Appendix E

Engineer's Report for Sanitary Sewer
Prepared by M.J. Engineering & Land Surveying, PC
Engineer's Report for
Sanitary Sewers
for
Village at Whispering Pines
Senior Living District

2200 Helderberg Avenue
Town of Rotterdam, Schenectady Co., New York

April 2018

MJ#: 843.09

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1.0 PROJECT BACKGROUND

1.1 Project Location

The Village at Whispering Pines project is planned to be a 55+ retirement community. The project site is located off of Helderberg Avenue, immediately adjacent to Interstate 90 (NYS Thruway) in the Town of Rotterdam, New York. The physical address of the site is 2200 Helderberg Avenue. The project is comprised of the following tax parcels.

<table>
<thead>
<tr>
<th>Tax ID</th>
<th>Physical Address</th>
<th>Land Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>71.5-1-5.111</td>
<td>2200 Helderberg Ave</td>
<td>W.P. Golf Corporation</td>
</tr>
<tr>
<td>71.5-1-5.112</td>
<td>2188 Helderberg Ave</td>
<td>Armstrong, Mark</td>
</tr>
<tr>
<td>71.5-1-7.1</td>
<td>2196 Helderberg Ave</td>
<td>Chambers, Allen</td>
</tr>
<tr>
<td>71.5-1-8.112</td>
<td>2208 Helderberg Ave</td>
<td>LaPrada, Michelle A.</td>
</tr>
<tr>
<td>71.5-1-8.111</td>
<td>Helderberg Ave</td>
<td>W.P. Golf Corporation</td>
</tr>
<tr>
<td>71.5-1-9</td>
<td>2204 Helderberg Ave</td>
<td>Pallutti, James E.</td>
</tr>
<tr>
<td>71.5-1-10.21</td>
<td>2212 Helderberg Ave</td>
<td>Mlodzianowski Irrevocable Trust</td>
</tr>
<tr>
<td>71.9-2-21.11</td>
<td>Ft Hunter Rd</td>
<td>Brown, Lyle</td>
</tr>
</tbody>
</table>

The overall project area, inclusive of the above parcels is approximately 96.6 acres. Refer to Figure 1-1 for the project site location.

![Site Location Map](image-url)
1.2 Project Description

The development is planned as a retirement community with varying types of housing styles, activities and services available, and the existing 18-hole executive golf course will be rearranged into a nine-hole executive golf course. To advance the project, it is proposed to rezone the project areas as a Senior Living District (SLD) with project specific densities and uses, including:

Residential Component
- 119 independent living units, blend of one and two bedrooms
- 144 assisted living units, blend of studio, one and two bedrooms
- 108 memory care units, 1 bedroom private and semiprivate
- 125 single family homes (attached and detached - blend of 1 and 2 bedrooms)

Ancillary Senior Services
- Residential dining and full-service kitchen
- Fitness center
- Swimming pool / spa
- Therapy room
- Salon
- Conference / meeting rooms

Recreational Uses

The existing golf course will be reconfigured with four to five of the holes relocated along with a new club house and maintenance facility, to create a new none hole executive golf course.

1.3 Soil Conditions

The National Resources Conservation Service (NRCS) soil survey for Schenectady County, New York identified the soils present at the subject site consists of the following (refer to Table 1-1):

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres% of Parcel</th>
<th>Slope</th>
<th>Depth to Groundwater</th>
<th>Depth to Restrictive Layer</th>
<th>Hydrologic Group</th>
<th>Drainage Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoA</td>
<td>Colonie loamy fine sand, 0 to 3 percent slopes</td>
<td>4.7/4.4%</td>
<td>0 to 3%</td>
<td>More than 80 inches</td>
<td>More than 80 inches</td>
<td>A</td>
<td>Well drained</td>
</tr>
<tr>
<td>CoC</td>
<td>Colonie loamy fine sand, 3 to 15 percent slopes</td>
<td>59.0/55.0%</td>
<td>13 to 15%</td>
<td>More than 80 inches</td>
<td>More than 80 inches</td>
<td>A</td>
<td>Well drained</td>
</tr>
<tr>
<td>CPE</td>
<td>Colonie and Plainfield soils, steep</td>
<td>5.1/4.8%</td>
<td>10 to 50%</td>
<td>More than 80 inches</td>
<td>More than 80 inches</td>
<td>A</td>
<td>Well drained</td>
</tr>
<tr>
<td>En</td>
<td>Elenora loamy fine sand</td>
<td>26.9/25.1%</td>
<td>0 to 3%</td>
<td>14 to 24 inches</td>
<td>More than 80 inches</td>
<td>A/D</td>
<td>Moderately well drained</td>
</tr>
<tr>
<td>Gr</td>
<td>Granby loamy fine sand</td>
<td>0.9/0.8%</td>
<td>0 to 3%</td>
<td>About 0 inches</td>
<td>More than 80 inches</td>
<td>A/A</td>
<td>Poorly drained</td>
</tr>
<tr>
<td>UR</td>
<td>Urban land – Colonie complex</td>
<td>10.6/9.9%</td>
<td>0 to 3%</td>
<td>More than 80 inches</td>
<td>More than 80 inches</td>
<td>C/D</td>
<td>Well drained</td>
</tr>
</tbody>
</table>

Approximately 79 acres (or 74%) of the project area contains soils that have more than 80-inches separation from groundwater. The soils are generally well drained and the depth to restrictive soil layers appears greater than 80-inches throughout the site.
1.4 Sewage Generate Rates

In developing sewage generation rates for the project, typical per-unit hydraulic sewage loading rate provided in Table B-3 of the NYSDEC Wastewater Design Standards (2014), taking into account a 20% water use reduction as permitted under Environmental Conservation Law (ECL) §15-0314. A summary of the estimated sewage generation rates is summarized in Table 1-2.

Table 1-2: Proposed Sewage Generation Rates by Use

<table>
<thead>
<tr>
<th>Use</th>
<th>No. Units</th>
<th>Loading Unit Rate (GPD)</th>
<th>Total Water Usage (GPD)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Living Units</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Bedroom</td>
<td>84</td>
<td>88</td>
<td>7,392</td>
<td></td>
</tr>
<tr>
<td>2 Bedroom</td>
<td>35</td>
<td>88</td>
<td>6,160</td>
<td></td>
</tr>
<tr>
<td>Assisted Living Units</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Bedroom</td>
<td>126</td>
<td>88</td>
<td>11,088</td>
<td></td>
</tr>
<tr>
<td>2 Bedroom</td>
<td>18</td>
<td>88</td>
<td>3,168</td>
<td></td>
</tr>
<tr>
<td>Memory Care Neighborhood</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Bedroom</td>
<td>108</td>
<td>88</td>
<td>7,560</td>
<td></td>
</tr>
<tr>
<td>Single Family Homes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Bedroom</td>
<td>125</td>
<td>88</td>
<td>22,000</td>
<td></td>
</tr>
<tr>
<td>Independent Living Common Areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resident Dining (4,302 s.f.)</td>
<td>251 seats</td>
<td>28</td>
<td>7,034</td>
<td>22.5 s.f. / seat (BCNYS 2015)</td>
</tr>
<tr>
<td>Swimming Pool (2,500 s.f.)</td>
<td>167 swimmers</td>
<td>8</td>
<td>1,333</td>
<td>15 s.f. / swimmer (DOH 6-1.29 (3.0))</td>
</tr>
<tr>
<td>Spa (300 s.f.)</td>
<td>30 swimmers</td>
<td>8</td>
<td>240</td>
<td>10 s.f. / swimmer (DOH 6-1.29)</td>
</tr>
<tr>
<td>Salon</td>
<td>5 stations</td>
<td>160</td>
<td>800</td>
<td>200 GPD beauty salon per station w/ hair care sink(NYSDEC 2014)</td>
</tr>
<tr>
<td>Fitness Studio (500 s.f.)</td>
<td>25 patrons</td>
<td>4</td>
<td>100</td>
<td>20 s.f. / patron (BCNYS 2015)</td>
</tr>
<tr>
<td>Assembly Space (3,000 s.f.)</td>
<td>300 seats</td>
<td>4</td>
<td>1,200</td>
<td>10 s.f. / seat (BCNYS 2015)</td>
</tr>
<tr>
<td>Facility Employees</td>
<td>206 seats</td>
<td>12</td>
<td>2,472</td>
<td></td>
</tr>
<tr>
<td>Golf Course(3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rounds per day</td>
<td>30</td>
<td>16</td>
<td>480</td>
<td>7,000 rounds per year over 8 months</td>
</tr>
<tr>
<td>Lounge</td>
<td>53 seats</td>
<td>16</td>
<td>853</td>
<td>Light lunch &amp; beverages</td>
</tr>
<tr>
<td>Employees</td>
<td>10</td>
<td>12</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Average Day Water Demands (GPD)</td>
<td></td>
<td></td>
<td>72,000</td>
<td></td>
</tr>
<tr>
<td>Peak Hourly Water Demands (GPM)</td>
<td></td>
<td></td>
<td>185</td>
<td>3.7 Peaking Factor based upon estimated population of 1,300 (Ten States 2012)</td>
</tr>
</tbody>
</table>

(1) Loading rate applies 20% reduction
(2) Golf course will not have full service food or showers. Executive golf courses do not typically host tournaments
2.0 RECEIVING SANITARY SEWER SYSTEMS – OPTION 1

Option 1 includes conveying the project sanitary sewer to Hamburg Street Sewer District, formed in 2015, which is located approximately 1/2 mile northeast of the project site. Refer to Figure 2-1.

![Figure 2-1](image)

2.1 Service Area

The existing Hamburg Street Sewer District consists of a combination of both residential and commercial properties, with mainly commercial properties located directly on Hamburg Street and residential properties on side streets. The sewer district, as shown in Appendix A, includes Hamburg Street from the intersection of Curry Road and Hamburg Street extending north to the CSX railroad. These properties include approximately 65 single family, 13 multi-family, and 56 commercial/industrial/community service parcels.

The Hamburg Street Sewer District conveys all sewage to the City of Schenectady sewer system under an Intermunicipal Agreement (agreement) between the Town and City. This agreement is renewed every five years with charges adjusted annually based upon the Consumer Price Index. A "right to serve" letter request has been submitted to the City of Schenectady for the purpose of confirming capacity exists within the City's collection and treatment system to support this project as an extension to the Hamburg Street Sewer District.
2.2 Sanitary Sewer Flows

The projected Hamburg Street Sewer District wastewater flows were previously estimated in the “Town of Rotterdam Hamburg Street Sanitary Sewer Collection System” design report (2016) as prepared by The Chazen Companies. The flows were estimated using water usage data for the service area, along with the Town of Rotterdam’s Equivalent Dwelling Units (EDU) formula. A summary of these flows is outlined in Table 2-1, and the above referenced design report is provided in Appendix A.

<table>
<thead>
<tr>
<th>Property</th>
<th>Average Day (GPM)</th>
<th>Maximum Day (GPM)</th>
<th>Peaking Factor</th>
<th>Peak Hour (GPM)</th>
<th>Reserve Capacity (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamburg Street Sewer District</td>
<td>34</td>
<td>68</td>
<td>4</td>
<td>136</td>
<td>64</td>
</tr>
</tbody>
</table>

*Based on July 2016 Design Report.

2.3 System Description

Subsequent to the previously referenced Hamburg Street Sewer design report, construction documents were prepared for New York State Department of Transportation (NYSDOT) Statewide Transportation Improvement Program (STIP) project, “Hamburg Street Safety Improvements”. The Hamburg Street sewer system improvements were included in the NYSDOT STIP project through a municipal betterment agreement. The NYSDOT project is under construction with completion expected in 2018.

The Hamburg Street sewer improvements consists of 6,730-ft of 12-inch diameter gravity sewer, a duplex pump station located on 4th Street (just off Hamburg Street), 4,710-ft of 6-inch diameter forcemain, and manholes spaced approximately 300-feet center to center along the gravity sewer.

The first section of 12-inch gravity sanitary sewer infrastructure on Hamburg Street collects and conveys wastewater flows via gravity, from the intersection of Curry Road and Hamburg Street, to the north, to the proposed pump station located on 4th Street. The second section of 12-inch gravity sanitary sewer collects and conveys wastewater flows via gravity from the CSX railway to the south, to the proposed pump station on 4th street. The collected flows from the two sections will be pumped north via a 6-inch diameter forcemain along Hamburg Street, under CSX railway and Chrlester Avenue, to an existing City of Schenectady sewer manhole located at the intersection of Hamburg Street and Glengary Road.

The projected peak flow from the Hamburg Street Sewer District is estimated to be 136 GPM. The pump station has been designed for a peak discharge of 200 GPM. Therefore, this pump station was designed to have a reserve capacity of approximately 64 GPM. The pump station consists of two (2) submersible pumps, as manufactured by Barnes. The pumps will be 10 horsepower and have variable frequency drives (VFDs). The station also includes a diesel fueled emergency generator with an automatic transfer switch. The pump station will be constructed this year or next year, 2018.

Wastewater from Hamburg Street Sewer District will be pumped through a 6-inch forcemain at a velocity of 2.4 feet per second, which is greater than the minimum cleansing velocity of 2 feet per second per Recommended Standards for Wastewater Facilities. With a design flow of 136 GPM and a maximum capacity of 500 GPM, there is 364 GPM capacity available in the forcemain.

The wet well will be an 8-foot diameter concrete structure. The effective volume of the wet well will be approximately 470 gallons based on the design “Pumps Off” to the “Lead Pump On” float elevations. The volume is derived from the Recommended Standards for Wastewater Facilities (Ten States Standards), which recommends a maximum fill time of 30 minutes to prevent septic-like conditions within the wet well, as well as prevent the pumps from cycling too often. Based on the initial average day design inflow of 34...
GPM from the Hamburg Street Sewer District, the maximum allowable effective volume per the Recommended Standards for Wastewater Facilities is 1,020 gallons (34 GPM x 30 Min). The initial pump station design utilized an average fill time of 13.82 minutes (470 Gallons ÷ 34 GPM), which is below the recommended maximum fill time. The average design cycle time, provided in the Hamburg Street Sanitary Sewer design report (2016), is 16.64 minutes or 3.6 cycles per hour. Refer to Table 2-2.

Table 2-2: Existing Hamburg Street Sewer District – Pump Operation Summary

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Pump Rate (GPM)</th>
<th>In-flow Rate (GPM)</th>
<th>Volume of Wetwell (GAL)</th>
<th>Time to Fill (MIN)</th>
<th>Time to Empty (MIN)</th>
<th>Cycle Time (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Average Day</td>
<td>200</td>
<td>34</td>
<td>470</td>
<td>13.82</td>
<td>2.83</td>
<td>16.65</td>
</tr>
</tbody>
</table>
3.0 RECEIVING SANITARY SEWER SYSTEMS – OPTION 2

Option 2 includes conveying the project site sewer to Helderberg Meadows Town of Rotterdam District #2 Extension 12 formed in 2008, which is located approximately 1/2 mile east of the project site. Refer to Figure 2-1 above.

3.1 Service Area

The existing Helderberg Meadows community consists of both single family and multi-family residential properties, with single family homes on Steeple Way and condominiums on Paddock Circle. The community, as shown in Figure 2-1, includes Steeple Way, which is bounded by Guilderland Avenue to the north and west, and County Line Road to the south, which was previously the Capitol Real Estate Parcel. These properties include approximately 103 single family and 100 condominium units consisting of 25, 4-unit buildings. All of the homes within this phase of the Helderberg Meadows project have not yet been constructed. There is an additional phase to this project that includes the Adamec Parcel to the north of Steeple Way. It is bounded by railroad to the west, NYS State Thruway to the east, and Guilderland Ave to the south. This parcel is planned to be developed into 58 single family homes with approximately 4,100 ft of new Town streets with associated water, storm, and sewer utilities.

3.2 Sanitary Sewer Flows

The Helderberg Meadows wastewater flows were previously estimated in the “Sanitary Sewer Extension Town of Rotterdam District #2 Extension 12” design report (2008) as prepared by Brett L. Steenburgh, P.E. PLLC. The flows were estimated using the per-unit hydraulic sewage loading rate provided in Table B-3 of the NYSDEC Wastewater Design Standards (2014). A summary of these flows is outlined in Table 3-1, and the above referenced design report is provided in Appendix B.

<table>
<thead>
<tr>
<th>Property</th>
<th>Average Day Flow (GPM)</th>
<th>Peaking Factor</th>
<th>Peak Hour Flow (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helderberg Meadows</td>
<td>38.6</td>
<td>4</td>
<td>154.4</td>
</tr>
</tbody>
</table>

*Based on April 2008 Design Report. Only includes Capitol Real Estate Parcel.

3.3 System Description

Helderberg Meadows, south of Guilderland Ave, consists of 8,662-ft of 8-inch diameter gravity sewer, 1,550-ft of 4-inch diameter forcemain, 2,200 of 6-inch diameter forcemain, two separate duplex pump stations, and manholes spaced approximately 300-feet center to center along the gravity sewer.

The southern portion of Steeple Way wastewater is collected and conveyed through an 8-inch gravity sewer main to Helderberg Meadows Pump Station #1 located at the intersection of Steeple Way and Paddock Circle. From there it is pumped via 4” forcemain to the north to an 8” gravity sewer main. This gravity system flows to Helderberg Meadows Pump Station #2 located on Steeple Way approximately 1,400 ft to the south of Guilderland Ave. From this point, the wastewater is pumped in a northerly direction along Guilderland Avenue, under the NYS Thruway and CSX Railroad, and eventually into a Town of Rotterdam sanitary sewer manhole near the intersection of Guilderland Avenue and Palm Street.

Helderberg Meadows Pump Station #1 has been designed for a peak discharge of 76.4 GPM, which includes wastewater from the southern portion of Steeple Way. As such, the pump station has an operating point of 116 GPM at 34 TDH. The pump station consists of two (2) above-grade pumps, as manufactured by Smith and Loveless Inc. The pumps are 3 horse power and have a natural gas fueled...
emergency generator with an automatic transfer switch. A summary of Helderberg Meadows Pump Station #1 is outlined in Table 3-2.

### Table 3-2: Helderberg Meadows Pump Station #1

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Number</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumps</td>
<td>2</td>
<td>Smith &amp; Loveless</td>
</tr>
<tr>
<td>Motors</td>
<td>2</td>
<td>3 HP, 120/208 V, 3 phase</td>
</tr>
<tr>
<td>Control Panel</td>
<td>1</td>
<td>SN 18060</td>
</tr>
<tr>
<td>Vacuum Pumps</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Runtime Meters</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Alternate Power</td>
<td>1</td>
<td>25 kW Olympian generator, Natural gas fueled, dated 2009, ATS</td>
</tr>
</tbody>
</table>

Wastewater from the Helderberg Meadows Pump Station #1 is pumped through a 4-inch forcemain at a velocity of approximately 3.0 feet per second, which is greater than the minimum cleansing velocity of 2 feet per second per Recommended Standards for Wastewater Facilities. With a design flow of 116 GPM and a maximum capacity of 300 GPM with a forcemain velocity of approximately 8.0 feet per second, there is approximately 184 GPM capacity available in the forcemain.

