendix B**

**Town of Watson**  
Water Withdrawal Reporting Form(s)

Year	Well Yield (gpm)			Daily Withdrawal (gpd)		Permitted*	Excess	
	Well 1	Well 2	BOCES Well	Average	Maximum		GPD	GPM
2021							0	
2020							0	
WS App Request	288,000	108,000			55,300	128,480	73,180	51

\* as reported on 2021 WSA  
nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes
PW-1	68	UW	200	10" dia
PW-2	68	UW	75	10" dia

**Water Supply Permit (Expiration date - 3/31/2026)**

Year Issued	No.	Notes
1990	8547	
1990	8726	
1992	8738	
1992	8739	
1992	8740	
1992	8741	
1992	8742	
2021	12571	Authorizes water districts and new well field with PW-1 (200 gpm), PW-2 (75 gpm) and combined max w/d of 128,480 gpd. Cannot pump both wells simultaneously.

**Appendix B**

**Village of Lowville/Town of Lowville**

**SPRINGS**

Water Withdrawal Reporting Form(s)

Year	Well Yield (gpm)			Daily Withdrawal (gpd)			Permitted*	Excess
	Well 1	Well 2	Up Spring	Main Spring	Young's Pond	Average		
2021								0
2020	na	na	200,000	200,000	1,500,000	1,254,000	1,550,000	50,000

\* as reported on 2020 WWRF

nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes
Well No. 1	43	UW	260	
Well No. 2	41	UW	200	
				Combined yield 360

**Water Supply Permit (Expiration date - none)**

Year Issued	No.	Notes
1941	1499	
1946	1687	
1961	3993	
1975	6578	
1988	8011	
1990	8548	
1991	8661, 8677, 8678, 8679, 8680, 8681	
1993	8881	
1999	9741	
2005	10778	Consolidates water districts and authorizes 30,000 gpd annual average w/d.

**Appendix B**

**Town of Martinsburg**  
Water Withdrawal Reporting Form(s)

Year	Well Yield (gpm)					Daily Withdrawal (gpd)		Permitted*	Excess
	Well 1	Well 2	Well 3	Well 4	Well 5	Average	Maximum		
2021									0
2020	70	26	27	95	136	49,323	100,000	175,000	75,000

\* as reported on 2020 WWRF  
 nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes
Well 1	29	BR	70	
Well 2	29	BR	26	
Well 3	29	BR	27	
Well 4	29	BR	95	
Well 5	29	BR	136	

**Water Supply Permit (Expiration date - none)**

Year Issued	No.	Notes
1907	26	
1983	7337	
1991	8724	Acquisition of private water supply system and 302,500 gallons per year from Lowville connection

**Appendix B**

**Village of Glenfield**  
Water Withdrawal Reporting Form(s)

Year	Well Yield (gpm)			Daily Withdrawal (gpd)		Permitted*	Excess		
	Well 1	Well 2	BOCES Well	Average	Maximum				
2021							0		
2020	30	55	---	---	---	30,794	75,000	30,000	-45,000

\* as reported on 2020 WWRF  
 nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes
Well 1	200	UW	20	
Well 2	200	UW	60	
BOCES Well			70	

**Water Supply Permit (Expiration date - none)**

Year Issued	No.	Notes
1963	4381	
2004	9254	Authorizes replacing 5 springs with 2 wells with limit of 30,000 gpd 30-day average. Well 1 approved for 20 gpm, well 2 for 60 gpm and BOCES well as a backup at 70 gpm. (1995 S&W data is not good)

**Appendix B**

**Village of Copenhagen/Town of Denmark  
Water Withdrawal Reporting Form(s)**

Year	Well Yield (gpm)				Daily Withdrawal (gpd)		Permitted*	Excess
	Well 2	Well 3	Well 4	Well 5	Average	Maximum		
2021	nr	300	45	nr	93,600	180,000	180,000	0
2020	50	300	45	133	93,600	180,000	180,000	0

\* as reported on 2020 WWRF  
nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes
PW-1	94	Bedrock	88	Woodbattle Rd
PW-2	105 or 98	Bedrock	50	Woodbattle Rd
PW-3	195	Bedrock	300	Stoddard rd - Surface influence
PW-4	275	Bedrock	45	Stoddard rd - Surface influence
PW-5	195	Bedrock	133	Stoddard rd - Surface influence

**Water Supply Permit**

Year Issued	No.	Notes
1990	8571	
2009	11262	
2020	11475	Authorizes Stoddard well 5 to w/d water at 85 gpm. W/d of 180,000 gpm combined from PW-3,4 and 5. W/d up to 72,000 gpd from PW-1,PW-2 at Woodbattle Rd.



