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August 10, 2018

**VIA UPS**

Mr. Michael Turturro  
 Highland Avenue Marlboro, LLC  
 11 Racquet Road  
 Newburgh, New York

Re: Marlboro on Hudson  
 Tax Parcel 108.12-8-23  
 Town of Marlborough, Ulster County, New York  
MC Project No. 030218F

Dear Mr. Turturro:

As requested, Maser Consulting P.A. investigated the impacts to sewer and water for the development Marlboro on Hudson with the proposed project buildout having a total of 3 bedrooms for each of the 24 new units, one additional over what was approved for the site.

The originally approved site Sanitary Sewer pump Station Design Report used an average daily flow of **10,800 Gpd** and a peak flow Rate of **44,280 Gpd** using the applicable design standards of 2003. The proposed flows were recalculated in accordance with New York state Design Standards for Intermediate Sized Wastewater Treatment Systems dated March 5, 2014, the calculations have been outlined below.

Average Daily Flow

110 Gpd for post 1994 plumbing code fixtures (Per Table B-3)

110 Gpd/bedroom * 12 units (existing) * 2 bedroom/unit	= 2,640 Gpd
110 Gpd/bedroom * 24 units (new) * 3 bedroom/unit	= 7,920 Gpd
Total	= <b>10,560 Gpd</b> (240 Gpd < approved)

Peak flow Rate

Peaking factor	= 4.1
10,560 * 4.1	= <b>43,296 Gpd</b> (984 < approved)

The previously approved sanitary sewer pump station design report, prepared by Maser Consulting, Dated November 13, 2003 has been attached to this letter for reference.

As shown, the proposed additional bedroom will not have an increase impact with regards to sewer and water flows. Additionally, Maser Consulting performed an inspection on the existing pump station on May 25, 2018, where the pump components were tested. It was determined that the

Customer Loyalty *through* Client Satisfaction



Chairperson Chris Brand  
MC Project No. 030218F  
August 10, 2018  
Page 2 of 2

pump station was generally built in accordance with the approved plan and was operating as designed. It is however required that a generator be installed on existing pad next to the pump station per the approved plan, as it does not have the required 24 hour storage.

Very truly yours,

MASER CONSULTING P.A.

A handwritten signature in blue ink, appearing to read 'Andrew B. Fetherston', is written over the printed name.

Andrew B. Fetherston, P.E.  
Principal Associate

ABF/pa  
Enclosures

R:\Projects\2003\03-0218F Marlboro on Hudson\Reports\SEW PUMP STA REPORT FINAL FOR UCDH\180820 Updateed Flow Calc.docx



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*Pine View Corners Subdivision  
Highland Avenue  
Town of Marlborough  
Ulster County, New York*

Tax Lot 108.12-8-23

Sanitary Sewer Pump Station Design Report

Dated: August 13, 2003  
Revised: November 13, 2003

A handwritten signature in black ink, appearing to read 'Andrew B. Fetherston', written over a horizontal line.

Andrew B. Fetherston, P.E., CPESC  
N.Y.S. License No. 073555



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PROJECT: Pine View Corners  
Highland Avenue  
Town of Marlborough  
Ulster County, New York  
MC Proposal No. 03-0218A

SCOPE: Sanitary Sewer Pump Station Design Report

DATE: August 13, 2003  
REVISED November 13, 2003

#### INTRODUCTION:

The proposed construction of thirty-six (36), two-bedroom housing units requires a flow determination and sanitary sewer pumping station design. The design presented herein meets the Standards for Wastewater Treatments Works 1988, NYSDEC and the Ten State Standards, 1997.