The wet well is a 6-foot diameter concrete structure. The effective volume of the wet well is approximately 114 gallons based on the design “Pumps Off” to the “Lead Pump On” float elevations. The volume is derived from the Recommended Standards for Wastewater Facilities (Ten States Standards), which recommends a maximum fill time of 30 minutes to prevent septic-like conditions within the wet well, as well as prevent the pumps from cycling too often. Based on the initial average day design inflow of 19.1 GPM from the southern portion of Steeple Way, the maximum allowable effective volume per the Recommended Standards for Wastewater Facilities is 573 gallons (34 GPM x 30 Min). The initial pump station design utilized an average fill time of 5.97 minutes (114 Gallons ÷ 19.1 GPM), which is below the recommended maximum fill time. The estimated average design cycle time is 7.15 minutes or 13.70 cycles per hour. Refer to Table 3-3.

### Table 3-3: Helderberg Meadows PS#1 Operation Summary

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Pump Rate (GPM)</th>
<th>In-flow Rate (GPM)</th>
<th>Volume of Wetwell (GAL)</th>
<th>Time to Fill (MIN)</th>
<th>Time to Empty (MIN)</th>
<th>Cycle Time (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Average Day</td>
<td>116</td>
<td>19.1</td>
<td>114</td>
<td>5.97</td>
<td>1.18</td>
<td>7.15</td>
</tr>
</tbody>
</table>
Helderberg Meadows Pump Station #2 receives the projected total peak flow of 154.4 GPM, which includes wastewater from Pump Station #1 and additional wastewater from the northern portion of Steeple Way. As such, Pump Station #2 has an operating point of 256 GPM at 102 TDH. The pump station consists of two (2) above-grade pumps, as manufactured by Smith and Loveless Inc. The pumps are 25 horsepower and have a natural gas fueled emergency generator with an automatic transfer switch. A summary of Helderberg Meadows Pump Station #2 is outlined in Table 3-4.

Table 3-4: Helderberg Meadows Pump Station #2

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Number</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumps</td>
<td>2</td>
<td>Smith &amp; Loveless</td>
</tr>
<tr>
<td>Motors</td>
<td>2</td>
<td>25 HP, 120/208 V, 3 phase</td>
</tr>
<tr>
<td>Control Panel</td>
<td>1</td>
<td>SN 181061</td>
</tr>
<tr>
<td>Vacuum Pumps</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Runtime Meters</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Alternate Power</td>
<td>1</td>
<td>80 kW Olympian generator, Natural gas fueled, dated 2009, ATS</td>
</tr>
</tbody>
</table>

Helderberg Meadows Pump Station #2 will receive wastewater from the northern portion of the site and Pump Station #1. These flows will be pumped through a 6-inch forcemain at a velocity of approximately 3.0 feet per second, which is greater than the minimum cleansing velocity of 2 feet per second per Recommended Standards for Wastewater facilities. With a design flow of 256 GPM and a maximum capacity of approximately 650 GPM with a forcemain velocity of approximately 8.0 feet per second, there is 394 GPM capacity available in the forcemain.

The wet well is a 6-foot diameter concrete structure. The effective volume of the wet well is approximately 255.9 gallons based on the design “Pumps Off” to the “Lead Pump On” float elevations. The volume is derived from the Recommended Standards for Wastewater Facilities (Ten States Standards), which recommends a maximum fill time of 30 minutes to prevent septic-like conditions within the wet well, as well as prevent the pumps from cycling too often. Based on the initial average day design inflow of 38.6 GPM from pump station #1 and the northern portion of Steeple Way, the maximum allowable effective volume per the Recommended Standards for Wastewater Facilities is 1,158 gallons (38.6 GPM x 30 Min). The initial pump station design utilized an average fill time of 6.6 minutes (255.9 Gallons ÷ 38.6 GPM), which is below the recommended maximum fill time. The estimated average design cycle time is 7.78 minutes or 14.37 cycles per hour. Refer to Table 3-5.

Table 3-5: Helderberg meadows PS#2 Operation Summary

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Pump Rate (GPM)</th>
<th>In-flow Rate (GPM)</th>
<th>Volume of Wetwell (GAL)</th>
<th>Time to Fill (MIN)</th>
<th>Time to Empty (MIN)</th>
<th>Cycle Time (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Average Day</td>
<td>256</td>
<td>38.6</td>
<td>255.9</td>
<td>6.6</td>
<td>1.18</td>
<td>7.78</td>
</tr>
</tbody>
</table>
4.0 PROPOSED ON-SITE SANITARY SEWER IMPROVEMENTS

4.1 Gravity Conveyance System

Gravity sewer mains will be installed throughout the development and generally along planned roads. Sewer mains within the development will generally be 8-inch diameter, including manholes and individual service laterals for each new building. The gravity sewer will convey wastewater to an on-site duplex pump station located on the southern portion of the site for both off-site options 1 and 2. Option 1 will direct wastewater through a 6-inch forcemain to the north and eventually connect into a terminus sanitary manhole, located near the intersection of Hamburg Street and Curry Road. This terminus manhole is part of the Hamburg Street Sewer District. Option 2 will direct wastewater through a 6-inch forcemain to the west, bypass Helderberg Meadows Pump Station 1, and eventually connect into a terminus sanitary manhole up located within Helderberg Meadows on Steeple Way, approximately 3,200 ft to the north of County Line Road. Forcemain routing is discussed further below in Section 5.0 and 6.0 for both options 1 and 2, respectively.

All sewer infrastructure will be designed and constructed in accordance with the Town of Rotterdam standards. Sanitary sewers servicing the single family homes will be conveyed to the Town of Rotterdam at no cost. Sewers servicing the senior complex, medical office / urgent care and golf course will be private laterals connecting to the sewers conveyed to the Town.

4.2 Pump Stations

The on-site sewer system will include two common pump stations. The first pump station (PS1) will be located on the northern portion of the site, which will collect wastewater from the northern half of the site and then pump it to a gravity system on the southern portion of the site. This gravity sewer will convey wastewater to the second pump station (PS2) which will be located on the southern portion of the site. Refer to Sections 5.0 and 6.0 for off-site forcemain routing for options 1 and 2, respectively.

For both off-site options, the on-site pump station designs will have the same pump rate, with slightly different TDH values due to varying head conditions. For this report, option 1 (Hamburg Street Sewer) was used to calculate TDH, however, if option 2 is used during design, the TDH will be recalculated.

Pump Station 1 will receive flows from the northern portion of the site, which will include approximately 147 GPM peak flow. As such, the pump station will be required to operate at approximately 175 GPM at 31 TDH. Refer to Table 4-1 below for the flows that will be directed to PS1.

<table>
<thead>
<tr>
<th>Building</th>
<th>Average Daily Usage (GPD)</th>
<th>Peak Day Usage (GPD)</th>
<th>Average Demand (GPM)</th>
<th>Peak Demand (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Living Common Areas &amp; Independent Living Units</td>
<td>28,115</td>
<td>104,025</td>
<td>19.5</td>
<td>72.2</td>
</tr>
<tr>
<td>Memory Care &amp; Assisted Living Neighborhood</td>
<td>21,816</td>
<td>80,719</td>
<td>15.2</td>
<td>56.1</td>
</tr>
<tr>
<td>Golf Club House</td>
<td>1,453</td>
<td>5,377</td>
<td>1.0</td>
<td>3.7</td>
</tr>
<tr>
<td>32 Single Family Town Homes (2 Bedroom)</td>
<td>5,632</td>
<td>20,838</td>
<td>3.9</td>
<td>14.5</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>57,016</strong></td>
<td><strong>210,960</strong></td>
<td><strong>40</strong></td>
<td><strong>147</strong></td>
</tr>
</tbody>
</table>

The proposed Pump Station 1 will include two (2), submersible pumps with variable frequency drives (VFDs). The pumps will be in an 8-foot diameter, 13-foot deep wet well. Based on the design operating point of 175 GPM at 31 TDH, the average day cycle time will be approximately 19.4 minutes. The cycle time is summarized below in Table 4-2. Refer to Appendix C for the pump station calculations.
Table 4-2: Proposed Pump Station 1 Cycle Times

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Pump Rate (GPM)</th>
<th>In-flow Rate (GPM)</th>
<th>Wetwell Drawdown Volume (GAL)</th>
<th>Time to Fill (MIN)</th>
<th>Time to Empty (MIN)</th>
<th>Cycle Time (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Day</td>
<td>175</td>
<td>40</td>
<td>594</td>
<td>15</td>
<td>4.4</td>
<td>19.4</td>
</tr>
</tbody>
</table>

Pump Station 2 (PS2) will receive flows from PS1 and the southern portion of the site, which is approximately 189 GPM peak flow. As such, the pump station will be required to operate at approximately 225 GPM at 55 TDH. Refer to Table 4-3 below for the flows that will be directed to PS2.

Table 4-3: Proposed Sewage Generation Rates to Pump Station 2

<table>
<thead>
<tr>
<th>Building</th>
<th>Average Daily Usage (gpd)</th>
<th>Peak Day Usage (1) (gpd)</th>
<th>Average Demand (gpm)</th>
<th>Peak Demand (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Station 1</td>
<td>57,016</td>
<td>210,960</td>
<td>40</td>
<td>147</td>
</tr>
<tr>
<td>Single Family Detached (2 Bedroom)</td>
<td>16,368</td>
<td>60,562</td>
<td>11</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>73,384</td>
<td>271,522</td>
<td>51</td>
<td>189</td>
</tr>
</tbody>
</table>

The proposed Pump Station 2 will include two (2), submersible pumps with variable frequency drives (VFDs). The pumps will be in an 8-foot diameter, 19-foot deep wet well. Based on the design operating point of 225 GPM at 85.5 TDH, the average day cycle time will be approximately 19.4 minutes. The cycle time is summarized below in Table 4-4. Refer to Appendix C for the pump station design basis and calculations.

Table 4-4: Proposed Pump Station 1 Cycle Times

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Pump Rate (GPM)</th>
<th>In-flow Rate (GPM)</th>
<th>Volume of Wetwell (GAL)</th>
<th>Time to Fill (MIN)</th>
<th>Time to Empty (MIN)</th>
<th>Cycle Time (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Day</td>
<td>225</td>
<td>51</td>
<td>764</td>
<td>15</td>
<td>4.4</td>
<td>19.4</td>
</tr>
</tbody>
</table>

4.3 Design and Construction Standards

All sewer system components would be designed and installed in accordance with the Town of Rotterdam Standards, Schenectady County Environmental Health Units Rules and Regulations, the New York State Dept of Environmental Conservation’s and Regulations and Ten State Standards.

4.4 Ownership, Operation and Maintenance

All facilities infrastructure to be constructed will be owned and operated by the Town of Rotterdam with the Town responsible for maintenance and operation of the system. These systems will be contained in easements and conveyed to the Town of Rotterdam at no cost.

Individual home owners / building owners will be responsible for maintaining the individual sewer laterals. These laterals are considered privately owned from the point of connection to the installed sewer mains conveyed to the Town.
5.0 PROPOSED OFF-SITE SANITARY SEWER IMPROVEMENTS – OPTION 1

5.1 Sanitary Sewer Forcemain

The on-site wastewater will be directed to a duplex pump station located on the southern portion of the site. It will be discharged through a 6-inch forcemain to be installed via directional drill under Interstate 90 (NYS Thruway). It will extend southeast along NYS Thruway, and then turn to the northeast to continue along Carmen Road. The forcemain will then connect into a Town of Rotterdam manhole installed under the “Hamburg Street Safety Improvements” NYSDOT project. The manhole will be located at the intersection of Curry Road and Hamburg Street. Refer to Appendix D for the proposed routing.

5.2 Modifications to Existing Sewer System

The Hamburg Street Sewer District has a projected peak flow of 136 GPM and the pump station has been designed to pump 200 GPM, which leaves 64 GPM reserve capacity. The Whispering Pines project projected peak flow of 189 GPM will exceed the 64 GPM reserve capacity by 125 GPM. Therefore, modifications will be needed at the Hamburg Street Pump Station.

The modifications will include upsizing the two pumps, as well as wet well adjustments as prescribed below. The total projected peak flow from the existing Hamburg Street Sewer District and Whispering Pines will be approximately 325 GPM, refer to Table 5-1. The proposed modifications will maintain the 64 GPM reserve capacity for future build-out. Therefore, the new pumps will need to have a total capacity of 400 GPM.

<table>
<thead>
<tr>
<th>Property</th>
<th>Average Day (GPM)</th>
<th>Maximum Day (GPM)</th>
<th>Peaking Factor</th>
<th>Peak Hour (GPM)</th>
<th>Reserve Capacity (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamburg Street Sewer District</td>
<td>34</td>
<td>68</td>
<td>4</td>
<td>136</td>
<td>64</td>
</tr>
<tr>
<td>Whispering Pines Development Site</td>
<td>51</td>
<td>94</td>
<td>3.7</td>
<td>189</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>325</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>64</strong></td>
</tr>
</tbody>
</table>

Based on these projected flows, the pump size will need to be increased. The new pumps will be provided with variable frequency drives (VFDs). Further analysis of the emergency generator and service lines will be needed to determine if upgrades are needed.

Wet well adjustments will also be needed. Based on the proposed wet well size (8-ft diameter 23.5-ft deep) and the total average daily inflow, the “High Water Alarm” and “Lead Pump On” float levels will need to be adjusted in order to increase the effective volume. Refer to Table 5-2 below.

<table>
<thead>
<tr>
<th>Float</th>
<th>Existing Elevation</th>
<th>Modified Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Water Alarm</td>
<td>327.25</td>
<td>327.50</td>
</tr>
<tr>
<td>Lead Pump On</td>
<td>326.25</td>
<td>327.25</td>
</tr>
<tr>
<td>Pump Off</td>
<td>325.00</td>
<td>325.00</td>
</tr>
</tbody>
</table>

These wet well modifications will thereby increase the time to fill the effective volume under the average flow conditions. Table 5-3 summarizes the impact on the cycle time if the effective volume is increased to accommodate the additional flow from the Whispering Pines Development.
Table 5-3: Proposed Pump Station Cycle Time Modifications

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Pump Rate (GPM)</th>
<th>In-flow Rate (GPM)</th>
<th>Volume of Wetwell (GAL)</th>
<th>Time to Fill (MIN)</th>
<th>Time to Empty (MIN)</th>
<th>Cycle Time (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Day</td>
<td>400</td>
<td>85</td>
<td>845</td>
<td>10.0</td>
<td>2.7</td>
<td>12.7</td>
</tr>
</tbody>
</table>

Pump station design basis and calculations are provided in Appendix E.

Based on the Hamburg Street design report, the forcemain will have an available 364 GPM. Thus, will not need any modifications since the Whispering Pines project has a design flow of 189 GPM. Refer to Table 5-4.

Table 5-4: Existing Forcemain Capacity Summary

<table>
<thead>
<tr>
<th>Total Capacity in 6&quot; FM (GPM)</th>
<th>Hamburg Street Sewer District (GPM)</th>
<th>Available Capacity (GPM)</th>
<th>Whispering Pines Flow (GPM)</th>
<th>Remaining available Capacity (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>136</td>
<td>364</td>
<td>189</td>
<td>175</td>
</tr>
</tbody>
</table>

Pursuant of the Recommended Standards for Wastewater Facilities, a cleansing velocity of at least 2 feet per second should be maintained at designed pumping rates, and a maximum velocity of 8 feet per second is recommended to avoid high head loss and protect valves. The additional flow from the Whispering Pines will increase the velocity in the forcemain to 4.8 feet per second from 2.4 feet per second. This is both greater than the minimum 2 feet per second and less than the maximum 8 feet per second. Refer to Table 5-5.

Table 5-5: Forcemain Velocity Summary

<table>
<thead>
<tr>
<th>*Minimum cleansing Velocity (FT/S)</th>
<th>*Maximum Velocity (FT/S)</th>
<th>Hamburg St. Sewer District (FT/S)</th>
<th>Hamburg St. Sewer &amp; Whispering Pines (FT/S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>8</td>
<td>2.4</td>
<td>4.8</td>
</tr>
</tbody>
</table>

*Minimum and maximum velocities are per Recommended Standards for Wastewater Facilities.

5.3 Cost to Make Improvements

At this time, all costs associated with off-site improvements shall be the responsibility of the applicant. Upon completion any improvements made by the applicant, specific to capacity upgrades or new infrastructure beyond the project boundaries would be conveyed to the Town at no cost.

5.4 Available Reserve Capacity for Other Parcels

The capacity of the Hamburg Street Sewer District is limited by the pump station and forcemain size that discharges sewage to the City of Schenectady’s sewer system. Upon completion of the improvements defined above, the Hamburg Street Sewer District pump station would be upgraded from a 200 GPM pump rate to 400 GPM.

When considering the expected peak hours sewage from both the Hamburg Street Sewer District Users of 136 GPM and Whispering Pines of 189 GPM, 325 GPM of sewage capacity will have been committed. This would provide for 75 GPM of reserve capacity. This equates to approximately 519 uncommitted EDUs for future connections. This is calculated as follows:

\[
75 \text{ GPM (peak hour)} = 108,000 \text{ GPD} \\
1 \text{ EDU} \approx 208 \text{ GPM (ave day)} \text{ [per Chazen MPR]} \\
108,000 \text{ GPM} / 208 \text{ GPM} = 519 \text{ EDUs}
\]
6.0 PROPOSED OFF-SITE SANITARY SEWER IMPROVEMENTS – OPTION 2

6.1 Sanitary Sewer Forcemain

The proposed on-site wastewater will be directed to a duplex pump station located on the southern portion of the site. It will be discharged through a 6-inch forcemain that will extend west along Keator Drive, cross Helderberg Avenue, and continue west along County Line Road. It will then turn north along Steeple Way, bypass Helderberg Meadows Pump Station 1, and connect into a Town of Rotterdam manhole that is located within Helderberg Meadows on Steeple Way, approximately 3,200-ft to the north of County Line Road. Refer to Appendix F for the proposed routing.

6.2 Modifications to Existing Sewer System

The Helderberg Meadow community has a projected peak flow of 154.4 GPM that flows via gravity to the existing Pump Station 2 and the pump station has been designed to pump 256 GPM. The Whispering Pines project projected peak flow of 189 GPM will exceed the available pump capacity by approximately 87.4 GPM. Therefore, modifications will be needed at Helderberg Meadows Pump Station 2.

The modifications will include upsizing the two pumps, as well as wet well adjustments as prescribed below. The Helderberg Meadows Pump Station 2 receives wastewater from the previously referenced Helderberg Meadows Pump Station 1, plus addition flow from the northern portion of Steeple Way. Therefore, the total projected peak flow from Helderberg Meadows and Whispering Pines will be approximately 343 GPM, refer to Table 6-5. The new pumps will need to have a total capacity of no less than 343 GPM.

Table 6-6: Summary of Total Projected Flows

<table>
<thead>
<tr>
<th>Property</th>
<th>Average Day (GPM)</th>
<th>Peaking Factor</th>
<th>Peak Hour (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helderberg Meadows (Northern Portion of Steeple Way plus Pump Station 1)</td>
<td>38.6</td>
<td>4</td>
<td>154.4</td>
</tr>
<tr>
<td>Whispering Pines Development Site</td>
<td>51.0</td>
<td>3.7</td>
<td>189</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>343.4</td>
</tr>
</tbody>
</table>

Based on these projected flows, the existing pumps will need to be upsized. The new pumps will be provided with variable frequency drives (VFDs). Further analysis of the emergency generator and service lines will be needed to determine if upgrades are needed.

