Village of Marcellus

6 Slocombe Street
Marcellus, NY 13108

FLOW MANAGEMENT PLAN AND WASTEWATER TREATMENT PLANT CAPACITY STUDY

for the

VILLAGE OF MARCELLUS WASTEWATER TREATMENT FACILITY AND SANITARY SEWER SYSTEM

TOWN OF MARCELLUS SANITARY SEWER SYSTEM

MARCELLUS CENTRAL SCHOOL DISTRICT SANITARY SEWER SYSTEM

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I. INTRODUCTION

The Village of Marcellus operates and maintains a Publicly Owned Treatment Works (POTW) including a wastewater treatment plant and associated sewer collection system. The Town of Marcellus also owns two Sewer Districts with sewer collection systems that transport wastewater flows to the Village system for treatment. Inflow and Infiltration (I&I) has become an increasingly significant concern within the collection systems and have had a direct impact on the Wastewater Treatment Plant (WWTP).

For the year 2010 and 2011, the plant's annual average daily flows were 0.380 MGD and 0.390 MGD, respectively. In addition, 6 NYCRR Part 750-2.9 requires that a Flow Management Plan shall be developed when annual average flows reach 95% of design flow. For the Village of Marcellus WWTP, 95% of the design flow rate would be 0.36 MGD. As shown in Figure 1, it appears that the annual average flow does exceed the 95% flow limit.

The following Flow Management Plan will help guide the Village in addressing I&I issues and identify processes and methods to reduce flows entering the sewer collection system. Excessive I&I may cause significant problems with plant performance and also imposes excessive treatment and pumping costs on the collection and treatment systems. These are unnecessary expenses that the Village of Marcellus wishes to minimize. It should be noted at this time that the Village Marcellus is working with the Town of Marcellus to identify high risk areas of I&I within their collection system. Negotiations are currently underway for the Village to ultimately take over the Town's sewer system. The following Flow Management Plan is intended to address the items noted in the regulations and also provide an implementation plan that reduces and stabilizes influent flows below 95% of the influent design flow.

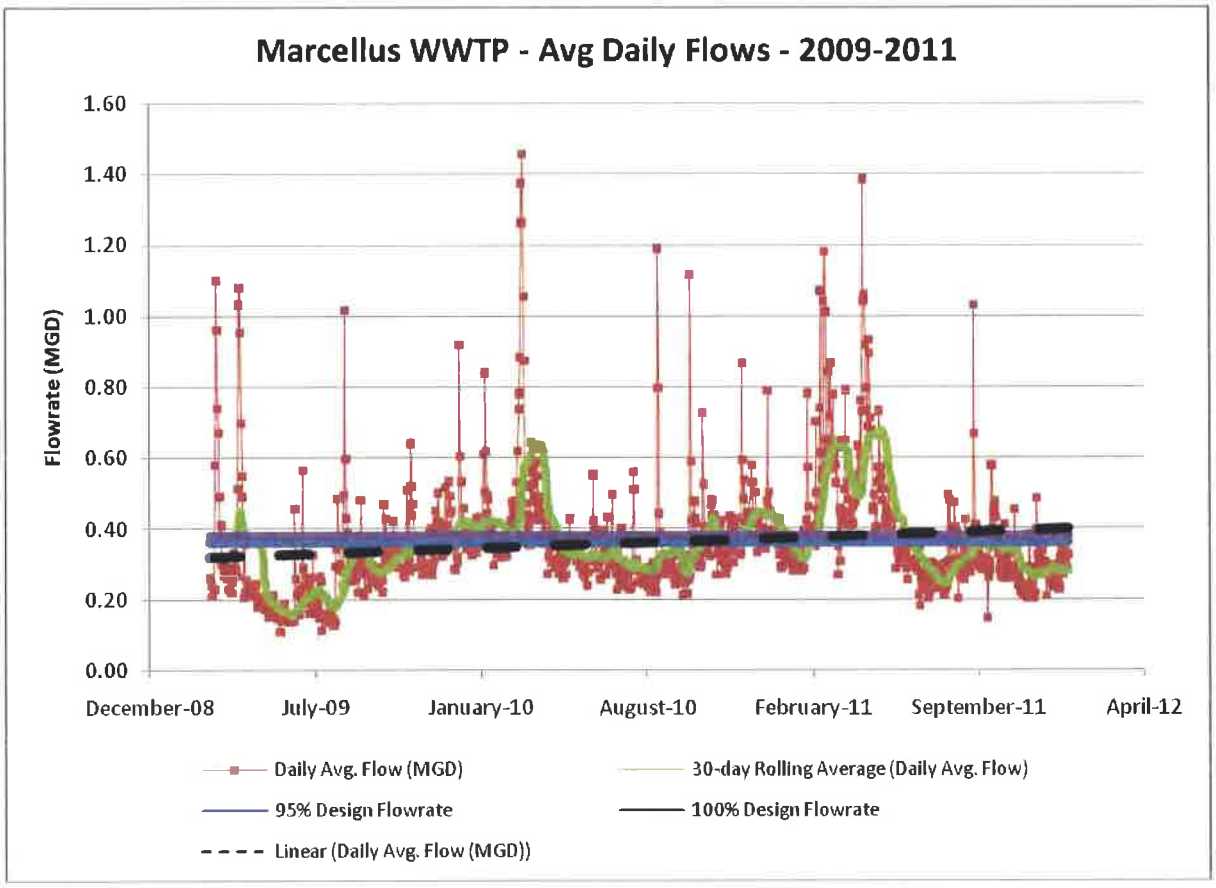


Figure 1: Average Daily Flows - 2009 - 2011

The Village of Marcellus is also planning for future permit limits for Phosphorus since they are part of the Onondaga Lake drainage basin. This report also investigated the capacity of the existing treatment plant and potential upgrades that may be necessary to meet these new permit limits.

II. Flow Management Plan

A. System Description

1. Wastewater Treatment Plant (WWTP)

The WWTP currently has a design average flow of 0.38 MGD. This can be referenced on the Effluent Limitations and Monitoring Requirements section of the SPDES permit, in Appendix A. The plant generally consists of an entrance structure which includes a manual bar screen, horizontal grit chamber, a parshall flume, and a comminutor. Flow then proceeds by gravity to two Contact Aeration Tanks. Following biological treatment in the aeration tanks, the wastewater is conveyed by gravity through the final clarifiers. After sufficient settling is achieved in the clarifiers, the wastewater travels via gravity to the chorine contact tank for disinfection and dechlorination before it is ultimately discharged into Nine Mile Creek. Biosolids treatment begins in the Contact Aeration Tanks. The sludge from these tanks are then pumped to two Reaeration Tanks for additional biological treatment and then sent to two Aerobic Digesters for stabilization. Then the stabilized biosolids are dewatered using a gravity belt filter press. Dewatered solids were historically hauled to a nearby permitted landfill facility, but the Village of Marcellus recently completed the construction of a new Compost Facility. Within this Compost Facility, the waste biosolids are mixed with wood chips where organisms will further treat the waste and produce a recycled product that can be used as a fertilizer or soil amendment. More details of the treatment plant will be discussed in later sections of this report.

2. Sewer Collection System

The Village sewer collection system is shown on the Preliminary Sanitary Sewer Map in Appendix B. The sewer system includes the Village and two sewer districts in the Town of Marcellus and the Marcellus Central School District. The

collection system includes mostly 8" sanitary sewer main which eventually leads into one main trunk line conveying sewage to the WWTP. In addition to the sanitary sewer collection system shown in Appendix B, the Village contains three pump stations throughout the sewer system. Most of these pump stations are relatively small and contribute a small amount of flow to the overall collection system. A list of the various pump stations can be found in Appendix C.

B. Influent Flow Evaluation

After review of the WWTP flows and the nature of incoming flows during wet weather events, it is evident that the sewer collection system is experiencing significant inflow and infiltration. In addition to those reasons stated earlier in the report, this can typically be determined by comparing dry weather flows (typical normal sanitary flow) to wet weather flows. The hydrograh below shows the direct correlation of a storm event and the resulting flow increases that were experienced at the Marcellus WWTP. Historical weather data from the Syracuse International Airport was used for this evaluation due to a lack of weather station data from within the Village of Marcellus.

