Cayuga County Water and Sewer Authority

7413 County House Road
Auburn, New York 13021

DRAFT

ENGINEERING REPORT
for the
PROPOSED HONOCO ROAD WATER SYSTEM

DRAFT

March 2021

MRB Group Project No. 0303.20002.000

DRAFT

Prepared by:

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EXECUTIVE SUMMARY

The Cayuga County Water and Sewer Authority (CCWSA) retained MRB Group to evaluate the feasibility of providing potable water service to serve approximately 157 parcels located along Honoco Road, which runs along the eastern shoreline of Cayuga Lake. Several options to supply water to Honoco Road were considered, including:

- Option #1 - Extending water service from the Village of Aurora along Lake Road/Sunset Beach Drive to Honoco Road, serving the 157 parcels on Honoco plus an additional 75 existing residences along Sunset Beach Drive and Lake Road, for a total of 232 Equivalent Dwelling Units (EDUs).
- Option #2 - Building a new water treatment plant (WTP) near Long Point State Park to serve only the 157 parcels on Honoco Road, plus 31residences along Lake Road, for a total of 188 EDUs.
- Option #3 - Extending water service from the Bolton Point Water Treatment Plant (WTP) in Tomkins County along Cayuga Lake to serve the Honoco Road area, the residences along Cayuga Lake between the Tomkins County line and Honoco Road, plus the residences along Sunset Beach Drive, Lake Road, and the Village of Aurora, allowing the Aurora WTP to be decommissioned. This option would serve a total of 597 EDUs.
- Option #4 - Building a new water treatment plant (WTP) near Long Point State Park to serve the Honoco Road area, the residences along Cayuga Lake between the Tomkins County line and Honoco Road, plus the residences along Sunset Beach Drive, Lake Road, and the Village of Aurora, allowing the Aurora WTP to be decommissioned. This option would serve a total of 597 EDUs.

The evaluation determined that the decision on how best to frame a potential project was complicated by many factors. Each option considered had benefits and drawbacks, and affected significantly different numbers of potential customers, making comparison of the options difficult.

The following table summarizes the findings:

Option	Description	# of EDU's	Project Cost	Cost/EDU based on 30-year loan at 3%
1	Village of Aurora Supply along Lake Road/Sunset Beach Drive	232	$5,769,000	$1,269
2	Small WTP at Long Point to Serve Honoco Only	157	$7,887,000	$2,140
3	Bolton Point Supply all the way to Aurora	597	$12,109,000	$1,035
4	Larger WTP at Long Point to Serve Honoco, Lake Road/Sunset Lane, Village of Aurora, Fire Lane 6 and Clearview Road	597	$10,501,000	$897

We recommend that CCWSA review and then discuss this Engineering Report to help determine if a project to bring water to the Honoco Road area fits in with the Authorities plans.

I. PROJECT BACKGROUND AND HISTORY

The northern end of Honoco Road is located about three miles south of the Village of Aurora, along the eastern shoreline of Cayuga Lake. Honoco Road stretches for about 3.6 miles (19,200 linear feet). Honoco Road is located mostly within the Town of Ledyard, with the southern end being in the Town of Genoa.

The Honoco Road area contains approximately 157 parcels of land that are tightly clustered along the shoreline of the lake. It contains a mix of seasonal and year round houses. Honoco Road and the homes along it are located between Cayuga Lake to the west and a steep incline to the east, with almost no buildable land available to widen the roadway or increase the size of the lots. Most residents along Honoco Road currently use outhouses for sanitary sewage disposal, while some have underground holding tanks. They also use privately owned lake water intakes for their grey water and are not presently served with public water. Honoco Inc., also known as Honoco Road Association, is a homeowner's association which maintains the gravel road and informs the residents about developments in the area.

The Cayuga County Water and Sewer Authority (CCWSA) engaged MRB Group to prepare an Engineering Report to evaluate the alternatives for providing public water to Honoco Road for potable use and fire protection.

This Engineering Report will serve as a necessary document for the Authority to pursue funding assistance from the Drinking Water State Revolving Fund (DWSRF) program, and the NYS Water Infrastructure Improvement Act (WIIA) grant program for construction of the proposed water system.

Preparation of this Engineering Report is wholly funded by the Authority.

A. Site Information

Honoco Road is located along the eastern shoreline of Cayuga Lake, between Aurora and King Ferry, in New York's Finger Lakes Region. This is desirable real estate of significant natural beauty, including year-round recreational activities. The northern end of Honoco Road intersects Lake Road near Long Point State Park, about 1 mile west of NYS Route 90. Figure I.1 is a map showing the Honoco Road area.

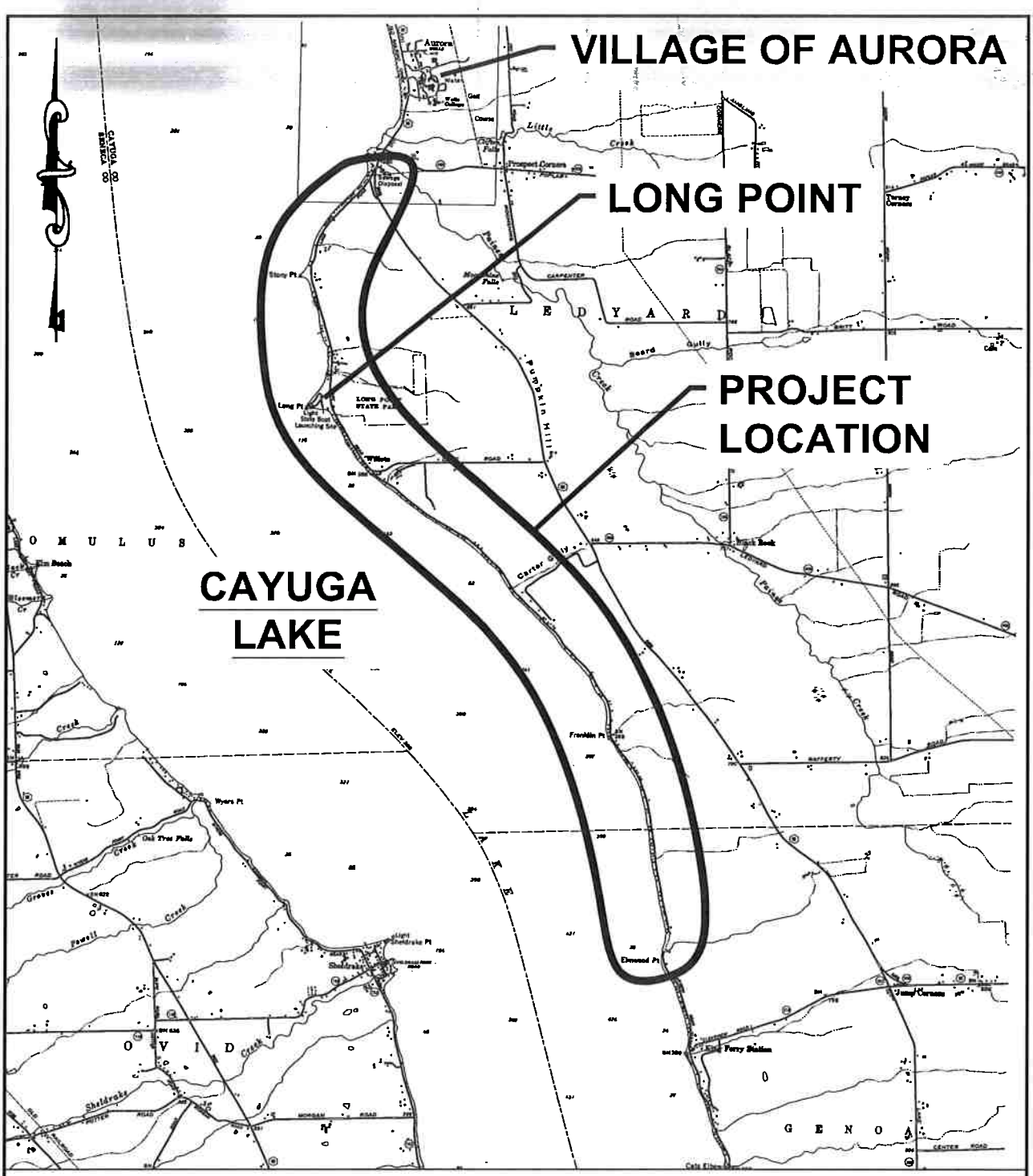
Honoco Road is built on an abandoned railroad bed, purported to have been the property of the Lehigh Valley Railroad until approximately 1970 when the land was sold to the current owners. There are approximately 157 land parcels along Honoco Road, with most having either seasonal or year-round houses constructed on them very close to the lake shore. The railroad bed was originally constructed very close to the shoreline. Once abandoned, the railroad bed was used as the entrance road and is now Honoco Road. Most of the existing residences are built between Honoco Road and the Lake on a narrow strip of land. A few residences are built between Honoco Road and the steep bank which rises immediately east of the roadway. Honoco Road has no outlet, and so is a dead end road.