Wet well adjustments will also be needed. Based on the existing wet well size (6-ft diameter 12-ft deep) and the total average daily inflow, the “High Water Alarm” and “Lead Pump On” float levels will need to be adjusted in order to increase the effective volume. Refer to Table 6-7 below.

Table 6-7: Wet Well Modifications

<table>
<thead>
<tr>
<th>Float</th>
<th>Existing Elevation</th>
<th>Modified Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Water Alarm</td>
<td>304.50</td>
<td>304.90</td>
</tr>
<tr>
<td>Lead Pump On</td>
<td>303.50</td>
<td>304.50</td>
</tr>
<tr>
<td>Pump Off</td>
<td>302.29</td>
<td>302.29</td>
</tr>
</tbody>
</table>

These wet well modifications will thereby increase the time to fill the effective volume under the average flow conditions. Table 6-8 summarizes the impact on the cycle time if the effective volume is increased to accommodate the additional flow from the Whispering Pines Development.

Table 6-8: Summary of Impacted Cycle Times

<table>
<thead>
<tr>
<th>Float</th>
<th>Average Cycle Time (min)</th>
<th>Modified Cycle Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Water Alarm</td>
<td>304.50</td>
<td>304.90</td>
</tr>
<tr>
<td>Lead Pump On</td>
<td>303.50</td>
<td>304.50</td>
</tr>
<tr>
<td>Pump Off</td>
<td>302.29</td>
<td>302.29</td>
</tr>
</tbody>
</table>

Based on the modifications described above, the existing pumps will need to be upsized. The new pumps will be provided with variable frequency drives (VFDs). Further analysis of the emergency generator and service lines will be needed to determine if upgrades are needed.
Table 6-8: Proposed Pump Station Cycle Time Modifications

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Pump Rate (GPM)</th>
<th>In-flow Rate (GPM)</th>
<th>Volume of Wetwell (GAL)</th>
<th>Time to Fill (MIN)</th>
<th>Time to Empty (MIN)</th>
<th>Cycle Time (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Day</td>
<td>455</td>
<td>90</td>
<td>467</td>
<td>5.2</td>
<td>1.3</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Pump station design basis and calculations are provided in Appendix F.

The 6-inch forcemain will have an available capacity of approximately 345 GPM. Thus, will not need any modifications since the Whispering Pines project has a projected peak flow of 189 GPM. Refer to Table 6-9.

Table 6-9: Existing Forcemain Capacity Summary

<table>
<thead>
<tr>
<th>Total Capacity in 6” FM (GPM)</th>
<th>Helderberg Meadows PS2 (GPM)</th>
<th>Available Capacity (GPM)</th>
<th>Whispering Pines Flow (GPM)</th>
<th>Remaining available Capacity (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>154.4</td>
<td>345</td>
<td>189</td>
<td>156</td>
</tr>
</tbody>
</table>

Pursuant of the Recommended Standards for Wastewater Facilities, a cleansing velocity of at least 2 feet per second should be maintained at designed pumping rates, and a maximum velocity of 8 feet per second is recommended to avoid high head loss and protect valves. The additional flow from the Whispering Pines will increase the velocity in the forcemain to 5.49 feet per second from 3.09 feet per second. This is both greater than the minimum 2 feet per second and less than the maximum 8 feet per second. Refer to Table 6-10.

Table 6-10: Forcemain Velocity Summary

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>8</td>
<td>3.09</td>
<td>5.49</td>
</tr>
</tbody>
</table>

*Minimum and maximum velocities are per Recommended Standards for Wastewater Facilities.

Additional improvements are anticipated within the Town’s collection system in the vicinity of Town Hall. A study conducted by John McDonald Engineering revealed areas of concern and backups along the gravity sanitary sewer beginning at manhole #339 in Guilderland Avenue and extending manhole #341 in Sunrise Blvd. The area of concern is approximately 1,200 l.f. of gravity sewer main. It has been recommended that before any additional flows are introduced to this system that the gravity mains be televised to pinpoint the problems which resulted in the previous backups and replace the existing pipes as necessary to convey the existing flows plus the proposed development flows. Although a thorough review should be conducted to outline the extent and cause of the backups, the initial discussions with McDonald Engineering indicated that it would likely be necessary to replace the existing 8” gravity sewer in that area with a new 12” gravity sewer main.
6.4 Cost to Make Improvements

At this time, all costs associated with off-site improvements shall be the responsibility of the applicant. Upon completion any improvements made by the applicant, specific to capacity upgrades or new infrastructure beyond the project boundaries would be conveyed to the Town at no cost.

6.5 Available Reserve Capacity for Other Parcels

Upon completion of the improvements described above, Pump Station 2 would have 10 GPM of reserve capacity. This is derived from the increased pump rate of 455 GPM, less the flows from the project of 189 GPM and the original design rate of the pump station of 256 GPM. The 10 GPM peak hour translates to a flow of 14,400 GPD or approximately 43 homes that could be served (14,400 GPD / 330 GPD per home).
7.0 ASSESSMENT OF TOWN WASTEWATER TREATMENT CAPACITY

Jack McDonald Engineering is currently preparing long-term plans to upgrade the Town's wastewater treatment plant (WWTP). Jack McDonald Engineering was contacted to obtain information regarding permitted treatment capacities, maximum month flow, committed capacity for approved projects and proposed projects that have not yet had capacity committed. The information furnished by Jack McDonald Engineering is included in Appendix H and is summarized as follows:

<table>
<thead>
<tr>
<th></th>
<th>MGD</th>
<th>GPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing WWTP Design Average Flow</td>
<td>1.50</td>
<td>1,500,000</td>
</tr>
<tr>
<td>2014-2016 Maximum month Flow (June 2016)</td>
<td>1.03</td>
<td>1,030,000</td>
</tr>
<tr>
<td>Committed capacity for Approved Projects</td>
<td>0.09</td>
<td>93,500</td>
</tr>
<tr>
<td>Proposed Projects</td>
<td>0.055</td>
<td>59,600</td>
</tr>
<tr>
<td>Reserve Capacity</td>
<td>0.317</td>
<td>316,900</td>
</tr>
</tbody>
</table>

As noted above, the current reserve capacity of 0.317 MGD (or 316,900 GPD) is derived by taking the existing design average flow, and subtracting the maximum month flows, approved projects and proposed projects.

When accounting for the average days flows from the Whispering Pines project of 73,384 GPD, the resulting reserve capacity would be 243,500 GPD (316,900 GPD – 73,384 GPD).

The above information was furnished to Jack McDonald Engineering, to confirm the conclusions regarding the reserve capacity of the Town's WWTP. Jack McDonald Engineering provided correspondence indicating their concurrence to the above analysis, noting that a final determination of available capacity at the wastewater treatment plant shall be made by the Region 4 office of the NYSDEC. Copies of the referenced correspondence are included in Appendix K.
Appendix A

Engineer's Basis of Design Report Town of Rotterdam
Hamburg Street Sanitary Sewer Collection System
Engineer’s Basis of Design Report

Town of Rotterdam
Hamburg Street Sanitary Sewer Collection System

Town of Rotterdam
Schenectady County, New York

July 14, 2016

Prepared for:

Town Supervisor and Town Board
Town of Rotterdam
2100 Sunrise Boulevard
Rotterdam, New York 12306

Prepared by:

Chazen Engineering, Land Surveying & Landscape Architecture Co., D.P.C.
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Troy, New York 12180
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(845) 454-3980

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(518) 812-0513

Chazen Project No. 31593.00

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1.0 INTRODUCTION

The New York State Department of Transportation (NYSDOT) intends to rehabilitate and improve the roadway on Hamburg Street in the Town of Rotterdam (Town), as part of a Traffic Improvement Project (TIP). As part of this TIP, there is potential to include the construction of a new wastewater collection system under a municipal betterment agreement at a significant cost saving to the Town.

The purpose of this Engineer’s Basis of Design Report is to present data and information to the Town relative to the proposed sanitary sewer collection system and pump station for the newly established Hamburg Street Sewer District. Currently, wastewater treatment and disposal in this area consists of on-site subsurface wastewater systems. The Town is proposing the construction of a wastewater collection system to service the Hamburg Street Sewer District. A general site map is attached in Appendix A which shows the location of the proposed sanitary sewer collection system and pump station.

This Basis of Design Report includes:

- Description of existing sanitary sewer collection and treatment facilities;
- Project justification;
- Soil and groundwater conditions;
- Sewer District boundary and service area;
- Design flow;
- Pump station sizing and design considerations, and;
- Future flow considerations.

This Engineer’s Basis of Design Report takes into consideration criteria outlined in the Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers, Recommended Standards for Wastewater Facilities, 2014 (Ten States Standards) and the New York State Department of Environmental Conservation (NYSDEC), Design Standards For Wastewater Treatment Works 2014 are referenced in the report. The development of this Report has relied on existing data and information provided by the Town and validated by The Chazen Companies.

2.0 EXISTING SANITARY SEWER COLLECTION AND TREATMENT FACILITIES

Existing development along Hamburg Street consists of a mix of residential and commercial, with primarily residential developments on nearby side streets. Currently, wastewater treatment and disposal in this area consists of on-site subsurface wastewater systems (i.e., septic tanks and subsurface disposal systems).

The Town currently owns and operates a permitted wastewater treatment facility that serves the portions of the Town; however, it is not feasible for this system to be expanded to include the Hamburg
Street corridor. Instead, it is proposed that wastewater collection from the Hamburg Street corridor be conveyed to the existing City of Schenectady wastewater collection system for treatment at the City wastewater treatment facility. According to the NYSDEC 2015 Annual Flow Certification form, the annual average flow to the City’s wastewater treatment facility in 2015 was approximately 12.80 million gallons per day (MGD), a portion of which is from the Town of Rotterdam. The State Pollutant Discharge Elimination System (SPDES) Discharge Permit (NY0020516) indicates that the permitted capacity of the City’s wastewater treatment facility is 18.5 MGD, leaving approximately 5.9 MGD available capacity within the City wastewater collection and treatment system to accept flows from the Hamburg Street corridor. Correspondence, dated April 8, 2016, from the City of Schenectady Commissioner to the Town of Rotterdam states that the proposed sewage flows of approximately 49,000 gpd will not adversely impact the operations or treatment process at the City’s wastewater treatment plant, and that final acceptance will be based on regulatory approval from NYSDEC. The Annual Certification Forms, SPDES Permit, and reference letter mentioned above are provided in Appendix B.

3.0 PROJECT JUSTIFICATION

Due to the relatively small lot sizes along Hamburg Street, many of the existing subsurface disposal systems may be undersized or otherwise not constructed in accordance with current NYSDEC regulations and codes. The continued operation of these subsurface systems not only represents a possible negative influence on local groundwater resources, but also serves to limit the potential for future development in this area (which has been identified by the Town has having significant potential for future development as a main business corridor). The Town has evaluated the feasibility for the construction of a wastewater collection system to serve this area, and has determined that doing so would provide both an environmental as well as an economic benefit to those properties included in the Hamburg Street Sewer District.

4.0 SITE CHARACTERISTICS

4.1 Soils and Groundwater

The United States Department of Agriculture (USDA) Soil Conservation Service (SCS) Soil Survey for Schenectady County was reviewed and provided surficial soil conditions for the study area. The SCS identified the presence of loamy fine sandy soil types. Soil data as provided by the SCS is presented in Table 1.
Table 1: USDA Soil Data

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<th>Hydrologic Soil Group</th>
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<th>Erosion Factor K</th>
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In addition, Chazen conducted subsurface explorations to provide geotechnical recommendations for the design of the sanitary sewer system, and to verify consistency with USDA SCS data. A total of twenty-six (26) geoprobe explorations were performed along the route of the proposed sanitary sewer collection system. Groundwater was observed in all twenty-six (26) explorations, typically at a depth of between nine (9) and twelve (12) feet below existing grade. Two explorations (GP-25 and GP-26) were performed at the proposed pump station location to a depth of twenty-five (25) feet. Groundwater was observed at a depth of twelve (12) feet and ten (10) feet, respectively. Soils across the study area consisted of silty sand to poorly-graded sand with silt. Field conditions were consistent with the USDA SCS data.

A soils map for the site is presented in Appendix C.

4.2 Flood Plains

According to the National Flood Insurance Program Flood Insurance Rate Map (FIRM), Schenectady County, New York, All Jurisdictions, Community Number 360740, Panel Number 170, effective January 8, 2014, the project site is located within Zone X, areas determined to be outside the 0.2% annual chance floodplain.

5.0 PROPOSED SANITARY SEWER SYSTEM

5.1 Proposed Service Area

The Hamburg Street Sewer District consists of all properties immediately adjacent to Hamburg Street between the existing railway running parallel to Chrisler Avenue and the intersection of Hamburg Street and Curry Road. There are approximately 134 properties, consisting of both residential and commercial uses, included within the service area. Approximately 65 properties are single family residential, 13 properties are multi-family residential, and 56 properties are commercial/industrial/community service. A map of the proposed service area is included in Appendix D.
5.2 Projected Flows

The anticipated average daily sewage generated from the Hamburg Street Sewer District was calculated using existing water usage data for the service area. According to Town records, the water usage for a typical family residence is approximately 205 gallons per day (gpd). The Hamburg Street Map, Plan, and Report, adopted January 13, 2016, estimated approximately 239 Equivalent Dwelling Units (EDUs) for the new sewer district. This was calculated based on the following Town of Rotterdam EDU formula:

- Single Family Residential Parcels – One (1) EDU
- Multiple Family Residence Parcels– One (1) EDU per dwelling or one (1) EDU per 75,000 gallons of annual water consumption
- Commercial/Industrial Parcels – One (1) EDU per 75,000 gallons of annual water consumption

Based on the typical water usage of 205 gpd and 239 EDUs, the estimated daily average wastewater flows for the proposed Hamburg Street Sewer District is approximately 49,000 gpd. Using a factor of 2x the average daily flow, the maximum day loading is estimated to be 98,000 gpd. With a peaking factor of 4x the average daily flow, the peak hourly loading is estimated to be 140 gpm.

5.3 Pump Station Design

The design pump rate for the proposed pump station will meet or exceed the identified peak hour flow of 140 gpm.

The Hamburg Street Pump Station will collect sewage from all properties immediately adjacent to Hamburg Street between the existing railway and Curry Road. Wastewater from the sewer district would flow to the proposed pump station located on 4th Street. The pump station would pump collected wastewater through a 6-inch force main along Hamburg Street, beneath the CSX railway and Chrisler Avenue, to the existing City of Schenectady sewer system manhole located at the intersection of Hamburg Street and Glengary Road.

The projected flows discussed above would require the proposed pump station be designed to pump 140 gpm. However, should the Town decide to expand the service area in the future to include the side streets off Hamburg Street, the pump station design flow rate would need to be increased in order to accept future flows.

6.0 PROPOSED IMPROVEMENTS

As previously discussed, the Town is proposing to construct a new sanitary sewer collection system under a municipal betterment agreement in the planned NYSDOT Traffic Infrastructure Program (TIP) on Hamburg Street.

The proposed improvements include the installation of approximately 6,730-lf of 12-inch gravity sewer, 4,710-lf of 6-inch force main, and the installation of a new pump station with associated control building, pumps, controls, piping, valves, back-up power and site work. Gravity sewers are designed in accordance with Ten States Standards. They will be generally located along the centerline of the south
bound lane in Hamburg Street, providing the minimum 10-ft separation from existing water mains. Ten States Standards indicates that sewers shall be designed to provide a minimum velocity of 2.0 ft/s when flowing full. Using Manning’s formula, the proposed 12-inch gravity sewers and are designed at a minimum pipe slope of 0.22%, with manholes spaced at approximately 300-ft intervals. The Town intends to implement annual or semi-annual maintenance measures, including flushing of the gravity system, prior to the full buildout and user connection to the Hamburg Street sewer system.

Wastewater from the Hamburg Street Sewer District will flow to the proposed pump station, which will pump collected wastewater through the 6-inch force main along Hamburg Street, proceeding beneath the railway bed and Chrisler Avenue, and finally discharge to the existing City of Schenectady sewer system manhole located at the intersection of Hamburg Street and Glengary Road. Grinder pumps, purchased by the Town will need to be installed at those properties where service by gravity is not possible due to site elevation constraints. This is anticipated for approximately 10 properties. Installation will be the responsibility of the property owner.

The new pump station will be a duplex submersible station and will be sized to accommodate the peak hour flow from the Hamburg Street Sewer District. Ten States Standards indicate that each pump shall be sized to accommodate the peak hour flow, with the second pump out of service. A new control building will be constructed to house the pump controls and electrical components.

Properties owners within the Hamburg Street Sewer District will abandon their existing septic systems once connected to the new sanitary sewer system. A NYSDEC permitted waste transporter will be required to pump out, wash off, and remove as much residual from the tank as possible. Any alarms and electrical services will be disconnected from septic system tanks and other system components. The top of the tank should be knocked in and the bottom of the tank punctured to allow for drainage of rain and surface water. The tanks will then be backfilled with sand or gravel and disturbed areas restored. Homeowners will be responsible for the costs associated with and coordination of the abandonment of their existing septic systems.

6.1 Hamburg Street Pump Station

6.1.1 Pump Operating Parameters

The Hamburg Street pump station has been sized with capacity to pump a design flow rate of 140 gpm. A plot of the system head curve and the pump performance pump curve results in an operating point of 200 gpm @ 37 feet TDH. The design pump operation point provides sufficient capacity to pump the estimated design flow rate of 140 gpm.

The recommended pump station will include duplex, submersible pumps model 4SHVB manufactured by Barnes with 10 horsepower motors at 3,450 RPM.

The pumps will be provided with variable frequency drives (VFDs) which will allow the Town to throttle the pump rate, if desired. At the design operating point (200 gpm @ 37 feet TDH) the pumps will operate at approximately 60 Hz.

An 8-foot diameter 23.5 foot deep wet well is proposed. Chazen has reviewed the wet well sizing for the design operating point. Based on the proposed wet well size and pumping rate of 200 gpm, the average
day cycle time is anticipated to be approximately 16.64 minutes. The pump station design basis and calculations are provided in Appendix E.

6.1.2 Force Main

The proposed force main will be sized to handle the design pump rate with a minimum cleansing velocity of 2 feet per second. Based on the design operating point of 200 gpm @ 37-ft TDH, the velocity in a 6-inch force main would be approximately 2.4 feet per second.

6.1.3 Communications

Local alarms will be provided at the proposed control building at the site, including high and low water wet well level alarms, station flood, and pump failure. Alarm notifications to Town staff will be provided utilizing an Auto Dialer.

6.1.4 Emergency Power

A diesel fueled emergency generator will be installed to provide back-up power in the event of interrupted power service. An automatic transfer switch will be provided for automatic power transfer to the standby generator. The generator will permit operation of both the lead and lag pump during a power outage.

6.1.5 Flood Protection

The Hamburg Street pump station is not located within an identified FEMA flood hazard zone.