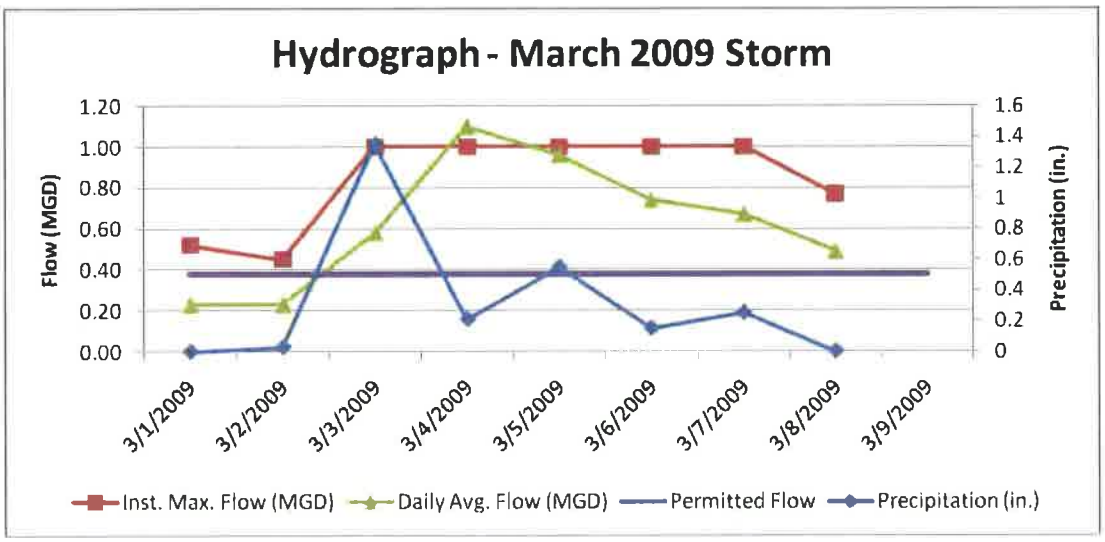


Figure 2: Hydrograph - March 2009 Storm Event

Past monthly reports indicate an average flow of 0.380 MGD in 2010 and 0.390 MGD in 2011. This equates to a two year average flow of 0.385. In addition, peak flows of 2.0 MGD and 2.0 MGD were recorded in 2010 and 2011, respectively. However, it is important to note that these excessively large peak flows do not occur in a high frequency. Based on the data provided for 2009 through 2011, it appears that a more typical peaking factor for the Marcellus WWTP would be 1.98, or 0.75 MGD, during peak flow events. As a worst case scenario, a peaking factor of 4, or 1.5 MGD, is assumed in this report to evaluate the appropriate capacity of the WWTP unit operations. Past minimum, average and peak flows all show a significant increase during wet weather. It is quite evident that if I&I is reduced accordingly, flow to the treatment may be reduced and potentially maintained below 95% of the design average.

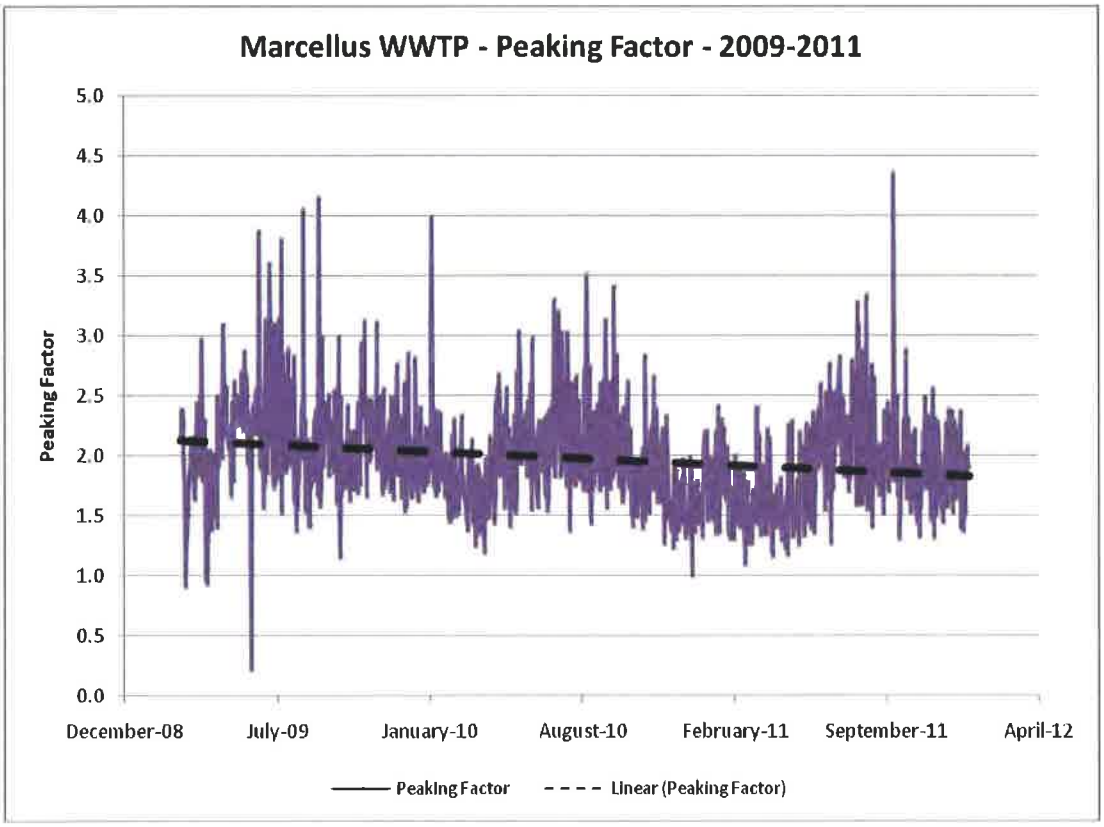


Figure 3: Peaking Factor Trend - 2009 - 2011

Lastly, an estimation of water consumption data for the Village was calculated based on a

per user basis of 250 gpd/user. This estimation indicates an approximate water usage of 303,000 GPD, or 80% of the Design Flow. The sewer plant experienced an average flow of 390,000 GPD in 2011, well beyond the water being conveyed to the users. Since the majority of sewer users and water users are the same, this may also be an indication that additional water sources (ground and surface waters) are leaking into the collection system.

III. POTW SERVICE AREA

A. DESCRIPTION OF SERVICE AREA

According to the United States 2010 Census and additional population data, the Village and Town of Marcellus have a combined population of 8,023 people. From this population, there are currently 932 Village Users and 284 Town Users connected to the sewer system. The users are primarily residential, some commercial, and a single significant demand user (Marcellus Central School District). At this time there are no identified significant industrial users (SIU's) requiring pre-treatment or SIU permits. Utilizing the population and water usage estimate, we estimate the overall sewer usage to be around 0.303 MGD, which is equivalent to that expected based on water usage. This also supports that the existing average flow to the plant is above that to be expected.

The sewer system also serves two additional town districts outside, Town of Marcellus Sewer District No. 1 and 2. Appendix D includes the Inter-Municipal agreement between the Village of Marcellus and the Town of Marcellus Sewer Districts as well as the current Village Sewer Use Law.

B. SERVICE AREA AUTHORITY

6 NYCRR Part 750-2.9(c)(1)(a) requires that the permittee (Village of Marcellus) have authority over all parts of the POTW service area. As noted in the Sewer Use Law and the inter-municipal agreement with the Town of Marcellus, it is evident that the Village

has sufficient jurisdiction over the service area to implement and enforce the following flow management plan.

C. Inventory of Future Connections

At this point in time or in the near future, there are no significant connections anticipated to the sewer system. Periodic residential connections may be expected. These connections and their associated flows would be insignificant in contribution to the existing flow to the plant. Any industrial and/or flows of higher significance would be considered on a case by case basis.

IV. Flow Management

As noted in section I, I&I is thought to be the primary contributor to the high flows being experienced at the WWTP. The following section provides some insight on some I&I efforts, a plan to address future potential I&I problems, and a plan to identify and address existing I&I flows.

A. Recent Flow Management Efforts

1. Sewer Inspections

a. Village

The Village has a record of a smoke testing study that was performed around the late 1970's; however, this data is approximately 40 years old and quite outdated. The Village has recently put forth efforts to begin to address I&I as noted below:

The Village has proactively taken measures to inspect the collection system within the Village by hiring the County to videotape the sewer piping located within the entire Village over a five year period. This videotaping has been

utilized in the sewer collection system to investigate problem areas and/or areas of blockage in order to expedite sewer cleaning or repair. It is unknown if any videotaping or inspection procedures have been completed on the sewers located within the Town. It is unlikely as many of the manholes have been paved over with asphalt over the years.

b. Town

There was little information available regarding past sewer monitoring within the Town sewer districts. It was reported that many of the manholes have been covered by asphalt over the years.

Since many of the manholes are inaccessible at this point in time, it is vital to begin a program to field verify the locations of all the manholes within the Town and to bring the tops and covers to surface grade to allow access for inspection and flow measuring purposes. It is important to note that this could be an expensive venture and should be implemented over several years to minimize capital expenditures on the limited budget that exists and the fact that there are not available staff resources to complete these repairs all at one time. We recommend focusing on areas that you suspect may contribute I&I based on surrounding terrain surfaces, areas prone to flooding, more densely populated areas, or areas with poorly drained soils. Identifying these higher risk areas first may result in more noticeable results in the near-term.

Once all of the manholes are uncovered, it is recommended for the Town to plan to adopt a periodic videotape inspection program similar to that of the Village. Through an agreement with the County, the Village is on a five year inspection program for televising and documenting deficiencies within their sewer system.

Due to a lack of any baseline flow data from the Town sewer system, it is recommended to obtain such useful data once a sufficient number of manhole locations are uncovered to determine if the implemented measures are resulting in reductions to flows within the sewer system.

