ENVIRONMENTAL DESIGN PARTNERSHIP, LLP.
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Engineer's Sewer Narrative

JACOBIE'S PARKSIDE FARM

11-29 Moreau Rec Road
Town of Moreau
Saratoga County, New York

Applicant:

Cerrone Builders
1589 Route 9
Fort Edward, NY 12828

March 2025

Prepared By:
The Environmental Design Partnership, LLP
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ENGINEERS REPORT
TOWN OF MOREAU SEWER DISTRICT No. 1
EXTENSION No. 3

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1.0 PROJECT DESCRIPTION

The following narrative has been prepared to provide the supporting information necessary for an extension of the existing Town of Moreau sanitary sewer collection system in order to serve the proposed Jacobie's Parkside Farm development. The Jacobie's Parkside Farm project includes the construction of 181 units split between; apartments, duplexes and single-family dwellings on two parcels located in the Town of Moreau that are split between Moreau Rec Road. The overall project area is 27.19 acres and water and sewer are proposed to be supplied by an existing Town of Moreau municipal source.

The proposed development will be serviced via a low-pressure sewer collection system that will connect to the neighboring Arrowhead Meadows, LLC site sewer infrastructure to the north, ultimately connecting to a 10-inch force main located along Bluebird Road. The proposed low pressure collection system will be owned and maintained by the Town of Moreau upon completion of construction and all sewer flows will be conveyed to the Saratoga County Sewer District No. 1 Wastewater Treatment Plant (WWTP).

Water service for the proposed subdivision will be via an extension of the existing Town of Moreau water distribution system.

2.0 EXISTING CONDITIONS

The existing project site consists of predominantly abandoned agricultural land. Ground cover on site is comprised primarily of fallow farmland. The topography of the land general slopes from northwest to southeast at slopes generally ranging from 1 to 5%, with localized areas over 15%. Elevations at the site vary between 325 and 355 feet above sea level.

The USDA Natural Resources Conservation Service Soil Survey (NRCSS) identifies the soils on the site to be Windsor Loamy Sand. The Soil Survey identifies Windsor Loamy Sand as excessively drained and classified as Hydrologic Soil Group (HSG) "A". Soil test pits observed by the Environmental Design Partnership, LLP during December of 2020 indicate fine to coarse sand with no evidence of groundwater up to 8 ft. No bedrock was encountered on the site during the soil testing.

Mapping available from the Federal Emergency Management Agency (FEMA) indicates that the project site is located outside of the 500-year floodplain. There are also no known NYS Department of Environmental Conservation or US Army Corp of Engineers regulated wetlands located on or directly adjacent to the project site.

3.0 DESIGN FLOW PARAMETERS

The proposed Jacobie's Parkside Farm project consists of a total of 181 units split between; apartments (100 units), townhomes (32 units) and single-family dwellings (49 units). The hydraulic loading for the proposed residential units was calculated in accordance with the Recommended Standards for Wastewater Facilities, 2014 Edition (Ten State Standards) using US Census data for the Town of Moreau. According to 2020 census data for the Town of Moreau there is an average of 2.4 persons per household (see Exhibit A). Ten State Standards recommends a design flow rate of 100 gallons per day per capita for design of new collection systems. Based on the census data the average daily flow and peak hourly flow for the proposed townhomes and single-family dwellings were calculated as follows:

<u>Townhomes and Single-Family Dwelling Design Flows</u>

- Residential units = 81 units
- Persons per household in Moreau = 2.4
- Design hydraulic loading = 100 gallons per day per capita

- Average daily hydraulic loading = 81*2.4*100 = 19,440 gpd (14 gpm)
- Peaking factor = 4.0
- Peak Hourly Flow Rate = **54 gpm**

Based on water data from previous apartment projects that EDP has worked on throughout Saratoga County, Schenectady County, Albany County, and Warren County (See Appendix A for locations and flow data), the median daily water usage for these apartments is on the order of 57 gallons per day per bedroom, with the maximum being on the order of 60 gallons per day per bedroom. Based on the historical water data, a conservative usage rate of 70 gallons per day per bedroom has been used for the apartments on this project site. Based on the median daily water usage data the average daily flow and peak hourly flow for the proposed apartments were calculated as follows:

Apartment Design Flows

- Residential units = 100 units
- Total number of bedrooms = 150 bedrooms
- Design hydraulic loading = 70 gallons per day per bedroom
- Average daily hydraulic loading = 150*70 = 10,500 gpd (7 gpm)
- Peaking factor = 4.0
- Peak Hourly Flow Rate = **29 gpm**

In summary, the total projected average daily flow for this development is on the order of **29,940 gpd** with a peak hourly flow of **83 gpm**.

4.0 PROPOSED SYSTEM INFRASTRUCTURE

The proposed sanitary sewer infrastructure will include a low-pressure collection system with individual grinder pumps serving the proposed residential units. The low-pressure system will include a PE force main varying between 2 inches to 3 inches in diameter pipe to service the proposed development.

4.1 Proposed Grinder Pump Stations

The proposed project will include 81 simplex, and 4 duplex grinder pump stations to serve the 181 proposed residential units. The proposed grinder pump stations will be prepackaged stations as manufactured by Environment One Corporation (EONE)

4.1.1 Pump Station Model Selection

The EONE grinder pumps were selected based on the calculated contributing flow rates to each station as noted below.

Townhomes and Single-Family Dwelling Grinder Pumps

- Persons per unit = 2.4
- Design hydraulic loading = 100 gallons per day per capita
- Average daily flow = 240 gpd
- Average daily flow rate = 0.17 gpm
- Peak hourly flow Rate = 0.17 gpm x 4 = 0.68 gpm
- Pump Selection: EONE DH071 Simplex Grinder Pump
- Pump Station Design Capacity = 700 gpd

16-Unit Apartment Grinder Pump

- Number of bedrooms = 24
- Design hydraulic loading = 70 gallons per day per bedroom
- Average daily flow = 1,680 gpd
- Average daily flow rate = 1.17 gpm
- Peak hourly flow Rate = 1.17 gpm x 4 = 4.68 gpm
- Pump Selection: EONE DH152 Duplex Grinder Pump
- Pump Station Design Capacity = 3,000 gpd

34-Unit Apartment Grinder Pump

- Number of bedrooms = 51
- Design hydraulic loading = 70 gallons per day per bedroom
- Average daily flow = 3,570 gpd
- Average daily flow rate = 2.48 gpm
- Peak hourly flow Rate = 2.48 gpm x 4 = 9.92 gpm
- Pump Selection: EONE DH272 Duplex Grinder Pump
- Pump Station Design Capacity = 5,000 gpd

4.1.2 Storage Capacity

In accordance with the Town of Moreau Sewer Regulations the EONE DH071 simplex, DH152, and DH272 grinder pump stations proposed herein have a minimum wet well capacity of 70, 150, and 270 gallons respectively.

4.1.3 Design Flow Rate

The proposed grinder pump stations are manufactured by to accommodate residential wastewater flows and are designed to operate on a linear performance curve between 7.5 GPM at 185 ft TDH and 15 GPM at 0 ft TDH (see Appendix B).

4.1.4 Buoyancy

The proposed grinder pump stations are prepackaged system with a HDPE wet well structure. When installed in areas with high groundwater EONE recommends the construction of a concrete ballast around the bottom of the structure to prevent floatation. Seasonal high groundwater on the site was not observed during test pits completed on the site and is not expected to present an issue with flotation of the grinder pump stations. Should groundwater be encountered, the concrete ballast shall be installed in accordance with the manufacturers recommendations.

4.2 Low Pressure Force Main

The site will be serviced with a low pressure force main consisting of 2 inch to 3 inch polyethylene (PE) pressure sewer pipe. The proposed force main pipe is specified as PE 4710 IPS DR-11 which has a pressure rating on the order of 200 psi. The force main has been sized using modeling software provided by EONE and is based on the number of pumps contributing to each section of force main. The table below takes into consideration the proposed 181 units from this development, as well as the SRH-TJM, LLC and Arrowhead Subdivision located to the north that the project connects directly into prior to connection to the existing sewer main on Bluebird Road. All force mains will contain air reliefs at highpoints and clean outs at regular intervals. Hydraulic models of all three sections have been performed using the E-One Design

Assistant Software with the results included in Exhibit C. The following table summarizes the daily peak flows for each section of low-pressure sewer as per the E-one design standards.

Table 1: Low Pressure Sewer Design Flows (Overall Subdivision)

Zone	Total No. of Connected Grinder Pumps	Max. No. of Grinder Pumps Running Simultaneously	Max Static Head in System	Max Friction Head Loss in System	Max TDH in System	Avg Flow Rate per Pump	Maximum Instantaneous Flow Rate*
1	29	5	15 ft	28.3 ft	100.0 ft	11 gpm	52.6 gpm
2	18	6	22 ft	7.0 ft	78.6 ft		65.3 gpm
3	0	6	22 ft	2.5 ft	71.6 ft		65.3 gpm
4	20	5	15 ft	23.2 ft	92.4 ft		54.3 gpm
5	16	6	20 ft	7.0 ft	74.1 ft		67.3 gpm
6	13	8	17 ft	10.0 ft	64.1 ft		89.4 gpm
7	9	3	14 ft	7.0 ft	64.2 ft		36.3 gpm
8	18	5	16 ft	6.1 ft	59.2 ft		61.3 gpm
9	10	9	12 ft	8.8 ft	49.1 ft		103.6 gpm
10	10	4	14 ft	19.0 ft	65.4 ft		48.2 gpm
11	5	4	14 ft	4.1 ft	46.4 ft		49.4 gpm
12	11	10	12 ft	12.2 ft	40.3 ft		117.1 gpm
13	9	3	14 ft	8.2 ft	65.3 ft		36.2 gpm
14	10	5	12 ft	26.9 ft	55.0 ft		61.5 gpm
15	2	11	7 ft	9.6 ft	22.1 ft		129.7 gpm
16**	0	11	7 ft	6.5 ft	13.5 ft		589.7 gpm**

**Maximum instantaneous flow rate is not the peak hourly flow rate (see Section 3.0).*
***Zone 16 includes the flows from the Moreau Industrial Park at a peak flow rate of 405 gpm and the Bluebird Terrace MHP at 44 gpm.*

As can be observed in Table 1 the maximum projected Total Dynamic Head (TDH) for the grinder pumps in the system is 117.1 ft which is well below the 180 ft maximum that E-One specifies. The number of connected grinder pumps in each zone was determined using one grinder pump per each single family home and a single grinder pump for every two multi-family units, in the potential multi-family development. The max number of grinder pumps running simultaneously is based on the E/One Design Manual "Low Pressure Sewer Systems Using Environment One Grinder Pumps". This design manual states that these numbers were "*initially developed after careful analysis of more than 58,000 pump events in a 307-day period during the Albany project (4). It was extended for larger systems by application of probability theory. The validity of this table has since been confirmed by actual operating experience with thousands of large and small LPS systems during a 34-year period".*

The low-pressure force main collection system will be proposed for dedication to the Town of Moreau upon completion of construction. The individual grinder pumps and laterals will be privately owned and maintained by the individual homeowners.

The proposed low pressure collection system will discharge to an existing 10-inch PE force main (Table 1, Zone 16) which conveys flows to the existing Route 9 Pump Station which is owned and operated by the Town of Moreau.

5.0 EXISTING MOREAU SEWER COLLECTION SYSTEM

The Town of Moreau currently owns and operates the Moreau Industrial Park (MIP) pump station, located on Fanan Road. The pump station discharges via an 8-inch DIP force main that extends to the intersection of Bluebird Road and Sisson Road. From there the force main is converted to 10-inch PE and runs westerly along Bluebird Road then south on Route 9 to the Route 9 Pump Station.

The existing system design was summarized in the 2023 report entitled “Town of Moreau, Saratoga County, New York Engineering Report Sewer District No. 1 Extension 5, County Forcemain Connection Map and Plan” by Laberge Group and last revised March 2023 (Extension 5 Report). This report was reviewed and approved by NYSDEC as part of the Sewer District No. 1 Extension 5 design review and this report has been included in Appendix D of this report.

5.1 Moreau Industrial Park (MIP) Pump Station

The MIP Pump station was designed to collect the wastewater from the properties within the Town Industrial Park. Per the Extension 5 report, the pump station is designed with a max pumping rate on the order of 405 gpm.

This pump station discharges to an existing 8-inch DIP force main that extends along Bluebird Road to the intersection with Sisson Road. The MIP pump station flows currently flow northerly on Sisson Road and toward the Glens Falls WWTP. However, it is proposed that the MIP pump station will be diverted into the newly installed 10-inch PE force main that extends, from the intersection with Sisson Road, westerly along Bluebird Road, past the proposed project site, and to Route 9 where it then extends south to the existing Route 9 Pump Station.

5.2 Existing Force Main

The existing 10 inch PE force main that extends along Bluebird Road, past the project site, conveys flows from the MIP pump station as well as provides service to the existing Bluebird Terrace Mobile Home Park located on Bluebird Road, to the east of the proposed project site.

The 10 in PE force main has an inside diameter on the order of 8.68 inches which results in a maximum capacity on the order of 1,200 gpm at a peak velocity of 6.5 ft/sec. The existing projected peak flows conveyed by the force main are summarized below:

- MIP Pump Station = 405 gpm
- Bluebird Terrace MHP = 44 gpm
- Arrowhead Subdivision = 28 gpm (10,080 gpd)
- SRH-TJM, LLC Subdivision = 26 gpm (9,360 gpd)
- Jacobie Park Side Farms = 83 gpm
- **Total Projected Peak Flow Rate = 586 gpm**

This projected flow rate is well below the maximum capacity of the existing 10-inch force main (49% capacity).

As noted in the Laberge Group Sewer Treatment Transmission Alternatives report dated February 2022, the Saratoga County Sewer District No. 1 has indicated their ability and willingness to accommodate flows from the Town of Moreau for up to 283,000 gpd which includes flows from future expansion of the existing sewer district as proposed herein.

5.3 Route 9 Pump Station

The 10-inch PE force main conveys flows to the existing Route 9 Pump Station, located on Route 9 near the intersection of Route 9 and Reynolds Road, which then conveys the flows to the Route 9 collection system within the Town of Wilton.

The Route 9 Pump Station was designed to receive the flows from the 10-inch force main as well as from a low-pressure collection system located along the Route 9 corridor in the Town of Moreau. In accordance with the Extension 5 Report the total projected future flows to the Route 9 Pump station, at full build out, are on the order of 283,000 gpd. This includes 100,000 gpd from the Moreau Industrial Park, 109,000 gpd from the Route 9 low pressure collection system and 74,000 from outside users/future development.

The total projected flows form the Jacobie's Parkside Farm as well as from the SRH-TJM, LLC and Arrowhead subdivision is on the order of 49,380 gpd which is below the 74,000 gpd from outside users that was projected in the Extension 5 report.

The Route 9 Pump Station was designed with a pumping rate on the order of 450 gpm. This pump station was also designed, approved and constructed with a 19,000-gallon equalization tank in order to provide additional storage during peak flow conditions when the collection system is fully built out.

Overall, the design flows from the Jacobie's Parkside Farm development are well within the original approved design capacity of the Route 9 Pump Station and therefore no modifications to the pump station are required.

5.4 Wastewater Treatment

The Route 9 Pump Station conveys flows to the SCSD#1 collection system located in the Town of Wilton and eventually to the SCSD#1 wastewater treatment plant located in Mechancville for treatment.

The projected flow rates from the proposed Jacobie's Parkside Farm development are well below the original design flow rates for outside users that were outlined in the Extension 5 Report and are well within the SCSD#1 trunking and treatment capacity. These projected flows will not result in Moreau exceeding the 283,000 gpd capacity agreement that the SCSD#1 made with the Town of Moreau in March of 2023.

SCSD has provided the daily sewer flows from the SCSD wastewater treatment plant (WWTP) located in Mechanicville dating from April 2024 thru March 2025. Based on this data the WWTP has a current average daily flow on the order of 15.585 million gallons per day (MGD) (70.84% capacity), and is currently permitted for a capacity of 22 MGD. With the addition of the proposed 29,940 GPD (0.030 MGD) for this project, the anticipated average daily flow to the WWTP will increase to approximately 15.615 MGP (70.98% capacity).

6.0 SUMMARY

Sanitary sewer service will be provided to the proposed 181 units split between; apartments, duplexes and single-family dwellings via the installation of a low-pressure sewer collection system. The proposed sewer infrastructure is designed to convey the total flows from the full buildout of the 181 units for this project.

The downstream receiving sewers have adequate capacity to receive the proposed project. The theoretical daily discharge from the proposed Jacobie's Parkside Farm of 29,940 gpd is within the Town of Moreau and Saratoga County Sewer District #1 Trunking and Treatment Capacity.

Prepared by:

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Environmental Design Partnership, LLP

SITE LOCATION MAP

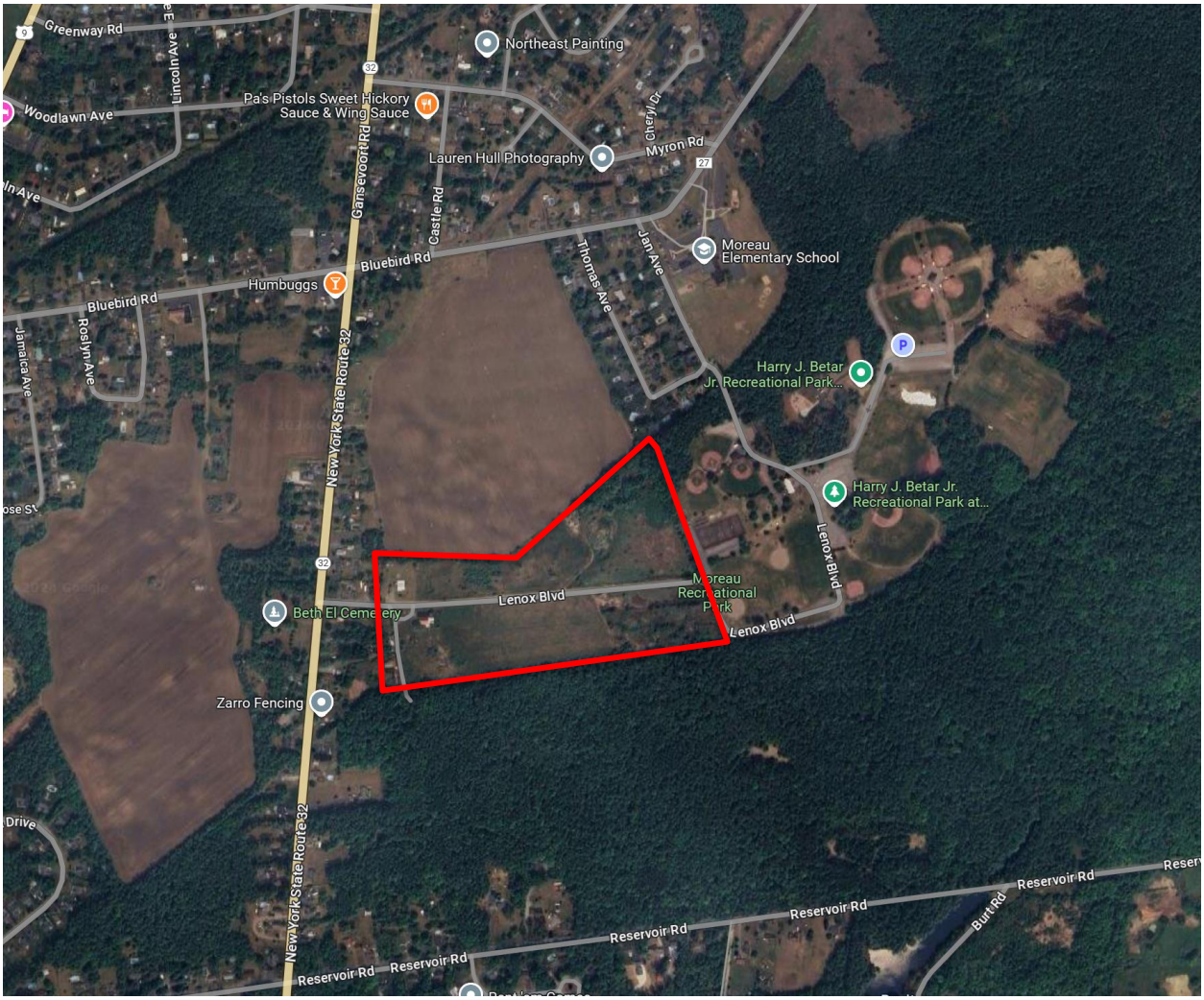


EXHIBIT A

CENSUS DATA FOR TOWN OF MOREAU

United States Census Bureau

QuickFacts

Moreau town, Saratoga County, New York

QuickFacts provides statistics for all states and counties. Also for cities and towns with a ***population of 5,000 or more***.

Families & Living Arrange…	Moreau town, Saratoga County, New York
Population estimates, July 1, 2023, (V2023)	⚠ 16,671
PEOPLE	
Families & Living Arrangements	
Households, 2018-2022	6,748
Persons per household, 2018-2022	2.42
Living in same house 1 year ago, percent of persons age 1 year+, 2018-2022	87.3%
Language other than English spoken at home, percent of persons age 5 years+, 2018-2022	4.0%

About datasets used in this table

Value Notes

⚠ Methodology differences may exist between data sources, and so estimates from different sources are not comparable.

Some estimates presented here come from sample data, and thus have sampling errors that may render some apparent differences between geographies statistically indistinguishable. Click the Quick Info ⓘ icon to the left of each row in TAI learn about sampling error.

The vintage year (e.g., V2023) refers to the final year of the series (2020 thru 2023). Different vintage years of estimates are not comparable.

Users should exercise caution when comparing 2018-2022 ACS 5-year estimates to other ACS estimates. For more information, please visit the 2022 5-year ACS Comparison Guidance page.

Fact Notes

(a)	Includes persons reporting only one race
(b)	Hispanics may be of any race, so also are included in applicable race categories
(c)	Economic Census - Puerto Rico data are not comparable to U.S. Economic Census data

Value Flags

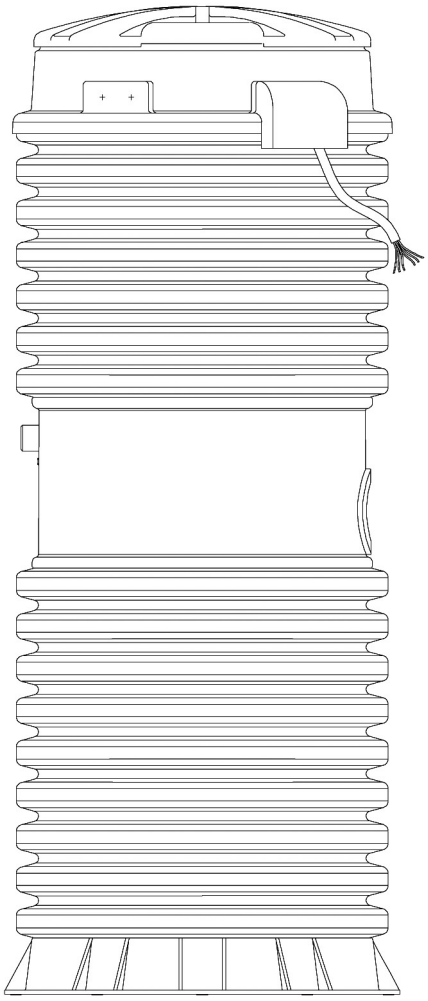
D	Suppressed to avoid disclosure of confidential information
F	Fewer than 25 firms
FN	Footnote on this item in place of data
NA	Not available
S	Suppressed; does not meet publication standards
X	Not applicable
Z	Value greater than zero but less than half unit of measure shown
-	Either no or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest or upper interval of an open ende
N	Data for this geographic area cannot be displayed because the number of sample cases is too small.

QuickFacts data are derived from: Population Estimates, American Community Survey, Census of Population and Housing, Current Population Survey, Small Area Health Insurance Estimates, Small Area Income and Poverty Estimates, Stat Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits.

EXHIBIT B

E-ONE D-SERIES DESIGN SPECIFICATIONS

E/ONE EXTREME SERIES



D-Series Wetwell/Drywell Grinder Pump Station with Wired Level Sensor

Typical Specifications

Semi-Positive Displacement Type Grinder Pump Stations

1.0 GENERAL

1.01 GENERAL DESCRIPTION: The **MANUFACTURER** shall furnish complete factory-built and tested Wetwell/Drywell Grinder Pump Station(s), each consisting of grinder pump(s) suitably mounted in a basin constructed of high density polyethylene (HDPE) for simplex stations and HDPE or Fiberglass Reinforced Polyester Resin for duplex stations with dimensions and capacities as show on the Contract Drawings, NEMA 6P electrical quick disconnect (EQD), pump removal system, stainless steel discharge assembly/shut-off valve, anti-siphon valve/check valve, each assembled in the basin, electrical alarm panel and all necessary internal wiring and controls. Component type grinder pump systems that require field assembly will not be acceptable due to the potential problems that can occur during field assembly. All components and materials shall be in accordance with section 2.0 of this Product Specification. For ease of serviceability, all pump, motor/grinder units shall be of like type and horsepower throughout the system.

1.02 SUBMITTALS: After receipt of notice to proceed, the **MANUFACTURER** shall furnish a minimum of six sets of shop drawings detailing the equipment to be furnished including dimensional data and materials of construction. The **ENGINEER** shall promptly review this data, and return two copies as accepted, or with requested modifications. Upon receipt of accepted shop drawings, the **MANUFACTURER** shall proceed immediately with fabrication of the equipment.