The topography along Honoco Road is flat along its 3.6-mile length, with ground surface generally being only about 20 feet higher at the north end compared to the south end.

Challenging site conditions include the following:

1. Very small building lots with little to no opportunity for drilling wells or installing septic systems.
2. Most of the homes are located very close to the lake.
3 A step bluff rises to the east of Honoco road, severely limiting the buildable area of the properties.

There is no existing utility right-of-way or easement available for construction of the water system.



PROJECT LOCATION MAP

Project Name:	**PRELIMINARY ENGINEERING REPORT CAYUGA COUNTY WATER/SEWER AUTHORITY CAYUGA COUNTY, NEW YORK**		Project No. **0303.20002**
MRB group Engineering, Architecture & Surveying, D.P.C. The Culver Road Armory, 145 Culver Road, Suite 160, Rochester, New York 14620 Phone: 585-381-9250 www.mrbgroup.com	Drawn By: GBK Checked By: TPC Scale: – Date: MARCH 2021	No. / Revisions / By / Date Distribution:	Sheet No. **FIGURE I.1** Drawing of Origin:

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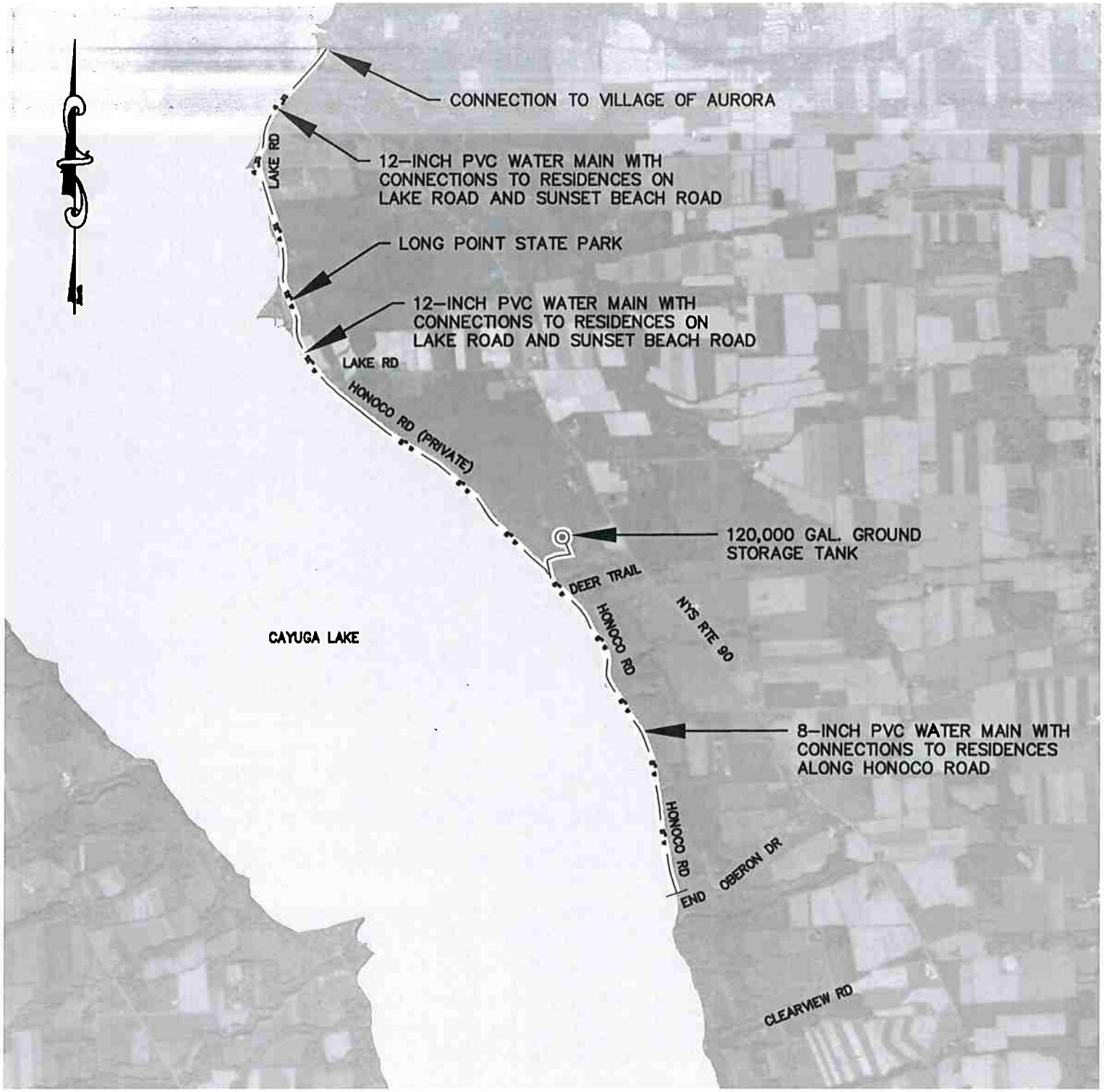

POTABLE WATER SYSTEM ALTERNATIVE 1 - CONNECT TO VILLAGE OF AURORA

Project Name:	**PRELIMINARY ENGINEERING REPORT CAYUGA COUNTY WATER/SEWER AUTHORITY CAYUGA COUNTY, NEW YORK**	Project No. **0303.20002**