One area that may require special attention is illegal sump pump, roof leader or other storm drain connections. Generally, the Town sewer system is much newer than the Village system and is therefore less prone to I&I occurring through deteriorated sewer pipes. Therefore we anticipate that some of the I&I flows coming from the Town may be due to illegal lateral connections. This will ultimately require some type of inspection program to assure that connections bringing storm or groundwater into the sanitary system are eliminated wherever possible.

In conclusion, the tasks listed below are recommended for the Town sewer system. In order to accomplish these activities, a team effort between the Town and Village is essential.

- Sewer video tape inspections
- Sewer smoke testing
- Manhole flow metering
- New service lateral connection inspection program
- Existing service/sump pump inspection program
- Expose and/or elevate all hidden manholes
- Monitor pump station output flows/run times

c. School District

There was also little information available regarding past sewer monitoring within the Marcellus Central School District Campus. Because the campus is similar to the Village with regard to development density, it is extremely important to identify any cross connections of the storm sewers, or any other similar illicit discharge sources, to the sanitary sewers. Due to the high concentration of impervious surfaces (i.e. buildings and pavement) found on the school campus, even a single cross connection could contribute a huge amount of I&I into the public sewer system. Therefore, it is extremely important to continuously inventory, inspect, and maintain the infrastructure found in this area.

Tasks that would be pertinent to the school district system would include the following:

- Sewer video tape inspections
- Sewer smoke testing
- Manhole flow metering
- Illicit discharge/pipe condition inspection program

2. Manhole Meters

a. Village

The Village has also undertaken investigative actions such as measuring dry and wet weather flows at several locations within the system (Manholes 25, 29, 92, 115A, 152, 173, 193, 192). These measurements were collected using portable flow metering equipment, ISCO Flow Poke. The Village plans to perform similar investigation activities at several more areas believed to have significant I&I issues (Manholes 18, 19, 35, 147) to identify if these are indeed problem areas and obtain detailed data. The meters will be utilized in an ongoing I&I study, further discussed later on in this report.

b. Town

Due to the lack of accessible manholes within the Town system, manhole metering may be very difficult. As mentioned earlier, it is recommended to begin uncovering and locating sealed manholes to allow for future manhole metering activities. In order to alleviate I&I impacts, it will be prudent to begin uncovering manholes in areas that are suspected of I&I or reside within more densely developed areas in the Town.

c. School District

There were no records available for manhole metering on the Marcellus CSD

campus. Due to the small size of this sewer network compared to the Town and Village systems, it should take less time to meter several manholes on the campus to determine the baseline flows that can be expected from this contributor. Since there are only a few connection points to the Village system it should prove much easier to identify and control problem areas that may be contributing I&I into the sewer collection system.

3. Repair/Reline/Grout & Patch

a. Village

Through televising, the Village has also identified areas of concern within the sanitary sewer system that will need to be repaired or relined. Those areas include: the cross-lot areas between Bradley St. and East Main St. including MH's 24-29; the line containing MH's 9-17; and several areas between Highland Drive and Reed St. Areas of concern also included Dunlap Ave, Baker Rd, Orange St. and other miscellaneous roads. In addition, several areas have been determined to be in need of grout and patch work.

b. Town

A determination of the condition of the Town sewer system is beyond the scope of this report. In addition, there was not sufficient data to begin such an assessment. Before any repairs of the sewers in the Town can be contemplated, a locations and conditions survey is recommended.

c. School District

A determination of the condition of the sanitary sewer system located on the Marcellus CSD Campus is also beyond the scope of this report. Before any repairs of the sewers in the Town can be contemplated, a locations and conditions survey is recommended.

B. Future Infiltration and Inflow

In an effort to eliminate the potential for I&I, it is suggested that the Village, Town, and School District enact the following protocols. These actions are also identified in the Implementation Schedule, provided in Appendix E.

1. Service Lateral Connection Inspections

It is recommended that a sanitary sewer lateral inspection process be performed on all new laterals and the process linked to the Code Enforcement Officers documentation (Certificate of Occupancy) in order to ensure that new development is not occupied prior to the sanitary sewer system being inspected. Dye tests, pressure testing, or other additional testing is also suggested to be implemented if the Village suspects any cross connections to the sanitary service lateral.

2. Routine Service Inspections

Secondly, it is recommended that the Village enact a routine inspection procedure to visually inspect sewer lateral connections and sump pump discharge lines (along with water meters) upon each transfer of property and/or change of billing information. This will enable Village personnel to be assured that new users are not cross-connected and also will help identify users that may have initiated any cross-connections to the sewer system.

3. Uncover Hidden Manholes

Thirdly, it is recommended that all manholes shall be located and verified on current mapping. It is believed that numerous manholes have been either covered due to bad construction practices and/or negligence. Once, uncovered, these manholes and connected sewermains should be videotaped and analyzed to

determine if they are points of concern with regard to I&I issues.

C. Infiltration and Inflow Detection and Identification

1. Monitoring All Pump Station Output Flows

It is recommended that the Village start recording, on a daily basis, all pump station run times and estimating outputs. This data can then be evaluated between dry weather and wet weather conditions in order to identify any potential I&I in those areas serviced by the pump stations. If significant wet weather flow is found at a pump station, further investigation can be done to identify the exact sources of I&I in these areas. If data indicates no significant I&I at any of these locations, pump station monitoring may be reduced as necessary.

2. MH Metering and I&I Study

The primary component of the flow management plan is the implementation of an I&I study to ultimately detect and identify source areas of I&I. The plan generally will include the installation of manhole meters in the sanitary sewer system. The meters will be utilized to compare dry or normal flow conditions to rain event (wet weather) conditions and begin to identify and be able to isolate the most problematic areas of the sewer system. The map of the sewer system can be referenced for the anticipated zones to be metered and the anticipated timeline. As the meters are moved and the data is analyzed, sewer televising and smoke testing may be initiated and utilized to more precisely identify sources of I&I. A Preliminary Implementation Schedule is provided in Appendix E. The schedule indicates that the study will be performed over the course of approximately six years. This estimated schedule is subject to change based on weather conditions as periodic rain events will be necessary in order to identify and try to quantify areas of I&I. Progress in the study will be dependent on a certain number of wet weather events for each metering location and the budgetary limitations of the

Town and the Village.

The Village has already collected data from various locations using an ISCO Flow Poke flow measurement device, which will be utilized for the I&I study. It is also in the process of performing flow meter data collection in several other potential problem areas.

The meters will first be placed on the main trunk lines where flows will be compared to plant influent flows. The meters will then be systematically analyzed and placed upstream into the sewer system on the main trunk lines and the subsidiary trunk lines. If potential areas of I&I are located at these MH's, the flow meters may then be utilized upstream within each immediate area to narrow the sources of I&I. Sources of I&I will then be documented, more thoroughly metered, smoke tested, televised, etc. as necessary to identify the precise location of the I&I. This process will continue over the course of the next six years, until all of the sewer system has been metered and evaluated.

D. Infiltration and Inflow Reduction Implementation

As noted above, the I&I study will be utilized to identify sources of I&I throughout the sanitary sewer collection system. As these sources are identified, they will be prioritized based on an estimated quantity of I&I coming from each source. Sources of I&I will be repaired and/or eliminated as the program progresses.

The amount of I&I that can be reduced and the amount of time it takes to accomplish this reduction is highly dependent upon a number of variables. The concentration of I&I in specific areas, quantity of I&I at each source, financial burden of eliminating the I&I, and the type of I&I encountered all play an important role on the economic feasibility of I&I reduction and also the amount of time it takes to reduce it. As I&I areas are found, appropriate funding will be allocated as necessary to address the most cost effective and significant areas, ultimately reducing flows being received at the WWTP.

As mentioned earlier, the Village is planning to implement an in-house inspection program to identify illegal connections to the sanitary sewers that may exist within the existing structures and contribute to the I&I levels found in the system. This program was also mentioned in the Intermunicipal Agreement that was just signed by Town officials, so these inspections will also take place in the Town to identify illegal connections to the sanitary sewers. These inspections will primarily focus on roof downspouts, sump crock connections, and other stormwater conveyance items that should not be connected to the sanitary sewers. To ensure the success of this program and full public participation, a thorough public notification process is essential. Each member of the community needs to understand what is involved, why it is being done, and how it impacts them and their property.

V. Flow Management Plan Conclusions

The above Flow Management Plan, primarily based around I&I identification and reduction, is provided in order to help reduce wastewater flows being received at the WWTP. It provides a cost effective, systematic approach to evaluating the sewer system and each area's potential I&I. It will provide the capability to identify the areas in the sewer system that have the most predominant amount of I&I, provide information to quantify the potential I&I, and help the Village progress in eliminating the most significant areas of I&I. As noted, the above metering approach can then be supplemented as necessary with other methods (i.e. sewer televising, smoke testing, visual inspection, etc.) to pinpoint exact locations of I&I. This will help concentrate the efforts of televising, smoke testing, etc. in the areas where I&I is most likely and most abundant.