7.0 RESERVE CAPACITY/FUTURE EXPANSION

7.1.1 Reserve Pump Capacity

Based on the 200 gpm design pump rate of the proposed pumps, and the design peak flow rate of 140 gpm, a reserve pump capacity of approximately 60 gpm (21,600 gpd) is available in the proposed pump station. Assuming an estimated flow per single family residence of 205 gpd/unit, this equates to approximately 105 reserve single family units.

7.1.2 Reserve Force Main Capacity

As previously discussed, the Town may decide to expand the collection system to include associated side streets along Hamburg Street. Based on the system curve of the 6-inch force main, and assuming a maximum velocity of 6 feet per second, the maximum flow in the force main would be 500 gpm at 132-ft TDH. Based on the 140 gpm design flow rate, approximately 360 gpm (129,600 gpd) reserve capacity would be available in the force main. Assuming 205 gpd/unit, this equates to approximately 632 reserve single family units. In order to maximize the capacity of the force main, new pumps capable of providing 500 gpm at 132-ft TDH would be required in the pump station. Pump station cycle times for the new pump rate would also need to be evaluated.
8.0 CONCLUSIONS

The Town of Rotterdam intends to construct a sanitary sewer collection system and pump station to service the Hamburg Street Sewer District, as a municipal betterment in the planned NYSDOT TIP on Hamburg Street. Costs associated with the sanitary sewer betterment would be funded by the Town under a Betterment Agreement, at a significant savings to the Town. The Town plans to install approximately 6,730-lf of 12-inch gravity sewer and 4,710-lf of 6-inch sanitary sewer force main along Hamburg Street. A pump station is proposed to be located on Fourth Street, off of Hamburg Street.
Appendix A:
Site Location Map

The Chazen Companies
July 14, 2016
Sanitary Sewer Collection System for Hamburg Street

Site Location Map

Town of Rotterdam, Schenectady County, New York

Connect to City of Schenectady
Sanitary Sewers

6" Force Main

12" Gravity Sewer / 6" Force Main Installed in Common Trench

Proposed Pumping Station

12" Gravity Sewer

Dutchess County Office:
21 Fox Street, Poughkeepsie, NY 12601
Phone: (845) 454-3980

Capital District Office:
547 River Street, Troy, NY 12180
Phone: (518) 273-0055

North Country Office:
375 Bay Road, Queensbury, NY 12804
Phone: (518) 812-0513

THE Chazen COMPANIES

Engineers
Land Surveyors
Planners
Environmental & Safety Professionals
Landscape Architects

Scale: 1:14,000

Project: 31593.00

Drawn: JLN

2/16/2010 -- 1:11:34 PM

Map Document: (R:\0\standards\Gis\ChazenGIS\8X11P_MinimalChazenAddress.mxt)

Date: 6/6/2016

Page: App A
Appendix B:
SPDES Permit, Annual Certification Forms, WWTP Capacity Letter
April 8, 2016

Ms. Kate McGuirl, Esq., Town Attorney
Town of Rotterdam
1100 Sunrise Boulevard
Rotterdam, New York 12306

RE: Town of Rotterdam - Hamburg Street Sanitary Sewer Request

Dear Ms. McGuirl:

The City of Schenectady has reviewed the Town of Rotterdam request to accept approximately 49,000 gpd of sanitary sewage from the proposed Hamburg Street sanitary sewer project.

Based on the information provided, the proposed sewage flows will not adversely impact the operations or treatment process at the City of Schenectady’s wastewater treatment plant. However, in accordance with Part II of the City’s SPDES permit (6NYCRR Part 750) final acceptance will be based on regulatory approval from New York State Department of Environmental Conservation.

The proposed sewer rate for sanitary sewage flows received from the Town will be in accordance with the rates set forth within the inter-municipal agreement between the City of Schenectady and the Town of Rotterdam. Such rate is currently established at:

Outside Unmetered Residential Rate $390.40 annually
Outside Metered Rate 2.08 per 100 cu.ft. + $39.75 per property

If you have any questions or concerns, please do not hesitate to contact me at 518-382-5199, ext 5403.

Sincerely,

Paul J. LaFond
Commissioner of General Services

Cc: Carl Falotico, Esq., Corporation Counsel
Jamie Malcolm, P.E., NYSDEC Region 4
Andrew Coppola, WWTP Manager
WWTP File
Appendix C: Soils Map
## Map Unit Legend

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<td><strong>Totals for Area of Interest</strong></td>
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Appendix D:
Proposed Service Area Map
Appendix E:
Pump Station Design Calculations
Company: koester
Name: Hamburg Street PS Option2
Date: 3/29/2016

Pump:
Size: 4SHVB / 4XSHVB 18-21 Frame
Type: SH 4" SolidsHandling
Synch speed: 1800 rpm
Curve: Impeller:
Specific Speeds: Ns: ---
Dia: 165 mm
Dimensions: Suction: 4 in
Discharge: 4 in

Search Criteria:
Flow: 200 US gpm
Head: 35 ft

Fluid:
Water
Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Viscosity: 1.105 cP
Atm pressure: 14.7 psi a
NPSHa: ---

Motor:
Motor is integral to the pump except in 4A, 4B, and 5B catalog sections.

--- Data Point ----
Flow: 200 US gpm
Head: 36.1 ft
Eff: 42%
Power: 4.16 hp
NPSHr: ---

--- Design Curve ----
Shutoff head: 46.1 ft
Shutoff dP: 20 psi
Min flow: 80 US gpm
BEP: 45% @ 253 US gpm
NOL power: 7.56 hp @ 528 US gpm

-- Max Curve --
Max power: 10.6 hp @ 609 US gpm

Performance Evaluation:
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### Pumping Station - System Curve Calcs

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**Flow Friction Static Dynamic Velocity Pump Parallel**

- **Total Flow Rate:** 199.0 GPM
- **TDH:** 37.0
- **DPS:** 2.4 FPS

### FLOW DATA

- **Design Flow (GPD):** 49,000 gpd
- **Design Operation Time (Hours per day):** 24 hrs/day
- **Avg Flow Rate (Design Flow/Design Time *60):** 34.0 gpm
- **Peak Flow:** 136.1 gpm

### SYSTEM HEAD CURVE

- **Force Main Length + Equiv. Length, (L), Ft =** 4782
- **Nominal Size of Force Main in Inches =** 6
- **Actual ID of Force Main, (D) in Inches =** 5.82
- **Type of Force Main =** HDPE DR-13.5 (DIPS)
- **C Value =** 120
- **Static Head (Hs) in Feet =** 13.00
- **Lowest Pump Flow Rate, in GPM =** 0
- **Incremental Increase, in GPM =** 25
- **Highest Static Elev =** 338.00
- **PS Outlet Elev =** 340.00
- **PS Inlet Elev =** 327.75
- **Lag Pump on =** 326.75
- **High Alarm =** 327.25
- **Lead Pump on =** 326.25
- **Pumps Off - Low Water Elev =** 325.00
- **Low Level Alarm =** 324.75

### Hazen Williams Equation

\[
H_f = \frac{(L \times 10.44 \times Q^{1.85})}{(D^{4.87} \times C^{1.85})}
\]

\[
TDH = H_s + H_f
\]

\[
V = \frac{.40853 \times Q}{D^2}
\]

\[
H_v = \frac{V^2}{2g}
\]

- **FM length =** 4710
- **Fittings Equiv length (Table 1) =** 72

### Project Information

- **Project Name:** T. Rotterdam - Hamburg St.
- **Project Number:** 31593.00
- **Designer:** BMS
- **DATE:** March 22, 2016

**The Chazen Companies**
# Hamburg Pump Cycle Time - Initial

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>T. Rotterdam - Hamburg St.</th>
<th>Designer:</th>
<th>BMS</th>
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<tbody>
<tr>
<td>Project Number:</td>
<td>31593.00</td>
<td>DATE:</td>
<td>March 22, 2016</td>
</tr>
</tbody>
</table>

- **PS Inlet Elev**: 327.75 ft
- **High Water Alarm**: 327.25 ft
- **Lag Pump On**: 326.75 ft
- **Lead Pump On**: 326.25 ft
- **(All Pumps Off) Low Water Elev**: 325.00 ft
- **Qin (min cycle time)**: 17.0 gpm
- **Qin (avg day)**: 34.0 gpm
- **Qin (peak hour)**: 136.1 gpm
- **Q out**: 200.0 gpm

### Volume of Wet Well:

- Wet well is round, yes/no: **Yes**
- Wet Well Inside Dia. (ft): **8**

### Water Volume Depth (Gal) (ft)

<table>
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<tr>
<th>(Operating Volume)</th>
<th>470.0</th>
<th>1.25</th>
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<tbody>
<tr>
<td>Between Lead Pump On &amp; Pumps Off</td>
<td></td>
<td></td>
</tr>
<tr>
<td>846.0</td>
<td>2.25</td>
<td></td>
</tr>
<tr>
<td>Between High Water Alarm &amp; Pumps Off</td>
<td></td>
<td></td>
</tr>
<tr>
<td>658.0</td>
<td>1.75</td>
<td></td>
</tr>
<tr>
<td>Between Lag Pump On &amp; Pumps Off</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1034.0</td>
<td>2.75</td>
<td></td>
</tr>
<tr>
<td>Between Pump Sta Inlet &amp; Pumps Off</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Storage above High Water Alarm)</td>
<td>188.0</td>
<td>0.50</td>
</tr>
<tr>
<td>Between Pump Sta Inlet &amp; High Water Alarm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Storage above Operating Range)</td>
<td>564.0</td>
<td>1.50</td>
</tr>
<tr>
<td>Between Lead Pump Inlet &amp; High Water Alarm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Drawdown Calculation:

- **For Qin=1/2Qout Flow**: 2.57 min.
- **For Average Day Flow**: 2.83 min.
- **For Peak Hour Flow**: 7.36 min.

### Fill Time Calculations:

- **For Qin=1/2Qout Flow**: 27.62 min.
- **For Average Day Flow**: 13.81 min.
- **For Maximum Day Flow**: 3.45 min.

### Cycle Time Calculation:

- **Min (Qin = 1/2 Qout)**: 30.19 min or 2.0 per hour
- **Avg Day flow**: 16.64 min or 3.6 per hour
- **Peak Hour flow**: 10.81 min or 5.6 per hour

---

6/27/2016

Z:\projects\31500-31599\31593.00 - Rotterdam Hamburg Street Sewer\ENG\WASTEWATER\Pump Station Design\4th Street Pumping Station Spreadsheet.xls

The Chazen Companies
Appendix B

Sanitary Sewer Extension Town of Rotterdam District #2
Extension 12 for Proposed Helderberg Meadows Report
SANITARY SEWER EXTENSION
Town of Rotterdam District #2
Extension 12

FOR THE PROPOSED
Helderberg Meadows

LOCATION
Guilderland Avenue
Town of Rotterdam
Schenectady County
State of New York

PREPARED FOR
Helderberg Meadows LLC
1621 Central Avenue
Albany, NY 12205

DATE PREPARED
April 2008

LAST REVISED

Brett L. Steenburgh, P.E. PLLC
2832 Rosendale Road
Niskayuna, NY 12309
(518) 365-0675

Civil • Environmental • Structural
Engineering
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<td>B. Parcel Description</td>
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<tr>
<td>C. Proposed Development/Zoning</td>
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I. PROJECT DESCRIPTION

A. Project Location

The subject site is located along County Line Road and the New York State Thruway and is intersected by Route 158 in the Town of Rotterdam, Schenectady County (see site location map figure 1). The parcels are owned by Capital Real Estate and John Adamec. The abutting property owners are The New York State Thruway to the North, Conrail to the west, and various landowners to the east.

B. Parcel Description

The subject Parcel encompasses approximately 324 acres. The area is predominantly flat with wetlands. The site generally slopes from northeast to southwest. The slopes vary from 0.5% to 2% throughout the site. Stormwater produced on the site flows toward four different streams. These streams are located near the southwestern property line between Route 158 and County Line Road.

Immature trees and brush characterize the site.

C. Proposed Development/Zoning

On December 12, 1998 by resolution #265-98 the Town of Rotterdam Town Board changed the zoning of the subject parcels from A-1 (Agricultural) to PRD. This legislation allowed for the parcels to be developed into 170 single-family lots, 100 condominium units and an 18-hole golf course with required appurtenances. This legislation also speaks of formation of a homeowners association, which will be responsible for the 100+/- acres of open space that will remain when the development is complete.

The current proposal is within the original threshold values of the PRD and consists of 161 single-family residences, 100 condominium units. The 9-hole golf course previously proposed has been eliminated to accommodate agency concerns for wetland impacts. Single-family lots will average 12,750 S.F. with a minimum of 85ft. of frontage.

It is proposed that the Adamec Parcel will be developed into 58 single-family homes. This development will require the construction of approximately 4,100 L.F. of new Town street with associated water lines, storm water facilities, and sanitary facilities.
An emergency access road will be constructed to a point on Old Guilderland Ave. near the Thruway. Approximately 33 acres will remain undisturbed and will be designated as open space.

The Capital Real Estate parcel will be developed into 103 single-family homes, 100 condominium units consisting of 25, 4-unit buildings. This development will require the construction of approximately 10,270 L.F. of new Town road with associated water lines, storm water facilities, and sanitary facilities. Approximately 160 acres will remain undisturbed and will be designated as open space.

II. WATER DISTRIBUTION SYSTEM

Two proposed D.I.P. water mains will service the northern Adamec Parcel. The first line will connect to the existing 12-inch water main along Guilderland Avenue and will terminate at the end of the longer cul de sac on the Adamec parcel north of Guilderland Avenue this main has been sized at 10". One 8" D.I. P. watermain will terminate on the short cul de sac on the north side of Guilderland Avenue. These two water mains will service lots 1 through 58. Four water mains will service the southern Capital Realty Parcel. One 10" D.I.P. water main will connect the existing water main along Guilderland Avenue to the existing water main along County Line Road. This water main will service the lots along Road 3. An 8" D.I.P. water main will be routed from this water main to service the proposed cul de sac. This water main will service the lots along Road 4. Two 10" D.I.P. water mains will be routed off of the main water main connecting Guilderland Avenue to County Line Road. These water mains will service the proposed condominium developments.

III. SEWER SYSTEM DESIGN

A. Design Standards

Population:

161 Single Family Detached Housing, 3.5 bedrooms per house
100 Condominiums

Average daily flow:

161 houses x 3.5 bedrooms/house x 110 gpd/bedroom = 61,985 gpd
100 units x 2.0 bedrooms/unit x 110 gpd/unit = 22,000 gpd

Total = 83,985 gpd

Peak Daily Flow = 4 x Average daily flow = 335,940 gpd
335,940 gpd x 1/1440 day/min = 233 gpm

The gravity sewer and pump station have been designed to New York State DEC and Town of Rotterdam Standards.
B. Collection Sewer

The proposed subdivision and condominiums will utilize the Town of Rotterdam municipal sewer treatment plant located on Campbell Road. The on site sanitary sewer collection system will consist of gravity sewer mains, pump stations and force mains. Two pump stations, 8,662 l.f. of gravity sewer, 3,753 l.f. of force main and 49 manholes are proposed on the south side of Guilderland Avenue. This system will route all sewage generated on the south side to the north side of Guilderland Avenue. One pump station, 3,252 l.f. of gravity sewer, 1077 l.f. of force main and 17 manholes make up the sanitary sewer collection system on the north side of Guilderland Avenue. All sewage from both the north and south side of Guilderland Avenue will flow to the pump station on the North side. From there, the sewage will be pumped through 5,553 l.f. of force main under the N.Y.S. Thruway along Dahlia Street to the existing gravity sewers on Guilderland Avenue. The proposed development is estimated to generate 83,985 GPD of Sanitary Waste. Discussions with Town staff indicate that sufficient capacity exists at the Town of Rotterdam treatment plant.

Sewers throughout the site will be 8” PVC SDR-26. The building laterals will be 6” PVC. The minimum proposed pipe slope is 0.4%. Upon installation, the sewer system will be subjected to an infiltration or exfiltration test against a maximum daily leakage of 100 gallons per inch diameter per mile of pipe per day. The system will also be subjected to a TV inspection before being put into service.

C. Pump Stations

It is proposed to install three Smith and Loveless pump stations to convey the waste from the subject site to the existing sanitary sewer manhole on Guilderland Avenue north of the eastbound Conrail/Amtrak Line. The pump stations will be located near the condominium development at the south end of the subject parcel, near detention pond 3 approximately 1/3 of the way from Guilderland Avenue to County Line Road at southern end of the Adamec Parcel. The pump stations located on the south side of Guilderland Avenue will be utilized to pump the raw sewage to a system a gravity sewers. The gravity sewers will ultimately route the raw sewage to the pump station on the north side of Guilderland Avenue where it will be pumped to the gravity sewer located in Dahlia Street. All pump stations will be duplex suction type systems. See Appendix C for the pump station design criteria.

D. Waste Water Treatment

The proposed collection system will connect via a low-pressure sanitary sewer to the existing sanitary sewer manhole located on Guilderland Avenue north of the Conrail/Amtrak Line. The sewage will then ultimately flow to the Town of Rotterdam wastewater treatment plant prior to being discharged into the Mohawk River. It is believed that the Town of Rotterdam wastewater treatment plant has an excess treatment capacity of about 250,000 gallons per day. This excess capacity will allow the Town of
Rotterdam wastewater treatment plant to treat the 83,985 gallons per day of wastewater produced by Helderberg Meadows.

IV. DISTRICT EXTENSION

Attached in Appendix B is a map showing the proposed sewer district extension. The proposed district will be extension 12 of Sewer District #2 and will include the entire 324 Acre development area. All state county and local permits will need to be obtained prior to filing and acceptance of the district extension.

V. FINANCING

Attached as Appendix A, is the cost estimate of the proposed sanitary sewer collection system for Helderberg Meadows. The cost will be borne entirely by the developer. Once constructed, the installation will be turned over to the Town of Rotterdam. This system will be considered Extension 12 of District 2. Since all of the infrastructure cost will be borne by the developer, the cost per user will be only the Operation and Maintenance fees. These fees for 2007 were $213.36 which will be the only cost to the user.
APPENDIX A.

Construction Cost Estimate
## ESTIMATE OF COST
### HELDERBERG MEADOWS
### SANITARY SEWER EXTENSION
### TOWN OF ROTTERDAM, SCHENECTADY COUNTY

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<th>ITEM</th>
<th>QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL</th>
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<td>11915 l.f.</td>
<td>$18.00 l.f.</td>
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<tr>
<td>Pre-cast concrete manholes</td>
<td>66 ea.</td>
<td>$1,200.00 ea.</td>
<td>$79,200.00</td>
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<tr>
<td>Installation of Wyes</td>
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<td>$40.00 ea.</td>
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<td>Bedding - crushed stone</td>
<td>1000 c.y.</td>
<td>$10.00 c.y.</td>
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<td>Pipe zone backfill w/ comp.</td>
<td>3530 c.y.</td>
<td>$4.00 c.y.</td>
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<td>Kor-n-Seal to existing sewer</td>
<td>1 ea.</td>
<td>$375.00 ea.</td>
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<tr>
<td>Proposed Pump Station</td>
<td>3 ea.</td>
<td>$85,000.00 ea.</td>
<td>$255,000.00</td>
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<tr>
<td>4&quot; Low press. Sewer pipe</td>
<td>10383 l.f.</td>
<td>$15.00 l.f.</td>
<td>$155,745.00</td>
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<td>Technical, Legal and</td>
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<tr>
<td>Administration Fees</td>
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<tr>
<td><strong>Total Project Costs</strong></td>
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<td><strong>$930,217.75</strong></td>
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APPENDIX B.