1.03 MANUFACTURER: Grinder pump stations, complete with all appurtenances, form an integral system, and as such, shall be supplied by one grinder pump station manufacturer. The **CONTRACTOR** shall be responsible for the satisfactory operation of the entire system. The equipment specified shall be a product of a company experienced in the design and manufacture of grinder pumps for specific use in low pressure sewage systems. The company shall submit detailed installation and user instructions for its product, submit evidence of an established service program including complete parts and service manuals, and be responsible for maintaining a continuing inventory of grinder pump replacement parts. The **MANUFACTURER** shall provide, upon request, a reference and contact list from ten of its largest contiguous grinder pump installations of the type of grinder pumps described within this specification.

The **MANUFACTURER** of the grinder pump station shall be Environment One Corporation (or Proposed Alternate).

Attention is directed to the fact that the drawings and overall system design are based on a particular piece of equipment from a particular manufacturer. These specifications are intended to provide guidelines for standard equipment of a recognized manufacturer who already meets all the requirements of this specification.

1.03a ALTERNATE EQUIPMENT: In the event that the **CONTRACTOR** or another supplier proposes an Alternate to the specified **MANUFACTURER**, the **ENGINEER** recognizes that it will be difficult to conform to certain details of this Specification due to different manufacturing techniques or grinder pump station designs. If proposing an Alternate, the **CONTRACTOR** (supplier) must submit, no less than 15 business days in advance of the bid date, a complete description of any changes that will be necessary to the system design, a complete submittal package as outlined in Section 1.02 SUBMITTALS, a system hydraulic analysis based on the proposed pump (including pipe sizes, flows, velocities, retention times and number and location of recommended valves and cleanouts, if any), a list of exceptions to this specification, and demonstration of compliance to Section 1.04 EXPERIENCE CLAUSE of this specification. The **CONTRACTOR** (supplier) must also complete the Manufacturer Disclosure Statement found at the end of this specification. This information must be submitted to the **ENGINEER** for pre-approval of the alternate equipment being proposed and determination of compliance with these Contract Documents. If the equipment differs materially or differs from the dimensions given on the Drawings, the **CONTRACTOR** (supplier) shall submit complete drawings showing elevations, dimensions, or any necessary changes to the Contract Documents for the proposed equipment and its installation. Pre-approval, if granted, will be provided in writing by the **ENGINEER** to the **CONTRACTOR** (supplier) at least five business days in advance of the bid date. If the **ENGINEER'S** approval is obtained for Alternate Equipment, the **CONTRACTOR** (supplier) must make any needed changes in the structures, system design, piping or electrical systems necessary to accommodate the proposed equipment at the expense of the **CONTRACTOR** (supplier).

1.04 EXPERIENCE CLAUSE: The equipment furnished hereunder shall be the product of a company experienced in the design and manufacture of grinder pumps specifically designed for use in low pressure systems. All manufacturers proposing equipment for this project shall have at least 10 years of experience in the design and manufacture of units of identical size(s) and performance to the specified units. All manufacturers proposing equipment for this project must also have not less than 500 successful installations of low pressure sewer systems utilizing grinder pumps of like type to the grinder pumps specified herein. An installation is defined as a minimum of 25 pumps discharging into a common force main which forms a low pressure sewer system. The **CONTRACTOR** (supplier) proposing alternate equipment shall also submit, as part of the bid schedule, an installation list with contact person(s), phone number(s) and date(s) of at least 10 installations of the type of pump specified herein that have been in operation for at least 10 years.

In lieu of this experience clause, the **CONTRACTOR** (supplier) of alternate equipment will be required to submit a 5-year performance bond for 100 percent of the stipulated cost of the equipment as bid and as shown in the Bid Schedule. This performance bond will be used to guarantee the replacement of the equipment in the event that it fails within the bond period.

1.05 OPERATING CONDITIONS: The pumps shall be capable of delivering 15 GPM against a rated total dynamic head of 0 feet (0 PSIG), 11 GPM against a rated total dynamic head of 92 feet (40 PSIG), and 7.8 GPM against a rated total dynamic head of 185 feet (80 PSIG). The pump(s) must also be capable of operating at negative total dynamic head without overloading the motor(s). Under no conditions shall in-line piping or valving be allowed to create a false apparent head.

1.06 WARRANTY: The grinder pump **MANUFACTURER** shall provide a part(s) and labor warranty on the complete station and accessories, including, but not limited to, the panel for a period of 24 months after notice of **OWNER'S** acceptance, but no greater than 27 months after receipt of shipment. Any manufacturing defects found during the warranty period will be reported to the **MANUFACTURER** by the **OWNER** and will be corrected by the **MANUFACTURER** at no cost to the **OWNER**.

(OPTIONAL) Certified Installation Program – In lieu of the above warranty, at no charge, the Certified Installation Program with the same coverage as E/One's standard warranty will be granted for residential applications of the DH071 and DH151 grinder pump stations when the installation uses an E/One Uni-Lateral Stainless Steel Curb Stop Assembly (Section 2.12); E/One Sentry Protect Plus alarm panel (Section 2.13); and the E/One Certified Installation and Start-Up forms located at apps.eone.com have been successfully completed and submitted.

Only after the installation and start-up data have been successfully completed and submitted via apps.eone.com will the **OWNER** be issued a 5-Year Certified Installation Program certificate for each applicable DH071 or DH151 grinder pump station. This certificate is the proof of the program coverage. If submissions are not received, no additional coverage has been applied.

1.07 WARRANTY PERFORMANCE CERTIFICATION: As a bid certification requirement, each bidder shall provide with their bid schedule a Warranty Performance Certification statement executed by the most senior executive officer of the grinder pump **MANUFACTURER**, which certifies a minimum of a 24-month warranty. They must further detail any exclusions from the warranty or additional cost items required to maintain the equipment in warrantable condition, including all associated labor and shipping fees, and certify that the **MANUFACTURER** will bear **all** costs to correct any original equipment deficiency for the effective period of the warranty. All preventive maintenance type requirements shall be included in this form as exclusions. These requirements include, but are not limited to, unjamming of grinder mechanism, periodic motor maintenance, and periodic cleaning of liquid level controls. Should the **CONTRACTOR** (supplier) elect to submit a performance bond in lieu of the experience clause outlined above, this Warranty Performance Certification shall also be used as a criterion to evaluate the **CONTRACTOR'S** (supplier's) performance over the warranty period. A Warranty Performance Certification form is included with the bid schedule and must be completed and submitted as part of the bid package. Bids with incomplete forms or missing forms will be considered nonresponsive.

2.0 PRODUCT

2.01 PUMP: The pump shall be a custom designed, integral, vertical rotor, motor driven, solids handling pump of the **progressing cavity type** with a single mechanical seal. Double radial O-ring seals are required at all casting joints to minimize corrosion and create a protective barrier. All pump castings shall be cast iron, fully epoxy coated to 8-10 mil Nominal dry thickness, wet applied. The rotor shall be through-hardened, highly polished, precipitation hardened stainless steel. The stator shall be of a specifically compounded ethylene propylene synthetic elastomer. This material shall be suitable for domestic wastewater service. Its physical properties shall include high tear and abrasion resistance, grease resistance, water and detergent resistance, temperature stability, excellent aging properties, and outstanding wear resistance. Buna-N is not acceptable as a stator material because it does not exhibit the properties as outlined above and required for wastewater service.

2.02 GRINDER: The grinder shall be placed immediately below the pumping elements and shall be direct-driven by a single, one-piece motor shaft. The grinder impeller (cutter wheel) assembly shall be securely fastened to the pump motor shaft by means of a threaded connection attaching the grinder impeller to the motor shaft. Attachment by means of pins or keys will not be acceptable. The grinder impeller shall be a one-piece, 4140 cutter wheel of the rotating type with inductively hardened cutter teeth. The cutter teeth shall be inductively hardened to Rockwell 50 – 60c for abrasion resistance. The shredder ring shall be of the stationary type and the material shall be white cast iron. The teeth shall be ground into the material to achieve effective grinding. The shredder ring shall have a staggered tooth pattern with only one edge engaged at a time, maximizing the cutting torque. These materials have been chosen for their capacity to perform in the intended environment as they are materials with wear and corrosive resistant properties.

This assembly shall be dynamically balanced and operate without objectionable noise or vibration over the entire range of recommended operating pressures. The grinder shall be constructed so as to minimize clogging and jamming under all normal operating conditions including starting. Sufficient vortex action shall be created to scour the tank free of deposits or sludge banks which would impair the operation of the pump. These requirements shall be accomplished by the following, in conjunction with the pump:

1. The grinder shall be positioned in such a way that solids are fed in an upward flow direction.

2. The maximum flow rate through the cutting mechanism must not exceed 4 feet per second. This is a critical design element to minimize jamming and as such must be adhered to.

3. The inlet shroud shall have a diameter of no less than 5 inches. Inlet shrouds that are less than 5 inches in diameter will not be accepted due to their inability to maintain the specified 4 feet per second maximum inlet velocity which by design prevents unnecessary jamming of the cutter mechanism and minimizes blinding of the pump by large objects that block the inlet shroud.

4. The impeller mechanism must rotate at a nominal speed of no greater than 1800 rpm.

The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of “foreign objects,” such as paper, wood, plastic, glass, wipes, rubber and the like, to finely-divided particles which will pass freely through the passages of the pump and the 1-1/4" diameter stainless steel discharge piping.

2.03 ELECTRIC MOTOR: As a maximum, the motor shall be a 1 HP, 1725 RPM, 240 Volt 60 Hertz, 1 Phase, capacitor start, ball bearing, air-cooled induction type with Class F installation, low starting current not to exceed 30 amperes and high starting torque of 8.4 foot pounds. The motor shall be press-fit into the casting for better heat transfer and longer winding life. Inherent protection against running overloads or locked rotor conditions for the pump motor shall be provided by the use of an automatic-reset, integral thermal overload protector incorporated into the motor. This motor protector combination shall have been specifically investigated and listed by Underwriters Laboratories, Inc., for the application. Non-capacitor start motors or permanent split capacitor motors will not be accepted

because of their reduced starting torque and consequent diminished grinding capability. The wet portion of the motor armature must be 300 Series stainless. To reduce the potential of environmental concerns, the expense of handling and disposing of oil, and the associated maintenance costs, oil-filled motors will not be accepted.

2.04 MECHANICAL SEAL: The pump/core shall be provided with a mechanical shaft seal to prevent leakage between the motor and pump. The seal shall have a stationary ceramic seat and carbon rotating surface with faces precision lapped and held in position by a stainless steel spring.

2.05 TANK AND INTEGRAL ACCESSWAY: **(Model DH071) High Density Polyethylene Construction.** The tank shall be a Wetwell/Drywell design made of high density polyethylene, with a grade selected to provide the necessary environmental stress cracking resistance. Corrugated sections are to be made of a double wall construction with the internal wall being generally smooth to promote scouring. The corrugations of the outside wall are to be a minimum amplitude of 1-1/2" to provide necessary transverse stiffness. Any incidental sections of a single wall construction are to be 0.250” thick (minimum). All seams created during tank construction are to be thermally welded and factory tested for leak tightness. The tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure.

The tank shall be furnished with one EPDM grommet fitting to accept a 4.50" OD DWV or Schedule 40 pipe. The tank capacities shall be as shown on the contract drawings.

The Drywell accessway shall be an integral extension of the Wetwell assembly and shall include a lockable cover assembly providing low profile mounting and watertight capability. The accessway design and construction shall enable field adjustment of the station height in increments of 4" or less without the use of any adhesives or sealants requiring cure time before installation can be completed.

The station shall have all necessary penetrations molded in and factory sealed. To ensure a leak free installation no field penetrations will be acceptable.

All discharge piping shall be constructed of 304 stainless steel. The discharge shall terminate outside the accessway bulkhead with a stainless steel, 1-1/4” Female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 235 psi WOG; PVC ball valves or brass ball/gate will not be accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P Electrical Quick Disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The EQD will be supplied with 32’, 25’ of useable Electrical Supply Cable (ESC) outside the station, to connect to the alarm panel. The ESC shall be installed in the basin by the manufacturer. Field assembly of the ESC into the basin is not acceptable because of potential workmanship issues. The EQD shall require no tools for connecting, seal against water before the electrical connection is made, and include radial seals to assure a watertight seal regardless of tightening torque. Plug-type connections of the power cable onto the pump housing will not be acceptable due to the potential for leaks and electrical shorts. A junction box shall not be permitted in the accessway due to the large number of potential leak points. The EQD shall be so designed to be conducive to field wiring as required. The accessway shall also include an integral 2-inch vent to prevent sewage gases from accumulating in the tank.

2.06 TANK & INTEGRAL ACCESSWAY: **(Models DH151 150 Gallon Simplex & DH152 150 Gallon Duplex) High Density Polyethylene Construction.** The tank shall be a Wetwell/Drywell design made of high density polyethylene, with a grade selected to provide the necessary environmental stress cracking resistance. Corrugated sections are to be made of a double wall construction with the internal wall being generally smooth to promote scouring. The corrugations of the outside wall are to be a minimum amplitude of 1-1/2" to provide necessary transverse stiffness. Any incidental sections of a single wall construction are to be 0.250” thick (minimum). All seams created during tank construction

are to be thermally welded and factory tested for leak tightness. The tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure.

The tank shall be furnished with one EPDM grommet fitting to accept a 4.50" OD DWV or Schedule 40 pipe. The tank capacities shall be as shown on the contract drawings.

The Drywell accessway shall be an integral extension of the Wetwell assembly and shall include a lockable cover assembly providing low profile mounting and watertight capability. The cover shall be high density polyethylene, green in color, with a load rating of 150 lbs per square foot. The accessway design and construction shall enable field adjustment of the station height in increments of 3" or less without the use of any adhesives or sealants requiring cure time before installation can be completed.

The station shall have all necessary penetrations molded in and factory sealed. To ensure a leak free installation no field penetrations will be acceptable.

All discharge piping shall be constructed of 304 stainless steel. The discharge shall terminate outside the accessway bulkhead with a stainless steel, 1-1/4” Female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 235 psi WOG; PVC ball valves or brass ball/gate will not be accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P Electrical Quick Disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The EQD will be supplied with 32’, 25’ of useable Electrical Supply Cable (ESC) outside the station, to connect to the alarm panel. The ESC shall be installed in the basin by the manufacturer. Field assembly of the ESC into the basin is not acceptable because of potential workmanship issues. The EQD shall require no tools for connecting, seal against water before the electrical connection is made, and include radial seals to assure a watertight seal regardless of tightening torque. Plug-type connections of the power cable onto the pump housing will not be acceptable due to the potential for leaks and electrical shorts. A junction box shall not be permitted in the accessway due to the large number of potential leak points. The EQD shall be so designed to be conducive to field wiring as required. The accessway shall also include an integral 2-inch vent to prevent sewage gases from accumulating in the tank.

2.07 TANK & INTEGRAL ACCESSWAY: **(DH272, 275-Gallon Duplex & DH502, 500-Gallon Duplex) Fiberglass reinforced polyester resin.** The tank shall be a Wetwell/Drywell design custom molded of fiberglass reinforced polyester resin with a high density polyethylene accessway. Accessway corrugated sections are to be made of a double wall construction with the internal wall being generally smooth to promote scouring. The corrugations of the outside wall are to be a minimum amplitude of 1-1/2" to provide necessary transverse stiffness. Any incidental sections of a single wall construction are to be 0.250” thick (minimum). All polyethylene seams created during tank construction are to be thermally welded and factory tested for leak tightness. The tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure.

The tank shall be furnished with one EPDM grommet fitting to accept a 4.50" OD DWV or Schedule 40 pipe. The tank capacities shall be as shown on the contract drawings.

The Drywell accessway shall be an integral extension of the Wetwell assembly and shall include a lockable cover assembly providing low profile mounting and watertight capability. The cover shall be high density polyethylene, green in color, with a load rating of 150 lbs per square foot. The accessway design and construction shall enable field adjustment of the station height in increments of 4" or less without the use of any adhesives or sealants requiring cure time before installation can be completed.

The station shall have all necessary penetrations molded in and factory sealed. To ensure a leak free installation no field penetrations will be acceptable.

All discharge piping shall be constructed of 304 stainless steel. The discharge shall terminate outside the accessway bulkhead with a stainless steel, 1-1/4" Female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 235 psi WOG; PVC ball valves or brass ball/gate will not be accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P Electrical Quick Disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The EQD will be supplied with 32', 25' of useable Electrical Supply Cable (ESC) outside the station, to connect to the alarm panel. The ESC shall be installed in the basin by the manufacturer. Field assembly of the ESC into the basin is not acceptable because of potential workmanship issues. The EQD shall require no tools for connecting, seal against water before the electrical connection is made, and include radial seals to assure a watertight seal regardless of tightening torque. Plug-type connections of the power cable onto the pump housing will not be acceptable due to the potential for leaks and electrical shorts. A junction box shall not be permitted in the accessway due to the large number of potential leak points. The EQD shall be so designed to be conducive to field wiring as required. The accessway shall also include an integral 2-inch vent to prevent sewage gases from accumulating in the tank.

2.08 CHECK VALVE: The pump discharge shall be equipped with a factory installed, gravity operated, flapper-type integral check valve built into the stainless steel discharge piping. The check valve will provide a full-ported passageway when open, and shall introduce a friction loss of less than 6 inches of water at maximum rated flow. Moving parts will be made of a 300 Series stainless steel and fabric reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A nonmetallic hinge shall be an integral part of the flapper assembly providing a maximum degree of freedom to assure seating even at a very low back-pressure. The valve body shall be an injection molded part made of an engineered thermoplastic resin. The valve shall be rated for continuous operating pressure of 235 psi. Ball-type check valves are unacceptable due to their limited sealing capacity in slurry applications.

2.09 ANTI-SIPHON VALVE: The pump discharge shall be equipped with a factory-installed, gravity-operated, flapper-type integral anti-siphon valve built into the stainless steel discharge piping. Moving parts will be made of 300 Series stainless steel and fabric-reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A nonmetallic hinge shall be an integral part of the flapper assembly, providing a maximum degree of freedom to ensure proper operation even at a very low pressure. The valve body shall be injection-molded from an engineered thermoplastic resin. Holes or ports in the discharge piping are not acceptable anti-siphon devices due to their tendency to clog from the solids in the slurry being pumped. The anti-siphon port diameter shall be no less than 60% of the inside diameter of the pump discharge piping.

2.10 CORE UNIT: The grinder pump station shall have a cartridge type, easily removable core assembly consisting of pump, motor, grinder, all motor controls, check valve, anti-siphon valve, level controls, electrical quick disconnect and wiring. The core unit shall be installed in the basin by the manufacturer. Field assembly of the pump and controls into the basin is not acceptable because of potential workmanship issues and increased installation time. In some cases, stations taller than 96" may be shipped on their side without the cores assembled in the basin for freight purposes but this is the only exception. The core unit shall seal to the tank deck with a stainless steel latch assembly. The latch assembly must be actuated utilizing a single quick release mechanism requiring no more than a half turn of a wrench. The watertight integrity of each core unit shall be established by a 100 percent factory test at a minimum of 5 PSIG.

2.11 CONTROLS: All necessary motor starting controls shall be located in the cast iron enclosure of the core unit secured by stainless steel fasteners. Locating the motor starting controls in a plastic enclosure is not acceptable. The wastewater level sensing controls shall be housed in a separate enclosure from

motor starting controls. The level sensor housing must be sealed via a radial type seal; solvents or glues are not acceptable. The level sensing control housing must be integrally attached to pump assembly so that it may be removed from the station with the pump and in such a way as to minimize the potential for the accumulation of grease and debris accumulation, etc. The level sensing housing must be a high-impact thermoplastic copolymer over-molded with a thermo plastic elastomer. The use of PVC for the level sensing housing is not acceptable.

Non-fouling wastewater level controls for controlling pump operation shall be accomplished by monitoring the pressure changes in an integral air column connected to a pressure switch. The air column shall be integrally molded from a thermoplastic elastomer suitable for use in wastewater and with excellent impact resistance. The air column shall have only a single connection between the water level being monitored and the pressure switch. Any connections are to be sealed radially with redundant O-rings. The level detection device shall have no moving parts in direct contact with the wastewater and shall be integral to the pump core assembly in a single, readily-exchanged unit. Depressing the push to run button must operate the pump even with the level sensor housing removed from the pump.

All fasteners throughout the assembly shall be 300 Series stainless steel. High-level sensing will be accomplished in the manner detailed above by a separate air column sensor and pressure switch of the same type. Closure of the high-level sensing device will energize an alarm circuit as well as a redundant pump-on circuit. For increased reliability, pump ON/OFF and high-level alarm functions shall not be controlled by the same switch. Float switches of any kind, including float trees, will not be accepted due to the periodic need to maintain (rinsing, cleaning) such devices and their tendency to malfunction because of incorrect wiring, tangling, grease buildup, and mechanical cord fatigue. To assure reliable operation of the pressure switches, each core shall be equipped with a factory installed equalizer diaphragm that compensates for any atmospheric pressure or temperature changes. Tube or piping runs outside of the station tank or into tank-mounted junction boxes providing pressure switch equalization will not be permitted due to their susceptibility to condensation, kinking, pinching, and insect infestation. The grinder pump will be furnished with a 6 conductor 14 gauge, type SJOW cable, pre-wired and watertight to meet UL requirements with a **FACTORY INSTALLED** NEMA 6P EQD half attached to it.

2.12 STAINLESS STEEL CURB STOP/CHECK VALVE ASSEMBLY (UNI-LATERAL): The curb stop shall be pressure-tight in both directions. The ball valve actuator shall include position stop features at the fully opened and closed positions. The curb stop/check valve assembly shall be designed to withstand a working pressure of 235 psi.

The stainless steel check valve shall be integral with the curb stop valve. The check valve will provide a full-ported 1-1/4” passageway and shall introduce minimal friction loss at maximum rated flow. The flapper hinge design shall provide a maximum degree of freedom and ensure seating at low back pressure.

Engineered Thermoplastic Fittings – All plastic fitting components are to be in compliance with applicable ASTM standards.

All pipe connections shall be made using compression fitting connections including a Buna-N O-ring for sealing to the outside diameter of the pipe. A split-collet locking device shall be integrated into all pipe connection fittings to securely restrain the pipe from hydraulic pressure and external loading caused by shifting and settling.

Curb Boxes – Curb boxes shall be constructed of ABS, conforming to ASTM-D 1788. Lid top casting shall be cast iron, conforming to ASTM A-48 Class 25, providing magnetic detectability, and be painted black. All components shall be inherently corrosion-resistant to ensure durability in the ground. Curb boxes shall provide height adjustment downward (shorter) from their nominal height.

High Density Polyethylene Pipe (Supplied by others) – Pipe shall be have a working pressure of 160 psi minimum and shall be classified SDR per ASTM D 3035.

Pipe Dimensions – The SDR (Standard Dimension Ratio) of the pipe supplied shall be as specified by the **SPECIFYING ENGINEER**. SDR 7, 9 and 11 fittings are available from the **MANUFACTURER**.

Factory Test – The stainless steel, combination curb stop/check valve component shall be 100 percent hydrostatically tested to 150 psi in the factory.

Construction Practices – Pipe shall be stored on clean, level ground to prevent undue scratching or gouging of the pipe. If the pipe must be stacked for storage, such stacking should be in accordance with the pipe manufacturer's recommendations. The pipe should be handled in such a manner that it is not damaged by being dragged over sharp objects or cut by chokers or lifting equipment.

Segments of pipe having cuts or gouges in excess of 10 percent of the wall thickness of the pipe shall be cut out and removed. The undamaged portions of the pipe shall be rejoined using the butt fusion joining method. Sections of polyethylene pipe should be joined into continuous lengths on the job site above ground. The joining method shall be the butt-fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt-fusion equipment used in the joining procedure shall be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, fusion temperature, alignment, and fusion pressure.

Fused segments of pipe shall be handled so as to avoid damage to the pipe. When lifting fused sections of pipe, chains or cable-type chokers should be avoided. Nylon slings are preferred. Spreader bars should be used when lifting long, fused sections. Care should be exercised to avoid cutting or gouging the pipe.

Installation – Assemble the compression fittings according to the fitting manufacturer's recommendations.

The trench and trench bottom should be constructed in accordance with ASTM D 2321. Embedment materials should be Class I, Class II or Class III materials as defined in ASTM D 2321. The use of Class IV and/or Class V materials for embedment is not recommended and should be allowed only with the approval of the **SPECIFYING ENGINEER**. Bedding of the pipe should be performed in accordance with ASTM D 2321. Compaction should be as specified in ASTM D 2321. Deviations from the specified compaction shall be approved by the **SPECIFYING ENGINEER**.

Haunching and initial backfill should be as specified in ASTM D 2321 using Class I, Class II or Class III materials. Materials used and compaction shall be as specified by the **SPECIFYING ENGINEER**. In cases where a compaction of 85 percent Standard Proctor Density is not attainable, the **SPECIFYING ENGINEER** may wish to increase the SDR of the pipe to provide adequate stiffness. ASTM D 2321 sections titled "Minimum Cover for Load Application," "Use of Compaction Equipment" and "Removal of Trench Protection" should apply unless directed otherwise by the **SPECIFYING ENGINEER**.

2.13 ALARM PANEL: Each grinder pump station shall include a NEMA 4X, UL-listed alarm panel suitable for wall or pole mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic polyester to ensure corrosion resistance. The enclosure shall include a hinged, lockable cover with padlock, preventing access to electrical components, and creating a secured safety front to allow access only to authorized personnel. The enclosure shall not exceed 10.5" W x 14" H x 7" D, or 12.5" W x 16" H x 7.5" D if certain options are included.