Once identified, I&I will be prioritized and eliminated in a systematic approach. Both the quantity of I&I and the economic feasibility of each project will be considered for each area of I&I. The Implementation Schedule, though subject to change based on wet weather conditions, provides a six-year plan for completion of the I&I study. During the

study, some I&I improvements are expected to be made as they are identified. Upon the completion of the study, it is anticipated that significant improvements in I&I reduction will be made in order to reduce and/or maintain WWTP flows below 95% of the permitted flow.

VI. WASTEWATER TREATMENT PLANT CAPACITY

A. INTRODUCTION

The WWTP currently has a design average flow of 0.38 MGD. This can be referenced on the Effluent Limitations and Monitoring Requirements section of the SPDES permit, in Appendix A. The plant generally consists of an entrance structure which includes a manual bar screen, horizontal grit chamber, a parshall flume, and a comminutor. Flow then proceeds by gravity to two Contact Aeration Tanks. Following biological treatment in the aeration tanks, the wastewater is conveyed by gravity through the final clarifiers. After sufficient settling is achieved in the clarifiers, the effluent travels via gravity to the chorine contact tank for disinfection and dechlorination before it is ultimately discharged into Nine Mile Creek. Biosolids treatment begins in the Contact Aeration Tanks. Sludge is then sent from the clarifiers to the Reaeration Tanks for additional biological treatment and finally sent to two Aerobic Digesters for stabilization. Then the stabilized biosolids are dewatered using a gravity belt filter press. Dewatered solids were historically hauled to a nearby permitted landfill facility, but the Village of Marcellus recently completed the construction of a new Compost Facility. Within this Compost Facility, the waste biosolids are mixed with wood chips where organisms will further treat the waste and produce a recycled product that can be used as a fertilizer or soil amendment. More details of the treatment plant will be discussed in later sections of this report.

The most recent upgrade of the wastewater treatment facilities was completed in 2008, which included: new positive displacement (PD) blowers for the aerobic digesters, new PD blowers and variable frequency drives (VFDs) for the biological oxidation reduction aeration process, dissolved oxygen monitoring equipment, emergency generator, clarifier mechanicals, and roof replacement of the digester and aeration control buildings.

B. TEN STATES STANDARDS RECOMMENDATIONS COMPARISON

Several components of the current WWTP configuration were compared with the latest

standards as recommended by Ten State Standards, 2004 edition. This plant is predominantly operating in accordance with the recommended guidelines of Ten State Standards, with the exception of the Secondary Clarifiers which are much too shallow.

Table VI.1: Ten States Standards Permissible Loadings Evaluation

Unit process	Design criteria	Value	"10 State Standard"
Contact Aeration basins	No. of units	2	
	Operational Side Water Depth	6.5'	
	Operational Surface Area, ea.	4,000 sf	
	Total operational volume, ea.	19,500 gal	
	Total operational volume	39,000 gal	
	HRT	2.5 hrs @ 0.38 MGD	
	Organic Loading Rate (3)	52 lb/day BOD per 1,000 ft^3	50 lb/day BOD per 1,000 ft^3 (2)
	F/M (4)	0.2	0.2-0.6 (2)
Secondary clarifiers	No. of units	2	Multiple Units Req'd
	Side water depth (1)	8'	Min. 12'
	Dimensions	20' dia.	
	Surface area, ea.	314 sf	
	Total surface area	628 sf	
	Hydraulic loading	605 gpd/sf @ 0.38 MGD	
	Peak surface overflow rate (2)	1,200 gpd/sf @ 0.83 MGD	1,200 gpd/sf

(1) For Secondary Tank following contact stabilization process
(2) For Contact Stabilization WWTP
(3) Based on influent avg. BOD loading of 810 lb/day. Aeration Tank Vol = 15,600 cf. Includes Contact and Reaeration Tanks volumes.
(4) Based on F=810 lb/day, M=(2,000*0.8)*0.38*8.34 = 5,070 lbs/day. 810/5,070 = 0.2

C. HEADWORKS

1. Existing Capacity

The existing Headworks elements consist of a manual bar rack, horizontal grit chamber, and a comminutor. The manual bar rack collects large debris such as rags and screenings, which is cleaned by the operators using a rake and a shovel. The grit chamber collects grit and is periodically cleaned by shoveling out accumulated solids.

2. Proposed Alternative

As reported in the Stearns & Wheler WWTP Capacity Study, dated March 2009, there is also a flow restriction of the 12-inch pipe between the Headworks and the Aeration Basins. Based on calculations of the properties of this installed pipe, the restricting flow is approximately 1.3 MGD. While the recommendation of constructing a distribution chamber and a manual bar screen upstream of the Headworks would resolve the flow restriction issue and involves lower capital costs, we do not recommend this option as it will still allow grit and screenings to disrupt downstream equipment such as pumps, diffusers, and weirs. Instead, we recommend installing new 14-inch piping, manholes, and concrete channel that go around the existing Headworks structure. New Headworks mechanicals including a mechanical bar screen with a minimum of 1/4" openings, a more efficient grit removal system, and a new Parshall flume capable of handling flows up to 1.5 MGD (peaking factor of 4 from design flow) are also included in this recommendation. In order to protect these new, sensitive mechanical operations, a new building to house them is also included in this alternative. The mechanical and electrical components housed within this building will need to be rated to meet the Class 1, Division 1 categorization of this type of area at the WWTP. The existing Headworks could remain as a bypass option during maintenance periods of the new equipment or an overflow point of the new Headworks if flows above 1.5 MGD are experienced. A preliminary opinion of probable cost for this alternative is $862,000. This upgrade would involve higher capital costs, but will increase the efficiency of the treatment processes and extend the useful life of the mechanical equipment downstream. Thus significant savings in O&M expenses are likely to be achieved in later years.

D. Contact Aeration and Reaeration Basins

1. Existing Capacity

Based on the operational data, this facility is consistently removing greater than 93% of the BOD and TSS entering the system. Additionally, this plant is also

nitrifying quite well as evident from the discharge monitoring report (DMR) data for the past several years. It appears that these unit operations are achieving appropriate BOD and NH_3 reductions. Therefore, it appears that these basins are adequately sized, operating properly, and effectively treating the incoming wastewater, which would confirm that improvements are not necessary at this time. Ideally, the Sludge Volume Index (SVI) should be around 100 or lower. If filamentous growth is observed, the SVI is likely to be higher (150 or greater). If this is the case, there are several options available to control the filamentous organisms. Adding a small shock of chlorine to the RAS line or reducing the age of the sludge that is kept within the system are a couple of the options available and are recommended.

In order to remove Phosphorus biologically additional tankage would be necessary to provide an anaerobic zone to maintain the organisms to consume the Phosphorus. Due to the lower temperatures, low strength waste, and limited area on the site, this option is not likely to be feasible and was not investigated further as part of this study.

E. SECONDARY CLARIFIERS

1. Existing Capacity

There are two (2) 20-foot diameter Secondary Clarifiers. As shown in Table VI.I, these clarifiers were constructed to past design standards and do not meet the current Ten States Standards with respect to side water depth. These clarifiers are lacking depth to provide the appropriate settling zones to ensure adequate removal quantities and surcharge protection during peak flow conditions. Based on the calculations shown above, the peak flow effectively treated by these clarifier units is 0.83 MGD. However, evidence has shown that this facility has received flows in excess of 1.0 MGD. Therefore, an expansion of the clarifier capacity is recommended at this facility. Additionally, the Marcellus WWTP is listed in the Draft TMDL for Phosphorus in Onondaga Lake. The WWTP will soon be

receiving an effluent limit for Total Phosphorus. The Draft TMDL estimated this value to be 1.0 mg/L Total P. It is unlikely that the existing clarifiers will be able to effectively settle the particles that result from the chemical addition/coagulation process to remove Phosphorus. The shallow clarifiers are insufficient, according to recent studies and current design standards, to prevent solids overflow of the Phosphorus flocs during periods of high flow. There is also likely to be a thicker sludge blanket due to the increase of solids from the removal of Phosphorus, which would further limit the various settling zones employed above the sludge blanker. For these reasons, additional clarification tankage is recommended.

2. Proposed Alternative

Assuming a worst case-scenario based on historical flow data thus using peaking factor of 4, the calculated peak flow rate for this facility will be approximately 1.5 MGD. Since the existing Parshall flume does not register flows this high, its appropriateness could not be confirmed nor denied as part of this study. Using the peak flow rate of 1.5 MGD, additional clarifier surface area is required to meet typical design standards. It appears that an additional 1,040 ft^2 of clarifier surface will be necessary. This could be accomplished by constructing two (2) 25-foot diameter circular clarifiers, based on a design surface overflow rate of 900 gallons per day per square foot (gpd/sf).

In order to meet the new Phosphorus effluent limit, chemical addition of a metal salt (i.e. Alum or PAC) will be necessary. The initial application point will be at the influent stream to the final clarifiers, but if sufficient coagulation and Total P removal is not accomplished solely at this location, a second application point at the Contact Aeration Tanks is recommended to settle out the appropriate amount of Phosphorus solids to meet the effluent limit. This will likely increase the amount of solids that are produced with respect to BOD, TSS, and Phosphorus. Additionally, solids from compounds that are not monitored will also result from the addition of these chemicals. Therefore, significant increases in solids production should be anticipated. Based on preliminary calculations, there will be

approximately 25-33% more solids removed that will require dewatering.