MRB group

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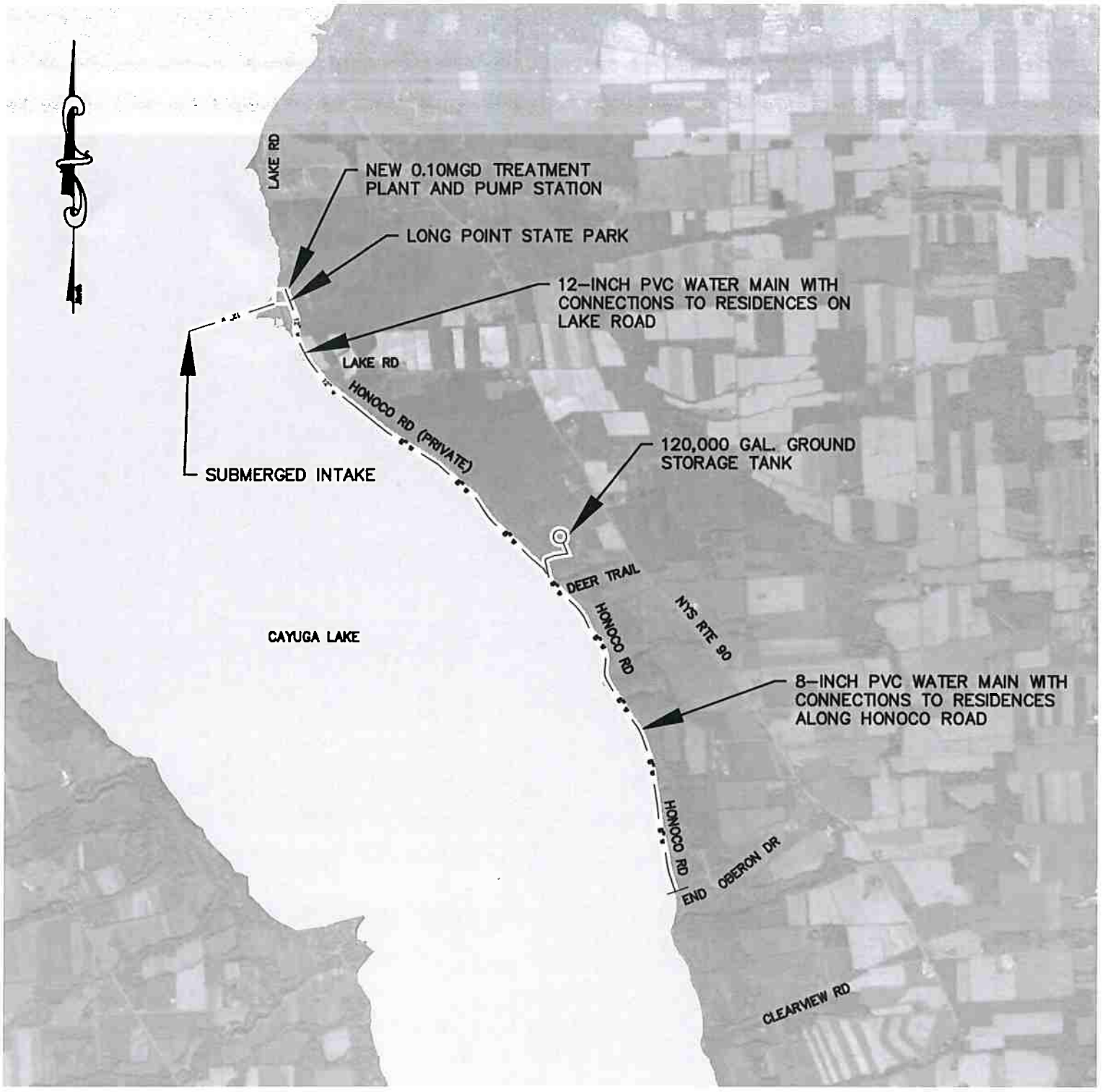

POTABLE WATER SYSTEM ALTERNATIVE 2 - CONSTRUCTION OF PACKAGE PLANT

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POTABLE WATER SYSTEM ALTERNATIVE 3 - CONNECT TO BOLTON POINT WATER SYSTEM

DRAWING ALTERATION
THE FOLLOWING IS AN EXCERPT FROM THE NEW YORK EDUCATION LAW ARTICLE 145 SECTION 7209 AND APPLIES TO THIS DRAWING.
"IT IS A VIOLATION OF THIS LAW FOR ANY PERSON UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE SEAL OF AN ENGINEER OR LAND SURVEYOR IS ALTERED, THE ALTERING ENGINEER OR LAND SURVEYOR SHALL AFFIX TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE AND THE DATE OF SUCH ALTERATION AND A SPECIFIC DESCRIPTION OF THE ALTERATION".

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Project Title:
PRELIMINARY ENGINEERING REPORT
CAYUGA COUNTY WATER/SEWER AUTHORITY
CAYUGA COUNTY, NEW YORK

Drawing Title:
POTABLE WATER SYSTEM ALTERNATIVE 3

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Scale: 1" = 3000'
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Project No. 0303.20002

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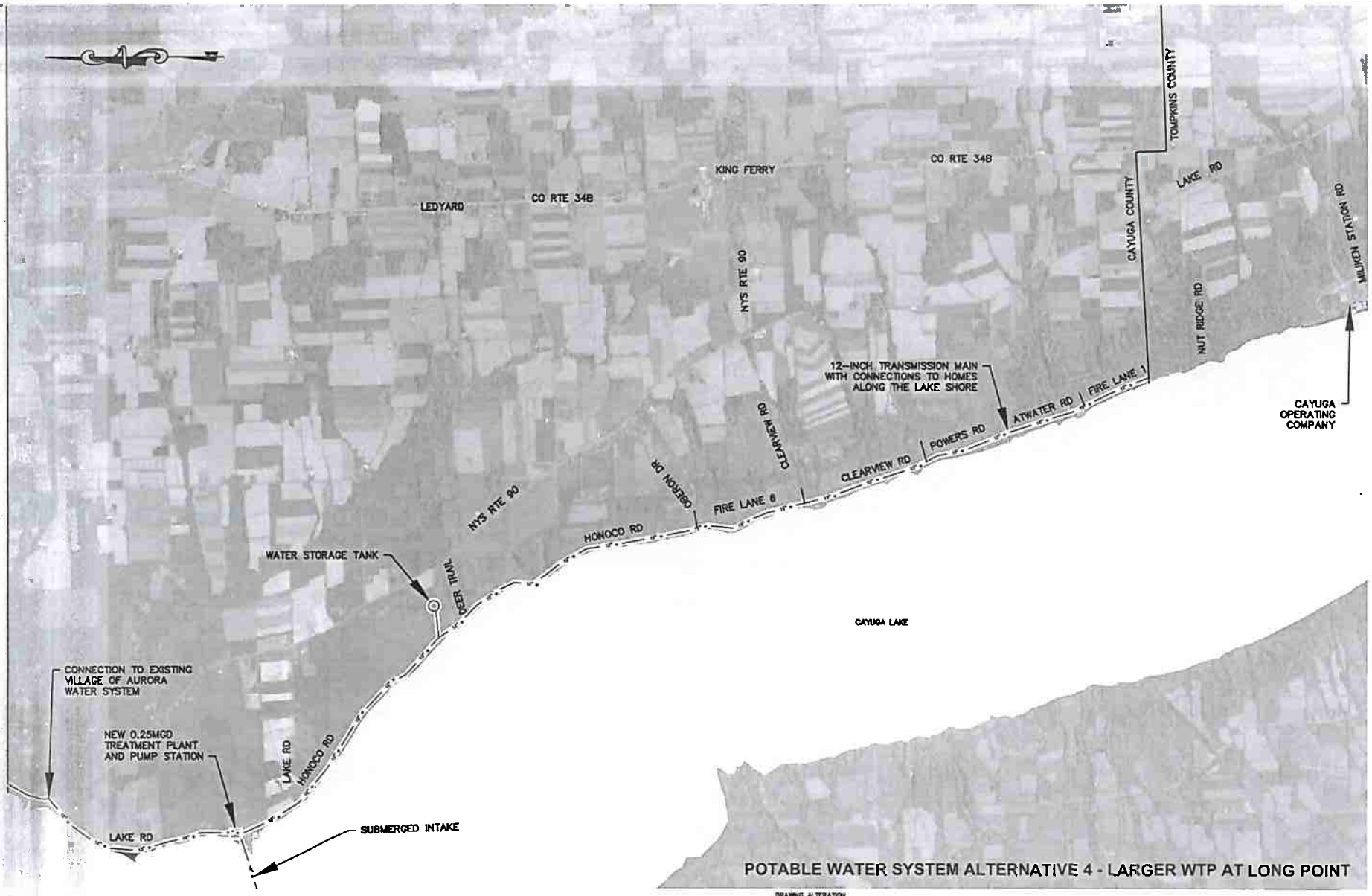

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No.	REVISIONS AND DESCRIPTIONS	BY	DATE

Project Title:
PRELIMINARY ENGINEERING REPORT
CAYUGA COUNTY WATER/SEWER AUTHORITY
CAYUGA COUNTY, NEW YORK

Drawing Title:
POTABLE WATER SYSTEM ALTERNATIVE 4

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Project No. 0303.20002

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B. Ownership And Service Area

Honoco Road includes approximately 157 parcels of land and was the primary goal of this report. As we prepared the report it became apparent that the waterfront residences continue along Cayuga Lake after the end of Honoco Road. Where Honoco Road ends after its 3.6-mile length, Fire Lane #6 and then Clearview Road and other small Fire Lanes and Roads continue along the edge of Cayuga Lake for an additional 3.1 miles (15,900 LF) to the Tomkins County Line. This 3.1-mile stretch includes approximately 101 residences along the Lake. This entire area would be well served by public water, and so we included information on these areas in the report.