#### METHODOLOGY:

1. The average daily flow was determined by multiplying the number of units by the number of gallons per unit per day.
2. The peak flow was determined by multiplying the average daily flow by 4.1<sup>(1)</sup>.
3. The route of the new forcemain has been laid out on a plan view. The length of forcemain, discharge elevation and pump elevation were determined.
4. A two (2") forcemain was assumed for the calculation of total dynamic head (TDH).
5. The Hazen Williams formula was used to calculate the total dynamic head for a series of flow values.
6. This series of flow values vs. TDH (the system curve) was plotted on a pump curve.
7. The operating point was determined for one pump.
8. The system curve was plotted on a modified pump curve representing two pumps operating.
9. The float switch elevations were set to eject the collected sewage.

#### DISCUSSION:

Per the Standards for Wastewater Treatments Works 1988, NYSDEC, the velocity in the forcemain has been calculated to be 3.17 feet per second (fps), greater than the minimum value of 2 fps. The pipe size, two-inch (2") diameter is sufficient to handle the required flow rate. The head loss does not exceed the pumping pressure capabilities. The system curve was plotted, the use and capacities discussed and faxed to the manufacturer for review. The pump model and impeller selection was determined by the manufacturer, and reviewed by the designing engineer. The system curve plotted on the pump curve shows the operating points for the one and two pumps operating.

The forcemain shall be installed four feet below grade and shall be marked with tracer tape for location. A high point air release and cleanout shall be provided in the receiving manhole.

A generator shall be provided onsite to provide standby emergency power.

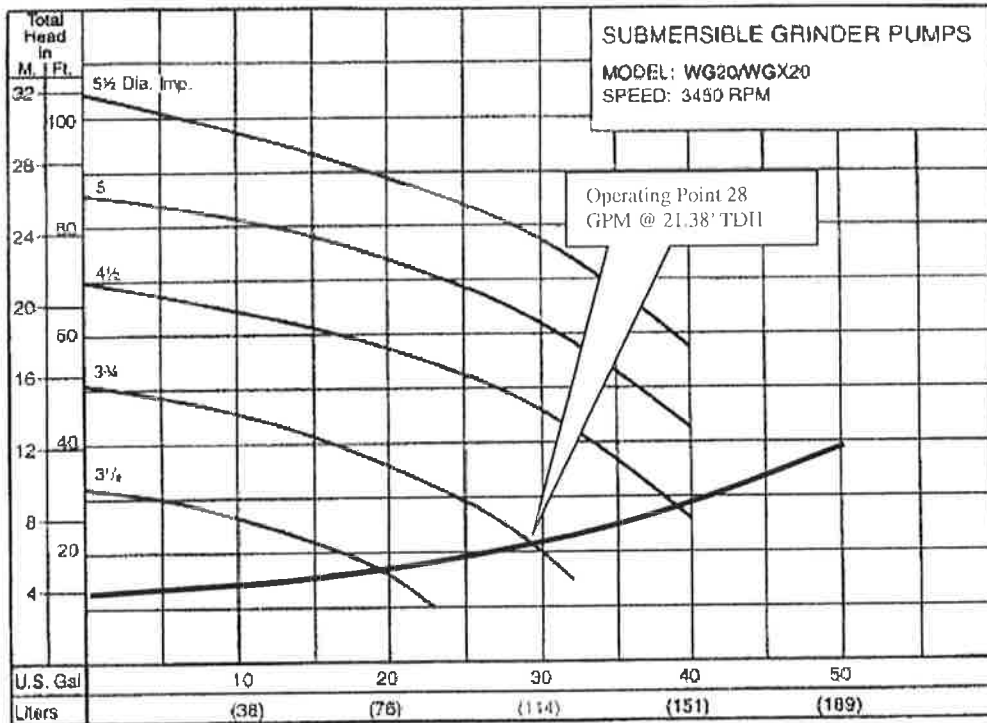
2" Forcemain, Pvc Sched 80				
Velocity In Force Main				
<b>1 Pump Running</b>				
Pipe Inside Diameter	2.00	In		
Pipe Area	0.022	Sq Ft		
Operating Flow Rate	28.0	Gpm		
	0.062	Cfs		
Operating Velocity	2.86	Fps		
<b>2 Pumps Running</b>				
Pipe Diameter	2.00	In		
Pipe Area	0.022	Sq Ft		
Operating Flow Rate	48	Gpm		
	0.107	Cfs		
Operating Velocity	4.90	Fps		
Cycle Time				
Basin Diameter	4	Ft	Average Inflow	10800 Gpd
Basin Area	12.57	Sq Ft	Average Inflow	7.50 Gpm
Depth Of Effluent	1.5	Ft	Quantity Of Effluent	140.99 Gal
Quantity Of Effluent	18.85	Cf	Ave. Time/Cycle	18.8 Min
Quantity Of Effluent	140.99	Gal	Peak Time/Cycle	7.5 Min
Time For 1 Pump To Empty Basin	5.0	Min		
Time For 2 Pumps To Empty Basin	2.9	Min		
Quantity Of Effluent In Force Main				
Force Main Diameter	2.00	In		
Force Main Area	0.022	Sq Ft		
Force Main Length	290	Ft		
Quantity Of Effluent In Force Main	6.33	Cf		
	47.32	Gal	Forcemain Is Cleared Each Cycle	
Float Switch Height From Wet Well Inv.				
Pump Off	0.5	Ft		
1 Pump On	2	Ft		
2 Pumps On	2.5	Ft		
Alarm On	3	Ft		
Flow Estimation				
Gal/Unit/Day	300			
Number Of Units	36			
Flow Rate (Gpd)	10800	Average Daily Flow		
Peaking Factor	4.1			