**Appendix B**

**Constableville  
Surface Water**

Water Withdrawal Reporting Form(s)

Year	Well Yield (gpm)		Daily Withdrawal (gpd)				Permitted*	Excess
	Well 1	Well 2	Well 3	Well 4	Average	Maximum		
2021								0
2020	No data							0

\* as reported on 2020 WWRF  
nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes

**Water Supply Permit**

Year Issued	No.	Notes
1905	5	Authorizes use of a spring near the intersection of White River and Sugar River to fill a 1 million gal reservoir for water supply

**Appendix B**

**Village of Lyons Falls**  
Water Withdrawal Reporting Form(s)

Year	Well 1	Well 2	Well 3	Daily Withdrawal (gpd)		Permitted*	Excess
				Average	Maximum		
2021	nr	nr	nr	140,000	159,000	313,000	154,000
2020	nr	nr	nr	136,150	177,100	313,000	135,900

\* as reported in Village of Lyons Falls report from Shane Rogers for 2000 Water Supply Permit  
 nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes
Well 1			78	described in partial report from Lyons Falls
Well 2			140	

**Water Supply Permit (Expiration date - none)**

Year Issued	No.	Notes
1906	4	
1961	3964	
1998	9634	Install 2 wells with combined capacity of 218 gpm

**Appendix B**

**Port Leyden  
Surface Water**

Water Withdrawal Reporting Form(s)

Year	Well Yield (gpm) (springs)				Daily Withdrawal (gpd)		Permitted*	Excess
	River 1	River 2	Well 3	Well 4	Average	Maximum		
2021						225,000*	120,000**	-105,000

\* Reported on WWRF

\*\* Existing Water Supply Permit

nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes

**Water Supply Permit (Expiration date - none)**

Year Issued	No.	Notes
1912	119	
1997	9589	

**Appendix B**

**Village of Turin**  
Water Withdrawal Reporting Form(s)

Year	Well Yield (gpm)			Daily Withdrawal (gpd)		Permitted*	Excess
	Well 1	Well 2	Well 3	Average	Maximum		
2021	67	42	--	36,260	77,500	167,000	89,500
2020	67	42		30,780	78,100	167,000	88,900

\* as reported on 2021 WWRF  
 nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes
Well 1	50	BR	67	
Well 2	73	BR	42	

**Water Supply Permit (Expiration date - none)**

Year Issued	No.	Notes
1922	294	
1969	5679	
1998	9625	Install 2 wells with combined capacity of 75 gpm to replace reservoir having poor quality water.

**Appendix B**

**Village of Castorland  
Groundwater**

Water Withdrawal Reporting Form(s)

Year	Well Yield (gpm)		Well 3	Well 4	Daily Withdrawal (gpd)		(gpd) Permitted*	Excess
	Well 1	Well 2			Average	Maximum		
2021	nr	nr	---	---	28,037	82,273	144,000	61,727
2020								0

\* as reported on 2021 WWRF  
nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes
Primary Well	197	BR		pumped alternately by week
Primary Well	210	BR		permtted for combined yield of 100 gpm (144,000 gpd)

**Contacts:**

Robin A. Grunert, Castorland Clerk/Treasurer (315)376-3895  
Brian Nutting, DANC 315-405-6322

**Water Supply Permit**

Year Issued	No.	Notes
1977	6701	Take over "Climax System". Install 2 wells with combined capacity not to exceed 100 gpm. New piping and storage

**Appendix B**

**Village of Croghan/Beaver Falls/New Bremen**  
Water Withdrawal Reporting Form(s)

Year	Well Yield (gpm)		Well 3		Well 4		Daily Withdrawal (gpd)		Permitted*	Excess
	Well 1	Well 2	Well 3	Well 4	Average	Maximum				
2021										0
2020	350	290	---	---	168,000	300,000	250,000			-50,000

\* as reported in 1998 WSA no. 9649  
 nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes
Well 1	57	UW	420	
Well 2	39	UW	170	

**Water Supply Permit**

Year Issued	No.	Notes
1909	58	
1932	712	
1934	806	
1998	9649	Authorizes 2 wells combined to w/d 30-day average of 250,000 gpd. On 24 hr basis, Well 1 approved for 420 gpm. Well 2 approved for 170 gpm

**Appendix B**

**Town of Diana/Village of Harrisville**  
Water Withdrawal Reporting Form(s)

Year	Well Yield (gpm)					Daily Withdrawal (gpd)		Permitted*	Excess
	Well 1	Well 2	Well 3	Well 4	Well 5	Average	Maximum		
2021									0
2020	100	45	271	---	---	65,827	149,933	598,800	448,867
Permit	100	29	271	---	---				

\* as reported on 2020 WWRF  
 nr - not reported

**Well Specifications**

Well ID	Depth	BR or UW	Max yield	Notes
PW-1	110		100	
PW-2	140		29	
PW-3	283		271	

**Water Supply Permit (Expires 9/21/2025)**

Year Issued	No.	Notes
2020	12478	Authorizes transfer of water system from Harrisville to T. of Diana and w/d of 158,400 gpd. PW-3 is primary. PW-1 and 2 are auxiliary.

*End of Document*