Potential project service areas include:

1. Honoco Road Only – 157 parcels
2. Lake Road/Sunset Beach Drive from Long Point to Aurora Line – 75 residences
3. Fire Lanes #1 and #6, Powers and Clearview Roads – 101 residences
4. Village of Aurora – 202 active water accounts, estimated at 264 EDU's due to larger water usage by Wells College when in session.

Most of these parcels have seasonal homes on them and some have year-round homes. Long Point State Park and some agricultural parcels are also located within the proposed service area. The proposed service area is located in the Towns of Ledyard and Genoa, and is entirely within Cayuga County, except for a portion of Alternative #3, which is located in Tompkins County. Honoco Road is privately owned and maintained. The Honoco Road Association organizes maintenance of the gravel sections of the road.

For the purpose of this report Average Day Demand (ADD) will be estimated as 175 gallons per day per residence or parcel. MDD Maximum Day Demand (MDD) will be based on 252 gpd per residence or parcel. Peak Hour Demand (PHD) shall be defined as 5/3 MDD. Estimated water demands for each area considered are shown in Table 1.

Table #1 - Water Demand Definition

	Parcels	Avg Daily Demand (gpd)	Maximum Daily Demand (gpd)	Peak Hourly Demand (gpm)
Aurora - existing	264	46,200	66,500	77
Honoco Rd	157	27,500	39,600	46
Lake Rd/Sunset	75	13,100	18,900	22
Fire Lanes to Cty Line	101	17,700	25,500	30
Aurora, Lake/Sunset, Honoco, Fire Lanes to Tompkins Cty	597	105,000	151,200	175

C. EXISTING FACILITIES AND PRESENT CONDITION

There is no public water system available to the residences along Honoco Road, or any of the other roads mentioned. Some residents use wells and others use untreated Cayuga Lake water for greywater uses. There is a common perception among property owners that sewage is leaching into the lake from private septage holding tanks and outhouses. There may be individual potable water systems installed at homes in the area, but this could not be confirmed, and water quality is widely regarded as poor. There are 157 parcels of land along Honoco Road that potentially can be served by the proposed water distribution system. Lake Road and Sunset Beach Drive have approximately 75 additional existing residences which could be served.

The Village of Aurora water system is supplied by a water treatment plant owned and operated by Wells College. The Village of Aurora's total population is 720, of which the 450 seasonal students at Wells College make up a majority. The water system is purportedly

capable of withdrawing and treating 12,000 gph (288,000 gpd) (PWS ID: NY0512920), but current average daily demand requires only 30,000 - 65,000 gpd. Wells College's Water Withdrawal Permit (see Appendix A) allows up to 320 gpm (460,800 gpd) to be withdrawn from Cayuga Lake.

The Wells College intake is located approximately 900 feet from shore in 20 feet of water. Water treatment consists of a diatomaceous earth (DE) filtration, with additional granular activated carbon (GAC) filtration used to control pollution during harmful algal bloom (HAB) events. Water is pumped to a 150,000 gallon water storage tank located on the college campus for disinfectant contact time. From this tank, the system runs by gravity to the Village, which owns and maintains a 300,000 gallon tank on Sherwood Road. A hydrant flow test was conducted at the southern end of the Village water distribution system, the results are included in Appendix C.

Evaluation of the withdrawal permit and the rated treatment capacity of the Wells College WTP and Village of Aurora distribution system shows that there is adequate excess capacity to supply water to the proposed Honoco Road Water System, plus the additional properties along Cayuga Lake to the south of Honoco Road to the Tompkins County line. Practically, the Wells College WTP is in poor condition, and increasing the average daily flows from the current 30,000-65,000 gpd by 40,000 – 60,000 gpd (see Table on page 10) to supply Honoco Road, Lake Road, and Sunset Beach Drive should be possible without placing the existing WTP under difficulty. This increase would roughly double the current water production at the plant, while still being well below the plants rated capacity of 288,000 gpd.

Supply of the additional residences along Cayuga Lake to the Tompkins County line would result in the need to produce 105,000 – 151,000 gpd, or roughly triple the current typical WTP production. While still well below the rated WTP capacity of 288,000 gpd, it seems likely that producing this much water would put the existing WTP under stress.

D. Definition of the Problem

There is no existing water district on Honoco Road, and no public water system. Therefore, construction of a potable water system must include a secure water source, treatment and disinfection, transmission piping, distribution piping, and storage. The new water system must provide adequate pressure for domestic use and enough flow for fire protection requirements. It is perceived that sewage from the residences along Honoco Road is leaching out into the lake and adversely impacting the Lake water quality. Therefore, to protect the water quality of the lake, a sanitary sewer system also needs to be installed. A separate report addresses the feasibility and engineering requirements of a public sewer system.

Honoco Road is very narrow in spots and does not afford adequate width to maintain the required minimum 10 feet of separation between sanitary sewers and water mains. If the project continues to the design stage a waiver will be sought from New York State Department of Health to reduce the minimum separation, if public water and sewer systems are to be installed along this road.

E. Demographics And Demand Analysis

Membership in the Honoco Road Association is a requirement of all parcels sharing the road for access. The Association reports there are 157 parcels included in the membership of the association. The Association reports there are 143 residences along the road, most are seasonally occupied. Lake Road and Sunset Beach Drive have a total of approximately 75 existing residences.

Lakeside development is frequently hampered by inadequate drinking water supplies. Following installation of public drinking water and sewage collection systems, more year-round residences are anticipated to be constructed.

F. FINANCIAL STATUS

The Honoco Inc. Homeowners Association exists and provides a forum for residents to obtain information about pertinent issues that affect this residential area. Mr. Steve Green is the current Association President (term of 2019 to 2021). Any specific required financial information can be provided by the Association. There is currently no assessment for water.

II. ALTERNATIVES ANALYSIS

The following alternatives are considered in this Engineering Report for a potable water system:

A. Alternative #1 – Aurora Water Supply to Honoco Road.

This alternative consists of purchasing water through a metered connection to the Village of Aurora's distribution system. A 12" transmission main would be constructed from the connection point on Main Street, along portions of Sunset Beach Drive and then Lake Road to the intersection of Honoco Road. An 8-inch distribution main would be constructed along Honoco Road to the end of the road. A ground storage tank would be sized to provide fire flows and peak demand. A tank mixer and re-chlorination system would be installed to ensure lasting water quality. See Figure II.1.

This alternative would serve the 157 parcels on Honoco Road, plus Long Point State Park, and the existing residences (approximately 75) on Lake Road and Sunset Beach Drive – for a total of 232 EDUs. Compare this to 264 EDUs associated with the current Village of Aurora water system. Water demand for this option is estimated at 40,000 – 58,000 gpd.

B. Alternative #2 – Package Plant for Honoco Road Area Only

This alternative consists of construction of a "package plant" to supply water to the Honoco Road area and to a small portion of Lake Road terminating at Long Point State Park. The package plant would be constructed in the area of Long Point State Park. Water would be withdrawn from a newly constructed intake installed in Cayuga Lake. The package plant would be located in a light frame construction building. A pumping station adjacent to the treatment works would provide flow. Water would be stored in a ground storage tank near the midpoint of the proposed district, providing for fire flows and storage. A 12-inch water main would be installed along Lake Road, and an 8-inch water main would be installed on Honoco Road. See Figure II.2.

This alternative would serve the 157 parcels on Honoco Road, plus Long Point State Park, and approximately 31 existing residences on Lake Road near Long Point. Sunset Beach Drive would not be provided with water. This alternative consists of approximately 188 EDUs. Compare this to 264 EDUs associated with the current Village of Aurora water system. Water demand for this option is estimated at 33,000 – 50,000 gpd.

A 2018 Source Water Alternatives Analysis report completed by Barton & Loguidice, D.P.C. did not identify any significant groundwater resources in the area near Honoco Road. For this reason, the development of a well in this area was not evaluated further.