Flow Rate (Gpd)	44280	Peak Daily Flow			
Peak Daily Flow	30.75	Gpm			
2 Hour Storage Capacity					
2 Hour Volume	900	Gal			
2 Hour Volume	120.32	Cf			
Wet Well Area	12.57	Sf			
Depth Req'd.	9.57	Ft			
Wet Well Top (Rim Elev.)	371.20	Ft			
Wet Well Inv. In	355.89	Ft			
Depth Provided	15.31	Ft			
Maximum Storage Capacity					
Generator Provided					

Computation Of System Dynamic Head Losses, 2" Sch. 80 Forcemain				
Flow: Gpm	28.0	Peak Factor		4.1
		<b>Num. Pumps On</b>		<b>1</b>
Design Flow:Cfs	0.062	Flow: Gpd		40320.0
<u>Item</u>	<u>Value</u>	<u>Head Loss</u>	<u>Computations</u>	
<b>Internal Piping</b>				
			High Point	371.73
Diameter:Inches	2.00		Pump Elev.	355.89
Length Of Pipe:Ft	6		Static Head	15.84
Hazen C Factor	150		Dynamic Head	5.54
Area Pipe:Sf	0.02			
Hydraulic Radius:Ft	0.04		Total Head	21.38
Design Flow: Gpm	28.00			
Velocity:Fps	2.859			
Head Loss:Ft	0.10	0.10		
<b>Bend 90 Degrees</b>				
K Value	0.75		Results For System Curve	
Velocity Fps	2.86		<u>Gpm</u>	<u>Tdh</u>
Head Loss: Ft	0.10	0.10	0.0	15.84
<b>Check Valve</b>				
			10.0	16.65
K Value	3		20.0	18.79
Velocity Fps	2.86		30.0	22.14
Head Loss: Ft	0.38	0.38	40.0	26.64
<b>Bend 90 Degrees</b>				
			50.0	32.25
K Value	0.75			
Velocity Fps	2.86			
Head Loss: Ft	0.10	0.10		
<b>Bend 90 Degrees</b>				
K Value	0.75			
Velocity Fps	2.86			
Head Loss: Ft	0.10	0.10		
<b>Gate Valve</b>				
K Value	0.25			
Velocity Fps	2.86			
Head Loss: Ft	0.03	0.03		
<b>Increaser</b>				
Initial Diameter: In.	2.00			
Increase To Dia.: In.	2.00			
K Value	0.46			
Velocity 1 Fps	2.86			
Velocity 2 Fps	2.86			
Head Loss: Ft	0.00	0.00		
<b>Bend 90 Degrees</b>				
K Value	0.75			
Velocity Fps	2.86			
Head Loss: Ft	0.10	0.10		