The alarm panel shall contain one 15-amp, double-pole circuit breaker for the pump core's power circuit and one 15-amp, single-pole circuit breaker for the alarm circuit. The panel shall contain a push-to-run feature, an internal run indicator, and a complete alarm circuit. All circuit boards in the alarm panel are to be protected with a conformal coating on both sides and the AC power circuit shall include an auto resetting fuse.

The alarm panel shall include the following features: external audible and visual alarm; push-to-run switch; push-to-silence switch; redundant pump start; and high level alarm capability. The alarm sequence is to be as follows when the pump and alarm breakers are on:

1. When liquid level in the sewage wet-well rises above the alarm level, the contacts on the alarm

pressure switch activate, audible and visual alarms are activated, and the redundant pump starting system is energized.

2. The audible alarm may be silenced by means of the externally mounted, push-to-silence button.

3. Visual alarm remains illuminated until the sewage level in the wet-well drops below the “off” setting of the alarm pressure switch.

The visual alarm lamp shall be inside a red, oblong lens at least 3.75" L x 2.38" W x 1.5" H. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain NEMA 4X rating. The audible alarm shall be externally mounted on the bottom of the enclosure, capable of 93 dB @ 2 feet. The audible alarm shall be capable of being deactivated by depressing a push-type switch that is encapsulated in a weatherproof silicone boot and mounted on the bottom of the enclosure (push-to-silence button).

The entire alarm panel, as manufactured and including any of the following options shall be listed by Underwriters Laboratories, Inc.

(OPTIONAL) Alarm Contacts Package

- **Alarm Activated Dry Contacts** – Normally open relay contact closes upon alarm activation.

- **Alarm Activated Contacts for Remote Sentry Indoor Alarm Module** – Will work with or without power to the alarm panel and is designed to work with E/One’s Remote Sentry.

(OPTIONAL) Generator Receptacle and Auto Transfer – The alarm panel shall include a 20 amp, 250 VAC generator receptacle with a spring-loaded, gasketed cover suitably mounted to provide access for connection of an external generator while maintaining a NEMA 4X rating. An automatic transfer switch shall be provided, which automatically switches from AC power to generator power. Power shall be provided to that alarm panel through the generator receptacle whenever power is present at the receptacle, allowing the audible and visual alarms to function normally in generator mode. When power is no longer applied to the generator receptacle, the panel is automatically switched back to the AC Mains power. (No manual switching within the panel enclosure is necessary to switch from generator power back to AC Mains, so the mode cannot be inadvertently left in the generator position after pumping down the station in generator mode as is the case with a manual transfer switch).

(OPTIONAL) Service Equipment/Main Service Disconnect Breaker – A separate, internal breaker rated and approved for use as “service equipment” and acts as a main service disconnect of the grinder pump station shall be provided.

(OPTIONAL) Remote Sentry Indoor Alarm Module – A separate, remote indoor alarm module shall be provided to indicate a high level alarm with or without AC power to the grinder pump station. The Remote Sentry indoor alarm module shall have an internal power source enabling its continued operation without AC power. The Remote Sentry shall have an audible alarm and a visual alarm, both of which shall automatically reset if the high level alarm condition is eliminated. The Remote Sentry indoor alarm module shall include a Silence button for the audible alarm and a Test button.

(OPTIONAL) Run-time/Hour Meter – A run-time or hour meter to display the total run-time or operation time for the pump core shall be provided.

(OPTIONAL) Event/Cycle Counter – An event or cycle counter to display the number of operations of the pump core shall be provided.

(OPTIONAL) SENTRY SIMPLEX PROTECT
Provides protection from the following operating conditions:

- **Low Voltage (Brownout) Protection** – A lockout cycle will prevent the motor from operating

and will illuminate an LED if:

- the incoming AC Mains voltage drops below a predetermined minimum, typically 12% of nameplate (211 volts for a 240 volt system) for 2 to 3 seconds, regardless of whether the motor is running
- the lockout cycle will end if the incoming AC Mains voltage returns to a predetermined value, typically 10% of nameplate (216 volts for a 240 volt system)

The system continues to retest the voltage every second indefinitely. If the lockout cycle has been initiated and the voltage comes back above the predetermined starting voltage, the system will function normally. The LED remains illuminated during a Brownout condition and remains latched until the pump breaker is turned off and then on again (reset). The audible and visual alarm will not be activated unless there is a high wastewater level in the tank.

- **Run Dry Protection** – A 20-minute lockout cycle will prevent the motor from operating and will illuminate an LED when the wastewater level in the tank is below the pump inlet level. The condition is rechecked every 20 minutes. If the lockout cycle has been initiated and the condition is satisfied, the pump is not allowed to cycle normally but the LED remains latched. The LED will remain latched until the pump breaker is turned off and then on again (reset). If the condition is not satisfied after 3 consecutive attempts, the visual alarm will be activated until the pump breaker is turned off and on (reset) or until there is one cycle of normal operation. If a high level condition is presented at any time, a pump run cycle will be activated.

- **High System Pressure Protection** – A 20-minute lockout cycle will prevent the motor from operating and will illuminate an LED when the pressure in the discharge line is atypically high (closed valve or abnormal line plug). The condition is rechecked every 20 minutes. If the condition is satisfied, the pump is allowed to cycle normally but the LED remains latched. If the condition is not satisfied after 3 consecutive attempts, the pump is locked out indefinitely until the condition is removed and power is reset. The LED will remain latched until the pump breaker is turned off and then on again (reset). The audible and visual alarm will be activated.

In all of the above cases, if more than one error condition is presented, the LED depicting the most recent error condition will be displayed.

Other included features:

- Alarm Activated Dry Contacts – Normally open relay contact closes upon alarm activation.
- Alarm Activated Contacts for Remote Indoor Alarm Module – Will work with or without power to the alarm panel and is designed to work with E/One's Remote Sentry.
- Includes Inner Door Dead Front
- Separate LED's for each condition

(OPTIONAL) SENTRY SIMPLEX PROTECT PLUS:

- All Sentry Protect features (as detailed above)
- High/Low Voltage monitoring with Trouble indication
- High/Low Wattage (wattage is used instead of current because it is a better indicator of pump performance) monitoring with Trouble indication
- Extended Run Time monitoring with Trouble indication
- Cycle/Event Counter
- Run Time Counter (Hour Meter)
- Run Time Limit — time adjustable, user-selected options: 10 minutes (default) to 120 minutes in 1-minute intervals
- Power-up Delay — time adjustable, user-selected options: None (default), to 300 minutes in 1-minute intervals
- Alarm Delay — time adjustable, user-selected options: None (default) or adjustable in 1-minute intervals
- System self-test diagnostic
- User-selectable Alarm latch
- User-selectable Protect Mode disable
- User-selectable buzzer timer

Specific Protect PLUS indicators and programming features shall include:

- Ready LED to indicate AC power to the station is satisfactory
- Pump Run LED to indicate pump is operating
- Trouble LED indicator and predictive Visual Alarm notification (“blinking” alarm lamp; clears on Normal cycle)
- High Level Alarm LED indicator
- Manual Run switch to manually activate pump
- Menu-driven programmable controller with navigation overlay-type buttons (Enter, Scroll, Up, Down)
- Normal Operation LED and Mode button for Mode status
- Pump Performance menu LED with LCD Display of the following pump performance statistics:
    - Real-time Voltage
    - Real-time Amperage
    - Real-time Wattage
    - Minimum/Maximum/Average Voltage
    - Minimum/Maximum/Average Amperage
    - Minimum/Maximum/Average Wattage
    - Minimum/Maximum Run-time
    - Average Run-time
    - Last Run-time
    - Cycle/Event Counter
    - Run Time Counter (Hour Meter)
- Diagnostics Menu LED
- Initialize System Menu LED
- Run Limit Menu LED
- Alarm Delay Menu LED
- Power Delay Menu LED

DUPLEX STATIONS

MOD T260 DUPLEX:

Each grinder pump station shall include a NEMA 4X, UL-listed alarm panel suitable for wall or pole mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic to ensure corrosion resistance. The enclosure shall include a hinged, lockable cover with padlock, preventing access to electrical components, and creating a secured safety front to allow access only to authorized personnel. The standard enclosure shall not exceed 12.5" W x 16" H x 7.5" D.

The panel shall contain one 15-amp single pole circuit breaker for the alarm circuit and one 15-amp double pole circuit breaker per core for the power circuit. The panel shall contain a push-to-run feature, an internal run indicator, and a complete alarm circuit. All circuit boards in the alarm panel are to be protected with a conformal coating on both sides and the AC power circuit shall include an auto resetting fuse.

The visual alarm lamp shall be inside a red, oblong lens at least 3.75" L x 2.38" W x 1.5" H. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain NEMA 4X rating. The audible alarm shall be externally mounted on the bottom of the enclosure, capable of 93 dB @ 2 feet. The audible alarm shall be capable of being deactivated by depressing a push-type switch that is encapsulated in a weatherproof silicone boot and mounted on the bottom of the enclosure (push-to-silence button).

The high-level alarm system shall operate as follows:

1. The panel will go into alarm mode if either pump’s alarm switch closes. During the initial alarm mode both pumps will run and the alarm light and buzzer will be delayed for a period of time based on user settings (default is 3-1/2 minutes). If the station is still in high-level alarm after the delay, the light and buzzer will be activated.
2. The audible alarm may be silenced by means of the externally mounted push-to-silence button.

3. The visual alarm remains illuminated until the sewage level in the wet well drops below the “off” setting of the alarm switch for both pumps.

The entire alarm panel, as manufactured and including any of the following options shall be listed by Underwriters Laboratories, Inc.

(OPTIONAL) Generator Receptacle and Auto Transfer – The alarm panel shall include a 20 amp, 250 VAC generator receptacle with a spring-loaded, gasketed cover suitably mounted to provide access for connection of an external generator while maintaining a NEMA 4X rating. An automatic transfer switch shall be provided, which automatically switches from AC power to generator power. Power shall be provided to the alarm panel through the generator receptacle whenever power is present at the receptacle, allowing the audible and visual alarms to function normally in generator mode. When power is no longer applied to the generator receptacle, the panel is automatically switched back to the AC Mains power. (No manual switching within the panel enclosure is necessary to switch from generator power back to AC Mains, so the mode cannot be inadvertently left in the generator position after pumping down the station in generator mode as is the case with a manual transfer switch).

(OPTIONAL) Service Equipment/Main Service Disconnect Breaker – A separate, internal breaker rated and approved for use as “service equipment” and acts as a main service disconnect of the grinder pump station shall be provided.

(OPTIONAL) Remote Sentry Indoor Alarm Module – A separate, remote indoor alarm module shall be provided to indicate a high level alarm with or without AC power to the grinder pump station. The Remote Sentry indoor alarm module shall have an internal power source enabling its continued operation without AC power. The Remote Sentry shall have an audible alarm and a visual alarm, both of which shall automatically reset if the high level alarm condition is eliminated. The Remote Sentry indoor alarm module shall include a Silence button for the audible alarm and a Test button.

(OPTIONAL) Run-time/Hour Meter – A run-time or hour meter to display the total run-time or operation time for the pump core shall be provided.

(OPTIONAL) Event/Cycle Counter – An event or cycle counter to display the number of operations of the pump core shall be provided.

(OPTIONAL) External Autodialer –

- Four separate voice message alarm zones
- Calls up to 8 telephones, cell phones or pagers
- Built-in line seizure
- Remote Turn Off feature allows termination of activated channel
- EEPROM Memory retains program despite power loss
- Listen-in verification and communication
- Universal dial tone
- Built-in auxiliary output to drive external siren, strobe or relay
- Five optional settings for notifications of a power loss occurrence — instantaneous, 15 minutes, 2 hours, 12 hours or 24 hours
- One channel for power-loss sensing, three hardwired channels for additional input
- Dialer senses loss of power and based on setting; will notify parties of loss condition only when specified time has elapsed
- If power restores before set time has elapsed, no call will be made
- Package includes battery backup and transformer

DUPLEX PROTECT PLUS:

Each grinder pump station shall include a NEMA 4X, UL-listed alarm panel suitable for wall or pole mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic to ensure corrosion resistance. The enclosure shall include a hinged, lockable cover with padlock, preventing access to

electrical components, and creating a secured safety front to allow access only to authorized personnel. The standard enclosure shall not exceed 12.5" W x 16" H x 7.5" D.

The panel shall contain one 15-amp single pole circuit breaker for the alarm circuit and one 15-amp double pole circuit breaker per core for the power circuit. The panel shall contain a push-to-run feature, an internal run indicator, and a complete alarm circuit. All circuit boards in the alarm panel are to be protected with a conformal coating on both sides and the AC power circuit shall include an auto resetting fuse.

The visual alarm lamp shall be inside a red, oblong lens at least 3.75" L x 2.38" W x 1.5" H. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain NEMA 4X rating. The audible alarm shall be externally mounted on the bottom of the enclosure, capable of 93 dB @ 2 feet. The audible alarm shall be capable of being deactivated by depressing a push-type switch that is encapsulated in a weatherproof silicone boot and mounted on the bottom of the enclosure (push-to-silence button).

The high-level alarm system shall operate as follows:

1. The panel will go into alarm mode if either pump's alarm switch closes. During the initial alarm mode both pumps will run and the alarm light and buzzer will be delayed for a period of time based on user settings (default is 3-1/2 minutes). If the station is still in high-level alarm after the delay, the light and buzzer will be activated.
2. The audible alarm may be silenced by means of the externally mounted push-to-silence button.
3. The visual alarm remains illuminated until the sewage level in the wet well drops below the "off" setting of the alarm switch for both pumps.

The entire alarm panel, as manufactured and including any of the following options shall be listed by Underwriters Laboratories, Inc.

Contains the following features:

- **Alarm Activated Dry Contacts** – Normally open relay contact closes upon alarm activation.

- **Alarm Activated Contacts for Remote Indoor Alarm Module** – Will work with or without power to the alarm panel and is designed to work with E/One's Remote Sentry.

- **Includes Inner Door Dead Front**

- **Separate LED's for each condition**

Provides protection from the following operating conditions:

- **Low Voltage (Brownout) Protection** – A lockout cycle will prevent the motor from operating and will illuminate the Trouble LED if:
  - the incoming AC Mains voltage drops below a predetermined minimum, typically 12% of nameplate (211 volts for a 240 volt system) for 2 to 3 seconds, regardless of whether the motor is running
  - the lockout cycle will end if the incoming AC Mains voltage returns to a predetermined value, typically 10% of nameplate (216 volts for a 240 volt system).

  The system continues to retest the voltage every second indefinitely. If the lockout cycle has been initiated and the voltage comes back above the predetermined starting voltage, the system will function normally. The Trouble LED remains illuminated during a Brownout condition and a corresponding Brownout message will be displayed on the LCD screen. The LED will turn off when the Brownout condition ends and the LCD message remains latched until the panel is reset. The audible and visual alarm will not be activated unless there is a high wastewater level in the tank.

- **Run Dry Protection** – A 20-minute lockout cycle will prevent the motor from operating and will

illuminate the Trouble LED when the wastewater level in the tank is below the pump inlet shroud. A corresponding Run Dry message will be displayed on the LCD screen. The condition is rechecked every 20 minutes and the LCD message remains latched. If the condition is satisfied, the pump is allowed to cycle normally and the Trouble LED will go out, but the LCD message remains latched. The LCD message will remain latched until the panel is reset. If the condition is not satisfied after 3 consecutive attempts, the visual alarm will be activated until the panel is reset or until there is one cycle of normal operation. If a high level condition is presented at any time, a pump run cycle will be activated.

- **High System Pressure Protection** – A 20-minute lockout cycle will prevent the motor from operating and will illuminate the Trouble LED when the pressure in the discharge line is atypically high (closed valve or abnormal line plug). A corresponding Overpressure message will be displayed on the LCD screen. The condition is rechecked every 20 minutes. If the condition is satisfied, the pump is allowed to cycle normally and the Trouble LED will turn off, but the LCD message remains latched. The LCD message will remain latched until the panel is reset. If the condition is not satisfied after 3 consecutive attempts, the pump is locked out indefinitely and the audible and visual alarm will be activated. The LCD message and alarms will remain latched until the condition is removed and the panel is reset.

In all of the above cases, if more than one error condition is presented, the LCD message depicting the most recent error condition will be displayed.

PROTECT PLUS FEATURES:

- High/Low Voltage monitoring with Trouble indication
- High/Low Wattage (wattage is used instead of current because it is a better indicator of pump performance) monitoring with Trouble indication
- Extended Run Time monitoring with Trouble indication
- Cycle/Event Counter
- Run Time Counter (Hour Meter)
- Run Time Limit — time adjustable, user-selected options: 10 minutes (default) to 120 minutes in 1-minute intervals
- Power-up Delay — time adjustable, user-selected options: None (default), to 300 minutes in 1-minute intervals
- Alarm Delay — time adjustable, user-selected options: zero to 10 minutes in 30-second increments; 4 minutes is default
- System self-test diagnostic
- User-selectable Alarm latch
- User-selectable Protect Mode disable
- User-selectable buzzer timer

Specific Duplex Protect PLUS indicators and programming features shall include:

- Ready LED to indicate AC power to the station is satisfactory
- Pump Run LED to indicate pump is operating (LCD indicates which pump is running)
- Trouble LED indicator and predictive Visual Alarm notification (“blinking” alarm lamp; clears on Normal cycle)
- High Level Alarm LED indicator (LCD indicates which pump is in alarm)
- Manual Run switch to manually activate pumps
- Lead/Lag indication (LCD indicates which pump is lead)
- Menu-driven programmable controller with navigation overlay-type buttons (Enter, Scroll, Up, Down)
- Normal Operation LED and Mode button for Mode status
- Pump Performance menu LED with LCD display of the following pump performance statistics:
    - Real-time Voltage
    - Real-time Amperage
    - Real-time Wattage
    - Minimum/Maximum/Average Voltage
    - Minimum/Maximum/Average Amperage
    - Minimum/Maximum/Average Wattage

    - Minimum/Maximum Run-time
    - Average Run-time
    - Last Run-time
    - Cycle/Event Counter
    - Run Time Counter (Hour Meter)
- Diagnostics Menu LED
- Initialize System Menu LED
- Run Limit Menu LED
- Alarm Delay Menu LED
- Power Delay Menu LED
- Pump alternating options (no alternation, adjustable time based and test)
- Pump alternating time options — 24 hours to 72 hours in 12-hour increments

(OPTIONAL) Generator Receptacle and Auto Transfer – The alarm panel shall include a 20 amp, 250 VAC generator receptacle with a spring-loaded, gasketed cover suitably mounted to provide access for connection of an external generator while maintaining a NEMA 4X rating. An automatic transfer switch shall be provided, which automatically switches from AC power to generator power. Power shall be provided to the alarm panel through the generator receptacle whenever power is present at the receptacle, allowing the audible and visual alarms to function normally in generator mode. When power is no longer applied to the generator receptacle, the panel is automatically switched back to the AC Mains power. (No manual switching within the panel enclosure is necessary to switch from generator power back to AC Mains, so the mode cannot be inadvertently left in the generator position after pumping down the station in generator mode as is the case with a manual transfer switch).

(OPTIONAL) Service Equipment/Main Service Disconnect Breaker – A separate, internal breaker that is rated and approved for use as “service equipment” and acts as a main service disconnect of the grinder pump station shall be provided.

(OPTIONAL) Remote Sentry Indoor Alarm Module – A separate, remote indoor alarm module shall be provided to indicate a high level alarm with or without AC power to the grinder pump station. The Remote Sentry indoor alarm module shall have an internal power source enabling its continued operation without AC power. The Remote Sentry shall have an audible alarm and a visual alarm, both of which shall automatically reset if the high level alarm condition is eliminated. The Remote Sentry indoor alarm module shall include a Silence button for the audible alarm and a Test button.

(OPTIONAL) External Autodialer –

- Four separate voice message alarm zones
- Calls up to 8 telephones, cell phones or pagers
- Built-in line seizure
- Remote Turn Off feature allows termination of activated channel
- EEPROM Memory retains program despite power loss
- Listen-in verification and communication
- Universal dial tone
- Built-in auxiliary output to drive external siren, strobe or relay
- Five optional settings for notifications of a power loss occurrence — instantaneous, 15 minutes, 2 hours, 12 hours or 24 hours
- One channel for power-loss sensing, three hardwired channels for additional input
- Dialer senses loss of power and based on setting; will notify parties of loss condition only when specified time has elapsed
- If power restores before set time has elapsed, no call will be made
- Package includes battery backup and transformer

2.14 SERVICEABILITY: The grinder pump core, including level sensor assembly, shall have two lifting hooks complete with lift-out harness connected to its top housing to facilitate easy core removal when necessary. The level sensor assembly must be easily removed from the pump assembly for service or replacement. All mechanical and electrical connections must provide easy disconnect capability for core

unit removal and installation. Each EQD half must include a water-tight cover to protect the internal electrical pins while the EQD is unplugged. A pump push-to-run feature will be provided for field trouble shooting. The push-to-run feature must operate the pump even if the level sensor assembly has been removed from the pump assembly. All motor control components shall be mounted on a readily replaceable bracket for ease of field service.

2.15 OSHA CONFINED SPACE: All maintenance tasks for the grinder pump station must be possible without entry into the grinder pump station (as per **OSHA 1910.146**, permit-required confined spaces). *"Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space."*

2.16 SAFETY: The grinder pump shall be free from electrical and fire hazards as required in a residential environment. As evidence of compliance with this requirement, the completely assembled and wired grinder pump station shall be listed by Underwriters Laboratories, Inc. to be safe and appropriate for the intended use. UL listing of components of the station, or third-party testing to UL standard are not acceptable.

The grinder pump shall meet accepted standards for plumbing equipment for use in or near residences, shall be free from noise, odor, or health hazards, and shall have been tested by an independent laboratory to certify its capability to perform as specified in either individual or low pressure sewer system applications. As evidence of compliance with this requirement, the grinder pump shall bear the seal of NSF International. Third-party testing to NSF standard is not acceptable.

3.0 EXECUTION

3.01 FACTORY TEST: Each grinder pump shall be submerged and operated for 1.5 minutes (minimum). Included in this procedure will be the testing of all ancillary components such as, the anti-siphon valve, check valve, discharge assembly and each unit's dedicated level controls and motor controls. All factory tests shall incorporate each of the above listed items. Actual appurtenances and controls which will be installed in the field shall be particular to the tested pump only. A common set of appurtenances and controls for all pumps is not acceptable. Certified test results shall be available upon request showing the operation of each grinder pump at two different points on its curve. Additional validation tests include: integral level control performance, continuity to ground and acoustic tests of the rotating components.

The **ENGINEER** reserves the right to inspect such testing procedures with representatives of the **OWNER,** at the **GRINDER PUMP MANUFACTURER'S** facility.

3.02 CERTIFIED SERVICE PROGRAM: The grinder pump **MANUFACTURER** shall provide a program implemented by the **MANUFACTURER'S** personnel as described in this specification to certify the service company as an authorized serviced center. As evidence of this, the **MANUFACTURER** shall provide, when requested, sufficient evidence that they have maintained their own service department for a minimum of 30 years and currently employ a minimum of five employees specifically in the service department.

As part of this program, the **MANUFACTURER** shall evaluate the service technicians as well as the service organization annually. The service company will be authorized by the **MANUFACTURER** to make independent warranty judgments. The areas covered by the program shall include, as a minimum:

1. Pump Population Information — The service company will maintain a detailed database for the grinder pumps in the territory that tracks serial numbers by address.

2. Inventory Management — The service company must maintain an appropriate level of inventory (pumps, tanks, panels, service parts, etc.) including regular inventory review and proper inventory

labeling. Service technicians will also maintain appropriate parts inventory and spare core(s) on service vehicles.

3. Service Personnel Certification — Service technicians will maintain their level-specific certification annually. The certifications are given in field troubleshooting, repair, and training.

4. Service Documentation and Records — Start up sheets, service call records, and customer feedback will be recorded and available by the service company.

5. Shop Organization — The service company will keep its service shop organized and pumps will be tagged with site information at all times. The shop will have all required equipment, a test tank, and cleaning tools necessary to service pumps properly.

3.03 DELIVERY: All grinder pump units will be delivered to the job site 100 percent completely assembled, including testing, ready for installation. Field installation of the pump in tanks under 96 inches is not allowed. Field installation of the level sensor into the tank is not allowed. Grinder pump stations will be individually mounted on wooden pallets.

3.04 INSTALLATION: Earth excavation and backfill are specified under **SITE WORK**, but are also to be done as a part of the work under this section, including any necessary sheeting and bracing.

The **CONTRACTOR** shall be responsible for handling ground water to provide a firm, dry subgrade for the structure, and shall guard against flotation or other damage resulting from general water or flooding.

The grinder pump stations shall not be set into the excavation until the installation procedures and excavation have been approved by the **ENGINEER**.

Remove packing material. User instructions MUST be given to the **OWNER**. Hardware supplied with the unit, if required, will be used at installation. The basin will be supplied with a standard 4" inlet grommet (4.50" OD) for connecting the incoming sewer line. Appropriate inlet piping must be used. The basin may not be dropped, rolled or laid on its side for any reason.

Installation shall be accomplished so that 1 inch to 4 inches of accessway, below the bottom of the lid, extends above the finished grade line. The finished grade shall slope away from the unit. The diameter of the excavated hole must be large enough to allow for the concrete anchor.

A 6" inch (minimum) layer of naturally rounded aggregate, clean and free flowing, with particle size of not less than 1/8" or more than 3/4" shall be used as bedding material under each unit.