C. Alternative #3 – Connect to the Bolton Point WTP and extend water along the Cayuga waterfront along Fire lanes, Clearview Road, Honoco Road, Long Point State Park, along Lake Road and then Sunset Beach Drive, connecting to the Village of Aurora, and allowing the Wells College WTP to be shut down.

This alternative consists of purchasing water through a metered connection to the Southern Cayuga Lake Intermunicipal Water Commission (SCLIWC) Bolton Point Water System. A 12-inch transmission main would be constructed along the lake from Nut Ridge Road near the Tomkins County line all the way to Aurora along the Cayuga Lake. A ground storage tank would be located in the Honoco Road area to provide fire flows. See Figure II.3

This alternative would serve approximately 597 EDUs s in the Village of Aurora, Lake Road, Sunset Beach Drive, Long Point State Park, Honoco Road, the Fire Lanes and Clearview Road. Compare this to 264 EDUs associated with the current Village of Aurora water system. Water demand is estimated at 105,000 – 150,000 gpd.

D. Alternative #4 – Construct a Larger WTP at Long Point to serve the entire Lakefront Area and the Village of Aurora.

This alternative consists of construction of a "package plant" to supply water to the larger project area from the Tompkins County Line to the Village of Aurora. The package plant would be constructed in the area of Long Point State Park. Water would be withdrawn from a newly constructed intake installed in Cayuga Lake. The package plant would be located in a light frame construction building. A pumping station adjacent to the treatment works would provide flow. Water would be stored in a ground storage tank near the midpoint of the proposed district, providing for fire flows and storage. A 12-inch water main would be installed along Lake Road, and an 8-inch water main would be installed on Honoco Road to the Tompkins County line. See Figure II.4.

This alternative would serve the 597 EDUs in the project area, and would include the 264 EDUs associated with the current Village of Aurora water system. Total water demand for the 597 EDUs is estimated at 105,000 – 150,000 gpd.

E. DETAILS OF ALTERNATIVES

The chosen alternative would be designed and constructed in accordance with the Recommended Standards for Water Works (latest edition) and CCWSA standard specifications. In general, gate valves would be located along the main line, adjacent to hydrants where possible. Fire hydrants would be located 500 feet apart, and at road intersections. Services would be extended from the water main to the edge of the public right-of-way, or on the private road would be extended beyond the edge of the roadway. Property owners would be responsible for final connection to the water service.

1. Alternative #1 – Purchase Water from Village of Aurora

This alternative consists of the following major components:

a. Water Mains and Appurtenances:

11,200 linear feet of 12" PVC transmission main (Lake Road/Sunset)

19,200 linear feet of 8" PVC water main (Honoco)

12 ea. 12" gate valves

24 ea. 8" gate valves

64 ea. fire hydrants

3,465 linear feet of ¾" service lateral pipe

6 Air Release Valves in Manholes

b. Water Storage Tank:

120,000 gallon ground storage tank

1 tank mixer

1 re-chlorination system

Figure II.1 illustrates the alignment of Alternative #1. Appendix E provides general equipment information on the proposed storage tank.

2. Alternative #2 – Construction of Package Plant for Honoco Road Area Only:

This alternative consists of the following major components:

a. Water Mains and Appurtenances

3,280 linear feet of 12" PVC water main

19,200 linear feet of 8" PVC water main

4 ea. 12" gate valves

21 ea. 8" gate valves

49 ea. fire hydrants

2,550 linear feet of ¾" service lateral pipe

5 Air Release Valves in Manholes

b. Package Water Treatment Plant:

Wooden framed building

Package Water Treatment Plant, 100,000 GPD

1,200 linear feet of intake piping

Intake Pumping station

c. Main Pump Station:

High Lift Pumps

Chlorination System

d. Water Storage Tank:

120,000 gallon ground storage tank

1 tank mixer

Figure II.2 illustrates the layout of the proposed water system, Appendix E provides general equipment information on the proposed storage tank, while Appendix F provides general equipment information on the proposed water treatment plant.

3. Alternative #3 – Purchase Water from Bolton Point Water System, terminate at Aurora .

This alternative consists of the following major components:

a. Water Mains and Appurtenances:

59,8000 linear feet of 12" PVC transmission main

62 ea. 12" gate valves

124 ea. fire hydrants

3,700 linear feet of ¾" service lateral pipe

7 Air Release Valves in Manholes

Pressure Reducing Valve in Manhole

b. Water Storage Tank:

120,000 gallon ground storage tank

1 tank mixer

1 re-chlorination system

Figure II.3 illustrates the proposed alignment and facility locations. Appendix E provides general equipment information on the proposed storage tank.

4. Alternative #4 – Construction of a Larger Package Plant for Honoco Road, County Line, and Aurora.

This alternative consists of the following major components:

a. Water Mains and Appurtenances

11,200 linear feet of 12" PVC water main

32,800 linear feet of 8" PVC water main

10 ea. 12" gate valves

31 ea. 8" gate valves

100 ea. fire hydrants

3,700 linear feet of ¾" service lateral pipe

5 Air Release Valves in Manholes

b. Package Water Treatment Plant:

Wooden framed building

Package Water Treatment Plant, 250,000 gpd

1,200 linear feet of intake piping

Intake Pumping station

c. Main Pump Station:

High Lift Pumps

Chlorination System

d. Water Storage Tank:

120,000-gallon ground storage tank

1 tank mixer

Figure II.4 illustrates the layout of the proposed water system, Appendix E provides general equipment information on the proposed storage tank, while Appendix F provides general equipment information on the proposed water treatment plant.

5. Flood Protection Requirements

The Ten States Standards require that all new water supply facilities and water treatment plant access roads be protected from at least the 100-year flood elevation or maximum flood of record. This requirement would be addressed in the design stage

and does not appear significantly affect any of the potential projects described.

G. PROJECT COST ESTIMATES

The following total project costs have been estimated for the above described water system alternatives (detailed construction cost estimates are located in Appendix B). Each estimate includes a 15% Construction Contingency, a 3% allowance for bonding and financial services, and a 25% allowance for Engineering, Legal Fees, and Administration:

Alternative #1 – Purchase Water from Village of Aurora Total = $5,769,000

Alternative #2 –Small WTP for Honoco Area Only Total = $7,887,000

Alternative #3 – Connect to Bolton Point Water System Total = $12,109,000

Alternative #4 – Larger WTP for Entire Project Area Total = $10,501,000

H. WATER PURCHASE AND ANNUAL OPERATIONS & MAINTENANCE COSTS

The following are estimated first year operations and maintenance (O&M) and water purchase costs:

1. Alternative #1 – Purchase Water from Village of Aurora

In a 2018 report Village of Aurora Water System Improvements, K. Teter Consulting estimated average O&M costs for the Village of Aurora to be $2.76/1000 gallons. The report cited a water purchase cost of $2.79/1000 gallons, for a total cost of supply of $5.55/1000 gallons to operate and maintain the existing water system which was projected to increase to $6.15/1000 gallons by 2021. Water purchase price is estimated to be 110% of the Village's cost: $6.76/1000 gallons.

The proposed distribution system will need to be operated and maintained by a NYSDOH Class D Water Operator. Part time operations, plus cost of parts and equipment are estimated to cost $15,000 per year, equal to $0.91/1000 gallons.

Electricity is estimated to cost $1,000 per year for pumping and instrumentation, equal to $0.06/1000 gallons.

Disinfection chemicals are estimated to cost $1,000 per year.

In sum, O&M and water purchase costs are estimated to be $7.80/1000 gallons.

2. Alternative #2 – Construction of Package Water Treatment Plant

Water treatment and disinfection chemicals are estimated to cost $12,000 per year. Electricity is estimated to cost $5,000 per year for pumping, treatment, and instrumentation, equal to $1.42/1000 gallons.

The proposed treatment and distribution system will need to be operated and maintained by a NYSDOH Class IIA Water Operator. Full time operations, plus cost of parts and equipment are estimated to cost $85,000 per year, equal to $7.08/1000 gallons.