Sewer Plan
Technical Description
Town of Rotterdam
Proposed Extension No. 12
Sewer District No. 2

ALL that piece or parcel of land situate in the Town of Rotterdam, County of Schenectady, State of New York lying northerly of County Line Road, easterly of the lands now or formerly of the Consolidated Rail Corporation, westerly of Helderberg Avenue and southerly of Sewer District No. 2 and being more particularly described as follows:

Beginning at a point on the existing southerly boundary of Sewer District No. 2 within the intersection of Palm Avenue and Guilderland Avenue (N.Y.S. Route 158), said point being southwesterly and distant 160 +/- feet from sanitary manhole #338 and running thence from said point of beginning and easterly along said southerly boundary also being the extension of the centerline of Palm Street, for a distance of 25 +/- feet to a point; thence southerly and crossing Palm Street for a distance of 25 +/- feet to a point, said point also being the intersection of the southerly boundary of Palm Street and the easterly boundary of Guilderland Avenue (N.Y.S. Route 158); thence southerly along the easterly boundary of Guilderland Avenue (N.Y.S. Route 158) and crossing lands now or formerly of Consolidated Rail Corporation and Miles Standish Road for a distance of 1110 +/- feet to a point, said point being the intersection of the projection of the southerly boundary of Dahlia Street and the easterly boundary of Guilderland Avenue (N.Y.S. Route 158); thence westerly along said southerly projection and crossing Guilderland Avenue (N.Y.S. Route 158) for a distance of 70 +/- feet to a point, said point also being the intersection of the southerly boundary of Dahlia Street and the westerly boundary of Guilderland Avenue (N.Y.S. Route 158); thence westerly and southerly along the southerly and easterly boundary of Dahlia Street and crossing Garden Street and lands now or formerly of Niagara Mohawk Power Corp. for a distance of 3840 +/- feet to a point, said point also being the intersection of the easterly boundary of Dahlia Street and the northeasterly boundary of (N.Y.S. Thruway) lands of the People of the State of New York; thence South 00º- 38'- 40" East, leaving Dahlia Street and crossing the (N.Y.S. Thruway) lands of the People of the State of New York for a distance of 334 +/- feet to a point on the southwesterly highway boundary of the (N.Y.S. Thruway) lands of the People of the State of New York; thence along said highway boundary the following four (4) courses and distances:
1) South 63° - 53' - 06" East, 826+/- feet to a point;  
2) South 57° - 15' - 51" East, 775.11 feet to a point;  
3) South 56°-58' - 42" East, 80.72 feet to a point; and  
4) South 54° - 44' - 03" East, 1242.72 feet to a point on the northerly boundary of Guilderland Avenue (N.Y.S. Route 158); thence South 33° - 28'- 47" West and along said northerly boundary for a distance of 42.08 feet to a point on the northeasterly boundary of the lands now or formerly of Scofield; thence North 60°- 54' - 18" West, along said northeasterly boundary 75.58 feet to a point; thence North 75°- 01' - 18" West, along said lands of Scofield and to and along the lands now or formerly of Kenneth and Karen Lancto, 143.40 feet to a point; thence North 86° - 11' - 18" West and continuing along the said lands of Lancto and to and along the lands now or formerly of Larry and Nancy Cote, 30.00 feet to a point on the northerly boundary of the lands now or formerly of Cote; thence along said northerly boundary of Cote the following three (3) courses and distances:  
1) Thence South 88°- 58'- 34" West, 262.32 feet to point;  
2) Thence South 86° - 58' - 34" West, 312.84 feet to a point; and  
3) Thence South 60°- 19'- 59" West, 300.00 feet to a point on the northerly boundary of the lands now or formerly of Gianetti; thence along said northerly boundary the following two (2) courses and distances:  
1) Thence South 60° - 18'- 00" West, 278.14 feet to a point; and  
2) Thence South 70°- 01'- 30" West, 227.34 feet to a point on the division line between the said lands of Gianetti on the east and the herein described parcel on the west; thence South 38°- 30'- 00" East, along the division line between the said lands of Gianetti, the lands now or formerly of Anthony and Mary Costa, and the lands now or formerly of Michael Olszewski on the east and the herein described parcel on the west, 874.97 feet to the point on the northerly boundary of Guilderland Avenue (N.Y.S. Route 158); thence South 10°-43'- 45" West and crossing Guilderland Avenue (N.Y.S. Route 158) for a distance of 75.68 feet to a point, said point also being the intersection of the southerly boundary of Guilderland Avenue (N.Y.S. Route 158) with the division line between the lands now or formerly of Riitano on the east and the herein described parcel on the west; thence South 20°-52'-31" East along the lands now or formerly of Riitano and to and along the lands now or formerly of Bonarrigo, 454.63 feet to a point on the southerly boundary of the lands now or formerly of Bonarrigo; thence North 69°-07'-29" East, along said southerly boundary, 126.91 feet to a point; thence North 29°-41'-25" West, along the division line between the lands now or formerly of Bonarrigo and the lands now or formerly of Riitano on the west and the herein described parcel on the east, 476.77 feet to a point on the southerly boundary of Guilderland Avenue (N.Y.S. Route 158); thence North 52°-04'-54" East, along said southerly boundary of Guilderland Avenue (N.Y.S. Route 158), 210.36 feet to a point on the division line between lands now or formerly of Kelly on
the east and the herein described parcel on the west; thence South 37°-38'-00" East, along said division line, 297.87 feet to a point on the division line between the lands now or formerly of Kelly on the north and the herein described parcel on the south; thence North 53°-17'-00" East, along said division line, 51.40 feet to a point on the division line between the lands now or formerly of Masullo Estates on the east and the herein described parcel on the west; thence along said division line and along the rear of properties fronting on Masullo Parkway in part the following three (3) courses and distances:

1) Thence South 38°-43'-30" East, 515.63 feet to a point; and
2) Thence North 86°-15'-29" East, 551.64 feet to a point; and

3) Thence South 11°-33'-59" West, 869.55 feet to a point on the division line between the lands now or formerly of Gerstenberger on the east and the herein described parcel on the west; thence along said division line the following two (2) courses and distances:

1) Thence South 89°-42'-38" West, 34.98 feet to a point; and
2) Thence South 06°-55'-11" West, 387.02 feet to a point on the division line between the lands now or formerly of Gerstenberger on the north and the herein described parcel on the south; thence along said division line the following two (2) courses and distances:

1) Thence North 71°-21'-18" East, 220.95 feet to a point; and
2) Thence South 83°-14'-49" East, 415.18 feet to a point on the centerline of Ghents Road; thence South 69°-56'-22" East, along said centerline, 146.87 feet to a point; thence South 20°-03'-38" West, 24.75 feet to a point on the southerly boundary of Ghents Road; thence South 69°-56'-22" East, along the southerly boundary of Ghents Road, 173.21 feet to a point on the westerly boundary of the lands now or formerly of Moore; thence along the westerly, southerly and easterly boundary of said lands of Moore the following (3) courses and distances:

1) Thence South 00°-32'-37" West, 182.09 feet to a point;
2) Thence South 70°-44'-04" East, 85.00 feet to a point; and
3) Thence North 00°-32'-37" East, 180.84 feet to a point on the southerly margin of Ghents Road; thence South 69°-56'-22" East, along the southerly boundary of Ghents Road, 99.96 feet to a point on the division line between the lands now or formerly of Delmonaco on the east and the herein described parcel on the west; thence South 02°-43'-50" West, along the lands now or formerly of Delmonaco and the lands now or formerly of Ferrara, 224.40 feet to a point; thence along the division line between the lands now or formerly of Ferrara on the north and the herein described parcel on the south the following three (3) courses and distances:

1) Thence South 76°-06'-51" East, 200.15 feet to a point;
2) Thence South 02°-43'-50" West, 229.33 to a point; and
3) Thence South 76°-06'-51" E, 350.21 feet to a point on the division line between lands now or formerly of Demarest on the east and the herein described parcel on the west; thence South 00°-41'-10" East, along said division line and along the lands now or formerly of Sementilli, 843.95 feet to a point on the division line between the lands now or formerly of Gahan on the east and the herein described parcel on the west; thence South 01°-04'-31" East, along said division line, 640.70 feet to a point; thence South 87°-05'-16" East, along the southerly boundary of the lands now or formerly of Gahan and the southerly boundary of the lands now or formerly of Mattice, 569.15 feet to a point on the division line between the lands now or formerly of Brunt on the east and the herein described parcel on the west; thence South 00°-13'-06" East, along said division line, 350.80 feet to a point on the division line between the lands now or formerly of Mc Ginn and lands now or formerly of Doulides and lands now or formerly of Decocco on the south and the herein described parcel on the north; thence North 86°-56'-41" West, along said division line, 229.29 feet to a point on the division line between lands now or formerly of Decocco on the east and the herein described parcel on west; thence along said division line the following two (2) courses and distances:

1) Thence South 00°-39'-43" East, 138.00 feet to a point; and

2) Thence South 00°-49'-37" West, 150.00 feet to a point on the northerly boundary of County Line Road; thence North 89°-55'-31" West, along said northerly boundary, 126.58 feet to a point on the easterly boundary of the lands now or formerly of Reese; thence along the easterly, northerly, and westerly boundary of said lands of Reese the following three (3) courses and distances:

1) Thence North 01°-10'-19" West, 307.95 feet to a point;

2) Thence South 88°-49'-26" West, 100.00 feet to a point; and

3) Thence South 01°-10'-34" East, 106.30 feet to a point on the northerly boundary of the lands now or formerly of Leschen; thence South 87°-21'-05" West, along said northerly boundary, 100.20 feet to a point on the division line between the lands now or formerly of Hering on the west and the herein described parcel on the east; thence North 01°-10'-34" West, along said division line, 355.48 feet to a point on the division line between the lands now or formerly of Hering on the south and the herein described parcel on the north; thence along said division line the following three (3) courses and distances:

1) Thence North 58°-03'-54" West, 377.23 feet to a point;

2) Thence South 84°-39'-28" West, 110.00 feet to a point; and

3) Thence South 05°-20'-32" East, 66.80 feet to a point on the division line between the lands now or formerly of Hall on the south and the herein described parcel on the north; thence North 84°-46'-35" West, along said division line, 285.90 feet to a point on the division line between the lands now or formerly of Hall on the east and the herein described parcel on the west; thence South 05°-19'-35" East, along said division line, 796.85 feet to a point on the northerly boundary of County Line Road; thence along the northerly boundary line of County Line Road the following six (6) courses:
1) Thence South 66°-05'-25" West, 77.08 feet to a point;
2) Thence South 62°-28'-25" West, 105.60 feet to a point;
3) Thence South 73°-29'-25" West, 75.10 feet to a point;
4) Thence South 84°-25'-25" West, 72.10 feet to a point;
5) Thence North 86°-35'-35" West, 200.00 feet to a point; and
6) Thence North 88°-00'-35" West, 376.50 feet to a point, said point also being on the division line between lands now or formerly of Verrigini on the west and the herein described parcel on the east, thence North 10°-40'-25" East along said division line, 331.00 feet to a point on the northerly boundary of the lands now or formerly of lands of Verrigni; thence along said northerly boundary the following two (2) courses and distances:

1) Thence North 85°-38'-09" West, 196.83 feet to a point; and
2) Thence North 65°-58'-53" West, 253.74 feet to a point on the division line between the lands now or formerly of DeLuce on the south and the herein described parcel on the north; thence along said division line the following five (5) courses and distances:

1) Thence North 65°-54'-57" West, 167.52 feet to a point;
2) Thence South 34°-46'-03" West, 116.80 feet to a point;
3) Thence North 65°-41'-57" West, 498.00 feet to a point;
4) Thence South 12°-56'-03" West, 96.15 feet to a point; and
5) Thence North 79°-51'-57" West, 416.03 to a point on the easterly boundary of the lands now or formerly of the Consolidated Rail Corporation; thence along the easterly boundary of the lands now or formerly of Consolidated Rail Corporation the following (4) four courses and distances:

1) Thence North 10°-37'-35" West, 156.51 feet to a point;
2) Thence North 11°-02'-25" East, 369.75 feet to a point;
3) Thence North 82°-54'-20" West, 127.26 feet to a point; and
4) Thence North 10°-13'-50" West, 1875.90 feet to a point on the division line between the lands now or formerly of Tiberio on the north and the herein described parcel on the south; thence North 88°-34'-53" East along said division line 285.01 feet to a point on the division line between the lands now or formerly of Tiberio on the west and the herein described parcel on the east; thence North 01°-57'-50" East, along said division line, 363.83 feet to a point on the division line between the lands now or formerly of Tiberio on the south and the herein described parcel on the north; thence North 88°-15'-40" West along said division line 127.83 feet to a point on the division line between the lands now or formerly of Tiberio on the west and the herein described parcel on the east; thence North 03°-18'-55" East, 100.04 feet to a point on the division line between lands now or formerly of Christ Community Church of Carman Road, Inc. on the west and the herein described parcel on the east; thence North 03°-19'-00" East along said division line,
351.48 feet to a point on the division line between the lands now or formerly of Faboskay on the north and the herein described parcel on the south; thence South 78°-51'-20" East, 110.00 feet to a point on the division line between the lands now or formerly of Faboskay on the west and the herein described parcel on the east; thence North 03°-19'-00" East, 776.47 feet to a point on the southerly boundary of Guilderland Avenue (N.Y. S. Route 158); thence along said southerly boundary of Guilderland Avenue the following two (2) courses and distances:

1) Thence North 84°-15'-48" East, a distance of 72.56 feet to a point of curvature; and

2) Thence along a curve to the left having a radius of 440.75 feet, an arc length 33.01 feet, a chord distance of 33.01 feet with a bearing of North 82°-07'-03" East to a point on the division line between the lands now or formerly of Fiorillo on the east and the herein described parcel on the west; thence along the said division line and also along the southerly and easterly boundary of the lands now or formerly of Fiorillo the following three (3) courses and distances:

1) Thence South 03°-19'-04" West, 215.00 feet to a point;

2) Thence North 77°-42'-21" East, 110.00 feet to a point; and

3) Thence North 03°-02'-31" West, 215.00 to a point on the southerly boundary of Guilderland Avenue (N.Y. S. Route 158); thence along said southerly boundary of Guilderland Avenue (N.Y.S. Route 158) and along a curve to the left having a radius of 440.75 feet, an arc length 127.54 feet, a chord distance of 127.10 feet with a bearing of North 60°-22'-18" East to a point; thence North 02°-20'-08" East and crossing Guilderland Avenue (N.Y.S. Route 158) for a distance of 61.48 feet to a point, said point also being the intersection of the northerly boundary of Guilderland Avenue (N.Y.S. Route 158) with the division line between lands now or formerly of Ronnie Raymus and Ann Marie Graber on the west and the herein described parcel on the east; thence North 38°-20'-00" West along said division line, 501.10 feet to a point; thence South 59°-56'-54" West, along the northerly boundary of the lands now or formerly of Raymus and Graber, 106.38 feet to a point on the northeasterly boundary of the lands now or formerly of Nelson and Eveline Boomer; thence North 36°-24'-04" West along said northeasterly boundary, 418.17 feet to a point at the most northerly corner of said lands of Boomer; thence South 12°-12'-58" East along the westerly boundary of said lands of Boomer 430.84 feet to a point; thence South 76°-18'-53" West along the lands now or formerly of Kusek on the south and the herein described parcel on the north, 428.59 feet to a point on the division line between the lands now or formerly of the Consolidated Rail Corporation on the west and the herein described parcel on the east; thence along said division line the following four (4) courses and distances:

1) Thence North 10°-13'-03" West, 266.79 feet to a point;

2) Thence North 40°-47'-11" East, 106.40 feet to a point;

3) Thence North 77°-39'-14" West, 96.68 feet to a point; and
4) Thence North 10°-13' - 21" West, 2201.75 feet to a point on the southwesterly boundary of the (N.Y.S. Thruway) lands of the People of the State of New York; thence North 02°-37' - 00" East and crossing the (N.Y.S. Thruway) lands of the People of the State of New York for a distance of 323+/- feet to a point, said point also being the intersection of the northeasterly boundary of (N.Y.S. Thruway) lands of the People of the State of New York and the westerly boundary of Dahlia Street; thence northerly and easterly along the westerly and northerly boundary of Dahlia Street and being in part the southerly boundary of lands now or formerly of Consolidated Rail Corporation for a distance of 3950+/- feet to a point, said point also being the intersection of the northerly boundary of Dahlia Street and the westerly boundary of Guilderland Avenue (N.Y.S. Route 158); thence northerly along the westerly boundary of Guilderland Avenue (N.Y.S. Route 158) and crossing lands now or formerly of Consolidated Rail Corporation for a distance of 1132+/- feet to a point, said point also being the intersection of the westerly boundary of Palm Street and the westerly boundary of Guilderland Avenue (N.Y.S. Route 158); thence northerly along the projection of the westerly boundary of Guilderland Avenue (N.Y.S. Route 158) and crossing Palm Street for a distance of 75+/- feet to a point on the westerly boundary of Sewer District No. 2; thence southerly along said westerly boundary for a distance of 52+/- feet to the point and place of beginning.
SITE LOCATION

USGS QUADRANGLE: SCHENECTADY

SCALE: 1" = 2000'

FIGURE 1
APPENDIX C.

Pump Station Criteria
<table>
<thead>
<tr>
<th>Pump Station</th>
<th># of Homes</th>
<th>Flow (GPD)</th>
<th>Peak Flow (GPM)</th>
<th># Condos</th>
<th>Flow (GPD)</th>
<th>Peak Flow (GPM)</th>
<th># Pump Stations*</th>
<th>Peak Flow (GPM)</th>
<th>Total Peak Flow (GPM)</th>
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</table>

* - Number of pump stations directly connected to the gravity system contributing the flows
Pump Station 1

Inlet Elev. = 313.54

GW Elev. = 320.82

Rim Elev. = 324.00

Sump Elev. Calc.

A. Inlet In. = 313.54
B. High Water Alarm = 313.54 - 6" = 313.04'
C. Lag Pump ON = B - 6" = 312.54'
D. Lead Pump ON = C - 6" = 312.04'
E. Pumps OFF = D - .54' = 311.50'

First Calculate Pump Volumes = Pumping Rate in Gallons = 116 Gallons

Height =

Pump Station Inflow = Average Flow = 95.1 GPM

116/95.1 gal. = 6 MINUTES < 30 MINUTES

Assume 6' - 0" ID Pump Station Wet Well

Working Volume = 0.54 ft

F. Bottom of Wet Well Inside = E - 1.5' = 310.00'

G. Bottom of Wet Well Outside = F - 1.0' = 309.00'

Buoyancy Calc.

Weight of Wet Well = 153 CF x 150 CF = 16,072 lb

Bottom = 5,769 lb

Weight of Wedge = 6,000 lb est.

Pump Station Weight = 12,000 lb est.

Buoyancy

Water Displaced = 455 CF displaced

455 CF x 62.4 lb/ft³ = 28,394 lb
Pumps Station 3

INV. EL/EVS = 306.71
GW EL/EVS = 310.5'
RM EL/EVS = 316.0

Sump EL/EVS Calc.