A concrete anti-flotation collar, as detailed on the drawings, and sized according to the manufacturer's instructions, shall be required and shall be pre-cast to the grinder pump or poured in place. Each grinder pump station with its pre-cast anti-flotation collar shall have a minimum of three lifting eyes for loading and unloading purposes.

If the concrete is poured in place, the unit shall be leveled, and filled with water, to the bottom of the inlet, to help prevent the unit from shifting while the concrete is being poured. The concrete must be manually vibrated to ensure there are no voids. If it is necessary to pour the concrete to a level higher than the inlet piping, an 8" sleeve is required over the inlet prior to the concrete being poured.

The **CONTRACTOR** will provide and install a 4-foot piece of 4-inch SCH 40 PVC pipe with water tight cap, to stub-out the inlet for the property owners' installation contractor, as depicted on the contract drawings.

E/One requires that an E/One Uni-Lateral assembly (E/One part number NB0184PXX or NC0193GXX) or E/One Redundant Check Valve (E/One part number PC0051GXX) be installed in the pipe lateral outside the home between the pump discharge and the street main on all installations.

The electrical enclosure shall be furnished, installed and wired to the grinder pump station by the **CONTRACTOR**. An alarm device is required on every installation, there shall be **NO EXCEPTIONS**. It will be the responsibility of the **CONTRACTOR** and the **ENGINEER** to coordinate with the individual property owner(s) to determine the optimum location for the Alarm Panel.

The **CONTRACTOR** shall mount the alarm device in a conspicuous location, as per national and local codes. The alarm panel will be connected to the grinder pump station by a length of 6-conductor type TC cable as shown on the contract drawings. The power and alarm circuits must be on separate power circuits. The grinder pump stations will be provided with 32 feet, 25 feet of useable, electrical supply cable to connect the station to the alarm panel. This cable shall be supplied with a **FACTORY INSTALLED** EQD half to connect to the mating EQD half on the core.

3.05 BACKFILL REQUIREMENTS: Proper backfill is essential to the long-term reliability of any underground structure. Several methods of backfill are available to produce favorable results with different native soil conditions. The most highly recommended method of backfilling is to surround the unit to grade using Class I or Class II backfill material as defined in ASTM 2321. Class 1A and Class 1B are recommended where frost heave is a concern, Class 1B is a better choice when the native soil is sand or if a high, fluctuating water table is expected. Class 1, angular crushed stone offers an added benefit in that it doesn't need to be compacted.

Class II, naturally rounded stone, may require more compactive effort, or tamping, to achieve the proper density. If the native soil condition consists of clean compactible soil, with less than 12 percent fines, free of ice, rocks, roots and organic material, it may be an acceptable backfill. Soil must be compacted in lifts not to exceed one foot to reach a final Proctor Density of between 85 percent and 90 percent. Heavy, non-compactible clays and silts are *not* suitable backfill for this or any underground structure such as inlet or discharge lines.

If you are unsure of the consistency of the native soil, it is recommended that a geotechnical evaluation of the material is obtained before specifying backfill.

Another option is the use of a flowable fill (i.e., low slump concrete). This is particularly attractive when installing grinder pump stations in augured holes where tight clearances make it difficult to assure proper backfilling and compaction with dry materials. Flowable fills should not be dropped more than 4 feet from the discharge to the bottom of the hole to avoid separation of the constituent materials.

Backfill of clean native earth, free of rocks, roots, and foreign objects shall be thoroughly compacted in lifts not exceeding 12" to a final Proctor Density of not less than 85 percent. Improper backfilling may result in damaged accessways. The grinder pump station shall be installed at a minimum depth from grade to the top of the 1 1/4" discharge line, to assure maximum frost protection. The finish grade line shall be 1" to 4" below the bottom of the lid, and final grade shall slope away from the grinder pump station.

All restoration will be the responsibility of the **CONTRACTOR**. Per unit costs for this item shall be included in the **CONTRACTOR'S** bid price for the individual grinder pump stations. The properties shall be restored to their original condition in all respects, including, but not limited to, curb and sidewalk replacement, landscaping, loaming and seeding, and restoration of the traveled ways, as directed by the **ENGINEER**.

3.06 START-UP AND FIELD TESTING: The **MANUFACTURER** shall provide the services of qualified factory trained technician(s) who shall inspect the placement and wiring of each station, perform field tests as specified herein, and instruct the **OWNER'S** personnel in the operation and maintenance of the equipment before the stations are accepted by the **OWNER**.

All equipment and materials necessary to perform testing shall be the responsibility of the **INSTALLING CONTRACTOR.** This includes, as a minimum, a portable generator and power cable (if temporary power is required), water in each basin (filled to a depth sufficient to verify the high level alarm is

operating), and opening of all valves in the system. These steps shall be completed prior to the qualified factory trained technician(s) arrival on site.

The services of a trained factory-authorized technician shall be provided at a rate of 40 hours for every 100 grinder pump stations supplied.

Upon completion of the installation, the authorized factory technician(s) will perform the following test on each station:

1. Make certain the discharge shut-off valve in the station is fully open.

2. Turn ON the alarm power circuit and verify the alarm is functioning properly.

3. Turn ON the pump power circuit. Initiate the pump operation to verify automatic “on/off” controls are operative. The pump should immediately turn ON.

4. Consult the Manufacturer’s Service Manual for detailed start-up procedures.

Upon completion of the start-up and testing, the **MANUFACTURER** shall submit to the **ENGINEER** the start-up authorization form describing the results of the tests performed for each grinder pump station. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed and any installation deficiencies corrected.

4.0 OPERATION AND MAINTENANCE

4.01 SPARE CORE: The **MANUFACTURER** will supply one spare grinder pump core for every 50 grinder pump stations installed, complete with all operational controls, level sensors, check valve, anti-siphon valve, pump/motor unit, and grinder.

4.02 MANUALS: The **MANUFACTURER** shall supply four copies of Operation and Maintenance Manuals to the **OWNER**, and one copy of the same to the **ENGINEER.**

END OF SECTION

WARRANTY PERFORMANCE CERTIFICATION

As a pre-bid certification requirement, each bidder shall provide a Warranty Performance Certification executed by the most senior executive officer, which certifies a minimum of a two (2) year warranty. They must further detail any exclusions from the warranty or additional cost items required to maintain the equipment in warrantable condition, including all associated labor and shipping fees, and certify that the manufacturer will bear **all** costs to correct original equipment deficiency for the effective period of the warranty.

I,_____, by and through my duly authorized signature below as its most senior operating executive, certify that _____ _____ will provide a two (2) year warranty on grinder pump equipment manufactured and supplied by _____ _____ for the _____ _____ project. I further certify that, other than failure to install equipment in accordance with manufacturer's instructions, no exclusions and/or cost items to maintain said equipment in warrantable condition, including labor, travel and shipping fees, exist except as detailed immediately below:

EXCLUSIONS: 1. _____
2. _____
3. _____

COST ITEMS TO MAINTAIN EQUIPMENT IN WARRANTABLE CONDITION:	Required Frequency (mos)	Avg. monthly cost ($) times warranty period
1. _____	_____	$ _____
2. _____	_____	$ _____
3. _____	_____	$ _____
4. _____	_____	$ _____
5. _____	_____	$ _____

Total labor/material cost to maintain equipment in warrantable condition for warranty period ($):

For any items not identified as exclusions or additional cost items above, OR for additional labor & material costs required to maintain equipment in warrantable condition that exceed the Avg. monthly cost ($) detailed above, _____ will bear all costs to correct such original equipment deficiency for the effective period of the warranty including all applicable labor, travel and shipping fees.

_____ _____
Signature Date

_____
Title

MANUFACTURER'S DISCLOSURE STATEMENT

Note: To be completed if proposing an alternate

1.0 GENERAL:

1.01 General Description
Describe all non-conforming aspects to the specification:
_____
_____
_____
_____
_____
_____
_____

1.04 Experience
List 10 low pressure sewer system installations ***of the type of pump/station specified (progressive cavity type)*** that have been in operation for a period of no less than ten years with a minimum of 100 pumps pumping into a "common" low pressure sewer system. Provide Name and Location, Contact Name, Phone Number, Number of Pumps, and Install Date for each.
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

1.05 Operating Conditions
Describe all non-conforming aspects to the specification:
_____
_____
_____

1.06 Warranty
Fully state the manufacturer's warranty:
_____
_____
_____
_____
_____
_____

2.0 PRODUCT:

2.01 Pump
Describe all non-conforming aspects to the specification:
_____
_____
_____

2.02 Grinder
Describe all non-conforming aspects to the specification:
_____
_____

_____
_____

2.03 Motor
Describe all non-conforming aspects to the specification:
_____
_____
_____
_____

2.05 Tank
Describe all non-conforming aspects to the specification:
_____
_____
_____
_____

2.07 Electrical Quick Disconnect
Describe all non-conforming aspects to the specification:
_____
_____
_____
_____

2.08 Check Valve
Describe all non-conforming aspects to the specification:
_____
_____
_____
_____

2.09 Anti-Siphon Valve
Describe all non-conforming aspects to the specification:
_____
_____
_____
_____

2.11 Controls
Describe all non-conforming aspects to the specification:
_____
_____
_____
_____

2.16 Safety
Describe all non-conforming aspects to the specification:
_____
_____
_____

3.0 EXECUTION:

3.01 Factory Test
Describe all non-conforming aspects to the specification:
_____
_____

_____
_____

I attest that all questions are answered truthfully and all non-conforming aspects to the specifications have been described where requested.

Manufacturer: _____

By: _____ _____ Date: _____
Name of Corporate Officer Signature

_____
Title of Corporate Officer

Witness: _____ _____ Date: _____
Name Signature

Environment One Corporation
2773 Balltown Road
Niskayuna, New York 12309
www.eone.com
A PCC Company

EXHIBIT C

LOW PRESSURE SEWER MODELS

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Prepared By: Jacobie's Park Side Farms

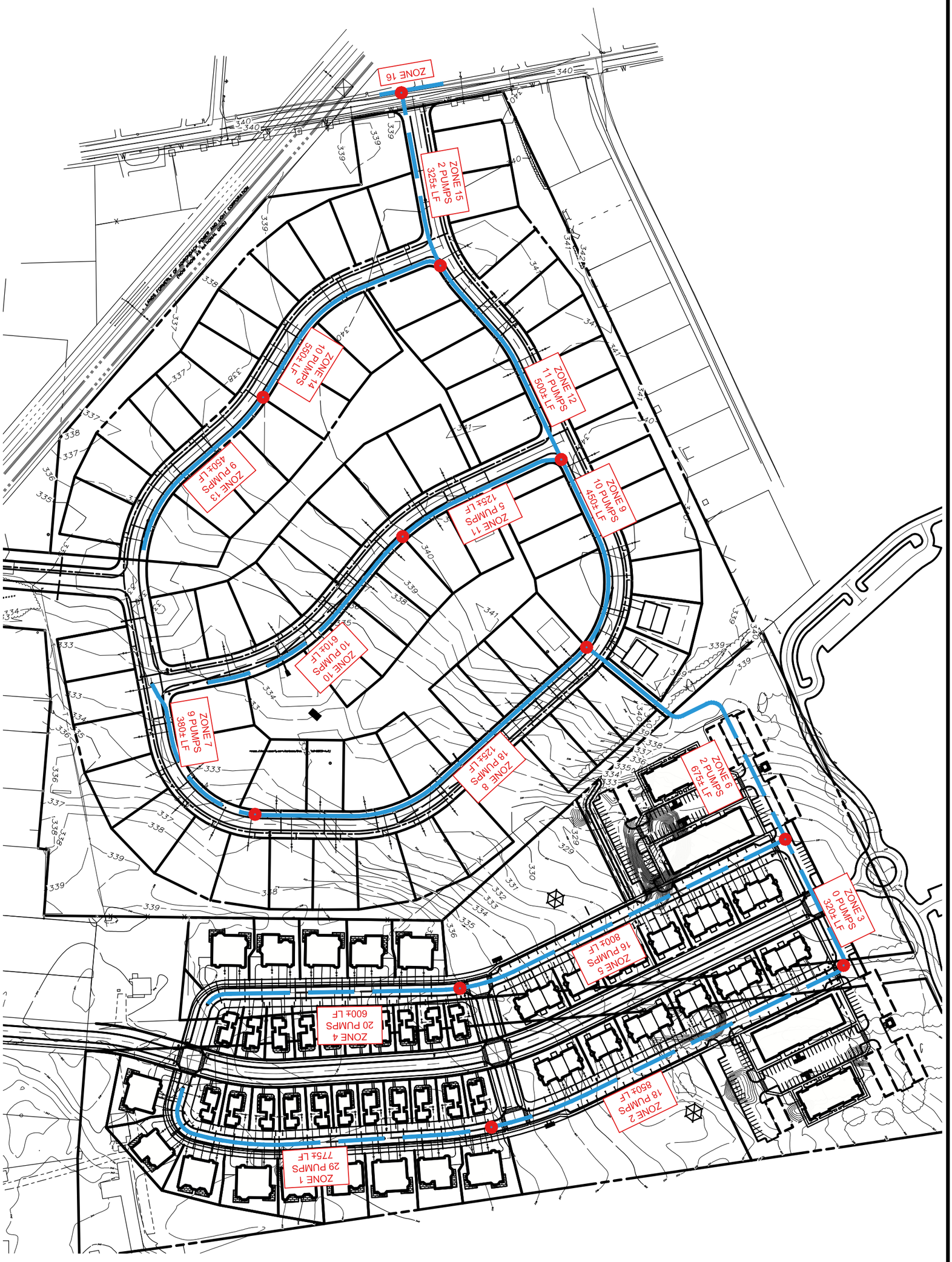
March 27, 2025

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Gals/day per Pump	Max Flow Per Pump (gpm)	Max Sim Ops	Max Flow (GPM)	Pipe Size (inches)	Max Velocity (FPS)	Length of Main this Zone	Friction Loss Factor (ft/100 ft)	Friction Loss This Zone	Accum Fric Loss (feet)	Max Main Elevation	Minimum Pump Elevation	Static Head (feet)	Total Dynamic Head (ft)
This spreadsheet was calculated using pipe diameters for: SDR21PVC											Friction loss calculations were based on a Constant for inside roughness "C" of: 150						
1.00	2.00	29	29	250	10.51	5	52.57	2.00	4.65	775.00	3.65	28.32	84.96	342.00	327.00	15.00	99.96
2.00	3.00	18	47	250	11.47	6	65.27	3.00	2.66	850.00	0.83	7.04	56.64	342.00	320.00	22.00	78.64
3.00	6.00	0	47	250	11.78	6	65.27	3.00	2.66	300.00	0.83	2.48	49.60	342.00	320.00	22.00	71.60
4.00	5.00	20	20	250	10.85	5	54.26	2.00	4.80	600.00	3.88	23.26	77.39	342.00	327.00	15.00	92.39
5.00	6.00	16	36	250	11.67	6	67.29	3.00	2.74	800.00	0.88	7.01	54.13	342.00	322.00	20.00	74.13
6.00	9.00	13	96	250	12.11	8	89.37	3.00	3.64	675.00	1.48	10.01	47.12	342.00	325.00	17.00	64.12
7.00	8.00	9	9	250	12.11	3	36.33	2.00	3.21	380.00	1.84	7.00	50.18	342.00	328.00	14.00	64.18
8.00	9.00	18	27	250	12.33	5	61.29	2.00	5.42	125.00	4.86	6.07	43.18	342.00	326.00	16.00	59.18
9.00	12.00	10	133	250	12.78	9	103.62	3.00	4.22	450.00	1.95	8.77	37.11	342.00	330.00	12.00	49.11
10.00	11.00	10	10	250	12.05	4	48.22	2.00	4.26	610.00	3.11	19.00	51.40	342.00	328.00	14.00	65.40
11.00	12.00	5	15	250	12.90	4	49.35	2.00	4.36	125.00	3.25	4.06	32.40	342.00	328.00	14.00	46.40
12.00	15.00	11	159	250	13.17	10	117.06	3.00	4.77	500.00	2.44	12.22	28.34	342.00	330.00	12.00	40.34
13.00	14.00	9	9	250	12.06	3	36.19	2.00	3.20	450.00	1.83	8.24	51.25	342.00	328.00	14.00	65.25
14.00	15.00	10	19	250	12.52	5	61.51	2.00	5.44	550.00	4.89	26.89	43.01	342.00	330.00	12.00	55.01
15.00	16.00	2	180	250	13.94	11	129.73	3.00	5.29	325.00	2.96	9.61	16.12	342.00	335.00	7.00	23.12
16.00	16.00	0	180	250	14.37	11	578.73	10.00	2.50	3,250.00	0.20	6.51	6.51	342.00	335.00	7.00	13.51

On) MHP 16.00 GPD: GPM: 44.00 Type: Desc:

On MIP 16.00 GPD: GPM: 405.00 Type: Desc:

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One.



SHEET NO.
1 of 1

SHEET TITLE:
SEWER FIGURE

SCALE:
1" = 200'

REVISION	DATE	BY

SEWER MAP FOR

JACOBIE'S PARK SIDE FARMS

11-29 MOREAU REC ROAD
TOWN OF MOREAU
SARATOGA COUNTY, NEW YORK

TAX MAP. No. 50.-3-28.2, 64.-1-54

ENVIRONMENTAL DESIGN PARTNERSHIP, LLP.
900 Route 146 Clifton Park, New York 12065
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SAMPLE CALCULATIONS

Total Dynamic Head Calculation:

TDH = Static Head + Friction Loss

Friction Loss = $0.002083 \times L \times (100/C)^{1.85} \times [Q^{1.85}/D^{4.8655}]$

L = Pipe Length (ft)
C = Hazen Williams Coefficient
Q = Flow Rate (gpm)
D = Pipe Diameter (in)

Sample Total Dynamic Head Calculation:

Static Head = 5 ft (max main elevation - min pump elevation)
L = 1000 ft
C = 150 (PE SDR-11)
Q = 50 gpm
D = 2.0 inches

Friction loss = $0.002083(1000)x(100/150)^{1.85}x[50^{1.85}/2^{4.8655}] = 46.9$ ft

TDH = 5 ft + 46.9 ft = 51.9 ft

Average Retention Time Calculation

Avg Detention Time (hrs) = 24 hours per day / Avg Changes per day
Avg Changes per hour = Avg Daily Flow (gallons) / Capacity of Zone (gallons)
Capacity of Zone (gallons) = [Length of Pipe (ft)/ 100] x Gallons Per 100 Lineal Feet
Gallons Per 100 lineal feet = Pipe Area (ft^2) x 100 ft x 7.48 gal/cf
Pipe Area (sf) = $(3.14 \times R(ft)^2)$
Average Flow (gpd)= # of Pumps x 250 gallons per day per dwelling

Sample Calculation:

10 pumps on 1000 lf of 2 inch force main (I.D. = 1.92 in = 0.16 ft)

Avg Flow = 10 pumps x 250 gpd/pump = 2500 gpd
Pipe Area = $(3.14 \times 0.08^2) = 0.0201$ sf
Gallons per 100 linear feet = 0.0201 sf x 100 ft x 7.48 gal/cf = 15.03 gallons
Capacity of Zone = 1000 LF/100 x 15.03 gallons per 100 LF = 150.3 gallons
Avg Changes per hour = 2,500 gpd / 150.3 = 16.64 changes
Avg. Detention Time = 24 hours per day / 16.64 = 1.45 hours

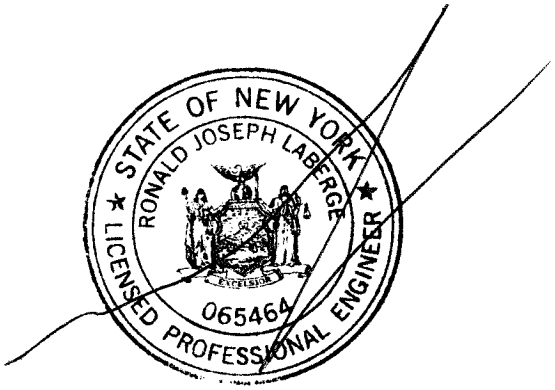
EXHIBIT D

EXTENTION NO. 5 SEWER REPORT

Town of Moreau
Saratoga County, New York
Engineering Report
Sewer District No. 1 Extension 5
County Forcemain Connection Map and Plan

ADDENDUM 1

November 2022



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Town of Moreau
Saratoga County, New York
Engineering Report
Sewer District No. 1 Extension 5
County Forcemain Connection Map and Plan

ADDENDUM 1

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Attachment B: Forcemain Schematic
Attachment C: Pump Curves
Attachment D: Central Pump Station Schematic
Attachment E: Flushing System Information
Attachment F: Town of Wilton - Comprehensive Plan for Water and Wastewater Management – 2007
Attachment G: Wilton Pump Station Schematic

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I. GENERAL

This report is intended to supplement the Laberge Group prepared Map, Plan and Report entitled "County Forcemain Connection" dated October 2022. This report provides the specific technical design information relating to the selected Alternative D, which proposed to direct flows exceeding 190,000 GPD to Saratoga County for treatment.

The improvements will be split into two projects, one being undertaken by the Town of Moreau and the other by the Saratoga County Sewer District. The Town project includes the installation of a sewer forcemain from the Moreau Route 9 Pump Station currently under construction in the Town's Sewer District No. 1, Extension 5, referred to herein as the Central Pump Station, to the Town of Moreau border with the Town of Wilton. Additional pump station upgrades in Moreau are also proposed at the Central Pump Station. The County project includes the installation of the remaining sewer forcemain required from the Town of Wilton border to the gravity sewer discharge point for the Wilton Pump Station. Additional pump station upgrades at the Wilton Pump Station are also proposed.

Improvements required for Alternative D include:

- Replace existing, aging pumps at the Moreau Industrial Park Pump Station with new pumps of similar size and capability.
- Connect Bluebird Terrace Mobile Home Park directly to the existing 10-inch forcemain and redirect flow to the Central Pump Station.
- Install new pump impellers and an equalization (EQ) tank with odor control and flushing system at the Central Pump Station in Moreau to accommodate flow of up to 283,000 GPD.
- Install a new connection from the existing Moreau Industrial Park 8-inch forcemain to the Route 9 10-inch forcemain.
- Install 43,000± LF of 10-inch HDPE (8-inch I.D.) forcemain from the Central Pump Station to an existing gravity sewer collection main along Ballard Road in Wilton.
- Install new pumps, equalization tank, and wet well at the Wilton Pump Station. The EQ tank is required to accommodate the peak flows from Moreau.

Although the proposed work primarily serves District 1 – Extension 5, the project also proposes to accept flow from the Moreau Industrial Park (MIP). MIP flows are required to redirect the flows from the City to the County since MIP flows will help maintain cleansing velocity needed in the 10-inch HDPE forcemain to the Central Pump Station. Since the Town has already identified the new forcemain interconnection and pump replacement is needed at the MIP Pump Station, this project will not be required to fund these improvements.

II. MOREAU PUMP STATIONS IMPROVEMENTS

The existing forcemain system is currently designed to flow from the Central Pump Station on Route 9 through a 10-inch HDPE forcemain which connects to the 8-inch Moreau Industrial Park (MIP) forcemain on Sisson Road and continues to the City of Glens Falls Wastewater Treatment Facility. There are 218 individual grinder pump stations along Route 9 that are connected to a low pressure sewer which discharges to the Central Pump Station. There are 19 grinder pump stations, 1 Town pump station, and 4 private pump stations connected to the 8-inch MIP forcemain.

This alternative calls for all of the flow from the private pump stations and several grinder pump units connected to the 8-inch MIP forcemain to continue to be directed to the City of Glens Falls for treatment, with the exception of the grinder pumps within Bluebird Terrace Mobile Home Park (District 1, Extension 5). Bluebird Terrace and the MIP Pump Station will pump to the Central Pump Station from where it will be pumped to the Saratoga County wastewater system. Sewer District Extensions 1 through 4 will continue to discharge approximately 157,000 GPD to the City at projected buildout (see **Attachment A**). This leaves 33,000 GPD of capacity for future development out of the 190,000 GPD that is contracted for City treatment. This alternative is selected for the following reasons:

- After reviewing the existing pumps in the four private pump stations, and the new design points required to reach the Central Pump Station, it has been determined that all four pump stations would require improvements if required to discharge to the Central Pump Station.
- The SCADA communications become simplified by not trying to control the flow from the Moreau Industrial Park in a manner that will send flow to the City until the 190,000 GPD treatment capacity is reached and then switch pump direction to the County. Directing flows from the MIP to the County removes the possibility of stagnant wastewater in the 10-inch forcemain.
- The City has expressed concerns about peak discharge rates and removing the MIP Pump Station should alleviate this concern.

Reversing the flow of the 10-inch forcemain to the Central Pump Station creates new design points for all of the connected pumps which are evaluated below. A schematic showing pipe lengths and pump station locations of the new flow direction is included in **Attachment B.**

1. MIP Pump Station Forcemain Connection

   To separate the MIP from the common 8-inch forcemain to the City of Glens Falls, the existing 8-inch forcemain from the MIP is required to be connected to the 10-inch forcemain. This connection is currently planned to be undertaken by the Town in order to provide the Town with flexibility to direct flow from the MIP to either the County or City for treatment. Relocating the MIP connection prior to the Bluebird Village connection distinctly separates the flow from these two sources in order to redirect the flow from the MIP with no effect on the Bluebird Village forcemain.