In sum, O&M and water treatment costs are estimated to be $8.50/1000 gallons.

3. Alternative #3 – Purchase Water from Bolton Point Water System

Water would be purchased from Bolton Point via the Town of Lansing. The 2020 Lansing Water Rate is $6.20/1,000 gallons. Water purchase price is estimated to be 110% of the Town's rate: $6.82/1000 gallons.

Disinfection chemicals are estimated to cost $1,000 per year, equal to $0.08/1,000 gallons.

Electricity is estimated to cost $1,000 per year, equal to $0.08/1000 gallons.

The proposed transmission main and distribution system will require a NYSDOH Class B Water Operator. Part time operations, plus cost of parts and equipment are estimated to cost $25,000 per year, equal to $2.09/1000 gallons.

In sum, O&M and water purchase costs are estimated to be $9.07/1000 gallons.

III. SUMMARY OF ALTERNATIVES

A summary of the alternatives is presented in this section of the report.

Option	Description	# of EDU's	Project Cost	Annual Cost Per EDU based on 30-year loan at 3%
1	Village of Aurora Supply along Lake Road/Sunset Beach Drive	232	$5,769.000	$1,269
2	Small WTP at Long Point to Serve Honoco Only	157	$7,887,000	$2,140
3	Bolton Point Supply all the way to Aurora	597	$12,109,000	$1,035
4	Larger WTP at Long Point to Serve Honoco, Lake Road/Sunset Lane, Village of Aurora, Fire Lanes and Clearview Road	597	$10,501,000	$897

IV. DISCUSSION OF ALTERNATIVES

Alternative #1 – Purchase Water from Village of Aurora. This option has the following advantages:

1. Lowest Total Capital Construction Cost
2. Lowest cost per 1,000 gallons of water.
3. It does not require construction of a new WTP.
4. No significant permits are required.

This option also has the significant disadvantage that the Wells College WTP is in poor condition, and may not stay in operation long term. The unusual situation that this is a private water supplier, rather than a municipality, makes it difficult to recommend a large project to supply water to Honoco Road using Wells College as a supplier. The estimated cost of $1,269 per EDU per year is also a negative, as it is higher than the New York State recommended limit of approximately $800 per EDU per year, and is not viable economically unless grant funding is obtained to lower the per EDU cost.

Alternative #2 – Construction of a Smaller WTP at Long Point to serve Honoco Road. This alternative has the following disadvantages:

1. A very high cost of $2,140 per EDU per year. This cost is much higher than the New York State recommended limit of approximately $800 per EDU per year, and is not viable economically unless grant funding is obtained to lower the per EDU cost.
2. The need to construct a new WTP on Cayuga Lake, while the area has existing WTPs just to the North at Wells College and to the South at Bolton Point. Each of these existing WTPs has the capacity to supply the water demand for the area. Adding an additional WTP in this area would require a new water withdrawal permit, which is a large effort and could meet criticism because of the existing WTPs in the area which could furnish the water required.
3. Significant permits are required if this alternative is pursued. The project would need a new water withdrawal permit for the proposed WTP.

4. Land would need to be acquired near the Long Point state Park.

Alternative #3 – Connection to Bolton Point. This alternative has an estimated cost of $1,035 per EDU per year, which is still higher than the recommended $800 cost burden. An additional disadvantage is that the line crosses the County line and so may be viewed negatively by residents of either County. This option has the following advantages:

1. It serves a large number of EDUs – 597
2. It provides a reliable replacement source for water to the Village of Aurora.
3. It constructs a connection from Bolton Point to Aurora, which could eventually be connected to the larger Cayuga County proposed system, allowing emergency supply between Auburn and Bolton Point.
4. It does not propose construction of a new WTP.

Alternative #4 – Construction of a Larger WTP at Long Point to serve the entire area and the Village of Aurora. This alternative has the following advantages:

1. It serves a large number of EUDs – 597
2. It has the lowest cost of any alternative considered at $897 per EDU per year.
3. If constructed, the WTP at Long Point could eventually serve as a backup to the City of Auburn WTP.

Alternative #4 also has the following disadvantages:

1. The need to construct a new WTP on Cayuga Lake, while the area has existing WTPs just to the North at Wells College and to the South at Bolton Point. Each of these existing WTPs has the capacity to supply the water demand for the area. Adding an additional WTP in this area would require a new water withdrawal permit, which is a large effort and could meet criticism because of the existing WTPs in the area which could furnish the water required.
2. Significant permits are required if this alternative is pursued. The project would need a new water withdrawal permit for the proposed WTP.
3. Land would need to be acquired near the Long Point State Park.

V. DESIGN AND PEMITTING ITEMS AND SCHEDULE

Design and Permitting Details to Consider. If a project to supply water to the Honoco Road area moves forward, the following items should be considered in the design process:

1. The municipality or Authority should own and be responsible for the water main and portions of the individual water services from corporation to curb stop.
2. The curb stops shall be installed on property on which the municipality has the right of access.
3. Water meters shall be owned by the Water System, but the customer shall be responsible for their protection. Meters shall be accessible to the municipality.
4. Residents who decide at a later date to connect to the water system will be required to pay for the installation of a water service from main to curb stop at their own expense, in addition to any costs they may incur installing the private side of their water service.
5. A municipal agreement must be reached between the Town of Ledyard, Village of Aurora, and Town of Genoa concerning the cost of water.
6. A water withdrawal permit will be required if a new WTP is pursued. These permits require a significant amount of work and time to obtain.
7. The State Environmental Quality Review Act (SEQRA) requires that any project proposed be properly considered for environmental impacts. This process will require one project entity to be the "Lead Agency" and to evaluate the potential impacts of any project, including disturbance of ground and water during construction, traffic impacts, etc.
8. A Water District will need to be formed for the proposed project area. This process will require some public outreach and education, preparation of a Map Plan and Report for review and approval by the agencies and County Legislature, and possibly a public referendum on the project.

Development was new water districts and infrastructure require time for the various items described below, and are applicable to the potential projects outlined in this report:

Project Definition by CCWSA Board	3-6 Months
Map, Plan and Report	3-4 Months
SEQRA Process	3-4 Months
Field Survey	2-3 Months
Procurement of Easements and Land	4-6 Months
Design of Water Lines	3-4 Months
Design of Water Plant	6-8 Months
DOH Review of Plans	3-4 Months
Water Withdrawal Permit (if required)	9-12 Months
Bidding Process and Contract Award	2-3 Months
Construction Period and Startup	9-12 Months
Total Time to Startup for Alternatives #1 or #3	24-30 Months
Total Time to Startup for Alternatives #2 or #4	36-48 Months

VI. RECOMMENDATION

The complicated situation with the Wells College WTP and with the Village of Auroras potential construction of a new WTP within the Village makes a definitive recommendation impossible at this time.

APPENDIX A

WELLS COLLEGE WATER WITHDRAWAL PERMIT

FILE COPY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Permits
625 Broadway, 4th Floor, Albany, New York 12233-1750
P: (518) 402-9167 I F: (518) 402-9168 I deppermitting@dec.ny.gov
www.dec.ny.gov

November 27, 2017

Brian Brown
Wells College
170 Main St
Aurora, NY 13026

Re: Initial Water Withdrawal Permit
Wells College, DEC ID# 7-0534-00005/00012
Aurora, Cayuga County

Dear Mr. Brown,

Please read the enclosed permit and note the conditions. This permit will **expire on November 26, 2027**. Withdrawals beyond the scope of the permit and the approved project plans may be considered a violation of the law and subject to appropriate enforcement action.

Please be advised that the Uniform Procedures Regulations (6 NYCRR Part 621) provide that an applicant may request a public hearing if a permit is denied or contains conditions which are unacceptable to them. Any such request must be made in writing within 30 calendar days of the date of permit issuance and must be addressed to the Chief Permit Administrator at the letterhead address. A copy should also be sent to the Chief Administrative Law Judge at NYSDEC, 625 Broadway, 1st Floor, Albany, NY 12233-1550.