A. IN3ST INV = 306.71
B. H2O Alarm = A - 6" = 306.21
C. Lag Pump ON = C - 6" = 305.71
D. Lead Pump ON = C - 6" = 305.21
E. Pumps OFF = D - 1.65' = 303.5'

Pumping VOL = Pumping RATE = 349 GAL
Pump Station INFLOW = 30.5 GPM
349 GAL / 30.5 GPM = 11.44 MIN < 30 MIN OK
Assume 6'0" ID Wet Well
∴ Working VOL = 1.65'

F. Bottom of Wet Well INSIDE = C - 1.5' = 302.06
G. Bottom of Wet Well OUTSIDE = C - 1.0' = 301.06

Buoyancy

Weight of Wet Well = 15,981 lb
Bottom of Wet Well = 5,769 lb
Weight of Concrete = 6,000 lb
Pump Station Weight = 12,000 lb
Total Weight = 39,750 lb
Water Displaced = 363 cF x 62.4 lb/cF
22,658 lb ≤ 39,750 lb
TOWN OF ROTTERDAM, NY

RECESSED WET WELL MOUNTED PUMP STATION
DESIGN NOTES

NOTES TO BE INCLUDED ON PUMP STATION DRAWING:

The following notes highlight the material, equipment and installation specifications pertaining to the pump station. A complete list of pump station design requirements is available from the pump station supplier.

1. All pump station components shall be in accordance with the Town’s requirements. The Town shall approve the pump station design prior to installing the pump station.
2. The pump station supplier shall demonstrate to the Town’s satisfaction successful operation of the pump station and all related components.
3. Pump station control and alarm circuitry shall be in full accordance with the Town’s requirements.
4. All electrical work shall conform to all state and local requirements.
5. Pump station manufacturer: Smith & Loveless, Inc.
6. Pump station design requirements:

**PS #1: Smith & Loveless Model 4B2B**

- Pumping rate: 116 GPM (each pump)
- TDH: 39 feet
- Motor Speed: 1170 rpm
- Impeller diameter: 9.375"
- Motor: 3 HP, 3 phase, 60 hertz, 208 VAC
- Station Service: 200 amps

**PS #2: Smith & Loveless Model 4B2B**

- Pumping rate: 256 GPM (each pump)
- TDH: 37 feet
- Motor Speed: 1170 rpm
- Impeller diameter: 9.375"
- Motor: 5 HP, 3 phase, 60 hertz, 208 VAC
- Station Service: 200 amps

**PS #3: Smith & Loveless Model 4B3B**

- Pumping rate: 349 GPM (each pump)
- TDH: 115 feet
- Motor Speed: 1760 rpm
- Impeller diameter: 10.75"
- Motor: 20 HP, 3 phase, 60 hertz, 208 VAC
- Station Service: 200 amps

7. Should three phase power not be available on site, pump station manufacturer to provide AC Power Inverter, to be installed by the electrical contractor.
8. Contact for the pump station is Koester Associates, Inc. (315)697-3800.
SYSTEM HEAD CURVE CALCULATIONS

Design Point Summary

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
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<tbody>
<tr>
<td>Initial Flow</td>
<td>116 gallons per minute</td>
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<tr>
<td>Force Main Diameter</td>
<td>4 inches</td>
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<tr>
<td>Station Piping Diameter</td>
<td>4 inches</td>
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<tr>
<td>Design C Factor</td>
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<tr>
<td>Static Lift</td>
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<tr>
<td>Force Main Length</td>
<td>15.5 hundreds of feet</td>
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<tr>
<td>Station Piping</td>
<td>1 hundreds of feet (station pipe equivalent length of same size force main)</td>
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<tr>
<td>Total Eq. Length</td>
<td>16.5 hundreds of feet (includes station loss)</td>
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<td>TDH (at C=120)</td>
<td>39.04 feet (calculated)</td>
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System Curve Summary

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<tr>
<th>Flow (gpm)</th>
<th>C FACTOR 100</th>
<th>C FACTOR 200</th>
<th>C FACTOR 130</th>
<th>C FACTOR 140</th>
<th>C FACTOR 150</th>
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Application Summary

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<td>Round to</td>
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Please note the System Curve Summary is provided to show system head curves at different possible conditions. Pipe C Factors change over time, so it is important to consider pump performance at different system curves.
**System Head Curve Calculations**

**Project Name:** Helderberg Meadows - PS#2  
**Prepared for:** Brett Steenburgh, P.E. - February 11, 2005

**Design Point Summary**

- **Initial Flow:** 256 gallons per minute
- **Force Main Diameter:** 6 inches
- **Station Piping Diameter:** 6 inches
- **Design C Factor:** 120
- **Static Lift:** 20 feet
- **Force Main Length:** 31.1 hundreds of feet
- **Station Piping:** 1 hundreds of feet (station pipe equivalent length of same size force main)
- **Total Eq. Length:** 32.1 hundreds of feet (includes station loss)
- **DH (at C=120):** 42.28 feet (calculated)

**System Curve Summary**

<table>
<thead>
<tr>
<th>Flow (gpm)</th>
<th>C FACTOR 100</th>
<th>C FACTOR 120</th>
<th>C FACTOR 130</th>
<th>C FACTOR 140</th>
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<th>Actual Pump Curve</th>
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**Application Summary**

- **Design Flow:** 256 gpm
- **DH (from above calculations):** 42.28 feet
- **Pump to:** 42 feet

Please note the System Curve Summary is provided to show system head curves at different possible conditions.  
As C Factors change over time, it is important to consider pump performance at different system curves.
Pump Station 2

INLET ELEV. = 305.00
RIM ELEV. = 313.00

SUMP ELEV. CALC.
A) INLET INV. = 305.00
B) H.W. ALARM = A - 6" = 304.5'
C) LOW PUMP ON = B - 6" = 304.0'
D) UPPER PUMP ON = C - 6" = 303.5'
E) PUMPS OFF = D - 1.2' = 302.29'

Pumping Vol. = Pumping Rate = 256 gpm

PUMP STATION INFLOW = AVG. Flow = 38.6 gpm

256 gpm / 38.6 gpm = 6.6 minutes < 30 min OK

Assume 6" OD Pump Station Wet Well

1. Working Vol. = 1.21 ft

F) BOTTOM OF WET WELL INSIDE = E - 1.5 = 300.79
G) BOTTOM OF WET WELL OUTSIDE = F - 1.0 = 299.79

Bouyancy

GROUNDWATER IS GREATER THAN 80" IN THIS AREA

1. Bouyancy will not be an issue
## Design Point Summary

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<th>Parameter</th>
<th>Value</th>
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<tbody>
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<td>Initial Flow</td>
<td>349 gallons per minute</td>
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<td>Force Main Diameter</td>
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<tr>
<td>Station Piping Diameter</td>
<td>6 inches</td>
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<td><strong>Design C Factor</strong></td>
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<tr>
<td>Static Lift</td>
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<tr>
<td>Force Main Length</td>
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<td>Station Piping</td>
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<td>Total Eq. Length</td>
<td>67 hundreds of feet (includes station loss)</td>
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<td><strong>TDH (at C=120)</strong></td>
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</table>

## System Curve Summary

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<th>C FACTOR 120</th>
<th>C FACTOR 130</th>
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<td>0</td>
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## Application Summary

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</tr>
<tr>
<td>Round to:</td>
<td>115 feet</td>
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</tbody>
</table>

Please note the System Curve Summary is provided to show system head curves at different possible conditions. Pipe C Factors change over time, so it is important to consider pump performance at different system curves.
Equipment Specifications

RECESSED WET WELL MOUNTED PUMP STATION

Town of Rotterdam, NY

Prepared for: Brett Steenburgh, P.E.

Date: March 28, 2007

PART 1 - GENERAL

1.1 WORK DEFINED

A. Work of this section shall conform with all requirements of the design drawings.

B. The contractor shall furnish and install one factory-built, automatic pumping station for placement on the precast wet well as shown on the drawings. Each station shall be complete with all needed equipment, factory-installed in a welded steel chamber with fiberglass cover.

The principal items of equipment shall included two (2) vertical, close-coupled, motor driven, vacuum primed, non-clog pumps; valves; internal piping, central control panel with circuit breakers; motor starters and automatic pumping level controls; heater; ventilating blower; priming pumps and appurtenances; internal wiring.

1.2 SUBMITTALS

A. In accordance with the procedures outlined in the specifications, submit the following:

1. Manufacturer's catalog cuts, specifications, recommended methods of installation.
2. Dimensional drawings.
3. Station layout drawings.
4. Catalog data on all accessories included with the pump station.
5. Assembly and foundation drawings.
7. Wiring diagrams.
10. List of installation of at least 100 stations of similar design and size which have been operating for over five (5) years.

1.3 QUALITY ASSURANCE

A. Comply with applicable requirements of related sections.

B. All pumps and pump stations of similar design supplied under this contract shall be the product of a single manufacturer.

C. Acceptable manufacturer of the recessed wet well mounted pump station shall be Smith & Loveless, Inc. as standardized by the Town of Rotterdam, NY.

1.4 DESIGN CONDITIONS

A. Refer to attached "Pump Schedule" for sizes, capacities of pumps, and electrical characteristics. All openings and passages shall be large enough to permit the passage of a sphere 3" in diameter.

B. All drive equipment shall be non-overloading at all points along the performance curve within the operating range of the system.

1.5 PUMP WARRANTY

A. The manufacturer of the lift station shall have a minimum of 1,000 installations, and twenty-five (25) years of experience in the design and manufacture of vacuum priming type factory-built automatic pumping stations of this type and shall guarantee the structure and all equipment to be free from defects in materials and workmanship per period of up to one year from the date of start up not to exceed 18 months from date of shipment.

B. Warranties and guarantees by the suppliers of various components in lieu of a single-source responsibility by the manufacturer will not be accepted. The manufacturer shall be solely responsible for the guarantee of the station and all components. Furnishing warranties and guarantees to the Owner shall be the Contractor’s responsibility.

C. In the event the component fails to perform as specified or is proven defective in service during the guaranteed period, the manufacturer shall provide a replacement part without cost to the owner. He shall further provide without cost, such labor as may be required to replace, repair or modify major components such as pumps, pump motors, and sewage piping manifold. This provision shall be the responsibility of the Contractor.

D. The manufacturer shall supply the services of a factory trained technician to inspect the installation, test the equipment for proper performance and instruct maintenance personnel on the operation and care of the stations. This provision shall be the responsibility of the Contractor.
PART 2 - PRODUCTS

2.1 GENERAL

A. The contractor shall furnish and install factory-built automatic pumping station. The station shall be complete with all equipment, factory installed as shown on the Project Manual or as specified in this section.

2.2 PRODUCT

A. Construction

1. The station shall be constructed in one complete factory-built assembly. It shall be sized to rest on the top of the wet well as detailed on the drawings. The supporting floor shall be minimum 3/4" thick steel to prevent deflection and ensure an absolutely rigid support. The shell shall be of 1/4" minimum thickness steel plate formed and welded to create a minimum 6'-3" by 8'-0" equipment chamber with a minimum inside height of 6'-7", and a separate 3'-0" by 2'-1" manway for access to the wet well. All internal clearances shall meet or exceed N.E.C. requirements. Stations not meeting NEC requirements shall not be allowed. Steel plate shall meet or exceed ASTM A-36 specifications.

2. The pump casings and discharge piping shall be mounted in relation to the station floor as detailed in the construction drawings. All valves, piping and fittings shall be capable of passing a 3" diameter spherical solid. All pump components and station piping, including the suction pipe connections, shall be removable without having to enter the wet well. The suction and discharge connections, where they pass through the floor, shall be sealed by gaskets, rather than being welded, to allow adjustment and replacement.

3. The equipment chamber shall be physically separated from the wet well. Wet well access shall be completely separate from the equipment chamber and shall be provided with the access manway exposed only to the atmosphere.

4. The equipment chamber shall be provided with two separate fiberglass covers, one over the pumps and piping and the other over the control section, hinged at the center support channel. The fiberglass covers shall be formed with a drip lip around the edges. Lockable pneumatic shocks shall be provided to assist in opening the covers, support them in the open position and to restrain them under load. An aluminum ladder with a 3' safety extension bar shall be located in the station to provide easy access. Only one segment of the fiberglass cover need be opened for personnel access into the equipment chamber, but either or both may be opened for equipment access. A single cover will not be acceptable.

5. The fiberglass two piece cover shall be made of molded reinforced orthophthalic polyester resins with a minimum of 30% glass fibers with a minimum average length of 1-1/4". The outside of the enclosure shall be coated with a polyester protective in-mold coating for superior resistance
to weathering, ultra-violet radiation, yellowing and chalking. The completed fiberglass enclosure shall be resistant to mold, mildew, fungus and corrosive liquids and gasses normally found in pump station environments.

6. A 1/4" hinged aluminum manway cover located exterior to the pump chamber shall be provided. The manway shall be 25" x 36" minimum and be an integral part of the station head plate and shall provide access into the wet well. Both equipment chamber and wet well access covers shall be provided with arrangements for padlocking.

7. The manway cover shall have a three color 7" x 10" (minimum) corrosion resistant sign permanently affixed to it, reading “DANGER – Before Entering, Test For Explosive Gasses. Test For Oxygen Deficiency. Supply Fresh Air To Work Area”.

8. A lifting socket shall be welded to the wall for each pump. A stanchion with lifting arm shall be provided for removal of the motors, impellers and pumps.

9. Two 12" by 36" steel shelves shall be mounted on the wall opposite the control panel, for the operator’s use or for auxiliary equipment mounting.

B. Welding

1. All steel and the station structure shall be jointed by electric arc welding with fillets of adequate section for the joint involved. Where required to exclude ground water, all welded joints on the exterior of the station shall be continuous throughout their length.

C. Protection Against Corrosion

1. All structural steel surfaces shall be factory blasted with steel grit, in an environmentally controlled booth, to remove rust, mill scale, weld slag, etc. All weld spatter and surface roughness shall be removed by grinding. Surface preparation shall comply with SSPC-SP6 specifications. Sandblasting is specifically prohibited.

2. Immediately following cleaning, a single 6-8 mil dry film thickness coating of a self-priming Cycloaliphatic Amine Epoxy shall be factory applied to the base. After curing, a 2-3 mil DFT top coating of a moisture-cured Aliphatic Polyurethane protective finish, for abrasion resistance and weather protection, shall be applied to the top of the base and as a finish coating for all other structural, pump and piping assemblies. The bottom of the station base, exposed to the wet well, shall be further coated with an additional 6-8 mil coating of epoxy for chemical and abrasion resistance. These coatings shall be as formulated by Smith & Loveless specifically for this type of application and service.

3. Stainless steel, aluminum and other corrosion-resistant surfaces shall not be coated. Carbon steel surfaces not otherwise protected shall be coated with a suitable non-hardening rust preventative compound. Auxiliary components such as the electrical enclosure, ventilating blower and vacuum pumps shall be furnished with the original manufacturer’s coating.

4. Finish coating shall be accomplished prior to shipment of the station from the
4. The motor shaft shall equal or exceed the diameter as specified above at all points from immediately below the top bearing to the top of the impeller hub.

5. The bearing cap shall be provided to hold the bottom motor bearing in a fixed position. Bearing housings shall be provided with fittings for lubrication as well as purging old lubricant.

6. The motors shall be fitted with heavy lifting eyes, each capable of supporting entire weight of the pump and motor.

F. Controls

1. The control equipment shall be mounted in a NEMA Type I steel enclosure with a removable access cover. The circuit breakers, starter reset buttons, and control switches shall be operable without removing the access cover, for dead front operation. An elapsed time meter shall be provided for each pump.

2. A grounding type outlet shall be provided on the face of the cabinet for operation of 115V AC devices.

3. Thermal magnetic air circuit breakers shall be provided for branch disconnect service and short circuit protection of all motor control and auxiliary circuits.

4. Magnetic across-the-line starters with under-voltage release and overload coils for each phase shall be provided for each pump motor to give positive protection. Each single phase auxiliary motor shall be equipped with an over-current protection device in addition to the branch circuit breaker, or shall be impedance protected. All switches shall be labeled and a coated wiring diagram shall be provided.

5. To control the operation of the pumps with variations of sewage level in the wet well, an automatic pump and alarm controller, manufactured by Consolidated Electric Co., St. Paul, MN Model D152 with Model A1000 submersible level transducer shall be supplied and installed in the pump station control panel.

a. The D152 Pump and Alarm Controller shall provide full-range differential control of two pumps plus a High and Low level alarm in response to an electronic, level-proportional signal.

b. The controller shall operate on 120 VAC power. It shall incorporate a motor starter pilot circuit control contact for the operation of each of the two pumps. The abnormal level alarms (individually adjustable High and Low settings with a total of four set points) shall be outputted through a fail-safe load relay having a form C contact and an audible alarm driver circuit. The High and
Low level alarms shall yield a common signal and cause the drop-out of a relay held in an energized state under normal level and AC power conditions.

c. The controller shall provide easy level indication on a 40-segment LED bar graph display. The adjustments of the control can be viewed or easily changed by means of the plug-in programming pins. Each of the eight adjustments shall have forty possible positions relating to the segments of the level display.

d. A manual override switch below the level display shall allow the actual output level signal to be overridden to confirm the performance of the controlled equipment. The switch shall be of the spring-return-to-center type with raise-auto-lower positions for use by operating personnel to simulate a false High or Low level and to observe the performance of the controlled pumps.

e. An automatic alternator shall be provided that transposes the starting sequence of the two pumps on successive operations. The alternator shall have a front panel override switch allowing placement of the pumps in either fixed manual sequence or allows the automatic alternation.

f. An alarm silence push-button on the face of the Controller shall cancel the audible alarm driver output circuit while the fail-safe alarm relay remains in the abnormal state until the condition has cleared.

g. Provide four LED's across the top of the Controller to indicate the On/Off state of each of the pump and alarm control circuits.

h. The submersible transducer shall be as manufactured by Consolidated Electric solid station Model A1000. The transducer shall sense the pressure caused by the height of liquid above its bottom face. The lower unit body shall be PVC. The bottom shall be a molded reinforced synthetic rubber diaphragm. The transducer pipe shall be mounted and have a sealed breather system. Transducer shall be mounted in the wet well with a stainless steel cable, connection hardware, and weight kit.

i. A redundant float switch shall be supplied to supply a high wet well level closure to the alarm system should the D-152 controller fail.

6. The main disconnect and high water and low water alarm light shall be pedestal mounted next to the station by the contractor.

7. Provisions shall also be made for the pumps to operate in parallel should the level in the wet well continue to rise above the starting level of the low level pump. Should the level continue to rise to the standby pump level, the standby pump shall start and the high water alarm shall be activated.
It shall also activate a remote 110V AC red alarm light. This alarm light shall be provided by the station manufacturer, for mounting as shown on the Contract Drawings.

G. Vacuum Priming Systems

1. A vacuum priming system shall be furnished to prime the main pumps. The system shall be as shown on the vacuum priming schematic and shall include two vacuum pumps, providing 100 percent standby. Vacuum pumps shall have corrosion-resistant internal components. The vacuum priming system shall be complete with large port vacuum control solenoid valves, vapor filters to protect the solenoid valves, Sonic Start™ prime level sensor, float-operated check valves to protect the vacuum pumps, and all necessary shut-off valves as shown on the piping schematic. The float-operated check valves shall have a transparent body for visual inspection. All hoses and tubing used in the priming system shall be at least 3/8" nominal diameter.