   This new connection will allow the MIP to pump to the Central Pump Station without interrupting any flow within the 8-inch forcemain going to the City. The connection is being made at the existing stub with a valve and cap on the 10-inch forcemain around station 294+50 of the 10-inch forcemain at the intersection of Sisson Road with Bluebird Road. Approximately 470 feet of new 10-inch forcemain is proposed to connect the existing 8-inch MIP forcemain to the stub. An air release valve is also proposed near the connection to the 8-inch forcemain due to a high point in the profile.

The existing 8-inch valve at the tapping sleeve connection at the end of the 10-inch forcemain will be closed to isolate the forcemains. This valve is approximately 500 feet downstream of the proposed MIP connection and would be closed in normal conditions. This will also provide an alternate route for the flow to go to the City in an emergency situation. The valve will be manually operated since it is not expected to be open under normal conditions.

2. Bluebird Terrace Mobile Home Park (MHP) Connection

   To redirect the MHP flow to the Central Pump Station, the 2-inch diameter low pressure sewer (LPS) will be connected to the 10-inch forcemain. The connection will be made on the north side of Bluebird Road across from the MHP driveway.

   The Bluebird Terrace MHP is served by eleven (11) grinder pumps. E-One has an empirical design analysis method for the grinder pump flows which uses the maximum discharge rate for a pump of 11 GPM and applies a factor for how many pumps are expected to operate simultaneously which in turn identifies the peak flow anticipated from the MHP. Based on that analysis, the MHP is expected to have a maximum of four (4) simultaneously operating pumps. Leading to an expected total of as much as 44 GPM from the Bluebird Terrace MHP during peak flow conditions.

   The grinder pumps have a head capacity of 185 feet, which is more than sufficient for this application. When the MIP is pumping into the 10-inch forcemain, the MHP grinder pumps will need to pump against the MIP pump station head. The high point in the 10-inch forcemain is just upstream of the proposed Bluebird Terrace connection, thus eliminating all of the static head from the MIP pumps by the time the MHP connects. The highest head condition in the MHP grinder pumps is approximately 30 feet TDH at peak flow when pumping to the 10-inch forcemain, thus leaving 155 feet of available pressure to pump against the MIP. Without having to account for the static head, the MIP pumps will not exceed this pressure and the grinder pumps will have ample head capacity to reach the Central Pump Station during all conditions.

3. MIP Pump Station

   The MIP pump station serves a partially developed industrial park, with full buildout expected at some unknown point in the future. The station has a 10-foot diameter wet well and a 1.9-foot operating range (1,116 gallons). The pumps are discontinued ABS Model AFP (K) 1047.1 ME 185/4 with a design flow of 405 GPM at full buildout. There is no pump data available but the estimated design point of the existing pumps is between 100 to 115 feet TDH at 405 GPM when pumping alone and could adjust to roughly 164 feet TDH at a pump rate of 315 GPM when pumping against the Central Pump Station to the City.

   a. New Design Point

      The new design point is determined by pumping to the Central Pump Station. The design flow will be 405 GPM, the current design flow for full buildout.

Friction Losses, H_L
Pipe friction losses are calculated using the equation:

$$Friction\ factor, f_f = .2083\left(\frac{100}{C}\right)^{1.852}(Q^{1.852}/d^{4.8655})$$
$$Friction\ Loss, H_L = f_f\ x\ L$$

Where:
C = pipe friction factor
Q = design flow (GPM)
d = inside pipe diameter (inches)
L = length of pipe (feet)

Table 1: MIP Pump Station Friction Losses

	C	Q (GPM)	d (in)	f_f (ft/100 ft)	L (ft)	H_L (ft)
8'' FM to new 10'' FM	110	405	8.39 (D.I.P. CL 50)	0.377	4,200	15.8
10'' FM to Central PS	120	405	8.68 (HDPE DR11)	0.272	23,580	64.1

Total H_L = 15.8 + 64.1 = 79.9 ft

Elevation Head, H_E
Pump off elevation = 260.0 ft ± (from design plans)
High point in forcemain = 344.5 ft (AR-8 in 10-inch forcemain)
H_E = 344.5 – 260.0 = 84.5 ft

Total Dynamic Head, TDH
TDH = H_L + H_E = 79.9 + 84.5 = 164.4 ft

Design Point = 405 GPM at 165 ft TDH

b. Pump Modification
As noted above, the existing ABS pumps have been discontinued, which can cause difficulty acquiring maintenance, parts and service. The Town has budgeted for MIP pump replacement due to age and condition irrespective of this project.

New submersible pumps have been selected by the Town that are able to achieve the new design point of 405 GPM at 165 ft TDH. The selected pumps are HOMA Model AV432 with 224mm impellers, see **Attachment C** for the pump curve. At the design rate and existing operating volume of 1,116 gallons, the pump run time will be around 2.8 minutes per cycle. The pumps are 50 HP and will be installed with VFD's in order to pump at the flow rate required by the usage of the industrial park. The minimum pump rate setting is 370 GPM in order to provide the required 2 FPS scour velocity in the 10-inch forcemain to the Central Pump Station. The new pumps can fit within the existing 10-foot diameter wet well.

With this pump station now disconnected from the common 8-inch forcemain to the City, the lockout conditions pertaining to the private pump stations may be disabled after flow is redirected to the County. The lockout controls are to remain, although disabled, for potential use in future improvements.

c. Emergency Backup Generator

The pump station is currently provided with an 80kW emergency backup generator that is powered by natural gas. Since the pumps are each sized to handle the design point, duplex pump operation is not required at this station. Therefore, the existing generator is properly sized for one pump operation and is capable of providing backup power for this pump station.

III. CENTRAL PUMP STATION IMPROVEMENTS & FORCEMAIN TO WILTON

1. Central Pump Station
   a. Existing Conditions

      The Central Pump Station has a 10-foot diameter wet well with 1,500 gallons of operating volume using a 2.6-foot operating range. This is based on the existing 75 GPM of average flow entering the station from 218 grinder pumps on the Route 9 LPS and a fill time of 20 minutes. The pumps are HOMA Model AKX434 with 310mm impellers and a design point of 567 GPM at 144 feet TDH.

   b. Flow Rates

      The flow into the station from the MIP and Bluebird Terrace MHP will increase the existing incoming flow. The Central Pump Station will now accept flow from the 218 grinder pump stations on the Route 9 LPS, 11 grinder pump stations at the Bluebird Terrace MHP, and the MIP Pump Station.

      Per the projected flow rates in **Attachment A**, the total projected average flow entering the Central Pump Station is:

District 1 – Moreau Industrial Park	100,000 GPD
Extension 5 – Route 9	109,000 GPD
Outside Users (planned future development)	74,000 GPD
Total average daily flow	283,000 GPD (**196 GPM**)

      The peak flow conditions are shown below, with the current flows shown first coming from only the grinder pumps and the MIP. The future flows are shown to provide a peak flow condition that the Central Pump Station may experience in the coming years when proposed developments are completed. The peak flow provided by the Route 9 grinder pumps is determined using E-One's empirical design analysis method which equals a maximum of twelve (12) simultaneously operating pumps within the Route 9 LPS. This leads to an expected total of as much as 132 GPM from the Route 9 grinder pumps during peak flow to the Central Pump Station.

      The peak flow conditions at the Central Pump Station are as follows:

Route 9 Grinder Pumps	= 132 GPM
Bluebird Terrace Grinder Pumps	= 44 GPM
MIP Pump Station (MIP Pumping Rate)	= 405 GPM
Total peak flow rate entering the Central PS (Current)	**= 581 GPM**
Future flows from outside users (PF = 4)	= 206 GPM
Total peak flow rate entering the Central PS (Future)	= **787 GPM**

      To minimize the pump rate required for this station, and thus the pump station requirements downstream in Wilton, an equalization tank is proposed at the Central Pump Station. This will allow the existing pumps to operate at 450 GPM, the lowest feasible pumping rate within its application range. With the equalization tank sized to provide the storage for the peak hour

flow, the Central Pump Station will provide a pump rate of 450 GPM, giving the pumps a peaking factor of 2.3 to the projected average flows.

2. Forcemain

The proposed forcemain from the Central Pump Station to the receiving Wilton Pump Station will be 10-inch HDPE DR11 (I.D. = 8.68 inches) rated for 200 psi. The forcemain will be approximately 43,200± linear feet in length and will discharge into the existing Town of Wilton gravity sewer manhole on the south side of Ballard Road to the east of the Ace Hardware driveway. The flow will continue south through the existing 12-inch gravity sewer approximately 2,100± feet where it discharges into the Wilton Pump Station. The sewer capacity is described in the Wilton Pump Station improvements section below.

The end-to-end elevation change on the overall forcemain is from 340± feet at the Central Pump Station to 343± feet at the discharge manhole, with the highest elevation being 403± feet at station 132+48 on Wilton-Gansevoort Road.

The proposed 10-inch force main shall be provided with air release valve structures at high points. These valves serve primarily to release air during force main pressurization, as vacuum pressure is less of a concern with the small pipe diameter, low pressures, and small elevation changes. The design basis for the air release valve is the ARI Valves D020. Each valve will have a ball valve in between the forcemain and the valve for the valve's isolation during maintenance or replacement.

The proposed forcemain will also be equipped with flushing stations for periodic maintenance. Flushing stations will be placed no more than 1,500 feet apart, excepting one location at Sta. 332+00 to 355+00 with 2,300 feet of separation due to constructability at a highway crossing. Stations may be placed closer for efficient installation by directional drill.

3. New Design Point

The Central Pump Station pumps will operate at a design rate of 450 GPM, providing a velocity of 2.4 FPS which exceeds the minimum scour velocity of 2 FPS, or 369 GPM, required within the proposed 10-inch HDPE DR11 forcemain. The head condition is determined by pumping to the gravity sewer manhole discharge on Ballard Road.

Friction Losses, H_L

Pipe friction losses are calculated using the equation:

$$Friction\ factor, f_f = .2083(100/C)^{1.852}(Q^{1.852}/d^{4.8655})$$
$$Friction\ Loss, H_L = f_f\ x\ L$$

Where:

C = pipe friction factor
Q = design flow (GPM)
d = inside pipe diameter (inches)
L = length of pipe (feet)

Table 2: Central Pump Station Friction Losses						
	C	Q (GPM)	d (in)	f_f (ft/100 ft)	L (ft)	H_L (ft)
10'' FM to gravity discharge on Ballard Road	120	450	8.68 (HDPE DR11)	0.331	43,200	143.0

Total H_L = 143.0 ft

Elevation Head, H_E
Pump off elevation = 332.4 ft ± (new control levels described below)
High point in forcemain = 403 ft (Sta. 132+48± in new 10-inch forcemain)
H_E = 403.0 – 332.4 = 70.6 ft

Total Dynamic Head, TDH
TDH = H_L + H_E = 143.0 + 70.6 = 213.6 ft

Design Point = 450 GPM at 214 ft TDH

4. Pump Modifications
   The existing pumps, HOMA Model AKX-434 with 310mm impellers, are unable to achieve the new design point required to reach the discharge point in Wilton. The new design point can be met by retaining the existing pumps and upsizing the impellers from 310mm to 355mm, see **Attachment C** for the pump curve.

   Both pumps will not need to operate at the same time with the upsized impellers. Therefore, the station will only run one pump at a time, alternating every cycle. The backup storage provided by the EQ tank allows this pump condition to be achievable.

5. Electrical Upgrades
   The existing pumps have 80 HP motors with 310mm impellers drawing 37.5 HP, while the new 355mm impellers would be using around 46 HP at the pumping rate of 450 GPM. This will not require a motor, generator, or electrical service upgrades.

6. Equalization Tank
   Due to the selected pumping rate of 450 GPM being lower than the expected peak flow of 787 GPM entering the station, an equalization tank is proposed to be installed offline from the wet well and within the fenced pump station site. The tank will provide the additional storage capacity necessary to avoid overflows and backups during peak hour flow conditions from Moreau and future development. A schematic of the tank and wet well layout is provided in **Attachment D.**

   The equalization tank will be sized based on a full hour of peak flow to the Central Pump Station. This is a conservative approach given that the peak flow rate includes a continuous 405 GPM from the MIP Pump Station. In reality, the MIP Pump Station will only pump intermittently and given the user(s) in the park are commercial/industrial, the peak flow rates will not align with the residential peak flow rates from the grinder pumps.

Total Volume During Peak Hour =	(787-450) GPM x 60 min	= 20,220 gal
Storage volume required		= **20,220 gal**
Volume Provided Within Wet Well =	(Sewer inv. – Pump On)(587.5 gal/ft) (337.50 – 335.40 ft)(587.5 gal/ft)	= (1,234) gal
EQ tank volume required		= **18,986 gal**

The storage volume required by the equalization tank is 19,000 gallons. This can be achieved with a below grade storage tank that will accept the overflow from the wet well. At the proposed pumping rate of 450 GPM, this tank volume will be pumped out in approximately 75 minutes during average flow periods.

A subsurface concrete EQ tank is proposed adjacent to the wet well. The tank size is proposed to be a rectangular concrete structure that is 20-feet wide and 42-feet long with a minimum average depth of 3.05 feet to provide the necessary volume. The tank will feed into the wet well via a 24-inch gravity pipe at an invert above the wet well pump operating levels and below the existing 18-inch gravity sewer invert from the discharge manhole. The tank will be provided with inspection hatches.

During periods of peak flow, the operating range of the pumps will be exceeded. Wastewater will back up into the EQ tank through the new 24-inch gravity pipe. The tank will then fill with the excess flow that cannot be pumped out of the wet well during peak hour. The EQ tank bottom will be sloped toward the gravity discharge to avoid any significant solids buildup.

The 4-inch LPS and 10-inch forcemain from the MIP that enter the discharge manhole adjacent to the wet well will be submerged during overflow conditions. Due to these pipes being under constant pressure and having check valves upstream, this will not pose an issue for operation.

7. Flushing System

In addition to the sloped bottom, the tank design will be provided with a flushing system in order to flush the settled residuals off the bottom of the tank after each use. Due to the infrequent use of the tank expected in the short term, this design will be included provisionally. A large hatch covering the width of the tank is proposed for either the manual cleaning of the tank by the operator or maintenance on the flushing system.

The flushing will be provided by an 800-gallon tipping bucket installed on the inside wall of the tank at the top of the sloped floor. A new valve pit will be installed adjacent to the EQ tank containing a SCADA actuated solenoid valve which will trigger to open when the tank has drained using the level transducer in the wet well. After the valve, the water will pass through a heated yard hydrant, which is used to avoid freezing above the frost line, and will freely discharge from here into the intake vent pipe on the EQ tank into the bucket. This flushing line will be a 1-inch pipe, ensuring fresh air intake is still available in the 4-inch vent pipe. The water system pressure will be utilized to convey the water to the tank from the service connection.

The bucket is designed to automatically dump once it is filled to clean off the bottom of the tank. This volume will not overwhelm the pumps as the peak hour will be complete with an empty tank. The flushing system information is provided in **Appendix E.**

8. Odor Control

The equalization tank and wet well are not to be considered habitable space and safety ventilation required during entry for maintenance will be provided using portable ventilation equipment. Due to the proximity of the station to residential and commercial properties, odor control units will be provided for both the tank and wet well with a minimum of 2 air changes per hour. The required storage volume is roughly 2,540 CF which equates to 85 CFM and the discharge manhole and wet well volume totals to approximately 480 CF which equates to 16 CFM. It is to be noted that the active volume requiring odor control will be less for all structures with waste decreasing the amount of air to exchange. Ventilation shall be accomplished by the suction side of a 100 CFM blower connected to an outflow vent pipe with fresh air entering via a separate inflow vent pipe on the tank and the air gap in the cover on the wet well top slab. The discharge of the blower shall connect to an above ground carbon canister odor control system. Consideration shall be given not to direct or locate the discharge towards adjacent property. The blowers will be constant operation and manually operated.

9. Control Levels

The pump operating range will be based on the pump rate with a minimum pump cycle of 15 minutes.

$$Volume\ required = \frac{(Q)(T)}{4} = \frac{(450\ GPM)(15min)}{4} = 1{,}687.5\ gal$$

$$Operating\ Range\ (10'\emptyset\ wet\ well) = \frac{1{,}687.5\ gals}{587.5\ \frac{gal}{VF}} = 2.87\ ft\ (\boldsymbol{use\ 3.0\ ft\ or\ 1{,}762.5\ gal})$$

The total volume provided within the operating range will be 1,762.5 gallons. At the design pump rate of 450 GPM, the pump run time will be 3.9 minutes during periods of average flow.

In order to keep the motor cool during operation and extend the motor life, the manufacturer recommends that the pump off level be halfway up the length of the motor. This puts the pump off level at approximately 3.0 feet above the bottom of the wet well, at 332.4.

The high water level will be set at an elevation six (6) inches below the existing vent pipe in the wet well (341.6) which is 341.1. This will signal that the EQ tank design capacity has been reached and flow has entered the freeboard space. With the top of the operational volume in the EQ tank at elevation 339.3, there will be approximately 11,300 gallons of freeboard volume available prior to triggering the high water alarm.

The Central Pump Station levels are as follows:

Table 3: Central Pump Station Levels

	Existing	**Proposed**
High water alarm	335.5	341.1
18-inch gravity sewer invert	337.5	337.5
24-inch EQ tank pipe invert	--	335.9
Lag pump on	334.5	*
Lead pump on	334.0	335.4
All pumps off	331.4	332.4
Wet well floor	329.4	329.4

* Lag pump on is to be programmed using the lead pump failure as its input

IV. WILTON PUMP STATION IMPROVEMENTS

1. Existing Infrastructure

   The existing pump station in Wilton will be accepting the flow from the Moreau Central Pump Station. The station is currently designed for a peak flow of 34 GPM. Based on the estimated demand in 2027 from Planning Area #7 in the Town's sewer system schematic and estimated sewer demand included in the "Comprehensive Plan for Water and Wastewater Management – 2007" for the Town of Wilton by Environmental Design Partnership, LLP (EDP), relevant portions of which are included as **Attachment F**, the future average daily flows are projected to be 40 GPM. The EDP report refers to this station as the Ace Pump Station, while this report will refer to it as the Wilton Pump Station. The station utilizes recessed wet well mounted suction lift pumps within a 6.5-foot diameter wet well at a design point of 75 GPM at 86 feet TDH.

   The flow is pumped from the station through approximately 2,000 LF of 6-inch forcemain to Northern Pines Road where it enters the Saratoga County Sewer District No. 1 forcemain. This 8-inch forcemain continues for approximately 17,550 linear feet along Northern Pines Road, Traver Road, and Carr Road to the Jones Road intersection. The forcemain increases to 12-inches at this point and continues for another 13,700 linear feet along Jones Road, Gick Road, Loughberry Road, and crosses Route 50 to a gravity sewer discharge. The wastewater flows by gravity for roughly 4,400 linear feet in an 18-to-30-inch gravity main to the Saratoga Springs Pumping Station on Excelsior Ave.

   According to the "Comprehensive Plan for Water and Wastewater Management – 2007", along the stretch of 8-inch and 12-inch forcemain starting from the Wilton Pump Station (referred to as the SCSD #1 Pressure Trunk Line), there are 11 pump stations and 126+ grinder pumps connected.

2. Gravity Sewer

   Total peak flows within the gravity sewer leading to the Wilton Pump Station will be the sum of Central Pump Station's pump rate of 450 GPM from Moreau and Wilton's projected peak flow of 160 GPM (PF = 4), or 610 GPM. Assuming a Manning's roughness value of 0.011 and a 12-inch nominal inside pipe diameter, this section of gravity sewer must have a minimum slope of 0.09% in order to have sufficient capacity for the incoming flows. Per record drawings, the minimum slope in the 12-inch gravity sewer from the proposed discharge manhole by Ballard Road to the Wilton Pump Station is approximately 0.44%, well in excess of the 0.09% required.

3. Wilton Pump Station Improvements

   a. New Design Point

      The new design point is determined by pumping to the gravity sewer discharge on the south side of Route 50. To minimize the impact that the new Wilton Pump Station will have on the other 11 pump stations connected to the trunk pressure main, the head being introduced to the system by the Wilton Pump Station will be minimized. According to the model of the Town of Wilton's sewer system prepared and utilized by EDP for the past 20 years, the maximum pump rate allowed without disrupting any of the downstream pump stations is 275 GPM, roughly four times higher than the current rate of 75 GPM. This rate was selected to keep up with the incoming flow as much as possible without introducing excessive amounts of head to the Wilton trunk pressure main during residential peak hours which would disrupt the operation of any downstream pump stations. The new design point, provided by the Town's engineer EDP,

is **275 GPM at 215 feet TDH** which was produced by their model when evaluating a conservative peak hour condition of all pumps connected to the common forcemain running simultaneously.

After peak hour, the Wilton Pump Station will operate at an increased pump rate due to the pressure drop in the common forcemain from the downstream pump stations no longer operating simultaneously. The preliminary pump curve for this design indicates that when operating alone, these pumps can reach a pump rate of approximately 475 GPM based on the pump curve and estimated friction losses. Analyzing the Town of Wilton's records of the available pump run times from five of the downstream stations, the highest average daily runtime is 214 minutes or roughly 3.5 hours. This indicates that the Wilton Pump Station will likely be operating at the increased pump rate condition for most of the day.

b. Pump Improvements

The existing suction lift Smith and Loveless pumps are not be capable of reaching the new design point. The Town has an active project being designed to replace the pumps and the wet well.

New submersible pumps will be required that are able to meet the design point of 275 GPM at 215 feet TDH. The preliminary pump selection is the Flygt Model NP3202 HT 3 with 354mm impeller, see **Attachment C** for the pump curve. The pumps will be 67 HP, equipped with VFD's, and will operate one pump at a time, alternating every cycle. Per the pump curve, this pump will operate slightly below the design point during peak conditions at a rate of approximately 270 GPM, which ensures that the maximum rate will not be reached and the downstream pump stations will continue operation.

Non-peak conditions will result in less head in the common forcemain, allowing the pumps to run further right on the pump curve at a higher rate. This will reduce the gap between the incoming peak flows and the outgoing pump rate, which will in turn reduce the utilized storage capacity or pump out the stored volume in a timelier manner. After the station becomes operational, the pump rate can be adjusted with the VFD based on the real-time performance from the downstream pump stations rather than the model.

c. Wet Well

Due to the pumps changing to submersible type and the large increase of flows entering the Wilton Pump Station, a new wet well is proposed to replace the existing wet well.

An 10.5-foot diameter wet well is proposed to provide space for the upsized pumps and storage capacity within the pump operating levels. The pump operating range will be based on the pump rate with a minimum pump cycle of 15 minutes.

$$Volume\ required = \frac{(Q)(T)}{4} = \frac{(270\ GPM)(15min)}{4} = \ 1{,}012.50\ gal$$

$$Operating\ Range\ (10.5'\ \emptyset\ wet\ well) = \frac{1{,}012.50\ gal}{647.7\ \frac{gal}{VF}} = 1.56\ ft$$

$$(\boldsymbol{use\ 1.75\ ft\ or\ \ 1{,}133\ gal})$$

The operating range leads to a minimum pump run time of 4.2 minutes at 270 GPM during average flow periods.

d. Equalization Tank

Due to the expected pump rate of 270 GPM being lower than the expected peak flow of 610 GPM entering the station, an equalization tank is proposed to be installed offline of the incoming gravity sewer and adjacent to new wet well within the pump station site. The tank will provide the additional storage capacity necessary to avoid overflows and backups during peak hour flow conditions and allow for the minimum pumping rate to avoid operational issues in the downstream pump stations. A schematic of the tank and wet well layout is provided in **Attachment G.**

The equalization tank is sized based on a full hour of peak flow and assumes a full Central Pump Station EQ tank being pumped to the Wilton Pump Station. This is a conservative approach given that the peak flow rate includes a continuous 450 GPM from the Central Pump Station as well as a full EQ tank and a continuous 160 GPM from the Wilton service area. In reality, the Central Pump Station will not receive this amount of projected volume for many years until the planned future development is complete and the peak flow rates from Moreau are mostly residential and will not align with the timing of the commercial/industrial peak flow rates from the Wilton service area. Per Town records, current pump operating times at the Wilton Pump Station indicate that the service area is not close to the projected 40 GPM of average daily flow for 2027 per the EDP report.

Due to the 75-minute pump out time for the Central Pump Station EQ tank, this tank will be sized to consider the time it will take the Wilton Pump Station to pump out its tank at the conservative pump rate of 270 GPM. The additional volume required will take into account 75 minutes of 450 GPM from the Central Pump Station and 40 GPM of average flow from the Wilton service area, less the volume pumped out by the Wilton Pump Station during this time. This would be on top of the volume remaining after a peak hour of incoming flow and continuous pumping out.

Total Volume During Peak Hour =	(610-270) GPM x 60 min	= 20,400 gal
Additional volume required =	(490-270) GPM x 75 min	= 16,500 gal
Storage volume required		= **36,900 gal**

Volume Provided Within Wet Well =	(Sewer inv. in – Pump on)(647.7 gal/ft)	
	(312.50 – 301.50 ft)(647.7 gal/ft)	= (7,124) gal
EQ tank volume required		= **29,776 gal**

The minimum storage volume required by the equalization tank is 29,776 gallons. This can be achieved with a below grade storage tank that will accept the overflow from the wet well. The tank size is proposed to be a rectangular concrete structure that is 20-feet wide and 25-feet long with a minimum usable depth of 8.0 feet to provide the necessary volume. This storage requirement is conservative because due to the time this tank is filled, the peak hour condition will likely no longer be seen in the common forcemain which will allow for the pumps to operate at the increased pump rate around 475 GPM. At this rate, the tank will be pumped out in approximately 63 minutes.