The new clarifier units will be needed to provide the necessary area to settle out the coagulated Phosphorus solids. Based on the different settling characteristics of floc solids containing Phosphorus compounds, it is recommended to design clarifier tanks to be operated at a lower surface overflow rate (400-600 gpd/sf). The additional units will provide the operators with the ability to treat at this lower rate, which would be impossible using only the existing clarifiers and the flows encountered. A minimum depth of 12 feet is recommended for facilities that perform chemical addition for phosphorus removal. It is important to note that the construction of these deeper tanks may be extremely difficult as the existing tanks sit directly on bedrock and the new tanks would require blasting and removal of rock. A preliminary opinion of probable cost for constructing these new clarifiers is $1,489,000. A spreadsheet showing the cost breakdown of this alternative is included in Appendix H.

Additionally, it may be feasible based on preliminary analysis of the hydraulic profile of this facility to convert the existing final clarifiers to primary clarifiers to lessen the load on the aeration basins and the final clarifiers. We recommend further investigative efforts to determine if this is truly feasible and will provide benefits for this facility.

F. Chlorine Contact Tank

1. Existing Capacity

The existing chlorine contact tank uses chlorine gas as the disinfecting agent and has a capacity of 1,400 CF, which provides approximately 17 minutes of detention time for the chlorine gas treatment at a flow of 0.85 MGD. At the design flowrate of 0.38 this unit provides about 40 minutes at the permitted flow of 0.38 MGD. Therefore, this unit does not provide the necessary contact time (15 minutes) during peak flows.

2. Proposed Alternative

Assuming a peaking factor of 4, or 1.5 MGD, the existing chlorine contact tank would need to be increased by 700 CF to achieve the necessary contact time. Of course, if flows above this are experienced a larger contact tank would be warranted. A preliminary opinion of probable cost places this alternative in the vicinity of $245,000 worth of capital upgrades and the same O&M expenses that are currently experienced. It is important to note that this chemical addition scheme is extremely complicated and there is a possibility that violation, or exceedances of the limit, will occur if moderate flow fluctuations occur, if concentrated, poorly mixed effluent is discharged, if laboratory and/or sampling errors are introduced, or if there is mechanical failure of the chemical dosing equipment. Therefore, a more consistent method is recommended.

A second alternative would be to convert the disinfection method from chlorination (Cl_2 gas) and dechlorination (SO_2 gas) to ultraviolet (UV) disinfection. Due to the higher capital costs associated with UV equipment, there will not be a cost savings incurred by the Village. The estimated opinion of probable cost for this alternative is $349,000. A short breakdown of this alternative is included in Appendix H. However, there will be significant increases in safety and decreases in hazardous chemical storage. Since the WWTP is located within the Village limits and is surrounded by residential housing and the Marcellus School District, there is a huge safety concern if a chlorine gas leak occurs and migrates to these neighboring properties. Additionally, the water quality of Nine Mile Creek in the vicinity of the WWTP outfall is likely to improve since chemical addition at the final point in the system will cease with the conversion to UV treatment. Due to the better dosage control, safety advantages, improved water quality benefit, and the full-life cost of this system, we recommend switching to UV disinfection.

G. Aerobic Sludge Digesters

1. Existing Capacity

There are two (2) square concrete tanks that are 16 feet by 16 feet with a depth of 27 feet. Accordingly, there is more than adequate freeboard in these tanks such that the maximum side water depth (SWD) is 24 feet. The existing aerobic sludge digesters each have a total volume of 6,144 cubic feet. Based on initial calculations using the monitoring data that was provided, these digesters have more than adequate capacity for this facility.

H. Sludge Dewatering Facilities (Belt Filter Press)

1. Existing Capacity

The 1 meter BDP Belt Filter Press was installed in 1999 and is more than adequate for a facility of this size. Thanks to excellent maintenance efforts of the operations staff, this unit is still in great working condition. Typically, pressing is completed twice per month. Even with the addition of Phosphorus removal, this unit is more than adequate to accomplish the dewatering needs of this facility. Therefore, no improvements are deemed necessary for this unit operation.

I. Compost Facility

1. Existing Capacity

The compost facility is brand new to this facility. This facility is sized to process two (2) compost and curing piles at a time based on the solids loading that are typically experienced at this WWTP. With the onset of Phosphorus removal requirements, additional solids will be encountered. Since the exact amount of increased solids due to chemical addition of metallic salts is unknown at this time, we will continue to use the assumed values of 25%-33%. Based on the design calculations for the compost facility, there should be ample space to accommodate this amount of biosolids. No improvements are recommended for this facility.

VII. WASTEWATER TREATMENT PLANT CAPACITY CONCLUSIONS

The Village of Marcellus is an older plant that is impacted from decades of I&I flows and will soon be required to provide Phosphorus Removal in addition to its typical contaminant removal requirements. This facility has never been designed for this type of nutrient removal and will require significant upgrades to achieve the new, upcoming Phosphorus effluent limit expected with the new TMDL for Phosphorus in Onondaga Lake. The WWTP has shown that it can effectively remove the traditional contaminants found in domestic wastewater such as BOD, TSS, and Ammonia during periods of high flows near the design flowrate of 0.38 MGD. Due to the relatively weak strength of the wastewater and cold temperatures in the winter months, biological Phosphorus treatment is not a feasible candidate at this particular WWTP. Chemical addition and improved clarification tanks are the best candidates to properly remove Phosphorus at this facility. There are also several other unit operations that are reaching their end of useful life and require upgrades, or replacements, as well. These operations include the Headworks and chemical disinfection systems. The total combined cost for these upgrades is approximately $2,700,000.

APPENDIX A

FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

SPDES DISCHARGE PERMIT

FLOW MODIFIED FROM INFLUENT TO EFFLUENT ON 3/9/2010

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning Effective Date of Permit and lasting until Expiration Date of Permit the discharges from the permitted facility shall be limited and monitored by the permittee as specified below:

LIMITATIONS APPLY: [X] All Year [ ] Seasonal from _____ to _____

Outfall Number: 001

EFFLUENT LIMITATIONS

[X]	Flow	30 day arithmetic mean	0.38	[X] MGD [ ] GPD		
[X]	BOD, 5 - Day	30 day arithmetic mean	30	mg/l and	95	lbs/day (1)
[X]	BOD, 5 - Day	7 day arithmetic mean	45	mg/l and	142	lbs/day
[ ]	UOD (2)			mg/l and		lbs/day
[X]	Solids, Suspended (TSS)	30 day arithmetic mean	30	mg/l and	95	lbs/day (1)
[X]	Solids, Suspended (TSS)	7 day arithmetic mean	45	mg/l and	142	lbs/day
[X]	Effluent disinfection required:	[X] All Year [ ] Seasonal from		to		
	[X] Coliform, Fecal	30 day geometric mean shall not exceed 200/100 ml				
	[X] Coliform, Fecal	7 day geometric mean shall not exceed 400/100 ml				
	[X] Chlorine, Total Residual	Daily Maximum		0.1		mg/l
[X]	pH	Range		6.0 to 9.0		SU
[X]	Solids, Settleable	Daily Maximum		0.3		ml/l
[ ]				mg/l as		
[ ]						
[ ]						
[ ]						
[ ]						
[ ]						

MONITORING REQUIREMENTS

	Parameter	Frequency	Sample Type	Sample Location Influent	Sample Location Effluent
[X]	Flow [X] MGD [ ] GPD	Continuous	N/A		X
[X]	BOD, 5 - Day, mg/l	1/Month	6 Hr. Comp.	X	X
[X]	Solids, Suspended, mg/l	1/Month	6 Hr. Comp.	X	X
[X]	Coliform, Fecal, No./100 ml (3)	1/Month	Grab		X
[X]	Nitrogen, TKN (as N), mg/l	1/Month	6 Hr. Comp.	X	X
[X]	Ammonia (as NH_3), mg/l	1/Month	6 Hr. Comp.	X	X
[X]	pH, SU (standard units)	1/Day	Grab	X	X
[X]	Solids, Settleable, ml/l	1/Day	Grab	X	X
[X]	Chlorine, Total Residual, mg/l (3)	1/Day	Grab	X	X
[X]	Phosphorus, Total (as P), mg/l	1/Month	6 Hr. Comp.	X	X
[X]	Temperature, Deg °C	1/Day	Grab	X	X
[X]	In-Stream Samples:				
[ ]	Upstream STP - Ammonia, TDS, D.O., TKN	1/Month	Grab	In-stream samples (	
[ ]	Downstream STP - " " " "				
[ ]					

NOTES: (1) and effluent values shall not exceed 15 % and 15 % of influent values for BOD_5 & TSS respectively.

(2) Ultimate Oxygen Demand shall be computed as follows:
UOD = 1 1/2 x $CBOD_5$ + 4 1/2 x TKN (Total Kjeldahl Nitrogen)

(3) Monitoring of these parameters is only required during the period when disinfection is required.

(4) Monitoring of these parameters is required from May 1 - October 31.