The solenoid valves used in the vacuum priming system shall be of the high flow, direct acting brass body type, with threaded ports, NBR seals and 300 Series stainless steel plunger, rod, plate and springs. The minimum orifice diameter shall be 5/16". The solenoid valves shall be UL Listed, with Class F coil rating and of suitable voltage and thermal capacity for the application.

Each solenoid valve shall be protected by a vapor filter, installed in the vacuum line between the valve and the priming dome. The vapor filter shall be constructed of corrosion resistant materials and shall have a minimum filtration area of 2.74 square inches and be suitable for operation from 25" Hg to 100 PSI. They shall be readily replaceable without the use of special tools.

Liquid level in the pump priming chamber shall be monitored by a Sonic Start resonant frequency liquid level probe. The probe shall be equipped with a piezoelectric drive and sensitive circuits to detect frequency shifts when the probe is covered by liquid. The probe shall be completely sealed and have a 316L stainless steel housing for corrosion resistance. It shall be provided with a wiring connector molded of PolyPhenylSulfone, an amorphous high performance thermoplastic for impact and chemical resistance. The probe shall have a plug-in connector to facilitate easy removal.

The Sonic Start probe shall be provided with light emitting diodes. This diagnostic tool shall indicate connectivity, prime status or a fault condition. Systems utilizing an electrode, mechanical means such as a float, or that require any type of electrical or moving parts inside the priming chamber, which may accumulate debris, short out, bind or fail will not be acceptable.

The priming system shall automatically provide positive lubrication of the mechanical seal each time a main pump is primed. To prevent excessive stoppage due to grease accumulation, no passageway in the priming
system through which the pumped liquid must pass shall be smaller than the equivalent of a 2-1/2” opening.

H. Ventilating Blower

1. A ventilating blower shall be provided capable of delivering (250 CFM) in the equipment chamber. The blower shall be rigidly mounted and shall discharge to atmosphere as shown on the plans. It shall be controlled by a percentage timer.

I. Heater

1. This station shall be provided with a dual wattage forced air heater with built-in thermostat to control operation. The heater wattage shall be 1300/1500, 110V.

J. Sewage Piping and Valves

1. The discharge line from each pump shall be fitted with a clapper type check valve and plug valve. Size, location, and quantity of check valves and plug valves shall be as shown on the construction drawings. The check valves shall be of the spring loaded type with external lever arm and an easily replaced resilient seat for added assurance against vacuum leaks. Check valves shall have stainless steel shaft with replaceable bronze shaft bushings and shall be sealed through the bearing with O-Rings, an operating wrench shall be provided for the plug valves. A pressure gauge shall be installed on the common pump discharge. The gauge shall be rated from 30” Hg to 30 psi and have bronze hardware with ¾” NPT connections.

2. All protrusions through the floor plate shall be welded gas-tight to effect sealing between the equipment chamber and the wet well. In order to prevent corrosive, noxious fumes from entering the station, the lift station manufacturer shall extend the suction connection below the floor plate at the factory, so that field connections can be made without disturbing the gas-tight seals.

3. The discharge pipe shall exit the station as shown on the drawings.

2.3 FACTORY TESTS

A. All components of the pump station shall be given an operational test of all equipment at the factory to check for excessive vibration, for leaks in all piping or seals, for correct operation of vacuum priming and control systems and all auxiliary equipment. Pumps shall take suction from a deep well, simulating actual service conditions. The control panel shall undergo a dry logic test and a full operational test with all systems operating.

2.4 SPARE PARTS
A. A complete replacement pump shaft seal assembly. The spare seal shall be packed in a suitable container and shall include complete installation instructions.

2.5 EXTENDED SERVICE

2.5.1 The manufacturer of the pump station shall offer an optional one year service for pump station parts and labor. Service contract details and costs shall be included in the equipment submittals. The Owner shall reserve the right to either accept, modify or decline this service contract. The pump station manufacturer shall have complete service capabilities within 100 miles of the project location.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation of the pump chamber shall be done in accordance with the written instructions provided by the manufacturer.

B. Five (5) copies of Operation and Maintenance manuals shall be furnished which will include parts list of components and complete service procedures and trouble shooting guide.

3.2 ELECTRICAL INSTALLATION

A. All field wiring and electrical installation shall be performed by licensed electricians and shall be in full accordance with the standards of the national electric code and the national board of fire underwriters.

B. All conduits shall have a minimum of 2' cover. All wiring shall be suitably grounded. All fittings and electrical boxes shall be made water tight.
Appendix B

Helderberg Meadows Pump Station Record Documents
**White Birch**

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Number</th>
<th>Specifications</th>
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<tbody>
<tr>
<td>Pumps</td>
<td>2</td>
<td>Smith &amp; Loveless</td>
</tr>
<tr>
<td>Motors</td>
<td>2</td>
<td>5 Hp, 120/208 V, 3 phase</td>
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<tr>
<td>Control Panel</td>
<td>1</td>
<td>SN 14-2109</td>
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<tr>
<td>Level Transducer</td>
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<td></td>
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<tr>
<td>Valves</td>
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<td>2 - 4” check valves, 2 - 4” plug valves</td>
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<tr>
<td>Vacuum Pumps</td>
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<tr>
<td>Runtime Meters</td>
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<td>Alternate Power</td>
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<td>12 kW Olympian generator, natural gas fueled, dated 2002, ATS</td>
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**High Bridge Road #1 (Time Warner)**

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<th>Equipment</th>
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<th>Specifications</th>
</tr>
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<tr>
<td>Pumps</td>
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<td>ABS submersible grinder</td>
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<tr>
<td>Motors</td>
<td>2</td>
<td>4.7 Hp, 120/208 V, 3 phase</td>
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<td>Control Panel</td>
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<td>SN 14-2109</td>
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<td>Level Transducer</td>
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<tr>
<td>Valves</td>
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<td></td>
</tr>
<tr>
<td>Vacuum Pumps</td>
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<td>Portable generator connection</td>
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<tr>
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**High Bridge Road #2**

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<td>Pumps</td>
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<td>ABS submersible grinder</td>
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<tr>
<td>Motors</td>
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<td>2.4 Hp, 120/208 V, 3 phase</td>
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**Helderberg Meadows #1**

<table>
<thead>
<tr>
<th>Equipment</th>
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<td>Pumps</td>
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<td>Smith &amp; Loveless</td>
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<tr>
<td>Motors</td>
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<td>3 Hp, 120/208 V, 3 phase</td>
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<td>Control Panel</td>
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### Helderberg Meadows #2

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<td>Smith &amp; Loveless</td>
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<td>2 - 4&quot; check valves, 2 - 4&quot; plug valves</td>
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<td>Vacuum Pumps</td>
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</table>

Manufacturer's Operation and Maintenance (O&M) manuals for equipment are located at each pump station.

Pump rebuilding, motor rewinds, and HVAC repairs for the pump stations are contracted to several different firms. Repairs to motor control centers, flow meters, valves, and macerators are typically repaired by Town of Rotterdam maintenance crews. In general, any replacement parts that are difficult to acquire are kept in stock by the Sewer Department; other parts are obtained from local vendors or the manufacturer's service center (See Spare Parts Inventory). As pumps and other parts are replaced, the Town of Rotterdam is making an effort to standardize pumping station equipment as much as possible.

Whether repairs are made by local vendors or by Town of Rotterdam personnel, all repairs are recorded on the tracking spreadsheet.

**A. Mechanical and Electrical Maintenance**

The size of the pump station and its related equipment determine its specific mechanical and electrical maintenance needs. The Sewer Department Superintendent is responsible for: incorporating the routine maintenance of each pump station into the tracking spreadsheet. The Sewer Department Superintendent uses manufacturers' Operation and Maintenance manuals to establish action items for pump station equipment. Pump stations listed in Table 6.1 have individual inspection protocols attached in Appendix G. A general description of weekly and bi-annual maintenance performed on pump stations by the Sewer Department is listed as follows:
Appendix C

On-Site Pump Station Design Calculations
Pump Station 1
Subject: Whispering Pines Senior Housing On-Site Pump Station 1

Average Sanitary Sewer Flow: 40 GPM
Peaking Factor: 3.7
Peak Sanitary Sewer Flow: 147 GPM

Wastewater Flows to Pump Station

1. Average
   Existing Sanitary Avg. Flow: 40 gpm → per proposed Whispering Pines Sewage Flow

2. Peak
   Existing Peak Sanitary Flow: 147 gpm → per proposed Whispering Pines Sewage Flow with peaking factor of 3.7

Wetwell Sizing

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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<tbody>
<tr>
<td>New Wetwell Diameter</td>
<td>8 ft</td>
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<tr>
<td>Wetwell Area</td>
<td>50.3 ft²</td>
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<tr>
<td>Wetwell Filling Time</td>
<td>15 minutes</td>
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<tr>
<td>Wetwell Drawdown Volume</td>
<td>594 gallons</td>
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<tr>
<td>Max. Wetwell Drawdown Level</td>
<td>1.6 ft</td>
</tr>
<tr>
<td>Design Pump Rate</td>
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<tr>
<td>Pump Drawdown Time</td>
<td>20.84 minutes</td>
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<tr>
<td>Wetwell Fill Time</td>
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<tr>
<td># of Pump Starts per Hour</td>
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</table>

Top of Wetwell EL: 343.00 ft
8” Inv. In EL: 334.50 ft
High Water Alarm EL: 334.00 ft
Pumps On EL: 333.75 ft
Pump Off EL: 332.17 ft
Low Water Alarm EL: 331.92 ft
Min Pump Submergence: 1.5 ft
Wetwell Base EL: 330.42 ft
Wetwell Depth: 12.58 ft

→ at Peak Influent Flow of 156 gpm and drawdown rate of 175 gpm (175-147)
Subject: Whispering Pines Senior Housing On-Site Pump Station 1

Static Head:
- Pump Off EL: 332.17 ft
- 6” FM Inv. In El.: 346.25 ft
- Static Head: 14.08 ft

Frictional / Minor Losses: 6-inch Forcemain

<table>
<thead>
<tr>
<th>Component</th>
<th>Length (ft)</th>
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<tr>
<td>6” 90 Bend</td>
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<td>6” Pipe</td>
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<td>6” Check Valve</td>
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<td>6” Gate Valve</td>
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<td>6” Pipe</td>
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<td>6” Equivalent Length</td>
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Forcemain Headloss

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<td>2,740</td>
<td>2,740</td>
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<td>Q (gpm)</td>
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<td></td>
<td></td>
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<td>140</td>
<td>140</td>
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<td>D (in)</td>
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<td>5.03</td>
<td>5.03</td>
<td>5.03</td>
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<td>5.03</td>
<td>5.03</td>
<td>5.03</td>
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<td>Velocity (ft/s)</td>
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<td>1.21</td>
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<td>2.83</td>
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<tr>
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Appendix C

On-Site Pump Station Design Calculations
Pump Station 2
Subject: Whispering Pines Senior Housing On-Site Pump Station 2

Average Sanitary Sewer Flow: 51 GPM  
Peaking Factor: 3.7  
Peak Sanitary Sewer Flow 189 GPM

Wastewater Flows to Pump Station

1. Average  
   Existing Sanitary Avg. Flow: 51.0 gpm → per proposed Whispering Pines Sewage Flow

2. Peak  
   Existing Peak Sanitary Flow: 189 gpm → per proposed Whispering Pines Sewage Flow with peaking factor of 3.7

Wetwell Sizing

- New Wetwell Diameter: 8 ft  
- Wetwell Area: 50.3 ft²  
- Wetwell Filling Time: 15 minutes  
- Proposed Avg. Daily Flow: 50.96 gpm  
- Wetwell Drawdown Volume: 764 gallons  
- Max. Wetwell Drawdown Level: 2.0 ft  
- Design Pump Rate: 225 gpm  
- Pump Drawdown Time: 20.98 minutes → at Peak Influent Flow of 189 gpm and drawdown rate of 208.7 gpm (=225-189)  
- Wetwell Fill Time: 4.05 minutes  
- Total Time between Cycles: 25.03 minutes  
- # of Pump Starts per Hour: 2.40

Top of Wetwell EL: 347.25 ft  
8" Inv. In EL.: 333.11 ft  
High Water Alarm EL: 332.61 ft  
Pumps On EL: 332.36 ft  
Pump Off EL: 330.33 ft  
Low Water Alarm EL: 330.08 ft  
Min Pump Submergence: 1.5 ft  
Wetwell Base EL: 328.58 ft  
Wetwell Depth: 18.67 ft
Subject: Whispering Pines Senior Housing On-Site Pump Station 2

Static Head:
- Pump Off EL: 330.33 ft
- 6" FM Inv. In El.: 345 ft
- Static Head: 14.673 ft

Frictional / Minor Losses: 6-inch Forcemain

<table>
<thead>
<tr>
<th>Component</th>
<th>Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; 90 Bend</td>
<td>16</td>
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<tr>
<td>6&quot; Pipe</td>
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<tr>
<td>6&quot; Check Valve</td>
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6" Equivalent Length: 4120 ft

Forcemain Headloss

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<td>5.03</td>
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Appendix D

Option 1 – Proposed Forcemain Routing
Appendix E

Option 1 – Proposed Pump Station Modifications
Subject: Hamburg Street Pump Station Modifications

Average Sanitary Sewer Flow: 85 GPM
Peak Sanitary Sewer Flow: 325 GPM

Wastewater Flows to Pump Station

1. Average
   Existing Sanitary Avg. Flow: 85 gpm → 34 gpm existing Hamburg St. Sewer District (per Chazen Design Report) + 51 gpm proposed

2. Peak
   Existing Peak Sanitary Flow: 325 gpm → Hamburg St. Sewer Peaking Factor : 4
       → Whispering Pines Peaking Factor : 3.7

Wetwell Sizing

New Wetwell Diameter: 8 ft
Wetwell Area: 50.3 ft²
Existing Storage Depth: 2.25 ft
Existing Storage Vol: 845.97 gallons
Proposed Avg. Daily Flow: 85 gpm
Proposed Fill Time: 10.0 minutes

Top of Wetwell EL: 346.50 ft
8” Inv. In El.: 327.75 ft
High Water Alarm EL: 327.50 ft
Pumps On EL: 327.25 ft
Low Water Alarm EL: 324.75 ft
Min Pump Submergence: 1.5 ft
Wetwell Base EL: 323.00 ft
Wetwell Depth: 23.50 ft

Design Pump Rate: 400 gpm
Pump Drawdown Time: 11.21 minutes → at Peak Influent Flow of 325 gpm and drawdown rate of 400 gpm (=400-325)
Wetwell Fill Time: 2.61 minutes
Total Time between Cycles: 13.82 minutes
# of Pump Starts per Hour: 4.34
Appendix F

Option 2 – Proposed Forcemain Routing
Appendix G

Option 2 – Proposed Pump Station Modification
Subject: Helderberg Meadows Pump Station 1 Modifications

Average Sanitary Sewer Flow: 70 GPM
Peak Sanitary Sewer Flow 265 GPM

Wastewater Flows to Pump Station

1. Average

2. Peak
Existing Peak Sanitary Flow: 265 gpm → Helderberg Meadows Sewer Peaking Factor : 4
→ Whispering Pines Peaking Factor : 3.7

Wetwell Sizing

<table>
<thead>
<tr>
<th>Wetwell Diameter: 6 ft</th>
<th>Wetwell Area: 28.3 ft²</th>
<th>Existing Storage Depth: 1.79 ft</th>
<th>Existing Storage Vol: 378.57 gallons</th>
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<tbody>
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<td></td>
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<td>8&quot; Inv. In El.: 313.54 ft</td>
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<td>High Water Alarm EL: 313.54 ft</td>
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<td>Pumps On EL: 313.29 ft</td>
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<td>Pumps Off EL: 311.50 ft</td>
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<td>Low Water Alarm EL: 311.25 ft</td>
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<td>Min Pump Submergence: 1.5 ft</td>
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<td>Wetwell Base EL: 310.00 ft</td>
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<td></td>
<td>Wetwell Depth: 14.00 ft</td>
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</tbody>
</table>

Proposed Avg. Daily Flow: 70.10 gpm
Proposed Fill Time: 5.4 minutes

Design Pump Rate: 315 gpm
Pump Drawdown Time: 7.63 minutes → at Peak Influent Flow of 265 gpm and drawdown rate of 315 gpm (=315-265)
Pump Fill Time: 1.43 minutes
Total Time between Cycles: 9.06 minutes
# of Pump Starts per Hour: 6.62

System Curve

Flow - gpm

Head - ft

0.00  100.00  200.00  300.00  400.00  500.00  600.00  700.00  800.00  900.00

0  25  50  75  100  125  150  175  200  225  250  275  300  325  350  375  400  425  450  475  500  525  550  575  600  625  650  675  700  725  750  775  800
Subject: Helderberg Meadows Pump Station 2 Modifications

Average Sanitary Sewer Flow: 90 gpm
Peak Sanitary Sewer Flow: 343 gpm

Wastewater Flows to Pump Station

1. Average
Sanitary Avg. Flow: 90 gpm → 38.6 gpm existing Helderberg Meadows (per Brett L. Steenburgh, P.E. PLLC Design Report) + 51 gpm proposed

2. Peak
Peak Sanitary Flow: 343 gpm → Helderberg Meadows Sewer Peaking Factor : 4
→ Whispering Pines Peaking Factor : 3.7

Wetwell Sizing

Wetwell Diameter: 6 ft
Wetwell Area: 28.3 ft²
Existing Storage Depth: 2.21 ft
Existing Storage Vol: 467.40 gallons
Proposed Avg. Daily Flow: 89.60 gpm
Proposed Fill Time: 5.2 minutes

Top of Wetwell EL: 313.00 ft
8" Inv. In El.: 305.00 ft
High Water Alarm EL: 304.90 ft
Pumps On EL: 304.50 ft

Wetwell Base EL: 300.79 ft
Min Pump Submergence: 1.5 ft

Wetwell Fill Time: 1.36 minutes → at Peak Influent Flow of 343 gpm and drawdown rate of 400 gpm (=400-343)

Design Pump Rate: 400 gpm
Pump Drawdown Time: 8.26 minutes
Total Time between Cycles: 9.62 minutes

# of Pump Starts per Hour: 6.24

Flow - gpm

0.00  50.00  100.00  150.00  200.00  250.00  300.00  350.00  400.00  450.00  500.00

Head - ft

0.00  50.00  100.00  150.00  200.00  250.00  300.00  350.00  400.00  450.00  500.00

System Curve
Appendix H

Town of Rotterdam WWTP Capacity Analysis
(as provided by JME)
Town of Rotterdam
Wastewater Treatment Plant Capacity Analysis

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<th>Average Daily Flow</th>
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<td>Existing WWTP Design Average Flow</td>
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<td>2014-2016 Maximum month Flow (June 2016)</td>
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<td>Current WWTP &quot;Excess&quot; Capacity</td>
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<tr>
<td>Remaining Capacity Available for New Development</td>
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**Approved projects:**

- Edgewood Avenue (Go Ahead Realty LLC)(62% occupied) : 2,675
- Terminus of Edgewood Avenue (Go Ahead Realty LLC)(40% occupied)* : 2,640
- County Line Rd & Guilderland Ave. (Helderberg Meadows)* : 47,080
  (55 single family homes & 45 condos built)
- Curry Road Plaza Redevelopment (Residences of Vista Square, 8 bldgs, 208 units total, info provided by EDP) : 24,440
- Helderberg Avenue Apartments (52 apartments)* : 11,440
- Mohonasen Bus Garage & Tech Center : 5,225

Subtotal : 0.09 93,500

**Proposed Projects:**

- Solara - Thompson Street Apartments (248 units) : 0.04 44,600
- V-Stream building (if sewer extended along Burdeck Street) : 0.015 15,000

Subtotal (Approved plus Proposed) : 0.153 153,100

Subtract Approved & Proposed from Available Capacity = Remaining : 0.317 316,900

**Notes:**
1. Most flow figures provided by Town from Engineering Reports for the proposed development.
2. Figures with * estimated by McDonald Engineering from information provided by the Town.
3. Some of the approved projects have partial occupation, which would already be seen in WWTP influent flows recorded, making the available capacity remaining figure conservative.
Appendix I

Hamburg Street Sewer District Fiscal Analysis
FINANCIAL IMPACT OF PROJECT BECOMING EXTENSION OF HAMBURG STREET SEWER DISTRICT (OPTION 1)

1.1 Equivalent Dwelling Units (EDUs)

The Equivalent Dwelling Units (EDUs) for the proposed district have been estimated based upon the criteria of the Hamburg Street Sewer District Map, Plan and Report last revised December 23, 2015. The general approach in developing the EDUs was to assign a minimum of 1 EDU for residential homes and then converting non-residential uses to residential EDUs by dividing the sewage flows by 208 GPD, which was determined to be the average day flow of the Hamburg Street Sewer District (refer to Section 3.1 of the MPR). The resulting EDUs from the proposed district are as follows:

<table>
<thead>
<tr>
<th></th>
<th>EDUs/Unit</th>
<th>EDUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>1</td>
<td>521</td>
</tr>
<tr>
<td>Non-Residential Use</td>
<td>Ave Day Sewage Flow (GPD)</td>
<td>EDUs (dividing ADF by 208 GPD)</td>
</tr>
<tr>
<td>Golf Course</td>
<td>1,453</td>
<td>7</td>
</tr>
<tr>
<td>Independent Living Coming Areas</td>
<td>11,307</td>
<td>54</td>
</tr>
<tr>
<td>Total Estimated EDUs</td>
<td>582</td>
<td></td>
</tr>
</tbody>
</table>

Prior to the petitioning for the district, the EDUs would be validated against the Town's adopted EDU policy.