During periods of peak flow, the operating range of the pumps will be exceeded. The EQ tank will then fill with the excess flow that cannot be pumped out of the wet well during peak hour. The tank will connect into the wet well via a gravity pipe and the tank storage volume will be between the wet well gravity sewer invert in elevation and the bottom of the tank. This will ensure that flow will not back up into the incoming gravity sewer pipe during overflow conditions, but rather into the EQ tank. The tank will be provided with inspection hatches and the bottom of the tank will be sloped toward the gravity discharge to avoid any significant solids buildup. Due to the location of the pump station site, distant from any residential or commercial properties, permanent odor control is not required.

e. Control Levels

The table below describes the proposed control levels for the Wilton Pump Station. The levels are determined assuming the existing 12-inch invert into the wet well, 312.50, will remain the gravity sewer invert in. This information is from the pump station record drawings.

The EQ tank bottom elevation will be 304.00, providing 8.5 feet of storage depth between the gravity sewer invert in. The pump on level is 2.5 feet below the EQ tank bottom elevation to provide additional storage within the wet well prior to the tank being utilized.

There are two high water level alarms, one is placed at the EQ tank bottom elevation of 304.00. This will signal that the wet well capacity has been reached and the EQ tank is being used for storage. The second alarm will be at elevation 312.50, indicating that the EQ tank storage has been reached.

Table 4: Wilton Pump Station Control Levels

	Elevation
Existing 12-inch gravity sewer invert into wet well	312.50
High water alarm 2	312.50
EQ tank bottom elevation	304.00
High water alarm 1	304.00
Pump on	301.50
Pump off	399.75
Wet well bottom	296.75

f. Emergency Backup Generator

The 10 State Standards require that all sewage pumping stations contain standby power so that wastewater may continue to be pumped during power outages to meet the average daily demand and to avoid sewage backups. It is recommended that the Wilton Pump Station include a permanent backup generator and automatic transfer switch sized for the new 67 HP pumps.

Fuel for the generator will use either natural gas, if available, or propane.

V. DOWNSTREAM CONSIDERATIONS

1. Downstream Impacts
   - Forcemain Capacity
     Per the engineering report for the latest pump station added to the Wilton system, Forest Grove, prepared by EDP and dated March 2020, the 8-inch forcemain and 12-inch forcemain that the upgraded Wilton Pump Station will be discharging to was evaluated for capacity, with a target velocity of 6.5 FPS. EDP determined that the flow within the 8-inch forcemain with all of the connecting pump stations operating simultaneously is 1,343 GPM and 1,505 GPM in the 12-inch.

     The new Wilton Pump Station design pump rate will add 200 GPM to both of these pipes based on the existing 75 GPM currently being pumped. The 8-inch forcemain will then have 1,543 GPM or 10.3 FPS in the theoretical scenario of all pumps operating simultaneously. The 12-inch forcemain will have 1,705 GPM or 5.6 FPS. The condition of all of the pump stations operating simultaneously during peak hour is very unlikely due to varying pump cycles and operating volumes, as well as off-peak conditions from commercial/industrial users and residential users. Therefore, these flow conditions within the forcemains are not likely to reach the values above and their capacity is expected to be more than sufficient.

   - Gravity Sewer Capacity
     The 18-inch gravity sewer that receives the proposed forcemain flow for conveyance to the Saratoga Springs Pumping Station has a minimum slope of 0.5% and a total capacity of 3,500 GPM. The gravity sewer will have sufficient capacity for the upgrades and the Saratoga County Sewer District reports that the Saratoga Springs Pumping Station has ample wet well storage and pumping capacity for the additional flows.

2. Wilton Pump Stations Operation
   The new design point will increase the head being introduced to the SCSD #1 Pressure Trunk Line by the Wilton Pump Station. The pump rate and associated head was selected utilizing the Town's sewer system model in order to allow the other 11+ pump stations connected to the trunk line to pump during peak hour conditions without any issues. Thus, the operation of the downstream pump stations connected to the trunk line should not be impacted by the Wilton Pump Station upgrades.

3. Operations and Maintenance
   The proposed Moreau system will be operated and maintained by the Town of Moreau Water and Sewer Department. The Wilton Pump Station in Wilton is currently operated and maintained by the Wilton Water and Sewer Authority (WWSA). The pump station discharges into the original 8-inch forcemain and eventually enters the SCSD 12-inch pressure main. It is the intent of the WWSA to turn over the ownership and maintenance of this pump station to the Saratoga County Sewer District #1 a short period after the upgrades are complete, since the pump station would serve both Moreau and Wilton.

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MOREAU FLOW TABULATION

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Laberge ENGINEERING ARCHITECTURE Group SURVEYING PLANNING

Town of Moreau
Saratoga County, New York
Treatment Alternatives
Preliminary Opinion of Probable Cost
July, 2021

District	Current EDU**	Sewage Discharged		Projected Additional EDU*	Projected Additional		Total EDU**	Total Sewage Flows		Projected Annual Treatment Costs		
		GPD	Gallons		GPD	Gallons		GPD	Gallons	Saratoga County	City of Glens Falls	Split Treatment
District 1 - Moreau Industrial Park	137	18,079	6,599,000	410	81,921	29,901,000	547	100,000	36,500,000	$ 147,281.75	$138,335.00	
Extension 1 - Leonelli/Schermerhorn	186	16,841	6,147,000	198	39,600	14,454,000	384	56,441	20,601,000	$ 103,488.00	$78,077.79	
Extension 2 - Bluebird Village	240	21,561	7,869,893	0	0	0	240	21,561	7,869,893	$ 64,680.00	$29,826.89	
Extension 3 - The Nest	3	0	0	269	53,800	19,637,000	272	53,800	19,637,000	$ 73,304.00	$74,424.23	190,000 gpd @ 2.44 per 1,000 gal = $169,214
Extension 3 - Harrison Place	26	1,931	704,900	0	0	0	26	1,931	704,900	$ 7,007.00	$2,671.57	249,833 gpd @ $3.69 per 1,000 gal = $336,487.58
Extension 4 - Bluebird Trace & Harrison Quarry	118	9,752	3,559,537	68	13,600	4,964,000	186	23,352	8,523,537	$ 50,127.00	$32,304.21	
Extension 5 - Route 9	608	55,932	20,415,340	266	53,068	19,369,660	874	109,000	39,785,000	$ 235,408.25	$150,785.15	
Outside Users	24	3,747	1,367,610	350	70,000	25,550,000	374	73,747	26,917,610	$ 100,793.00	$102,017.74	
Total	**1,341**	**127,845**	**46,663,280**	**1,410**	**311,988**	**113,875,660**	**2,902**	**439,833**	**160,538,940**	**$ 782,089.00**	**$608,442.58**	**$505,701.58**

*Projected EDU as identified in Map, Plan & Reports for District Formation
**EDU equivalency: 1 EDU = 200 gpd

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B

FORCEMAIN SCHEMATIC

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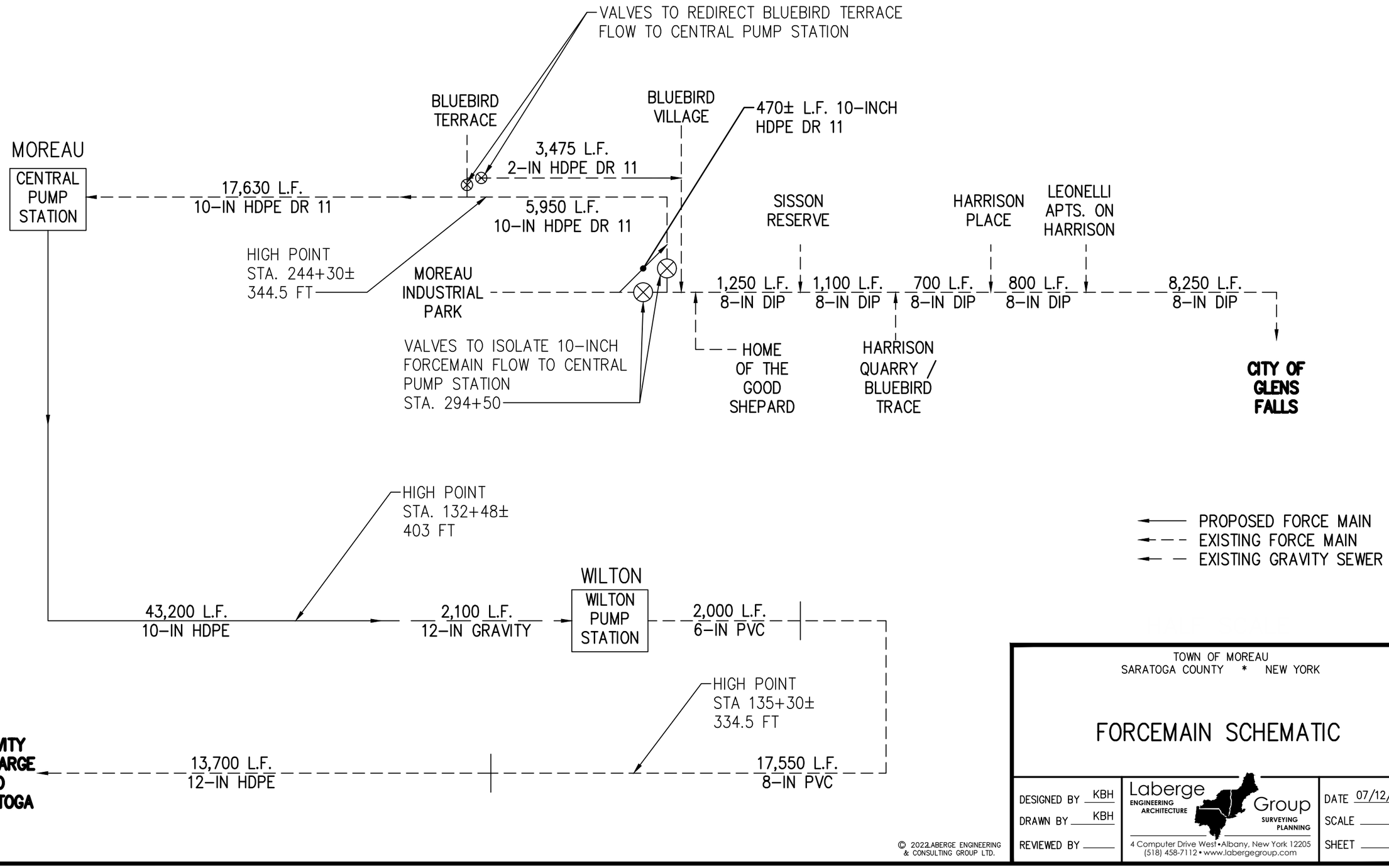

TOWN OF MOREAU
SARATOGA COUNTY * NEW YORK

FORCEMAIN SCHEMATIC

DESIGNED BY KBH
DRAWN BY KBH
REVIEWED BY

Laberge ENGINEERING ARCHITECTURE Group SURVEYING PLANNING
4 Computer Drive West • Albany, New York 12205
(518) 458-7112 • www.labergegroup.com

DATE 07/12/2022
SCALE NTS
SHEET 1

ATTACHMENT

C

PUMP CURVES

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Performance Curve

AV432-224/53F/C

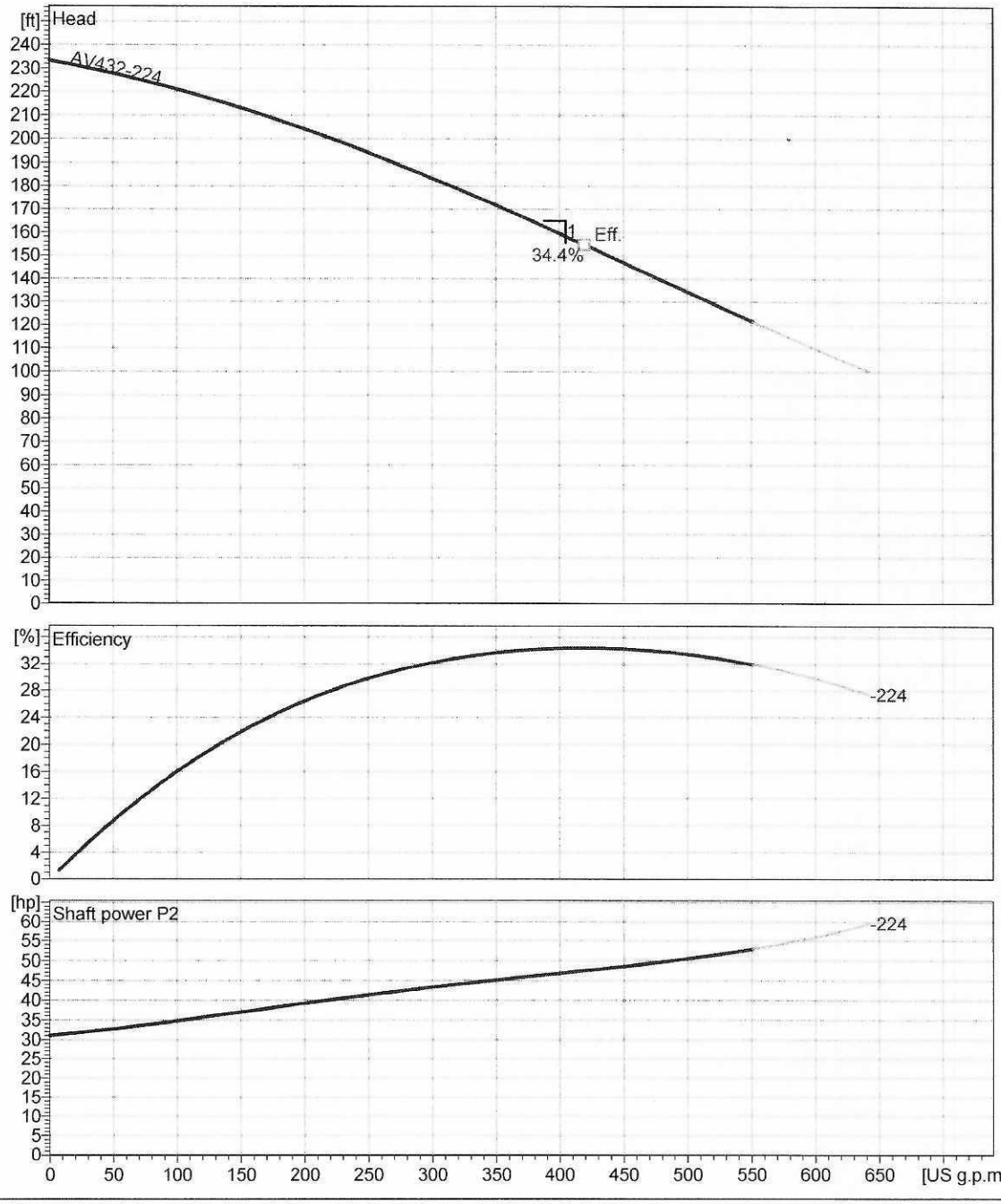
MOREAU INDUSTRIAL PARK PS

Impeller					
Impeller type: Vortex impeller	Solid size Ø: 3 inch	Max. Ø: $8^{15}/_{16}$"	Min. Ø: $8^{1}/_{4}$"	Sel. Ø: $8^{15}/_{16}$"	

Operating data				
Speed: **3450 rpm**	Frequency: **60 Hz**	Duty point: **Q = 405 US g.p.m. H = 165 ft**	Shaft power P2: **46.6 hp**	Discharge port: **4" ANSI**

Power data referred to:
Water, clean [100%] ; 68°F; 62.322lb/ft³; 1.0818E-5ft²/s

Testnorm: **P2>10kW, HI Standard Grade 2B**
P2<10kW, HI Standard Sect. 11.6.5.4



2.0.1 - 17.01.2017 (Build 147)

Project	Project no.:	Created by:	Page:	Date:
			2	2022-10-11

Performance Curve

AKX434-360/70G/C FM

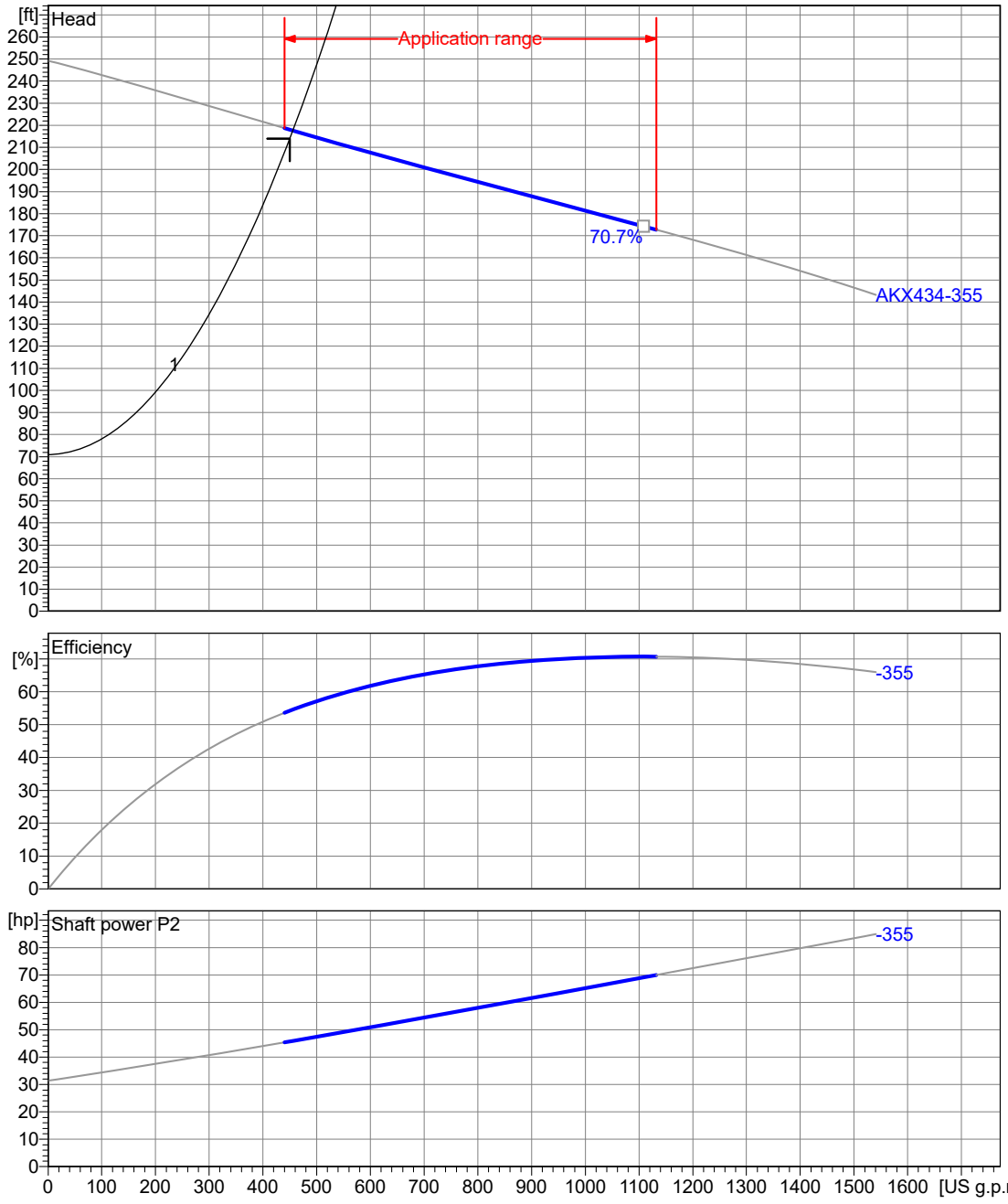
CENTRAL PS

Impeller					
Impeller type: Multi channel impeller	Solid size Ø: 80 mm	Max. Ø: 360 mm	Min. Ø: 300 mm	Sel. Ø: 355 mm	

Operating data				
Speed: **1750 rpm**	Frequency: **60 Hz**	Duty point: **Q = 450 US g.p.m. H = 214 ft**	Shaft power P2: **45.9 hp**	Discharge port: **4" ANSI**

Power data referred to:
Water [100%] ; 68°F; 62.322lb/ft³; 1.0818E-5ft²/s

Testnorm: **HI Standard Grade 2B**



2.0.1 - 14.09.2018 (Build 147)

Project	Project no.:	Created by:	Page:	Date:
			2	**2022-10-06**

WILTON PS

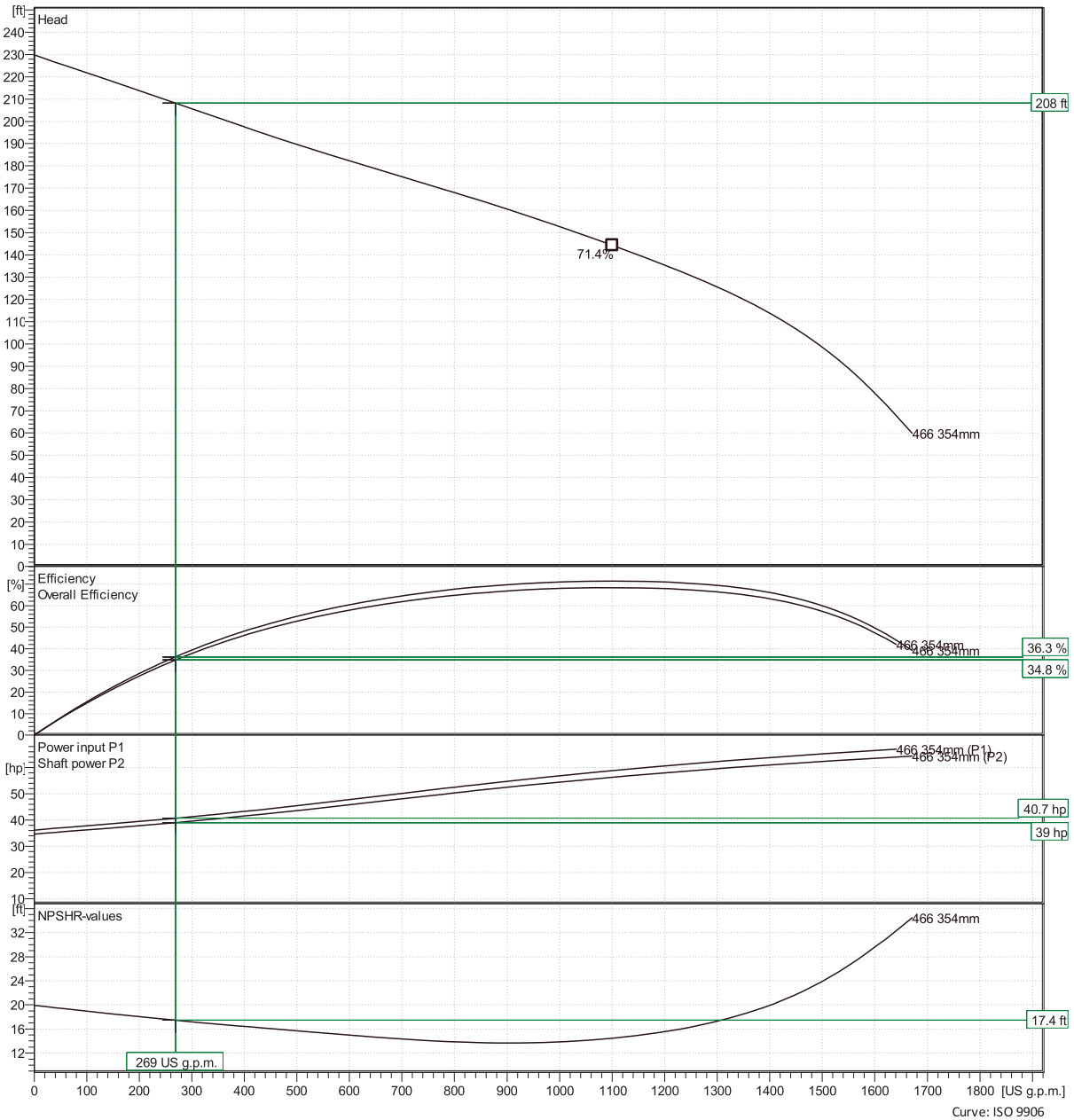
NP 3202 HT 3~ 466

Performance curve

Duty point

Flow	Head
269 US g.p.m.	208 ft

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.43 lb/ft³,1.6888E-5 ft²/s



Curve: ISO 9906

			Peter Pastore		
0		**Created on**	10/13/2022	**Last update**	10/13/2022

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ATTACHMENT

D

CENTRAL PUMP STATION SCHEMATIC

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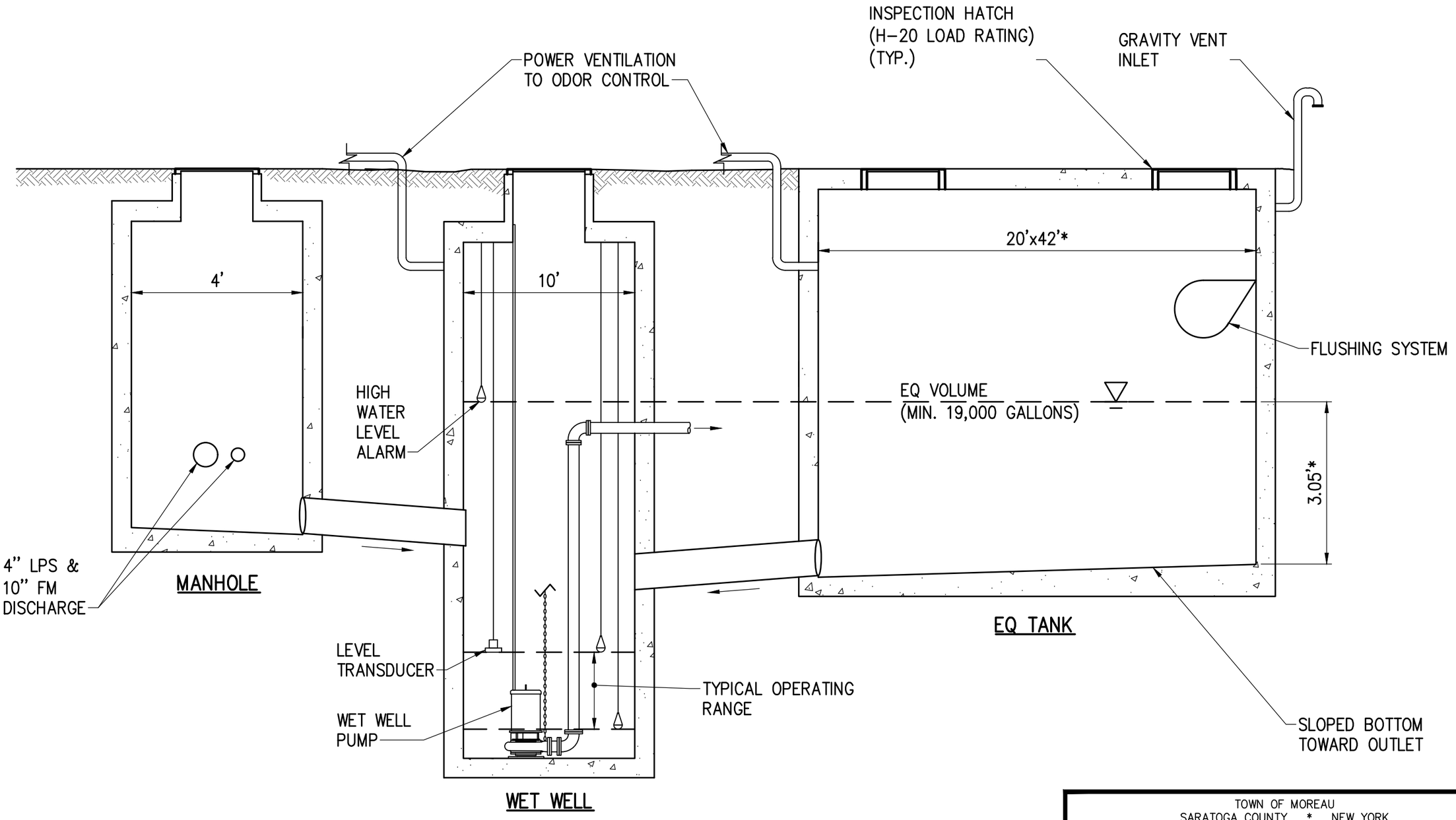

CENTRAL PUMP STATION SCHEMATIC

NTS

*TANK DIMENSIONS ARE PRELIMINARY FOR SCHEMATIC PURPOSES. ACTUAL DESIGN MAY RESULT IN A STRUCTURE WITH DIFFERING DIMENSIONS.