APPENDIX B

PRELIMINARY SANITARY SEWER MAP

LEGEND
MUNICIPAL BOUNDARY
SANITARY SEWER

Project No. 1375.12001.000	Sheet No. ___ of ___	**MRB** | *group* Engineering, Architecture, Surveying, P.C. The Culver Road Armory, 145 Culver Road, Suite 160, Rochester, New York 14620 585-381-9250 2750 Westinghouse Road, Suite 1, Horseheads, New York 14845 607-796-9340 The Mill, 125 High Rock Avenue, Saratoga Springs, New York 12866 518-899-2180 www.mrbgroup.com	

Drawn By: ADC	Project Title: **VILLAGE/TOWN OF MARCELLUS ONONDAGA COUNTY NEW YORK**
Checked By: AJO	
Scale: 1" = 400'	Drawing Title: **SEWER SYSTEM MAP**
Date: JUNE 2012	

No.	Revisions and Descriptions	By	Date

APPENDIX C

LIST OF PUMP STATIONS IN MARCELLUS WWTP AREA

Pump Stations in Marcellus, NY

1) Orange Street - Village owned
2) Platt Road - Village owned
3) Marcellus Park - Village owned (services the Fire Station)

APPENDIX D

SEWER USE LAW AND INTER-MUNICIPAL AGREEMENT

PART II – GENERAL LEGISLATION

Chapter 198 – Sewage and Sewage Disposal
[Adopted as Local Law #2 of 1982]

Article I	**In General**	**Sections 198-1 – 198-40**
Article II	**Discharge of Industrial Wastes**	**Sections 198-41 – 198-54**
Article III	**Penalties**	**Sections 198-55 – 198-61**
Article IV	**Sewer Rent**	**Sections 198-62 – 198-68**

Article I In General – Sewage and Sewage Disposal

A local law regulating the use of public and private sewers and drains, private wastewater disposal, the installation and connection of building sewers, and the discharge of water and wastes into the public sewer system(s) and providing penalties for violations thereof in the Village of Marcellus, County of Onondaga, State of New York.

Be it enacted by the Village Board of the Village of Marcellus as follows: The Village Board of the Village of Marcellus shall be responsible for enforcement of this local law. The Board shall appoint inspectors to assure compliance (L.L. No. 2 of 1982).

*Cross references – Buildings and structural appurtenances, Ch. 44; health and sanitation generally, Ch. 106; swimming pools, Ch. 225.

State law references – Power to lay out, establish sewers and sewer systems, Vill. Law, 89(6); to require repair, Vill. Law, 89(45); to regulate private sewers, Vill. Law, 89(55); to adopt plumbing code, Vill. Law, 90-a; connections with sewer system, Vill. Law, 278, 278-a.

Section 198-1 – Definitions – Unless the context specifically indicates otherwise, the meaning of the words, terms and phrases used in the chapter shall be as follows:

BOD (denoting biochemical oxygen demand): The quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five (5) days at twenty degrees Centigrade (20 C), expressed in milligrams per liter.

Building drain: That part of the lowest horizontal piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building sewer, beginning five (5) feet (1.5 meters) outside the inner face of the building wall.

Building sewer: The extension from the building drain to the public sewer or other place of disposal.

Combined sewer: A sewer design to receive both surface runoff and sewage.

Garbage: Solid wastes from the domestic and commercial preparation, cooking and dispensing of food and from the handling, storage and sale of produce.

Industrial wastes: The liquid wastes from industrial manufacturing processes, trades or businesses as distinct from sanitary sewage.

Natural Outlet: Any outlet into a watercourse, pond, ditch, lake or other body of surface or groundwater.

New York State Department of Environmental Conservation or NYSDEC: The NYS Department of Environmental Conservation or other duly authorized official of said Department.

Person: Any individual, firm, company, association, society, corporation or group.

pH: The logarithm of the reciprocal of the weight of hydrogen ions in grams per liter of solution.

Pollution: The man-made or man-induced alteration of the chemical, physical biological, and radiological integrity of water.

Pretreatment: Shall mean the reduction of the amount of pollutant properties in wastewater to a less harmful state prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. The reduction or alteration can be obtained by physical, chemical or biological processes, process changes or by other means, except as prohibited by 40 CFR 403.6 General Pretreatment Regulations for Existing and New Sources of Pollution.

Properly shredded garbage: The wastes from the preparation, cooking and dispensing of food that have been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than one-half (1/2) inch (1.2 centimeters) in any dimension.

Public Sewer: A sewer in which all owners of abutting properties have equal right, and which is controlled by public authority.

Residential user: Shall mean all premises used only for human residency and which is connected to the wastewater facilities.

Sanitary sewer: A sewer, which carries sewage and to which storm, surface and groundwaters are not intentionally admitted.

Sewage: A combination of the water-carried wastes from residences, business buildings, institutions and industrial establishments, together with such ground, surface, and storm waters as may be present.

Sewage treatment plant: Any arrangement of devices and structures used for treating sewage.

Sewerage works: All facilities for collecting, pumping, treating and disposing of sewage.

Sewer: A pipe or conduit for carrying sewage.

Shall is mandatory; may is permissive.

Significant industrial user: Any user who (i) has a discharge flow of 25,000 gallons or more per average work day, or (ii) has a flow greater than 5% of the flow in the municipality's wastewater system, or (iii) has in his waste toxic pollutants as defined pursuant to Section 307 of PL 95-217 or (iv) has been identified as one of the 21 industrial categories pursuant to Section 307 of PL 95-217 or (v) is found by the Village to have significant impact, either singly or in combination with other contributing industries, on the treatment or collection system.

Slug: Any discharge of water, sewage or industrial waste which in concentration of any given consistuent or in quantity of flow exceeds for any period of duration longer than fifteen (15) minutes more than five (5) times the average twenty-four (24) hour concentration of flows during normal operation.

Storm drain (sometimes termed storm sewer): A sewer which carries storm and surface waters and drainage, but excludes sewage and industrial wastes other than unpolluted cooling water.

Superintendent: The superintendent of public works of the Village or his authorized deputy, agent or representative.

Suspended solids: Solids that either float on the surface of, or are in suspension in water, sewage or other liquids, and which are removable by laboratory filtering.

United States Environmental Protection Agency or USEPA: The U. S. Environmental Protection Agency or where appropriate a designation for the administrator or other duly authorized official of said agency.

Watercourse: A channel in which a flow of water occurs, either continuously or intermittently (L.L. No. 2 of 1982).

Section 198-2 – Construction, maintenance of privies, septic tanks, cesspools – Except as hereinafter provided, it shall be unlawful to construct or maintain any privy, privy vault, septic tank, cesspool or other facility intended or used for the disposal of sewage (L.L. No. 2 of 1982).

Section 198-3 – Connection to public sewer system – The owner of all houses, buildings or properties used for human occupancy, employment, recreation or other purposes, situated within the village and abutting on any street, alley or right-of-way in which there is now located or may in the future be located a public sanitary or combined sewer system of the village. is hereby required at his expense to install suitable toilet facilities therein, and to connect such facilities directly with the proper public sewer in accordance with the provisions of this chapter, within ninety (90) days after date of official notice to do so; provided that said public sewer is within one hundred (100) feet (30.5 meters) of the property line. During connection of such facilities to the public sewer any septic tank previously serving said facilities shall be cleaned of sludge and filled with sand, bank run gravel or other suitable material.(L.L. No. 2 of 1982)

Section 198-4 – Permit required to connect to, alter, etc., public sewer – No unauthorized person shall uncover, make any connections with or opening into, use, alter or disturb any public sewer or appurtenance thereof without first obtaining a written permit from the Superintendent (L.L. No. 2 of 1982).

Section 198-5 – Classes of building sewer permits – There shall be two (2) classes of building sewer permits, which shall be as follows:

Class 1: For residential, commercial or other establishments, discharging sanitary wastewater only.

Class 2: For service to Significant Industrial Users (L.L. No. 2 of 1982).

Section 198-6 – Permit application – Application for a permit of either class provided for in Section 10-5 shall be made to the Village Clerk on a special form furnished by the village. The permit application shall be supplemented by any plans, specifications or other information considered pertinent in the judgment of the Superintendent (L.L. No. 2 of 1982).

Section 198-7 – Permit and inspection fee – A permit and inspection fee of fifty dollars ($50.00) for a Class 1 building sewer permit and fifty dollars ($50.00) for a Class 2 sewer permit shall be paid to the Village at the time the application or reapplication is filed (L.L. No. 2 of 1982).

Section 198-8 – Term of Permit and Modification – Class 2 permits shall have a term of five (5) years and shall be renewable upon reapplication. The terms and conditions of all permits

shall be subject to modification and change by the village allowing one hundred twenty (120) days for notification and compliance with new permit terms and conditions. Significant Industrial Users shall apply for a permit modification if production or process is changed so that the wastewater characteristics or flow is altered. No additional fee shall be charged for the modification.

Section 198-9 – No Reassignment – Class 2 permits shall not be reassigned or transferred or sold to a new owner, new user, different premises, or a new changed operation.