Note that this permit does not eliminate the need to obtain any other federal, state or local permits or approvals that may be required for this project.

Should you have any questions regarding your obligations under the permit, please contact me by phone at (518) 408-5476 or by email at karyn.hanson@dec.ny.gov. Thank you.

Sincerely,

Karyn Hanson

Karyn Hanson
Environmental Analyst

Enclosures: Permit

Electronic copies to: J. Hock, NYSDEC DOW
C. Conyers, NYSDEC OGC
D. Bimber, NYSDEC DEP
G. Hotaling, ghotaling@mrbgroup.com

PERMIT

Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:
WELLS COLLEGE
RT 90
AURORA, NY 13026
(315) 364-3408

Facility:
WELLS COLLEGE
RTE 90
AURORA, NY 13026

Facility Location: in LEDYARD in CAYUGA COUNTY
Facility Principal Reference Point: NYTM-E: 360.8 NYTM-N: 4734
Latitude: 42°44'45.2" Longitude: 76°42'02.8"
Authorized Activity: This permit authorizes the withdrawal of water for potable water supply at Wells College in accordance with the terms and conditions of this permit.

Permit Authorizations

Water Withdrawal Non-public - Under Article 15, Title 15
Permit ID 7-0534-00005/00012 (WWA No. 12,373)
New Permit Effective Date: 11/27/2017 Expiration Date: 11/26/2027

NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: KENT P SANDERS, Deputy Chief Permit Administrator
Address: NYSDEC Headquarters
625 Broadway
Albany, NY 12233

Authorized Signature: Kent P. Sanders Date 11/27/2017

Permit Components

WATER WITHDRAWAL NON-PUBLIC PERMIT CONDITIONS

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

WATER WITHDRAWAL NON-PUBLIC PERMIT CONDITIONS

1. Source Approval Table

This table summarizes all system source approvals			
Well Field or Source of Water Supply	**Status**	**Past WWA Number**	**Permitted Source Capacities (gpm)**
Cayuga Lake	Active	-	320
Total Approved			320

2. Approval of Completed Works from NYS P.E. Any new works constructed or modified pursuant to this water withdrawal permit shall be constructed under the general supervision of a person licensed to practice engineering in this state (professional engineer). Upon completion of construction and pre-operational testing, such works may not commence final operation until the professional engineer first certifies in writing to the Department that the works have been constructed in accordance with the issued permit.

3. Transfer of Ownership of Water Withdrawal Systems Unless otherwise specified in this permit, a new water withdrawal permit application is required for the acquisition or condemnation of the approved water withdrawal system.

4. Permit Expiration and Renewal Any permittee who intends to continue to operate a water withdrawal system beyond the period of time covered in the applicable water withdrawal permit must apply for a renewal of the permit at least 30 days prior to its expiration.

5. Meter All Sources The permittee must install and maintain meters or other appropriate measuring devices on all sources of supply used in the system. Source master meters or measuring devices are to be read, and records kept of those readings, on at least a weekly basis. The permittee must maintain records of water withdrawn and consumptive use for each calendar year.

6. Source Meter Calibration All source meters or measuring devices shall be calibrated for accuracy at least once each year.

7. **Permittee Must Maintain Records** The permittee must retain records of production and consumption, reports of audit results, and summaries of leaks detected and repaired for at least ten years. The permittee must provide copies of such of these records, reports, and summaries as might be requested in writing by the Department within one month of receiving such a request.

8. **Conduct Water Audits** At least once annually, the permittee must conduct a system-wide water audit that utilizes metered water production and consumption data to determine unaccounted-for water.

9. **Leak Detection and Repair** The permittee must develop and implement a leak detection and repair program using visual inspection of above ground piping and fittings and sonic detection equipment, meter-to-meter readings reconciliation or other methods acceptable to the Department for the inspection of the facility's underground piping in a systematic fashion. Leaking pipes and fittings shall be repaired in a timely manner.

10. **Annual Water Withdrawal Reports** The permittee must submit a Water Withdrawal Reporting Form to the Department's Division of Water, Albany, NY. by March 31st of each year. The form is available on the Department's website and includes information regarding approved sources of water supply, source capacities, average and maximum day water use data and water conservation and efficiencies employed during the past calendar year.

GENERAL CONDITIONS - Apply to ALL Authorized Permits:

1. **Facility Inspection by The Department** The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71- 0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

2. **Relationship of this Permit to Other Department Orders and Determinations** Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

3. **Applications For Permit Renewals, Modifications or Transfers** The permittee must submit a separate written application to the Department for permit renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing. Submission of applications for permit renewal, modification or transfer are to be submitted to:

Deputy Chief Permit Administrator
NYSDEC Headquarters
625 Broadway
Albany, NY12233

4. **Permit Modifications, Suspensions and Revocations by the Department** The Department reserves the right to exercise all available authority to modify, suspend or revoke this permit. The grounds for modification, suspension or revocation include:

a. materially false or inaccurate statements in the permit application or supporting papers;

b. failure by the permittee to comply with any terms or conditions of the permit;

c. exceeding the scope of the project as described in the permit application;

d. newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;

e. noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

5. **Permit Transfer** Permits are transferrable unless specifically prohibited by statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification
The permittee, excepting state or federal agencies, expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees, and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in compliance or not in compliance with the terms and conditions of the permit. This indemnification does not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under Article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

Item B: Permittee's Contractors to Comply with Permit
The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same

sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

Item C: Permittee Responsible for Obtaining Other Required Permits
The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

Item D: No Right to Trespass or Interfere with Riparian Rights
This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

APPENDIX B

PROJECT COST ESTIMATES

Cayuga County Water and Sewer Authority
Proposed Honoco Road Water System
Alternative No. 1 - Connect to Aurora

MRB Group
Project No. 0303.20002.000
March 2021

Estimate of Probable Project Costs

Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	12" PVC Transmission Main	11,200	LF	$ 85	$ 952,000
2	8" PVC Water Main	19,200	LF	$ 62	$ 1,190,400
3	12" Gate Valve and Valve Box	12	EA	$ 3,600	$ 43,200
4	8" Gate Valve and Valve Box	24	EA	$ 2,015	$ 48,360
5	Hydrant Assembly	64	EA	$ 5,200	$ 332,800
6	Service Laterals	231	EA	$ 1,800	$ 415,800
7	Air Release Valve and Manhole	6	EA	$ 13,200	$ 79,200
8	Connection to Existing Water Main	1	EA	$ 4,100	$ 4,100
9	Chemical Feed Equipment	1	LS	$ 35,000	$ 35,000
10	Water Storage Tank	120,000	GAL	$ 2.15	$ 258,000
11	Tank Mixer	1	LS	$ 45,000.00	$ 45,000
12	Electrical / I&C	1	LS	$ 75,000	$ 75,000
13	Land Acquisition Pump Station	1	AC	$ 7,500	$ 3,750
14	Land Acquisition Water Storage Tank	2	AC	$ 7,500	$ 11,250
15	Gravel Road Restoration	4,550	CY	$ 40	$ 182,000
16	Pavement Restoration	570	CY	$ 140	$ 79,800
17	Topsoil and Seed	1,040	CY	$ 90	$ 93,600
18	Work Zone Traffic Control	NEC	LS	$ 10,000	$ 10,000
19	Erosion and Sediment Control	NEC	LS	$ 20,000	$ 20,000
20	Mobilization	4.00%	LS	$ 155,200	$ 155,200
CONSTRUCTION SUBTOTAL					**$ 4,034,460**
CONSTRUCTION CONTINGENCY				15%	$ 605,200
BOND, INSURANCE, GEN. CONDITIONS				3.00%	$ 121,000
ENGINEERING, LEGAL, ADMIN.				25%	$ 1,008,600
TOTAL OPINION OF PROBABLE COST					**$ 5,769,000**
INFLATION TO 2022				4.50%	$ 6,028,600

Cayuga County Water and Sewer Authority — MRB Group
Proposed Honoco Road Water System — Project No. 0303.20002.000
Alternative No. 2 - Package Plant for Honoco Road Only — March 2021