TOWN OF MOREAU
SARATOGA COUNTY * NEW YORK

CENTRAL PUMP STATION SCHEMATIC

DESIGNED BY KBH	Laberge ENGINEERING ARCHITECTURE Group SURVEYING PLANNING	DATE 11/18/2022
DRAWN BY JDF		SCALE NTS
REVIEWED BY	4 Computer Drive West • Albany, New York 12205 (518) 458-7112 • www.labergegroup.com	SHEET 1

ATTACHMENT

E

FLUSHING SYSTEM INFORMATION

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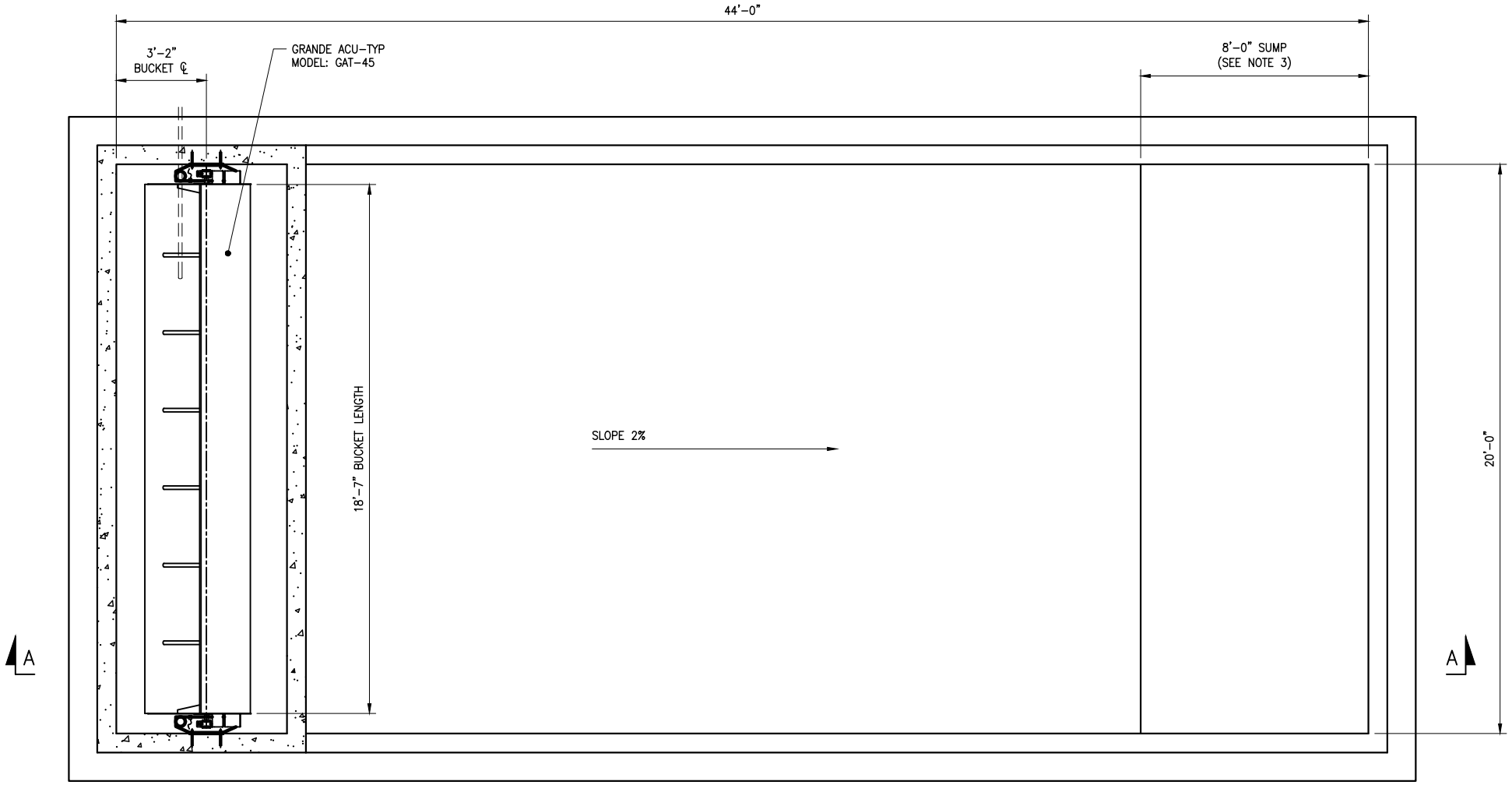
NOTES:

1– GRANDE WATER MANAGEMENT SYSTEMS (GWMS) WILL SUPPLY ONE (1) TIPPING BUCKETS MODEL GAT–45, MADE IN SS 304, AS SPECIFIED.
2– GWMS WILL SUPPLY TWO (2) EXTREME BEARINGS IN SS316 (SPLIT HOUSING) WITH 2" Ø TYPE DOUBLE ROLLER BEARINGS & LOCKING SLEEVE, EACH MOUNTED ON A SIDE OF WALL SUPPORT IN SS 304.
3– THE SUMPS SHOULD ACCOMMODATE A MINIMUM FLUSHING VOLUME OF 259 Ft^3 PER FLUSH (112 Ft^3 OF FLUSH WATER + 147 Ft^3 OF DEBRIS ASSUMING 2" DEPOSITION).
4– CONCRETE STRUCTURAL DIMENSIONS MUST BE RESPECTED TO A TOLERANCE OF +/– 1/4", ALL DIMENSIONS ARE IN IMPERIAL UNITS.



PLAN VIEW

REV	DATE	DESCRIPTION
00	11/18/22	

TITLE: GRANDE ACU–TIP GAT–45 PLAN VIEW

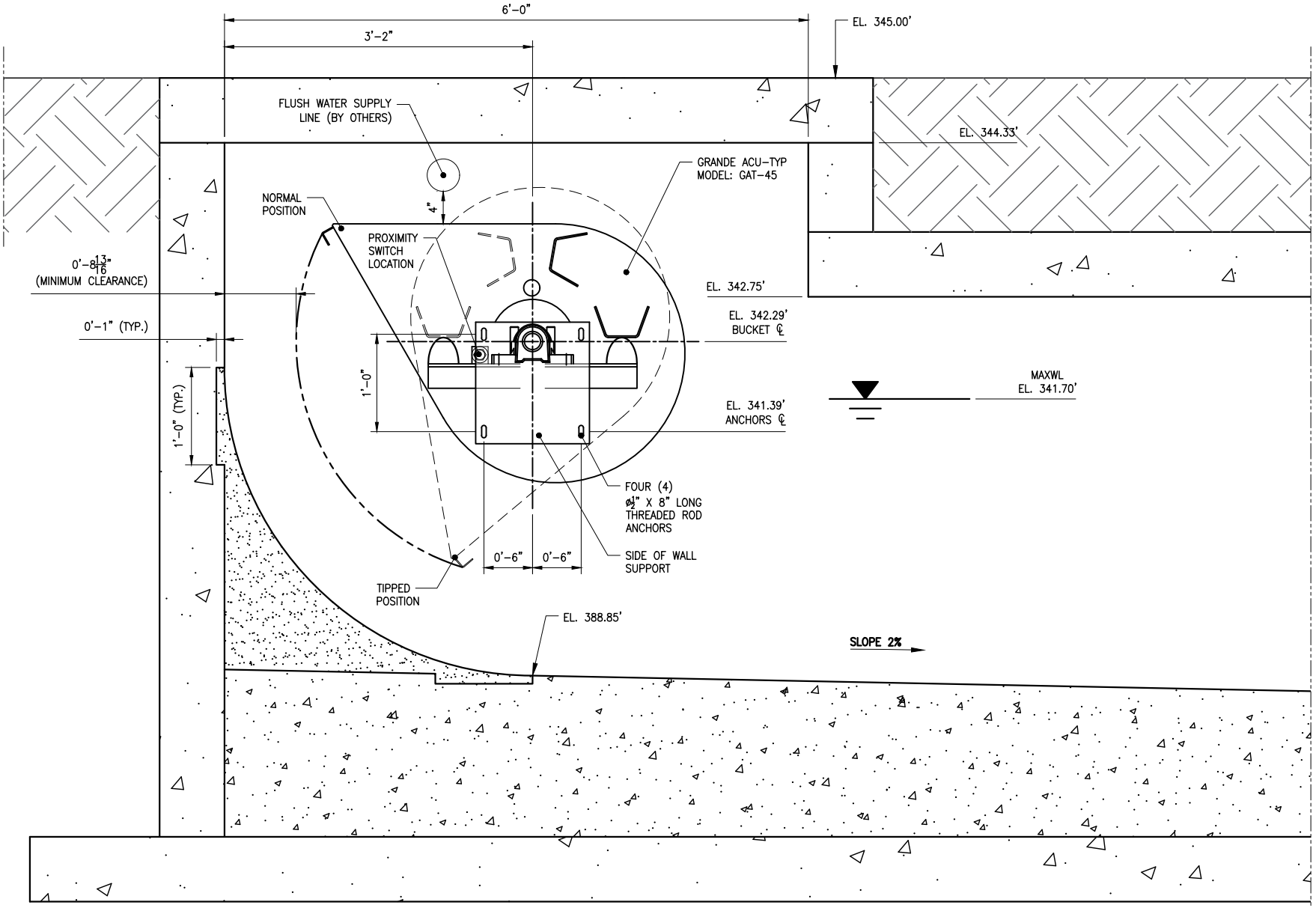
DWG NO: 1979–P–101

PROJECT NAME: TOWN OF MOREAU LIFT STATION

LOCATION: SARATOGA, NY

Grande Water management systems
www.grandeinc.com TOLL FREE: 1-855-315-1115

NOTES:
1- THE GWMS TIPPING BUCKETS MODEL GAT-45 HOLDS 45 GAL/Ft. FOR A TOTAL FLUSH WATER VOLUME OF 836 GALLONS.
2- THE SUMP SHOULD ACCOMMODATE A MINIMUM FLUSHING VOLUME OF 259 Ft^3 PER FLUSH (112 Ft^3 OF FLUSH WATER + 147 Ft^3 OF DEBRIS ASSUMING 2" OF DEPOSITION).



SECTION A-A

THE EQUIPMENT DETAILS ARE FOR APPROVAL PURPOSES ONLY. ALL INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND THE EXCLUSIVE PROPERTY OF GRANDE WATER MANAGEMENT SYSTEMS.

REV	DATE	DESCRIPTION
00	11/18/22	

TITLE: GRANDE ACU-TIP GAT-45 SECTION A-A

DWG NO: 1979-P-102

PROJECT NAME: TOWN OF MOREAU LIFT STATION

LOCATION: SARATOGA, NY

Grande Water management systems
www.grandeinc.com TOLL FREE: 1-855-315-1115

AUTOMATIC TIPPING BUCKET FLUSHING SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION

A. This section is for the supply, installation, testing and commissioning of the automatic flushing system as herein specified and as shown in the drawings. The automatic flushing system shall be of the **"Automatic Tipping Bucket"** type and shall be suitable for flushing accumulated solids and debris from the proposed tank or sewer floor using only one flush under normal loading conditions. The automatic flushing system shall include, but not be limited to the following:

1. One (1) Grande Water Management Systems ACU-TIP Tipping Buckets, model GAT-45 with 45 gallons of flush water per foot of bucket length. The tipping buckets are complete with stainless steel end bearings, wall supports, integral stoppers and rubber bumpers.
2. Two (2) side of wall supports and anchoring system
3. Two (2) stainless steel 316 housing EXTREME BEARINGS and bearings
4. One (1) non-contact proximity switch
5. One (1) 2" ϕ NEMA 4X solenoid valves
6. One (1) NEMA 4X local control panel
7. PLC

1.2 OPERATION

A. The automatic tipping bucket flushing system shall operate as follows:

1. Under normal dry weather conditions, the system shall be inoperative.
2. When the proposed storage tank has been used and subsequently emptied (using a signal from a level sensor located in the tank sump), following an equalization storage event, the operator or a remote signal will start the flushing sequence. The local programmable controller (PLC) shall initiate the tipping bucket filling sequence. Once the automatic tipping bucket is filled, the bucket becomes unstable, resulting in a shift in its center of gravity, and tips thereby causing its water content to

spill along the back wall and the floor of the tank. The resulting high celerity wave will wash all debris, which were deposited on the tank floor into the flushing water trough (tank sump) located at the opposite end of the tank. The unit thereafter returns automatically to its stable upright position.

3. When the control panel receives the signal from the proximity switch indicating that the unit has flushed, the flush water supply valve is shut off.
4. The tank sump is then allowed to drain (using a signal from the level sensor in the tank or sewer sump) before proceeding with the operation of a subsequent flush event. The empty signal is important to prevent unnecessary cycling, and to ensure that the trough or sump is empty enough to receive the flush water and debris volume of a single flush way without resulting in a splash back and re-soiling of the flush ways with debris.
5. The system returns to its normal stand-by condition once the bucket cycle is complete.

B. The automatic tipping bucket flushing system shall be designed to remove debris from the floor of the proposed tank using one flush, under normal loading conditions, but with the ability for the operator to program more than one flush per cycle if deemed necessary. The centerline of the tipping bucket shall be placed at the exact distance from the back wall of the tank and height from the tank floor, as recommended by the manufacturer and shown in the project drawings. The rotation of the automatic tipping bucket shall be limited to 100-degrees so that the flush water is properly directed to the back wall of the tank. There will be a radial concrete fillet between the back wall of the tank and the floor of the flush way to ensure that the flush water transitions from a vertical to a horizontal direction while minimizing the transitional losses, the radius of the fillet will be as per the manufacturer's recommendation, in this case 3'-2". Systems that drop the flush water directly onto the floor of the tank shall not be considered as equivalent for this project.

C. Equipment furnished and installed shall be fabricated, assembled, tested, erected and placed in proper operating condition in full conformity with detail drawings, specifications, engineering data, instruction and recommendations of the equipment manufacturer..

D. The Contractor shall ensure that the structure is dimensionally correct to accept selected equipment. The Contractor shall note that the basis of design is based on the ACU-TIP GAT-45 tipping bucket as manufactured by, Grande Water Management Systems, and that any and all modifications required due to improper dimensioning or to

accommodate equipment other than that specified shall be at the expense of the CONTRACTOR.

E. The automatic tipping bucket system shall be assembled, balanced and tested in North America at the place of manufacture prior to shipment.

1.3 SUBMITTALS

A. Submit four (4) sets of shop drawings for all equipment in accordance with SUBMITTALS section.

B. The CONTRACTOR shall provide detailed shop drawings of the automatic tipping bucket system including detailed drawings of the tank, automatic tipping buckets, their supports, bearings and anchoring details, drawings showing layout of units in the tank, their identification numbers, and any other pertinent information. In addition, if requested by the ENGINEER, the manufacturer shall provide the following information:

1. The calculated “Free Board” available at the moment the unit begins to tip
2. The distance from the centerline of the unit to the back wall of the tank based on the trajectory of the flush water
3. The static, dynamic and buoyancy forces (if applicable)

1.4 QUALITY ASSURANCE

A. The automatic tipping bucket system to be furnished hereunder shall be provided by a North American manufacturer regularly engaged in such work and who has furnished at least twenty (20) similar installations and products and has had them in successful and continuous operation for a minimum of five (5) years in North America.

PART 2 PRODUCTS

1.5 GENERAL

A. Provide products to meet the specified features and operating conditions.

1.6 AUTOMATIC TIPPING BUCKETS

A. Automatic tipping buckets complete with two (2) tipping bucket end bearings and wall support systems, the tipping buckets shall be sized for the following:

1. One (1) unit
    a. Flushing length = 44.0 feet
    b. Flush way width = 20.0 feet
    c. Tank floor slope = 2.0 %
    d. Height to Unit centerline (from floor slab) = 3.20 feet
    e. Minimum flush water volume = 45 gallons per foot of bucket length; (The tipping bucket shall hold a total flush volume of 836 gallons) to be verified on site

B. Automatic tipping bucket shall be constructed of type 304 stainless steel and shall be fabricated using continuous TIG or MIG welding. The plate thickness shall be a minimum of 1/8” and designed to withstand both the static and dynamic loading experienced under normal operation and installation conditions.

C. The supports shall be fabricated entirely of type 304 stainless steel and anchored in place using embedded threaded rod type anchors. The threaded rods will be of type 316 stainless steel and will be installed into the concrete structure using the HILTI HIT-RE-500 two-part chemical anchor. The support and anchoring systems shall be designed to withstand both static and dynamic loads. In addition, the manufacturer shall supply the static and dynamic loads as well as their exact locations to facilitate structural design and verification.

D. The bearings shall be factory installed and tested and shall be permanently lubricated under normal operating conditions. The bearings should not be submerged and hence are not designed for this eventuality. The bearings shall be stainless steel 316 “split” housing type double roller bearings with locking sleeve and end cap as manufactured by EXTREME BEARINGS Model as recommended by tipping bucket manufacturer. Should the bearings be submerged for a prolonged period of time, they must be checked for water intrusion.

E. The non-contact position switches shall be waterproof proximity switches. These switches are to be mounted directly to the wall support so that they can be adjusted or replaced from below without the need to

remove the automatic tipping buckets. Proximity switches shall be equivalent to the following design basis:

1. PEPPERL+FUCHS, model NJ15-30GK-N proximity switch wired through an intrinsically safe relay in order to meet both waterproof and explosion proof condition. Do not wire switches directly to a power source to avoid damage.
2. Suitable for submergence, meeting IP68 requirements
3. Contact Rating: Suitable for low current, low voltage duty
4. Arrange for proximity switch contact to close for approximately one (1) second when the automatic tipping bucket is tipped under normal (non-submerged) operating conditions
5. Proximity switches are installed on shock proof mounts incorporated into the wall support

F. Filling of the automatic tipping buckets shall be done via a 2" Ø NEMA 4X solenoid valve, suitable for use in a non-classified area.

G. The automatic tipping buckets is to be balanced so that it shall return effortlessly and unhindered to the fill position ready for the next flush. The automatic tipping bucket is to be designed so that no water will be retained in the bucket or in the bucket structural frame once it has tipped.

1.7 MANUFACTURER

A. The project specifications and drawings are based on the ACU-TIP flushing system as manufactured and supplied by Grande Water Management Systems of Montreal, Canada, Toll Free: (855) 315-1115, Fax: (450) 315-1355, represented locally by Mr. Greg Palmer of Koester Associates Inc., Tel: 1-518-888-4413.

B. Equivalent substitutions will be considered if received no later than fifteen working days prior to the bid opening. The request must be accompanied by all information required to evaluate the suitability of the proposed manufacturer to meet the requirements specified herein. It must include a complete set of fabrication drawings, approval documents including volume requirement calculations, load calculations at each support for static, dynamic & buoyancy forces, detailed installation drawings showing any changes from the project drawings and specifications and a complete reference installation list with end user contact names.

C. The manufacturer shall have at least five (5) years' experience in sizing, designing, fabricating, and installing the equipment specified herein and shall have a minimum of ten (10) North American installations in operation for a minimum of five years. The buckets shall be manufactured in North America and all components shall meet North American standards.

D. The contractor shall be responsible for any changes, modifications, or additions to the contract drawings as a result of using equipment from a manufacturer other than the named manufacturer in Section 2.3.A.

2 PART 3 EXECUTION

2.1 INSTALLATION

A. Install and initiate operation of all equipment in accordance with the manufacturer's written instructions.

B. Certify proper installation and operation of all components.

2.2 AUTOMATIC TANK FLUSHING SYSTEM CONTROL DESCRIPTION

The flushing system will be controlled by a local control panel. The local control panel enclosure will meet NEMA 4X conditions will be equipped with a three position key operated switch for "LOCAL" / "OFF" / "REMOTE" operation, an illuminated "E-STOP" push button, a Power Disconnect Switch and Operator Interface Devices. The control panel will be designed so that the flushing operation can be carried out by an operator using the push buttons located on the local control panel when the system is in the "LOCAL" mode by pushing a "FLUSH TB-X" button or the complete flushing sequence may be initiated by pushing the appropriate button. The enclosure will be sized with 20% extra space and 20% spare digital inputs and outputs on the PLC. In the "REMOTE" mode the system will wait for remote signals to control the flushing operation. The PLC can also be programmed to monitor the tank to determine when it has been placed in use, requires dewatering and flushing.

The basic flushing sequence is described below:

A. The PLC is used to control the flushing sequence after the Storage Tank and sump has been emptied.

B. All flush ways are to be flushed after each use.

C. When the tank has been emptied, the first tipping bucket will be filled by sending a signal to open the electrically operated ball valve corresponding to the flushing manhole equipped with a submersible pump which will fill the tipping bucket. When the bucket is full and tips, it activates its respective proximity switch. The proximity switch signal is used to close the first solenoid valve which will stop filling the manhole and in turn cause the submersible pump to stop filling when the low float switch limit is reached.

D. After a preset time delay and upon the level measurement reaching a certain level in the sump (empty) to insure that it is drained and can adequately accommodate the flush water and settled solids for the next flush, the next valve is energized.

E. After the tipping bucket is operated, and the Tank sump is drained, the system goes back into stand-by mode and waits for the next signal.

F. The PLC will also have an internal adjustable timer that will be used to determine if a malfunction occurs during the flushing sequence. The timer will be set so that the flush water supply valve operation can be monitored.

G. THE PLC will also have an alarm that will send an alarm to the operator and prevent filling if the water level in the flushing manhole are above the alarm level. The flushing manhole alarm level shall be no higher that 6-inches from the potable water discharge and check valve.

2.3 TESTING, COMMISSIONING AND TRAINING

A. The Contractor shall be responsible to ensure that the equipment is properly installed and that it operates as per these specifications and the manufacturer's recommendations. The equipment manufacturer shall provide the services of a qualified field engineer or technician to inspect and verify the installation of the equipment, as well as to instruct the contractor's personnel to make any necessary mechanical adjustments, commissioning, and start-up for a period of one (1) day for eight (8) hours on site.

B. The manufacturer's field engineer or technician shall prepare a field report and submit four (4) copies of the report to the Owner or Owner's representative.

C. The equipment manufacturer shall provide the services of a qualified service engineer to instruct the OWNER's staff in the proper maintenance of the equipment for a period of four (4) hours on one (1) day.

2.4 WARRANTY

A. All mechanical components of the specified equipment shall be guaranteed against manufacturing and design defects for a period of two years from the date of substantial completion. Any and all electrical or electronic components (control panel, proximity switches, etc…) shall be guaranteed for a period of one year from the date of substantial completion. Should the device or one of its components prove to be defective, the manufacturer shall be responsible for the modification or replacement at the discretion of the manufacturer of the defective equipment only.

B. The manufacturer of the Automatic Tipping Bucket System also warrants that the flushing system will effectively remove the sediments deposited on the storage facility floor using only one flush under normal loading conditions.