Section 198-10 – Class 2 Permit Application Requirements – Class 2 permit application shall require information concerning volume, constituents and characteristics of wastewater, flow rates, each product produced by each type, amount and rate of production, and description of activities, facilities and plant processes on the premises including all materials processed and types of materials which are or could be discharged. The Village shall implement measures to ensure the confidentiality of information provided by an industrial discharger pursuant to this Ordinance. In no event shall any claimed confidential information be disclosed to any person without prior notice in writing to the Owner and without providing the Owner with the opportunity to protect such confidential information, including the right to seek judicial relief.

Section 198-11 – Permits to contain monitoring requirements – Class 2 permits may contain specifications for monitoring programs, which may include sampling locations, frequency of sampling, number, types and standards for tests and reporting schedule.

Section 198-12 – Uniform enforcement – Sewer permits shall be uniformly enforced by the village in accordance with the terms and conditions of this Chapter and applicable State and Federal regulations. Permits shall be expressly subject to all provisions of this Chapter and all other regulations, user charges and fees established by the village and applicable State and Federal regulations.

Section 198-13 – Owner to bear installation costs, indemnify Village from loss or damage – All costs and expenses incident to the installation and connection of the building sewer to the public sewer system shall be borne by the owner. The owner shall indemnify the Village from any loss or damage that may directly or indirectly be occasioned by the installation of the building sewer (L.L. No. 2 of 1982).

Section 198-14 – Conformance with codes, regulations

a) Size, slope, alignment, excavation, etc. The size, slope, alignment, excavation, or a building sewer, and the methods to be used in excavating, placing of the pipe, jointing, testing and backfilling of the trench, shall all conform to the requirements of the building and plumbing code or other applicable rules and regulations of the village. In the absence of code provisions or in amplification thereof, the materials and procedures set forth in appropriate specifications of the A.S.T.M. and W.P.C.F. Manual of Practice No. 9 shall apply.

b) Connection. The connection of the building sewer into the public sewer shall conform to the requirements of the building and plumbing code or other applicable rules and regulations of the Village, or the procedures set forth in appropriate specifications of the A.S.T.M. and the W.P.C.F. Manual of Practice No. 9 shall apply (L.L. No. 2 of 1982).

Section 198-15 – Approval required for deviations – Any deviation from prescribed procedures and materials on the connection of a building sewer to the public sewer system must be approved by the Superintendent before installation (L.L. No. 2 of 1982).

Section 198-16 – Separate building sewers required, exception – A separate and independent building sewer shall be provided for every building; except where one building stands at the rear of another or on an interior lot and no private sewer is available or can be constructed to the rear building through an adjoining alley, court, yard, or driveway, the building sewer from the front building may be extended to the rear building and the whole considered as one building sewer (L.L. No. 2 of 1982).

Section 198-17 – Use of old building sewer – Old building sewers may be used in connection with new buildings only when they are found on examination and test by the Superintendent to meet all requirements of this Chapter (L.L. No. 2 of 1982).

Section 198-18 – Elevation of building sewer – Whenever possible, the building sewer shall be brought to the building at an elevation below the basement floor. In all buildings in which any building drain is too low to permit gravity flow to the public sewer, sanitary sewage carried by such building drain shall be lifted by an approved means and discharges to the building sewer (L.L. No. 2 of 1982).

Section 198-19 – Notification of readiness for inspection and connection – The applicant for a building sewer permit shall notify the Superintendent when the building sewer is ready for inspection and connection to the public sewer (L.L. No. 2 of 1982).

Section 198-20 – Connections to be supervised – All building sewers shall be connected to the public sewer under the supervision of the Superintendent or his authorized representative (L.L. No. 2 of 1982).

Section 198-21 – Material Requirements for building sewers – The building sewer shall be tar coated, extra heavy cast iron soil pipe, conforming to ASTM Specification A-74, and American Standards Association (ASA) Specification A-40.1; asbestos-cement house connection pipe conforming to ASTM Specification C-428, Type II minimum class 2400; or PVC (Polyvinyl Chloride) rubber gasketed joints, ASTM D-3034, SDR-35. Joints shall be tight and waterproof. Any part of the building sewer that is located within ten feet of a water service pipe shall be constructed of extra heavy cast iron soil pipe with leaded joints. Cast iron pipe with leaded joints may be required by the Superintendent where the building sewer is exposed

to damage by tree roots. If installed in filled or unstable ground, the building sewer shall be of cast iron soil pipe, except that nonmetallic material may be accepted if laid on a suitable concrete bed or cradle as approved by the Superintendent. Building sewer pipe shall have a maximum length of five feet between joints for cast iron or asbestos cement pipe and twelve and one-half (12 1/2) feet for PVC.

Section 198-22 – Excavations for sewer installations to be guarded – All excavations for building sewer installations shall be adequately guarded with barricades and light so as to protect the public from hazard (L.L. 2 of 1982).

Cross Reference – Excavations generally, ch. 11, Art. III.

Section 198-23 – Requirement of settlement pit at gas station or car wash – The connection from a gas station or car wash shall comply with all current NYS DEC and SPDES regulations. Discharge of said waters into the sanitary sewer will be made only upon approval of the Superintendent.

Section 198-24 – Restoration of streets, sidewalks, etc. – Streets, sidewalks, parkways and other public property disturbed in the course of connecting a building sewer to the public sewer shall be restored in a manner satisfactory to the Village (L.L. 2 of 1982).

Cross Reference – Excavations generally, ch. 11, Art. III

Section 198-25 – Connection of roof downspouts, areaway drains, etc., prohibited – No person shall make connection of roof downspouts, foundation drains, areaway drains, or other sources of surface runoff or groundwater to a building sewer or building drain which, in turn, is connected directly or indirectly to a public sanitary sewer (L. L. 2 of 1982).

Section 198-26 – Unsanitary deposits prohibited – It shall be unlawful for any person to place, deposit or permit to be deposited in any unsanitary manner on public or private property within the Village, or in any area under the jurisdiction of the Village, any human or animal excrement, garbage or other objectionable waste (L.L. 2 of 1982).

Section 198-27 – Discharge of sewage to natural outlets regulated – It shall be unlawful to discharge to any natural outlet within the Village, or in any area under the jurisdiction of the Village, any sewage or other polluted waters, except where suitable treatment has been provided in accordance with the provisions of this Chapter (L.L. 2 of 1982).

Section 198-28 – Damaging, defacing, tampering with structures prohibited, arrest for violation – No unauthorized person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment which is a

part of the sewage works. Any person violating this Section shall be subject to immediate arrest under charge of disorderly conduct (L.L. 2 of 1982).

Section 198-29 – Right of entry of Superintendent, employees on property through which Village has easement – The Superintendent, other duly authorized employees of the Village and representatives of the NYSDEC and USEPA bearing proper credentials and identification shall be permitted to enter all private properties through which the Village holds a duly negotiated easement for the purposes of, but not limited to, inspection, observation, measurement, sampling, repair and maintenance of any portion of the sewage works lying within said easement. All entry and subsequent work, if any, on said easement, shall be done in full accordance with the terms of the duly negotiated easement pertaining to the private property involved. (L. L. 2 of 1982).

Section 198-30 – Right of entry of Superintendent, and authorized Village employees – The Superintendent, other duly authorized employees of the Village and representatives of the NYSDEC and USEPA bearing proper credentials and identification shall be permitted to enter all properties for the purposes of inspection, observation, measurement, sampling and testing in accordance with the provisions of this Chapter (L. L. 2 of 1982).

Section 198-31 – Superintendent, employees not to inquire into processes – The Superintendent or his representatives shall have no authority to inquire into any processes including metallurgical, chemical, oil, refining, ceramic, paper or other industries beyond that point having a direct bearing on the kind and source of discharge to the sewers or waterways or facilities for waste treatment (L. L. 2 of 1982).

Section 198-32 – Observation of safety rules; liability of Village – While performing any necessary work on private properties, the Superintendent or duly authorized employees of the Village shall observe all safety rules applicable to the premises established by the company and the company shall be held harmless for injury or death to Village employees and the Village shall indemnify the company against loss or damage to its property by Village employees and against liability claims and demands for personal injury or property damage asserted against the company and growing out of the gauging and sampling operation, except as such may be caused by negligence or failure of the company to maintain safe conditions as required in this article (L.L. 2 of 1982).

Section 198-33 – Prohibited discharges to sanitary sewers – No person shall discharge or cause to be discharged any storm water, surface water, groundwater, roof runoff, subsurface drainage, uncontaminated cooling water or unpolluted industrial process waters to any sanitary sewer. Storm water and all other unpolluted drainage shall be discharged to such sewers as are specifically designated as storm sewers, or to a natural outlet approved by the Superintendent. Industrial cooling water or unpolluted process waters may be discharged, on approval of the

Superintendent, to a storm sewer, or natural outlet but require a NYSDEC SPDES permit and are subject to Federal and State regulations (L.L. 2 of 1982).