Forcemain Pipe			
Diameter:Inches	2.00		
Length Of Pipe:Ft	290		
Hazen C Factor	150		
Design Flow: Gpm	28.0		
Design Flow:Cfs	0.06		
Area Pipe:Sf	0.02		
Hydraulic Radius:Ft	0.04		
Velocity:Fps	2.86		
Head Loss:Ft	4.65	4.65	
Total Head Loss: Ft		5.54	

**Pump Performance**



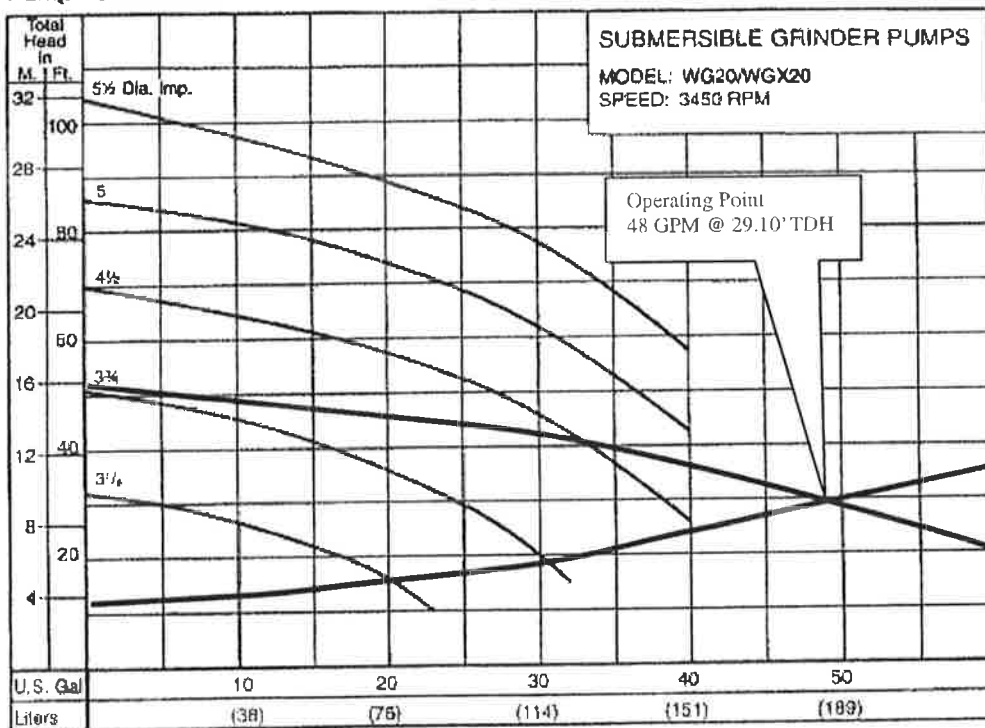
Available Models		Motor Electrical Data										
Standard	Explosion Proof	HP	Volts	Phase	Hertz	Start Amps	Run Amps	Run KW	Start KVA	Run KVA	NEC Code Letter	Service Factor
WG20-01-15	WG20-01-15	2	200	1	60	50.0	15.0	2.8	10.0	3.0	F	1.25
WG20-21-15	WG20-21-15	2	230	1	60	44.0	12.0	2.9	10.1	2.8	F	1.25
WG20-03-15	WG20-03-15	2	200	3	60	30.0	8.5	2.9	10.4	3.3	F	1.25
WG20-23-15	WG20-23-15	2	230	3	60	27.5	8.4	2.9	11.0	3.3	F	1.25
WG20-43-15	WG20-43-15	2	460	3	60	13.8	4.2	2.9	11.0	3.3	F	1.25