1.2 Anticipated User Costs

General Municipal Law requires that all costs associated with a sewer district are to be borne by users in the district. The proposed costs to the typical user are based on a shared debt service by the property owners in the proposed district and operation and maintenance (O&M) of the sewer district. In instances where the district discharges to another municipal sewer system, additional costs arise from transport and/or processing of wastewater. The user cost consists of two components; debt retirement and operation and maintenance (for both conveyance and processing), both of which are to be charged on a benefit basis.

1.2.1 Debt Service

The infrastructure planned for conveyed to the Town will be done at no cost. As such the proposed district will have no debt service. However, since this sewer system will connect to and become an extension of the Hamburg Street Sewer District, it must assume a proportioned share of outstanding debt of the "mother" district.

Based upon the Hamburg Street Sewer District Map, Plan and Report (MPR), the district will have an annual debt retirement of $226,565. This is distributed over the 248 EDUs within the district. With the addition of, at a minimum 582 EDUs as summarized in Table 1-1, the annual debt
retirement for existing sewer district users and new district users within the Whispering Pines project will be adjusted from $914 per year to $273 per year.

### 1.2.2 Operation and Maintenance Costs

The O&M costs for the Hamburg Street Sewer District are $10,000 per year as noted in the Hamburg Street Sewer District MPR. This is distributed over all developed properties having been allocated EDUs based on water usage resulting in 239 EDUs within the district. Undeveloped properties not connected to the collection system would not be billed O&M charges. The resulting O&M charges are $42/EDU. The new district will be responsible for a proportioned share of these O&M charges, based upon the additional EDUs added. With the addition of 582 EDUs, the annual O&M for existing sewer district users would be adjusted from $42 per year to $12 per year.

The sewer system proposed within the Village at Whispering Pines will be conveyed to the Town. While no firm annual O&M charges have been established, for the purpose of budgeting, a similar annual O&M charge of $10,000 has been applied. When distributing this annual cost over the 582 EDUs within the proposed sewer district, the annual O&M would be $17,17 per year.

### 1.2.3 Wastewater Processing Costs

The Hamburg Street Sewer District conveys all sewage to the City of Schenectady sewer system. The Intermunicipal Agreement (agreement) between the Town and City is renewed every five years with these charges adjusted annually based upon the Consumer Price Index. Pursuant to the agreement, receiving water service from a municipal system via a metered connection, the 2015 rate was $39.70 per year plus $2.08 per 100 cubic feet of water used. As noted in the Hamburg Street Sewer District Map, Plan and Report, this is equivalent to approximately $248 per year for the average single family residence (or per EDU).

### 1.2.4 Estimated Sewer District User Costs

With the addition of the projected EDUs from the Whispering Pines development, anticipated user charges for both existing and proposed users are as follows:

<table>
<thead>
<tr>
<th>User Costs</th>
<th>Hamburg Street Sewer District</th>
<th>Whispering Pines Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current</td>
<td>Future</td>
</tr>
<tr>
<td>Debt Service</td>
<td>$914</td>
<td>$273</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>$42</td>
<td>$12</td>
</tr>
<tr>
<td>Treatment</td>
<td>$208</td>
<td>$248</td>
</tr>
<tr>
<td>Total</td>
<td>$1,204</td>
<td>$533</td>
</tr>
</tbody>
</table>
Appendix J

Sewer Service Request Letters
March 20, 2017

Mr. Paul Lafond
Commissioner of Public Works
City of Schenectady
105 Jay Street
Schenectady, New York 12305

Sent via email only: plafond@schenectadyny.gov

RE: Village at Whispering Pines Senior Community
2200 Helderberg Avenue
Town of Rotterdam, Schenectady County, New York
MJ Project No. 843.09

Dear Mr. Lafond:

Lecce Senior Living, LLC is in the initial planning stages of a proposed senior living community located in the Town of Rotterdam, Schenectady County, New York. Included as an attachment is a site location map showing the project location and a concept site plan illustrating the project layout.

It is proposed to direct sewage from the project site to the recently formed Hamburg Street Sewer District, operated by the Town of Rotterdam. We understand that the infrastructure associated with this district will be installed as part of the reconstruction of Hamburg Street through a New York State Dept. of Transportation betterment agreement with the Town of Rotterdam. We understand that the infrastructure is planned for completion some time in 2018. This sewer district discharges to the City of Schenectady sewer system via a pump station and forcemain.

Included as an attachment is the preliminary calculations for the sanitary sewer loading, which is summarized as follows:

- Average Day: 88,572 gallons per day (GPD)
- Peak Hourly: 228 gallons per minute (GPM) @ 3.7 X Average Day
  (per Ten State Standards for approx population of 1,300)

As part of the Town of Rotterdam’s regulatory review, we are preparing an Engineer’s Report that assesses the ability to construct the proposed sanitary sewer facilities and connect to the Hamburg Street Sewer District. This will be provided to you, once complete. Until such time that the report is complete, we would request that the City of Schenectady confirm whether or not adequate sewer capacity exists within the City’s sewer system to support the planned
project. If there are specific areas within the City’s sewer system where capacity is unknown, we will incorporate an assessment of those areas to the greatest extent that we can.

Should you have any questions or concerns, please do not hesitate to contact me directly at (518) 371-0799 or via email at jbianchi@mjels.com.

Sincerely,

Joel M. Bianchi, P.E.
Municipal Engineering
Group Manager

JMB/enc
Site Location Map
Concept Site Plan
Sanitary Sewer Loading Calculations

w/o attachments
cc. Lou Lecce, Applicant
    Terresa Bakner, Applicant’s Legal Counsel
    File
Whispering Pines Senior Community

Sewage Generation Estimates

<table>
<thead>
<tr>
<th>Use</th>
<th># Units</th>
<th>Size SF Ea</th>
<th>Total SF</th>
<th>Loading Rate GPD</th>
<th>Sewage Rate GPD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent Living Units</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 bedroom, 1 bath</td>
<td>104</td>
<td>640</td>
<td>21,120</td>
<td>110</td>
<td>11,440</td>
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<tr>
<td>1 bedroom, 1 bath, den</td>
<td>77</td>
<td>800</td>
<td>16,800</td>
<td>110</td>
<td>8,470</td>
</tr>
<tr>
<td>2 bedroom, 1.5 bath</td>
<td>51</td>
<td>960</td>
<td>13,440</td>
<td>110</td>
<td>11,220</td>
</tr>
<tr>
<td>2 bedroom, 1.5 bath, den</td>
<td>46</td>
<td>1,120</td>
<td>13,440</td>
<td>110</td>
<td>10,120</td>
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<tr>
<td><strong>Assisted Living Neighborhood</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Studio</td>
<td>27</td>
<td>400</td>
<td>1,200</td>
<td>110</td>
<td>2,970</td>
</tr>
<tr>
<td>1 bedroom apartment</td>
<td>63</td>
<td>500</td>
<td>3,500</td>
<td>110</td>
<td>6,930</td>
</tr>
<tr>
<td>1 Bedroom + Den Apartment</td>
<td>36</td>
<td>670</td>
<td>2,680</td>
<td>110</td>
<td>3,960</td>
</tr>
<tr>
<td>2 bedroom apartment</td>
<td>18</td>
<td>750</td>
<td>1,500</td>
<td>110</td>
<td>3,960</td>
</tr>
<tr>
<td><strong>Memory Care Neighborhood</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 bed Semiprivate Apartment</td>
<td>72</td>
<td>500</td>
<td>6,000</td>
<td>110</td>
<td>7,920</td>
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<tr>
<td>1 bedroom private apartment</td>
<td>36</td>
<td>300</td>
<td>1,800</td>
<td>110</td>
<td>3,960</td>
</tr>
<tr>
<td><strong>Independent Living Common Areas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resident Dining</td>
<td>192</td>
<td>seats</td>
<td>4,302</td>
<td>35</td>
<td>3,360</td>
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<tr>
<td>Swimming Pool</td>
<td>200</td>
<td>swimmers</td>
<td>1,500</td>
<td>10</td>
<td>1,500</td>
</tr>
<tr>
<td>Spa</td>
<td>30</td>
<td>swimmers</td>
<td>300</td>
<td>10</td>
<td>300</td>
</tr>
<tr>
<td>Salon</td>
<td>5</td>
<td>station</td>
<td>200</td>
<td>1,000</td>
<td>200</td>
</tr>
<tr>
<td>Fitness Studio</td>
<td>25</td>
<td>patron</td>
<td>500</td>
<td>5</td>
<td>125</td>
</tr>
<tr>
<td>Assembly/Performing Arts</td>
<td>300</td>
<td>seats</td>
<td>3,000</td>
<td>5</td>
<td>1,500</td>
</tr>
<tr>
<td><strong>Senior Center</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Café</td>
<td>60</td>
<td>seats</td>
<td>25</td>
<td>1,500</td>
<td>1,350</td>
</tr>
<tr>
<td><strong>Facility Employees (excludes golf course)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employees</td>
<td>30</td>
<td>employees</td>
<td>15</td>
<td>450</td>
<td>(NYSDEC 2014)</td>
</tr>
<tr>
<td><strong>Single Family Homes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 bedroom detached</td>
<td>97</td>
<td></td>
<td>21,340</td>
<td>110</td>
<td>21,340</td>
</tr>
<tr>
<td>2 bedroom condo</td>
<td>30</td>
<td></td>
<td>6,600</td>
<td>110</td>
<td>6,600</td>
</tr>
<tr>
<td><strong>Golf Course</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rounds of golf (per day)</td>
<td>32</td>
<td>rounds/day</td>
<td>0</td>
<td>20</td>
<td>640</td>
</tr>
<tr>
<td>Lounge</td>
<td>25</td>
<td>seats</td>
<td>0</td>
<td>35</td>
<td>875</td>
</tr>
<tr>
<td><strong>Medical Office/ Urgent Care</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Units</td>
<td>1</td>
<td>5000</td>
<td>5000</td>
<td>0.1</td>
<td>500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>110,715</td>
<td>GPD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted Avg</td>
<td>88,572</td>
<td>GPD</td>
<td></td>
<td></td>
<td>20% reduction for water saving fixtures (NYSDEC 2014)</td>
</tr>
<tr>
<td>Max</td>
<td>177,144</td>
<td>GPD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Hour</td>
<td>228</td>
<td>GPM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
May 17, 2017

Mr. James Longo
Town of Rotterdam Department of Public Works
John F Kirvin Government Center
110 Sunrise Boulevard
Rotterdam, New York 12306

Sent via email and regular mail: jlongo@rotterdamny.org

RE: Village at Whispering Pines Senior Community
Request for Sanitary Sewer Service
2200 Helderberg Avenue
Town of Rotterdam, Schenectady County, New York
MJ Project No. 843.09

Dear Mr. Longo:

Lecce Senior Living, LLC is in the initial planning stages of a proposed senior living community located at 2200 Helderberg Avenue within the Town of Rotterdam, Schenectady County, New York. Two options have been considered for providing public sanitary sewer service to the project described as follows:

- Option 1, connecting to the Town's Hamburg Street Sewer District, which conveys sewage to the City of Schenectady's collection system; and

- Option 2, connecting to the Helderberg Meadows sewer collection system, which is part of the Town's collection system and discharges to the Town's wastewater treatment plant.

We sent a sewer service request to Mr. Paul Lafond of the City of Schenectady on March 20, 2017 for Option 1 and are awaiting a formal response on that request.

The preliminary calculations for the sanitary sewer loading for the project are summarized as follows:

Average Day: 81,214 gallons per day (GPD)
Peak Hourly: 209 gallons per minute (GPM) @ 3.7 X Average Day
(per Ten State Standards for approx population of 1,300)

We have prepared and submitted an Engineer’s Report to the Town and the Town's consulting engineer, CHA that assesses the ability to construct the proposed sanitary sewer facilities and
connect to either the Hamburg Street Sewer District (Option 1) or the Helderberg Meadows sewer collection system (Option 2).

As part of the continued review of the project by the Town Board of the Town of Rotterdam, we would request that the Town Department of Public Works / Sewer Department confirm whether the Town can provide sanitary sewer service to the project for Option 1 and/or Option 2.

We kindly request that the Town Department of Public Works / Sewer Department provide a written response in regards to our request so that the Town Board may include it as part of the project records.

Should you have any questions or concerns, please do not hesitate to contact me directly at (518) 371-0799 or via email at jbianchi@mjels.com.

Sincerely,

Joel M. Bianchi, P.E.
Municipal Engineering
Group Manager

cc.  Lou Lecce, Applicant
     Terresa Bakner, Applicant's Legal Counsel
     Steven Tommasone, Town Supervisor
     Peter Comenzo, Senior Planner
     File
Appendix K

McDonald Engineering Correspondence
Jared Fagan

From: Doug Cole <dcole@primeeng.com>
Sent: Wednesday, May 17, 2017 12:26 PM
To: Jared Fagan
Cc: Joel M. Bianchi
Subject: RE: Whispering Pines

Jared,

Based upon the known planned development and projects under construction within the sewer district, it does not appear that the Whispering Pines project wastewater flows would trigger an upgrade to the WWTP. However, NYSDEC could still require this to be explored further.

A detailed hydraulic capacity analysis of the gravity sewers that the project would utilize should be performed. We are aware of existing flow issues in sections of the sewers on Sunrise Boulevard, between Guilderland Ave and Curry Road.

Sincerely,

Douglas P. Cole, PE
Director of Wastewater Systems - NY Division

John M. McDonald Engineering, a member of PRIME AE Group, Inc.
7 South Church Street | Schenectady, New York 12305
Work: 518 382 1774 | Fax: 518 382 1776| Cell: 518 421 2329 | Email: dcole@primeeng.com
www.primeeng.com

From: Jared M. Fagan [mailto:jfagan@mjels.com]
Sent: Monday, May 15, 2017 1:45 PM
To: Doug Cole <dcole@primeeng.com>
Cc: Joel Bianchi <jbianchi@mjels.com>
Subject: RE: Whispering Pines

Doug

If it is at all possible, can you provide a brief narrative in regards to two items outlined below that deal with the Whispering Pines Senior Living project:

1. We have provided you with the initial average day sewage loading rate for the project and understand that you are using that as you evaluate potential future upgrades at the WWTP. Can you confirm that you have this information and are using it as you develop potential capacity upgrades at the WWTP? When adding in our flows to the summary furnished, we find that there would be approximately 15% reserve capacity remaining. Do you foresee that upgrades at the WWTP would be necessary prior to or as part of Whispering Pines coming on-line or that the upgrades are long term and not directly related to any known development project within the Town.

2. Our project considers two options to provide sanitary sewer service, one of which sends sewage to the Town of Rotterdam (Option 2). Option 2 will send sewage to the Helderberg Meadows sewer system, which then pumps to the Town’s gravity system near Palm Street. From that point, we understand that sewage flows through the Town’s collection system and ultimately to the Town’s WWTP. Having the most experience with the Town’s
collection system, are you aware of any capacity limitations from Palm Street to the Town’s WWTP that would be of concern should the project utilize Option 2?

One final item, CHA, the Town’s TDE for the project has suggested that the Town may want you to look at our report for the Option 2 analysis. We will be sending you a copy with transmittal letter in case the Town does in fact request that review. But don’t review it until the Town requests it.

Thank you for all your help.

Regards,

Jared Fagan
Design Engineer, E.I.T.
MJ Engineering and Land Surveying, P.C.
1533 Crescent Road, Clifton Park, NY 12065
P: 518.371.0799  F: 518.371.0822
Appendix L

NYS Thruway Correspondence
Kurt,

I have reviewed the conceptual sanitary sewer alignment plan as prepared by your company, M.J. Engineering and Land Surveying, PC dated March 2, 2017, for the Whispering Pines project within the Town of Rotterdam, Schenectady County, approximate NYS Thruway mile post 155.55. While it is not standard practice for our department at this stage of its review, we take no exception to the crossing of the right-of-way as we do consider and approve such utility crossing throughout the Thruway corridor.

This should not be considered in any way as an approval of the crossing being proposed, but rather it is an activity we do receive requests for and approve or disapprove based on the merits of the activity. The Thruway Authority will make a final determination on the viability of the utility crossing being considered, once detailed engineering plans along with a Use and Occupancy Permit are submitted for our consideration.

Gary J. Raylinsky Jr. PE
Assistant Division Maintenance Engineer, Albany Division
Acting Permit Coordinator, Albany Division

NYS Thruway Authority
200 Southern Blvd., P.O. Box 189 Albany, NY 12201
(518) 436-2710 | gary.raylinskyjr@thruway.ny.gov
www.thruway.ny.gov

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