Estimate of Probable Project Costs

Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	12" PVC Transmission Main	3,280	LF	$ 85	$ 278,800
2	8" PVC Water Main	19,200	LF	$ 62	$ 1,190,400
3	12" Gate Valve and Valve Box	4	EA	$ 3,600	$ 14,400
4	8" Gate Valve and Valve Box	21	EA	$ 2,015	$ 42,300
5	Hydrant Assembly	49	EA	$ 5,200	$ 254,800
6	Service Laterals	170	EA	$ 1,800	$ 306,000
7	Air Release Valve and Manhole	5	EA	$ 13,200	$ 66,000
8	Treatment Building	4,000	SF	$ 100	$ 400,000
9	Tri-Mite Package Water Treatment System	2	EA	$ 420,000	$ 840,000
10	Plant Wastewater Lagoon Earthworks	100	CY	$ 1,050	$ 105,000
11	8" HDPE Intake Pipe	1,200	LF	$ 200	$ 240,000
12	Intake Screen	1	LS	$ 250,000	$ 250,000
13	Chemical Feed Equipment	1	EA	$ 35,000	$ 35,000
14	Cast in Place Wet Well	100	CY	$ 450	$ 45,000
15	Low Service Pumps & VFDs	2	EA	$ 127,300	$ 254,600
16	Cast in Place Clear Well	100	CY	$ 450	$ 45,000
17	High Service Pumps & VFDs	2	EA	$ 152,000	$ 304,000
18	Ground Storage Tank	120,000	GAL	$ 2.15	$ 258,000
19	Tank Mixer	1	LS	$ 45,000.00	$ 45,000
20	Electrical / I&C	1	LS	$ 250,000	$ 250,000
21	Land Acquisition WTP and Pump Station	3	AC	$ 7,500	$ 22,500
22	Land Acquisition Water Storage Tank	2	AC	$ 7,500	$ 11,250
23	Gravel Road Restoration	4,550	CY	$ 40	$ 182,000
24	Pavement Restoration	570	CY	$ 140	$ 79,800
25	Topsoil and Seed	360	CY	$ 90	$ 32,400
26	Work Zone Traffic Control	1	LS	$ 10,000	$ 10,000
27	Erosion and Sediment Control	1	LS	$ 20,000	$ 20,000
28	Mobilization	1	LS	$ 212,100	$ 212,100
CONSTRUCTION SUBTOTAL					**$ 5,515,550**
CONSTRUCTION CONTINGENCY				15%	$ 827,300
BOND, INSURANCE, GEN. CONDITIONS				3.00%	$ 165,500
ENGINEERING, LEGAL, ADMIN.				25%	$ 1,378,900
TOTAL OPINION OF PROBABLE COST					**$ 7,887,000**
INFLATION TO 2022				4.50%	$ 8,241,900

Cayuga County Water and Sewer Authority
Proposed Honoco Road Water System
Alternative No. 3 - Bolton Point to Aurora District

MRB Group
Project No. 0303.20002.000
March 2021

Estimate of Probable Project Costs							
Item	Description	Quantity	Unit		Unit Cost		Total Cost
1	12" PVC Transmission Main	59,800	LF	$	85	$	5,083,000
3	12" Gate Valve and Valve Box	62	EA	$	3,600	$	223,200
5	Hydrant Assembly	124	EA	$	5,200	$	642,720
6	Service Laterals	478	EA	$	1,800	$	860,400
7	Air Release Valve and Manhole	7	EA	$	13,200	$	92,400
8	Connection to Existing Water Main	2	LS	$	4,100	$	8,200
9	Master Meter Pit	1	LS	$	45,000	$	45,000
10	Chemical Feed Equipment	1	LS	$	35,000	$	35,000
11	Pressure Reducing Valve Station	1	LS	$	120,000	$	120,000
12	Water Storage Tank	120,000	GAL	$	2.15	$	258,000
13	Tank Mixer	1	LS	$	45,000.00	$	45,000
14	Electrical / I&C	1	LS	$	75,000	$	75,000
15	Land Acquisition Reducing Valve Station	0.20	AC	$	7,500	$	1,500
16	Land Acquisition Water Storage Tank	1.50	AC	$	7,500	$	11,250
17	New Gravel Access Road	1	LS	$	50,000	$	50,000
18	Gravel Road Restoration	7,060	CY	$	40	$	282,400
19	Pavement Restoration	1,330	CY	$	140	$	186,200
20	Topsoil and Seed	700	CY	$	90	$	63,000
21	Work Zone Traffic Control	1	LS	$	30,000	$	30,000
22	Erosion and Sediment Control	1	LS	$	30,000	$	30,000
23	Mobilization	1	LS	$	325,700	$	325,700
CONSTRUCTION SUBTOTAL						**$**	**8,467,970**
CONSTRUCTION CONTINGENCY					15%	$	1,270,200
BOND, INSURANCE, GEN. CONDITIONS					3.00%	$	254,000
ENGINEERING, LEGAL, ADMIN.					25%	$	2,117,000
TOTAL OPINION OF PROBABLE COST						**$**	**12,109,000**
INFLATION TO 2022					4.50%	$	12,653,900

Cayuga County Water and Sewer Authority — MRB Group
Proposed Honoco Road Water System — Project No. 0303.20002.000
Alternative No. 4 - Package Plant for Larger Area plus Aurora — March 2021

Estimate of Probable Project Costs							
Item	Description	Quantity	Unit		Unit Cost		Total Cost
1	12" PVC Transmission Main	11,200	LF	$	85	$	952,000
2	8" PVC Water Main	32,800	LF	$	62	$	2,033,600
3	12" Gate Valve and Valve Box	10	EA	$	3,600	$	36,000
4	8" Gate Valve and Valve Box	31	EA	$	2,015	$	62,500
5	Hydrant Assembly	100	EA	$	5,200	$	520,000
6	Service Laterals	170	EA	$	1,800	$	306,000
7	Air Release Valve and Manhole	5	EA	$	13,200	$	66,000
8	Treatment Building	4,000	SF	$	100	$	400,000
9	Tri-Mite Package Water Treatment System	2	EA	$	620,000	$	1,240,000
10	Plant Wastewater Lagoon Earthworks	100	CY	$	1,050	$	105,000
11	8" HDPE Intake Pipe	1,200	LF	$	200	$	240,000
12	Intake Screen	1	LS	$	250,000	$	250,000
13	Chemical Feed Equipment	1	EA	$	35,000	$	35,000
14	Cast in Place Wet Well	100	CY	$	450	$	45,000
15	Low Service Pumps & VFDs	2	EA	$	127,300	$	254,600
16	Cast in Place Clear Well	100	CY	$	450	$	45,000
17	High Service Pumps & VFDs	2	EA	$	152,000	$	304,000
18	Ground Storage Tank	120,000	GAL	$	2.15	$	258,000
19	Tank Mixer	1	LS	$	45,000.00	$	45,000
20	Electrical / I&C	1	LS	$	250,000	$	250,000
21	Land Acquisition WTP and Pump Station	3	AC	$	7,500	$	22,500
22	Land Acquisition Water Storage Tank	2	AC	$	7,500	$	11,250
23	Gravel Road Restoration	7,770	CY	$	40	$	310,800
24	Pavement Restoration	970	CY	$	140	$	135,800
25	Topsoil and Seed	610	CY	$	90	$	54,900
26	Work Zone Traffic Control	1	LS	$	10,000	$	10,000
27	Erosion and Sediment Control	1	LS	$	20,000	$	20,000
28	Mobilization	1	LS	$	282,400	$	282,400
CONSTRUCTION SUBTOTAL						**$**	**7,343,350**
CONSTRUCTION CONTINGENCY					15%	$	1,101,500
BOND, INSURANCE, GEN. CONDITIONS					3.00%	$	220,300
ENGINEERING, LEGAL, ADMIN.					25%	$	1,835,800
TOTAL OPINION OF PROBABLE COST						**$**	**10,501,000**
INFLATION TO 2022					4.50%	$	10,973,500