END OF SECTION

ATTACHMENT

F

TOWN OF WILTON "COMPREHENSIVE PLAN FOR WATER AND WASTEWATER MANAGEMENT – 2007"

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TOWN OF WILTON

2007 COMPREHENSIVE PLAN UPDATE FOR

WATER & WASTEWATER MANAGEMENT

PREPARED FOR:

WILTON WATER AND SEWER AUTHORITY

PREPARED BY:

ENVIRONMENTAL DESIGN
PARTNERSHIP, LLP
900 ROUTE 146
CLIFTON PARK, NY 12065
(518) 371-7621

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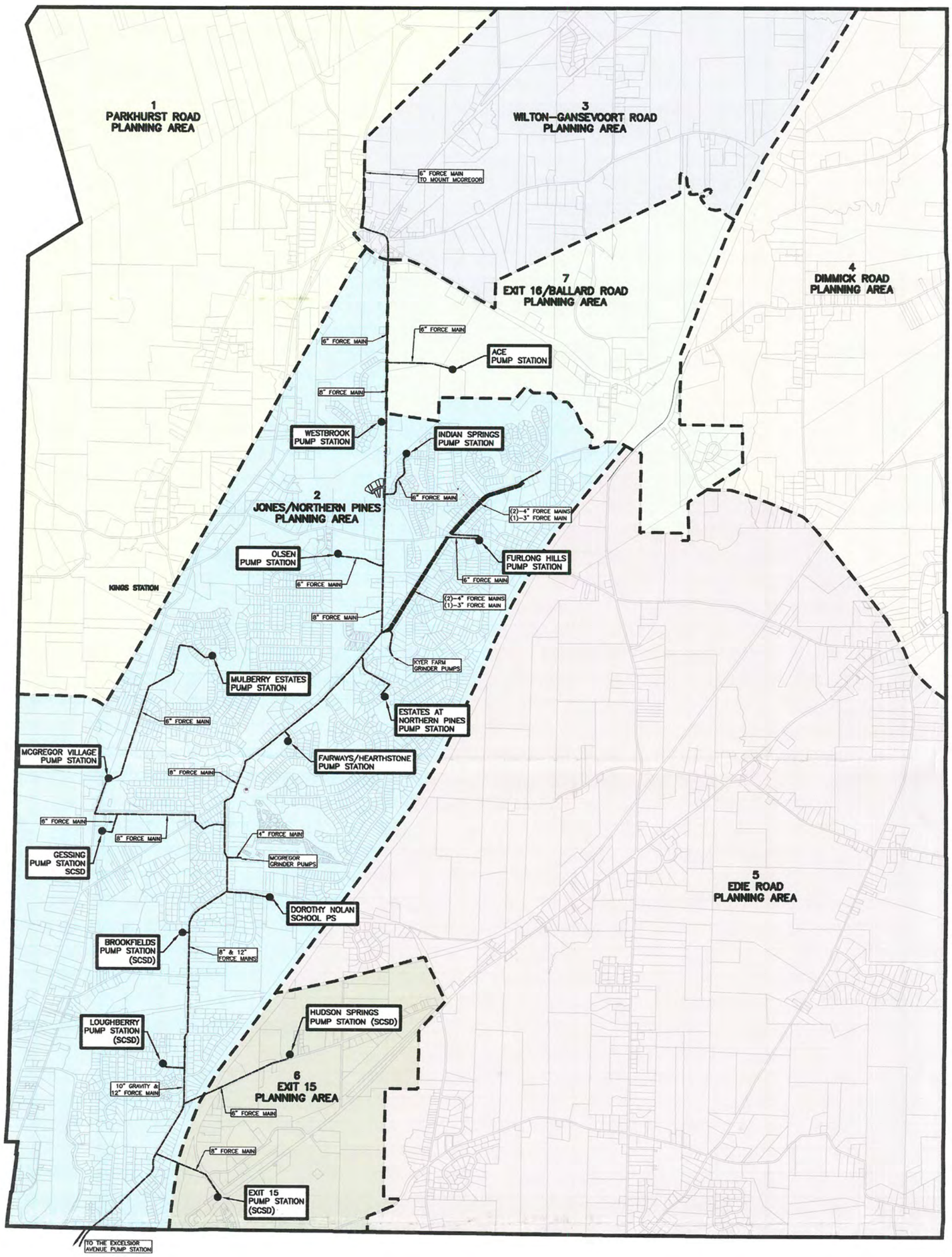

SCALE:
1"=3000'
FIGURE NO.
4

REVISIONS	DATE	BY

SHEET TITLE

SEWER SYSTEM SCHEMATIC

SEPTEMBER 12, 2007

WILTON WATER AND SEWER AUTHORITY

2007 COMPREHENSIVE PLAN UPDATE
TOWN OF WILTON SARATOGA COUNTY, NEW YORK

ENVIRONMENTAL DESIGN PARTNERSHIP, LLP
ROUTE 146 CLIFTON PARK, NY 12065 (518) 371-7621
ENGINEERING + LANDSCAPE ARCHITECTURE + LAND SURVEYING
edp

SUMMARY OF ESTIMATED SEWER DEMANDS					
User Name	2007 Number of EDU's	2027 Number of EDU's	Flow Rate per EDU	Existing Flow (gpd)	Estimated 2027 Flow (gpd)
Mt. McGregor Correctional Facility			N.A.	256,542	256,542
PLANNING AREA #1 -PARKHURST ROAD					
FUTURE CONNECTIONS		150	250	0	37,500
PLANNING AREA #2 - JONES / NORTHERN PINES					
Westbrook	101	101	250	25,250	25,250
Veterans Apartments	6	6	250	1,500	1,500
N. Pines Senior Apartments	18	18	250	4,500	4,500
Preston Court	1	8	250	250	2,000
Burnham Hollow	0	61	250	0	15,250
Indian Springs	105	125	250	26,250	31,250
Olson Farm	0	53	250	0	13,250
Gailor Road	0	10	250	0	2,500
Little Mills	6	7	250	1,500	1,750
Kings Mills	131	131	250	32,750	32,750
Craw Farm	0	48	250	0	12,000
Huck Finn	0	42	250	0	10,500
Canyon Run	11	61	250	2,750	15,250
Furlong Hills	182	182	250	45,500	45,500
Kyer Farm	12	12	250	3,000	3,000
Estates at Northern Pines	185	185	250	46,250	46,250
Lonesome Pine Trail	22	22	250	5,500	5,500
Jessica Trace	12	12	250	3,000	3,000
Fairways I, II & III	245	245	250	61,250	61,250
O'Brien Fairways	28	28	250	7,000	7,000
Links	18	21	250	4,500	5,250
Mulberry Estates	110	110	250	27,500	27,500
McGregor Village Office	15	17	250	3,750	4,250
McGregor Village Apartments	108	108	250	27,000	27,000
Wilton Commons Senior Apt	18	18	250	4,500	4,500
Home of Good Shepard	0	12	250	0	3,000
Saratoga Heritage Phase 1	72	72	250	18,000	18,000
Saratoga Heritage Phase 2	0	40	250	0	10,000
Saratoga Hertiage Phase 3	0	32	250	0	8,000
McGregor Villas	16	16	250	4,000	4,000
Stewart Court	0	5	250	0	1,250
Greens at McGregor	115	115	250	28,750	28,750
McGregor Country Club	5	5	250	1,250	1,250
Dorothy Nolan School	32	32	250	8,000	8,000
Brookfields	100	100	250	25,000	25,000
The Forest	16	16	250	4,000	4,000
Loughberry Estates	80	80	250	20,000	20,000
FUTURE CONNECTIONS		277	250	0	69,250

SUMMARY OF ESTIMATED SEWER DEMANDS					
User Name	2007 Number of EDU's	2027 Number of EDU's	Flow Rate per EDU	Existing Flow (gpd)	Estimated 2027 Flow (gpd)
PLANNING AREA #3 - WILTON / GANSEVOORT ROAD					
Ridgeview	0	38	250	0	9,500
Ballard Road School	5	5	**	1,400	14,000
FUTURE CONNECTIONS		100	250	0	25,000
PLANNING AREA #4 - DIMMICK ROAD					
FUTURE CONNECTIONS		150	250	0	37,500
PLANNING AREA #5 - EDIE ROAD					
FUTURE CONNECTIONS		200	250	0	50,000
PLANNING AREA #6 - EXIT 15					
Hudson Springs PDD	0	168	250	0	42,000
Paddocks PDD	0	42	250	0	10,500
Exit 15 Pump Station Area	500	500	**	125,000	125,000
FUTURE CONNECTIONS		108	250	0	27,000
PLANNING AREA #7 - EXIT 16 / BALLARD ROAD					
Wilton Travel Plaza	5	5	250	1,250	1,250
Wilton Town Hall	1	1	250	250	250
Stewart	2	2	250	500	500
Target	13	13	**	5,000	5,000
Ace Hardware	8	8	**	2,000	2,000
Police Barracks	1	1	250	250	250
Wilton Developmental Cen/Exit 16	3	30	250	750	7,500
Wilton Funeral Home	1	1	250	250	250
FUTURE CONNECTIONS		165	250	0	41,250
***Actual Flow Data*					
TOTALS:		4120		835,692	1,301,042

Note: The Sanitary Sewer Demand Table has been color coordinated with the Sewer System Schematic (Figure 4) to identify individual Planning Areas as defined by the Town of Wilton Comprehensive Plan.

ATTACHMENT

G

WILTON PUMP STATION SCHEMATIC

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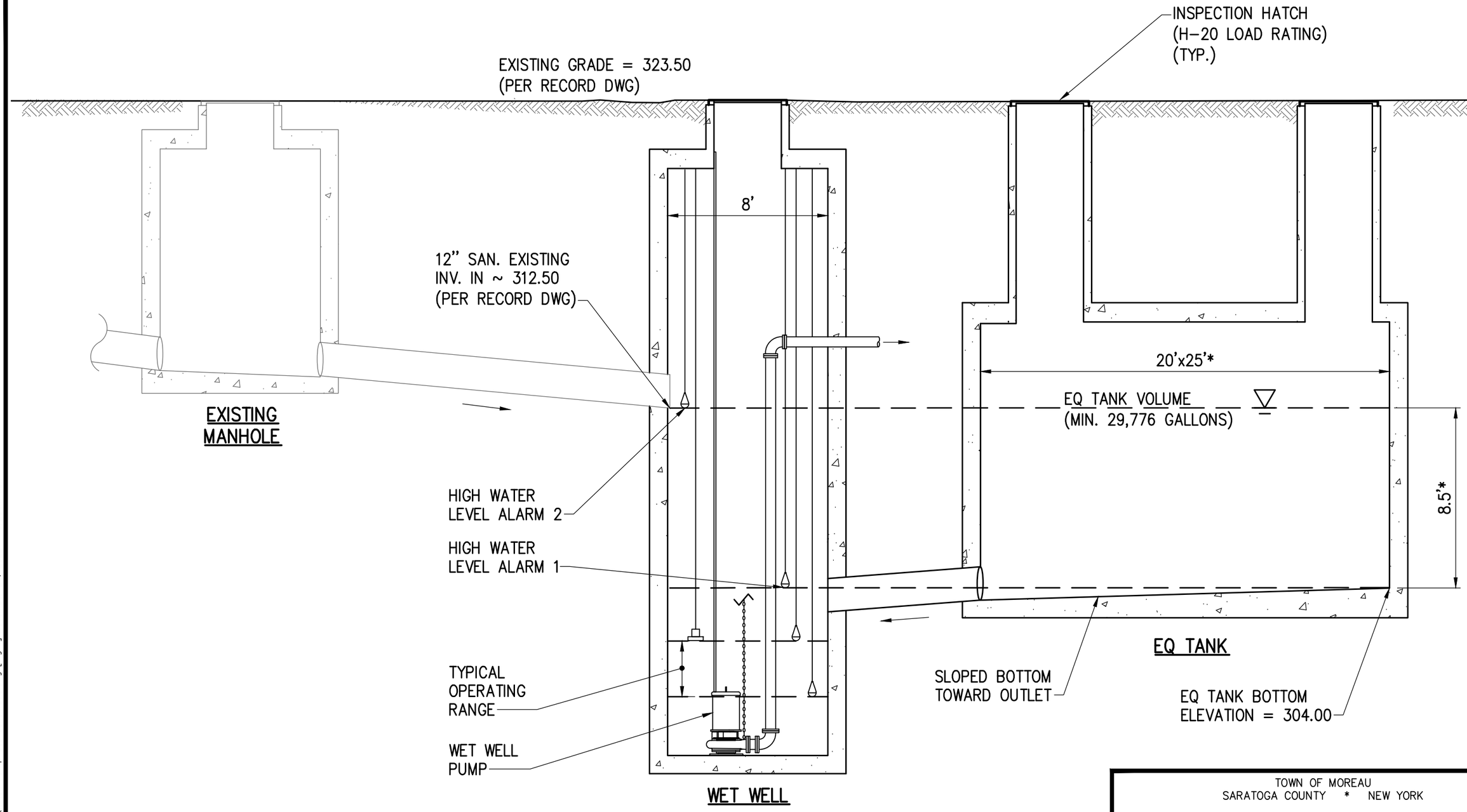

*TANK DIMENSIONS ARE PRELIMINARY FOR SCHEMATIC PURPOSES. ACTUAL DESIGN MAY RESULT IN A STRUCTURE WITH DIFFERING DIMENSIONS.

WILTON PUMP STATION SCHEMATIC

NTS

TOWN OF MOREAU
SARATOGA COUNTY * NEW YORK

WILTON PUMP STATION SCHEMATIC

DESIGNED BY KBH
DRAWN BY KBH
REVIEWED BY

Laberge ENGINEERING ARCHITECTURE Group SURVEYING PLANNING
4 Computer Drive West • Albany, New York 12205
(518) 458-7112 • www.labergegroup.com

DATE 10/27/2022
SCALE NTS
SHEET 1

ATTACHMENT E

SCSD#1 Capacity Commitment Letter
And
Outside User Agreement

SARATOGA COUNTY SEWER DISTRICT # 1

P.O. Box 550
Telephone (518) 664-7396

Mechanicville, NY 12118
Fax (518) 664-6280

DAN ROURKE, P.E.
EXECUTIVE DIRECTOR

December 17, 2024

Michelle Lafay
NYSDEC - Region 5
232 Golf Course Road
Warrensburg, NY 12885-0220

RE: Reserve Capacity Commitment for Arrowhead Meadows 10,080 gpd (ADF) 28 GPM (peak)
(Co.) Saratoga, (T) Moreau

Dear Ms. Lafay:

The above referenced project is located within the boundaries of Saratoga County Sewer District No.1 (SCSD). Sufficient capacity exists within the facilities of SCSD to transport and treat the project's design flows.

Sufficient capacity has been confirmed as being available as determined by EDP in the Engineer's Sewer Narrative. Upon compliance with provisions of SCSD's rules and regulations for the construction of new projects, SCSD will grant approvals for discharge to the facilities of SCSD. The project will be monitored under the SCSD Quality Assurance Program.

SCSD will not be responsible for owning and maintaining the sewer mains and associated structures within the project.. Per the sewer districts Sewer Use Ordinance, each connection in the project is required to obtain a SCSD permit and all laterals will be privately owned. Reserve capacity commitments serving Arrowhead Meadows are granted under provisions of SCSD's rules and regulations as adopted on January 21, 2003 and will expire December 17, 2026.

Should you have any questions, or require any additional information, please do not hesitate to contact me at (518) 664-7396.

Sincerely,

Dan Rourke, P.E.
Executive Director

cc: Kevin Kenyon, P.E., NYSDOH (via email)
Supervisor. Town of Moreau (via email)
EDP, Designated Agent, (via email)

AGREEMENT TO SUPPLY SEWER SERVICE TO PROPERTY OUTSIDE OF THE SEWER DISTRICT

THIS AGREEMENT is entered into this 21st day of June 2024 by and between the **Town of Moreau,** a municipal corporation existing by and under the laws of the State of New York, having its principal place of business located at 351 Reynolds Road, Moreau, New York, acting for and on behalf of Sewer District No. 1, Extension No. 5 of the Town of Moreau (hereinafter referred to as "Town"), and Arrowhead Meadows, LLC a limited liability company existing by and under the laws of the State of New York, and having its principal place of business located at 900 Route 146, Clifton Park, New York 12065 (hereinafter referred to as "Arrowhead")

W I T N E SSETH:

WHEREAS, the Town has duly established Sewer District No. I, Extension 5 (the "Sewer District") within the boundaries of the Town and adopted rules and regulations for Sewer Districts as found in Chapter 115 of the Code of the Town of Moreau; and

WHEREAS, Arrowhead is the owner of real property (located south of Bluebird Road, west of Gansevoort Road, and east of Thomas Avenue, identified by Tax Map No. 50.-3-29.22 (hereinafter referred to as the "Subject Premises") and has received preliminary approval from the Town of Moreau Planning Board and intends to complete the processes to subdivide the Subject Premises; and

WHEREAS the Subject Premises is currently located outside the boundaries of the Sewer District but in the vicinity of the boundaries and/or infrastructure of the Sewer District; and

WHEREAS, Arrowhead desires at its sole cost and expense to extend municipal sewer infrastructure to the Subject Premises, connect to the sanitary sewer service of the Sewer District

and if necessary to purchase sewer capacity for the Sewer District so that the Subject Premises can be developed or receive the benefit of public sewers; and

WHEREAS, sewer infrastructure is required to support the proposed forty two (42) lot single-family subdivision previously reviewed and approved by the Town Planning Board contingent on Town Board and Water Department approval of the sewer system; and

WHEREAS, the Town is presently completing a sewer project which will connect to the Saratoga County Sewer District No. 1 collection and treatment system to provide additional sanitary sewer treatment capacity (hereinafter referred to as the "County Connection"); and

WHEREAS, the Town expects to place the County Connection into service in the immediate future; and

WHEREAS, the Town through the Sewer District is willing to allow Arrowhead at its sole cost and expense to extend and connect the Subject Premises to the sewer infrastructure of the Sewer District upon the terms and conditions set forth herein.

NOW, THEREFORE, it is hereby agreed by and between the parties hereto as follows:

1. This Agreement shall be binding upon the parties and their respective successors, heirs, or assigns.
2. Until such time that the Town incorporates the Subject Premises into the Sewer District, all rules and regulations outlined in Town of Moreau Chapter 115 and now applying in the Sewer District, including any amendments to such rules and regulations as the Town Board may from time to time hereafter enact, shall apply in its entirety to the Subject Premises and Arrowhead agree to comply with all said rules and regulations to the same extent as such rules and regulations apply to all other similarly

situated properties.

3. Arrowhead shall, at its sole risk, cost, and expense, furnish and install all necessary infrastructure, including but not limited to sewer lines, mains, laterals, pump stations, telemetry system and all the appurtenances needed for the Subject Premises to connect to the Sewer District. Construction and/or connection shall be completed in accordance with all applicable State, County and local regulations and as required by the Town's Water and Sewer Department.

4. Arrowhead, at its sole cost and expense, shall be responsible for obtaining all necessary easements, access agreements, permits, and approvals from any other governmental agencies, including, but not limited to, the County of Saratoga Highway and Sewer Departments, the State of New York Department of Health, and the State of New York Department of Environmental Conservation, and the Town of Moreau Water Department. The Town shall cooperate with Arrowhead to the extent necessary to obtain such approvals or permits.

5. Within sixty (60) days from the effective date of this Agreement, Arrowhead shall make application to the Town Board of the Town of Moreau pursuant to Article 12 or Article 12A of the New York State Town Law for an extension of the Sewer District to include the Subject Premises.

6. The Town shall accept dedication for sewer infrastructure installed within public roadways provided they are designed and constructed to the reasonable satisfaction of the Town of Moreau Water Department and in accordance with approved plans and specifications. Improvements located on private property shall be privately

owned unless otherwise required under governmental approvals or permits.

7. Arrowhead shall be responsible for any legal and engineering fees required for the review of public water and sewer infrastructure plans, reports, and final construction prior to backfill.

8. It is expressly agreed that the sanitary sewer service herein provided is exclusively for, and limited to, the Subject Premises and the land uses specifically approved by the Town of Moreau Planning Board and for no other uses or purposes.

9. All infrastructure, including, but not limited to, sewer lines, lateral lines, and pump stations to be installed and utilized by Arrowhead shall receive the prior approval of the Town Water Superintendent and shall be coordinated to be compatible with the Sewer District as the Sewer District exists at the time of design approval. Within forty-five (45) days from the effective date of this Agreement, Arrowhead shall provide the Town stamped engineering plans, specifications, and engineering reports depicting all infrastructure designs, sewer lines, lateral lines, connections, and pump stations.

10. Any water or sewer infrastructure to be dedicated to the Town shall be inspected by the Water Department or designee before trenches are filled, with inspection costs to be borne by Arrowhead.

11. Arrowhead hereby releases the Town from any and all liability which may arise out of any actions of the Town or its employees, agents, and consultants as well as the actions of Arrowhead or its employees, agents, or contractors in completing the sewer connection(s) as herein contemplated and the furnishing of sanitary sewer service to

the Subject Premises and agrees to indemnify and hold harmless the Town from any and all liability which may arise out of any actions of Arrowhead or its employees, agents, or contractors in completing the sewer connection(s) as herein contemplated and the furnishing of sanitary sewer service to the Subject Premises.

12. It is hereby agreed that all rules and regulations set forth in Chapter 115 and now applying in the Sewer District including any amendments to such rules and regulations as the Town Board may from time to time hereafter enact, shall apply in their entirety to the Subject Premises, and Arrowhead agrees to comply with all said rules and regulations. Arrowhead shall pay a connection fee to the Town in the amount of Three Thousand and 00/100 Dollars ($3,000.00) per equivalent dwelling unit at the time that a building permit is issued by the Town's Building Department A $400.00 per equivalent dwelling unit fee will thereafter be paid by the owner of the real property beginning on January 1, 2025 and continuing on an annual basis on January 1 of each year until modified by the Town of Moreau Town Board. All billing for the Three Thousand and 00/100 Dollars ($3,000.00) equivalent dwelling unit fee will be sent to Arrowhead and billing for the annual Four Hundred and 00/100 Dollars ($400.00) equivalent dwelling unit fee will be sent to the property owner on an annual basis. Payment of invoices must be remitted in full to the Town within thirty days of issuance, and if payment is not received within the said thirty days the Town shall be entitled to initiate an action against Arrowhead to recover all arrears together with all disbursements, court costs and attorneys' fees.

13. It is agreed that at such time when the Subject Premises in its entirety is included in

the Sewer District, in any extension of the Sewer District or in any Consolidated Sewer District, then and in that event, this Agreement shall become null and void with the exception of required permit review and approval, indemnification, and reserve capacity purchase terms. The Subject Premises shall remain subject to compliance with Chapter 115 and any amendments thereto.

14. No Town public water or sewer infrastructure construction or connections will be allowed until detailed shop drawings are reviewed by the design engineer and subsequently approved in writing by the Town Water Superintendent, whose review shall be completed within sixty (60) days of submission by the design engineer.

15. This Agreement may be canceled by the Town in the event of a material breach by Arrowhead upon thirty (30) days prior written notice from the Town to Arrowhead and commencement to cure such breach has not commenced within such 30 day period.

16. This Agreement has been executed and delivered in the State of New York and shall be governed by and interpreted in accordance with the laws of the State of New York.

17. In the event any term or provision of this Agreement is deemed void or unenforceable, the remainder of this Agreement and the application of such provision, other than to the extent it is held invalid, will not be invalid or affected thereby.

18. No waiver of any breach of any condition of the Agreement shall be binding unless in writing and signed by the party waiving said breach. No such waiver shall in any way affect any other term or condition of this Agreement or constitute a cause or excuse for a repetition of such or any other breach unless the waiver shall include the same.

19. This Agreement constitutes the entire Agreement between the parties and shall not be modified except by a subsequent written agreement executed by the authorized representatives of the parties hereto.

20. Solely in respect to the subject of this Agreement, this Agreement supersedes all prior negotiations, representations, understandings, or agreements, whether oral or written, and no modification, alteration, amendment, construction, or interpretation of this Agreement shall be binding on either Party unless reduced to writing and executed by each Party.

21. Each of the persons signing below warrants that he or she is duly authorized to sign this Agreement on behalf of the party for which he or she is signing.

IN WITNESS WHEREOF, this Agreement has been duly executed by the parties hereto the day and year above written.

TOWN OF MOREAU

By: _____

Date: 6/21/2024

ARROWHEAD MEADOWS, LLC

By: _____
Travis Mitchell

Date: 6/19/2024

STATE OF NEW YORK)
)ss.:
COUNTY OF SARATOGA)

On the 21st day of June in the year 2024 before me, the undersigned, a Notary Public in and for said state, personally appeared Jesse A. Fish, Jr., personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the instrument and acknowledged to me that he executed the same in his capacity and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Dianne M. Lewis

NOTARY PUBLIC

DIANNE M. LEWIS
Notary Public, State of New York
Saratoga County #01LE6414480
Commission Expires Feb. 22, 2025

STATE OF NEW YORK)
)ss.:
COUNTY OF SARATOGA)

On the 19th day of June in the year 2024 before me, the undersigned, a Notary Public in and for said state, personally appeared Travis J. Mitchell personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the instrument and acknowledged to me that he executed the same in his capacity and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Stephen H. Freed

NOTARY PUBLIC

STATE OF NOTARY PUBLIC NEW YORK
STEPHEN H FREED
Registration #01FR6046210
Qualified in Schenectady County
My Commission Expires
July 1, 2026