Computation Of System Dynamic Head Losses, 2" Sch. 80 Forcemain				
Flow: Gpm	48.0	Peak Factor		4.1
		<b>Num. Pumps On</b>		2
Design Flow:Cfs	0.107	Flow: Gpd		69120.0
<u>Item</u>	<u>Value</u>	<u>Head Loss</u>	<u>Computations</u>	
<b>Internal Piping</b>			High Point	371.73
Diameter:Inches	2.00		Pump Elev.	355.89
Length Of Pipe:Ft	6		Static Head	15.84
Hazen C Factor	150		Dynamic Head	13.26
Area Pipe:Sf	0.02			
Hydraulic Radius:Ft	0.04		Total Head	29.10
Design Flow: Gpm	24.00			
Velocity:Fps	2.451			
Head Loss:Ft	0.07	0.07		
<b>Bend 90 Degrees</b>				
K Value	0.75			
Velocity Fps	2.45			
Head Loss: Ft	0.07	0.07		
<b>Check Valve</b>			Results For System Curve	
K Value	3		<u>Gpm</u>	<u>Tdh</u>
Velocity Fps	2.45		0.0	15.84
Head Loss: Ft	0.28	0.28	10.0	16.56
<b>Bend 90 Degrees</b>			20.0	18.45
K Value	0.75		30.0	21.38
Velocity Fps	2.45		40.0	25.29
Head Loss: Ft	0.07	0.07	50.0	30.15
<b>Bend 90 Degrees</b>			60.0	35.91
K Value	0.75			
Velocity Fps	2.45			
Head Loss: Ft	0.07	0.07		
<b>Gate Valve</b>				
K Value	0.25			
Velocity Fps	2.45			
Head Loss: Ft	0.02	0.02		
<b>Increaser</b>				
Initial Diameter: In.	2.00			
Increase To Dia.: In.	2.00			
K Value	0.46			
Velocity 1 Fps	2.45			
Velocity 2 Fps	2.45			
Head Loss: Ft	0.00	0.00		
<b>Bend 90 Degrees</b>				
K Value	0.75			
Velocity Fps	2.45			

Head Loss: Ft	0.07	0.07	
<b>Forcemain Pipe</b>			
Diameter: Inches	2.00		
Length Of Pipe: Ft	290		
Hazen C Factor	150		
Design Flow: Gpm	48.00		
Design Flow: Cfs	0.11		
Area Pipe: Sf	0.02		
Hydraulic Radius: Ft	0.04		
Velocity: Fps	4.90		
Head Loss: Ft	12.61	12.61	
Total Head Loss: Ft		13.26	

**Pump Performance**



Available Models		Motor Electrical Data										
Standard	Explosion Proof	HP	Volts	Phase	Hertz	Start Amps	Run Amps	Run KW	Start KVA	Run KVA	NEC Code Letter	Service Factor
WG20-01-15	WGX20-01-15	2	200	1	60	80.0	15.0	2.8	10.0	3.0	F	1.25
WG20-21-15	WGX20-21-15	2	230	1	60	44.0	12.0	2.8	10.1	2.8	F	1.25
WG20-03-15	WGX20-03-15	2	200	3	60	30.0	9.5	2.9	10.4	3.3	F	1.25
WG20-23-15	WGX20-23-15	2	230	3	60	27.5	8.4	2.9	11.0	3.3	F	1.25
WG20-43-15	WGX20-43-15	2	480	3	60	12.8	4.2	2.9	11.0	3.3	F	1.25

CONCLUSION:

The proposed pump station and forcemain have ample capacity to handle a wide variety of flows including peak hourly. The pump station and appurtenances meet the requirements of the Standards for Wastewater Treatments Works 1988, NYSDEC.

Submitted By:

Andrew B. Fetherston, P.E.

- (1) (10 State Standards) Recommended Standards For Wastewater Facilities (1997 Ed.) Prepared By The Great Lakes-Upper Mississippi River Board Of State Public Health And Environmental Managers.