Section 198-34 – Prohibited discharges to public sewers – Except as hereinafter provided, no person shall discharge or cause to be discharged, any of the following described waters to any public sewer:

a) Any liquid or vapor containing heat in amounts which will accelerate the biodegradation of wastes, causing the formation of excessive amounts of hydrogen sulfide in the wastewater sewer or inhibit biological activity in the wastewater treatment facilities, but in no case shall the discharge of heat cause the temperature in the Village wastewater sewer to exceed 65.5 degrees C (150 degrees F) or the temperature of the influent to the treatment facilities to exceed 40 degrees C (104 degrees F).

b) Any waters or wastes which contain grease or oil or other substance that will solidify or become discernibly viscous at temperatures between 32 and 150 degrees Fahrenheit.

c) Any waters or wastes containing fats, wax, grease or oils, whether emulsified or not, exceeding an average of 50 milligrams/liter (417 pounds per million gallons) or other soluble matter.

d) Any gasoline, benzine, naphtha, fuel oil or mineral oil, or other flammable or explosive liquid, solid or gas.

e) Any noxious or malodorous gas such as hydrogen sulfide, sulfur dioxide or nitrous oxide, or other substance with either singly or by interaction with other wastes, is capable of creating a public nuisance or hazard to life or to prevent entry into sewers for their maintenance and repair.

f) Any garbage that has not been properly shredded. The installation and operation of any garbage grinder in a commercial establishment shall be subject to the review and approval of the Superintendent.

g) Any ashes, cinder, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastic, cardboard, wood, paunch manure, hair and fleshings, entrails, lime slurry, lime residues, beer or distillery slops, whey, chemical residues, paint residues, cannery waste, bulk solids or other solid or viscous substance, capable of causing obstruction to the flow of the sewers, or other interference with the proper operation of the sewage works.

h) Any waters or wastes, acid and alkaline in reaction, having corrosive properties capable of causing damage or hazard to structures, equipment and personnel of the sewage works. Free acids and alkalies must be neutralized, at all times, within a permissible pH range of 6.0 to 9.5.

i) Any cyanides, in excess of 0.3 milligrams per liter by weights as CN.

j) Radioactive Wastes that do not comply with Federal or State Regulations.

k) Any waters or wastes that for a duration of 15 minutes has a concentration greater than five (5) times that of "normal" sewage as measured by Suspended Solids and B.O.D. and/or which is discharged continuously at a rate exceeding 1,000 gallons per minute except by special permit. Normal sewage shall be defined as falling within the following ranges:

Constituents	Permissible Range
Suspended Solids	180 to 350 mg/l
B. O. D.	140 to 300 mg/l
Chlorine Requirements	5 to 15 mg/l

l) Any storm water, roof drains, spring water, cistern or tank overflow, footing drain, or water motor, or the contents of any privy vault, septic tank or cesspool, or the discharge or effluent from any air conditioning machine or refrigeration unit.

m) No person shall discharge or cause to be discharged any waters or wastes containing a toxic or poisonous substance, a high chlorine demand or suspended solids in sufficient quantity to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals or create any hazard in the receiving waters or the effluent of the Village sewage treatment plant. Such toxic substances shall be limited to the average concentrations listed hereinafter in the sewage as it arrives at the treatment plant and at no time shall the hourly concentration at the sewage treatment plant exceed three times the average concentration. If concentrations listed are exceeded, individual establishments will be subject to control of wastes discharged.

Note: The former provisions of ch. 10, derived from an ordinance, adopted May 23, 1966, arts I-VII, have been deleted as superseded by L.L. 5 of 1977, now superseded by L.L. 2 of 1982, from which the present chapter is now derived.

Limits of Toxic Sustenances in Sewage:

Iron, as Fe----------	1.4	mg/l
Chromium, as Cr (hexavalent)------	0.10	mg/l
Copper, as Cu----------	0.5	mg/l
Chlorine Requirements----------	15.0	mg/l
Phenol----------	0.8	mg/l
Cyanide, as CN----------	0.3	mg/l
Cadmium, as Cd----------	0.02	mg/l
Zinc, as Zn----------	0.5	mg/l
Nickel----------	1.0	mg/l
Arsenic, as As----------	0.1	mg/l
Barium, as Ba----------	2.0	mg/l
Lead, as Pb----------	0.05	mg/l
Selenium, as Selenium, as Se--------	0.02	mg/l
Mercury, as Hg----------	0.01	mg/l
Persistent pesticides----------	0.00	mg/l

Sections 198-35 – 198-40 – Reserved.

Article II – Discharge of Industrial Wastes

Section 198-41 – Action by Superintendent on discharge of harmful waters, wastes – If any waters or wastes are discharged, or are proposed to be discharged, to the public sewers, which waters contain the substances or possess the characteristics enumerated in Section 10-34, and which in the judgment of the Superintendent may have a deleterious effect upon the sewerage works, processes, equipment or receiving waters, or which otherwise create a hazard to life or constitute a public nuisance, the Superintendent may:

a) Reject the wastes.

b) Require that when pretreatment standards are adopted by the USEPA or NYSDEC for any given class of industries, then such industries must immediately conform to the USEPA or NYSDEC timetable for adherence to these standards. The Superintendent shall further assure that compliance by industries to whom pretreatment standards are applicable are in compliance with Section 307 of PL-95-217 as amended and any more stringent standards as may be determined by the Village.

c) Require control over the quantities and rates of discharge.

d) Require payment to cover the added cost of handling and treating the wastes not covered by existing taxes or sewer charges under the provisions of Section 10-51. (L.L. 2 of 1982)

Section 198-42 – Review and approval of pretreatment facilities – If the Superintendent permits the pretreatment or equalization of waste flows, the design and installation of the plants and equipment shall be subject to the review and approval of the Superintendent and subject to the requirements of all applicable codes, ordinances and laws (L.L. 2 of 1982).

*State law reference - Power to compel abatement, removal of unwholesome or nauseous condition, Vill. Law, 89(55).

Section 198-43 – Grease, oil and sand interceptors

a) When required. Grease, oil and sand interceptors shall be provided when, in the opinion of the Superintendent, they are necessary for the proper handling of liquid wastes containing floatable grease in excessive amounts, or any flammable wastes, sand or other harmful ingredients; except that such interceptors shall not be required for private living quarters or dwelling units.

b) Type, capacity, location. All interceptors shall be of a type and capacity approved by the Superintendent and shall be located so as to be readily and easily accessible for cleaning and inspection. (L.L. 2 of 1982)

c) Disposal of debris. In the maintaining of these interceptors, the Owner shall be responsible for the proper removal and disposal by appropriate means of the captured material and shall maintain records of the dates and means of disposal which are to be the subject to review by the Superintendent. Any removal and hauling of the collected materials not

performed by the Owner's personnel must be performed by currently licensed waste disposal firms.

Section 198-44 – Maintenance of preliminary treatment facilities – Where preliminary treatment of flow-equalizing facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the Owner at his expense (L.L. 2 of 1982).

Section 198-45 – Facilities for observation, sampling, measurement of wastes - When required – When required by the Superintendent, the Owner of any property serviced by a building sewer carrying industrial wastes shall install a suitable control manhole, together with such necessary meters and other appurtenances in the building sewer to facilitate observation, sampling and measurement of the wastes (L.L. 2 of 1982).

Section 198-46 – Same - Location and construction – When facilities for the observation, sampling and measurement of wastes are required, such facilities shall be accessibly and safely located and shall be constructed in accordance with plans approved by the Superintendent (L.L. 2 of 1982).

Section 198-47 – Same - Installation and maintenance – Facilities for the observation, sampling and measurement of wastes shall be installed by the Owner at his expense and shall be maintained by him so as to b Ie safe and accessible at all times (L.L. 2 of 1982).

Section 198-48 – Measurements, tests, analyses – Standards – All measurements, tests and analyses of the characteristics of waters and wastes to which reference is made in this article shall be determined in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater", published by the American Public Health Association (L.L. 2 of 1982).

Section 198-49 – Same - Where determined – Measurements, tests and analyses shall be determined at the control manhole provided or upon suitable samples taken at said control manhole. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest downstream manhole in the public sewer to the point at which the building sewer is connected (L.L. 2 of 1982).

Section 198-50 – Same – Sampling – Sampling for measurements, tests and analyses shall be carried out by customarily accepted methods to reflect the effect of constituents upon the sewerage works and to determine the existence of hazards to life, limb and property. The particular analyses involved will determine whether a twenty-four (24) hour composite of all outfalls of a premises is appropriate or whether a grab sample or samples should be taken. Normally, but not always, BOD and suspended solid analyses are obtained from twenty-four

(24) hour composite of all outfalls whereas pH's are determined from period grab samples (L.L. 2 of 1982).

Section 198-51 – Special agreements for receipt of industrial wastes – No statement contained in this article shall be construed as preventing any special agreement or arrangement between the Village and any industrial concern whereby an industrial waste of unusual strength or character may be accepted by the Village for treatment subject to payment therefor, by the industrial concern (L.L. 2 of 1982).

Section 198-52 – Notification required if accidental discharge occurs – A Significant Industrial User shall notify the Village immediately upon accidentally discharging wastes in violation of this ordinance. This notification shall be followed, within 15 days of the date of occurrence, by a detailed written statement describing the causes of the accidental discharge and the measures being taken to prevent future occurrence. Such notification will not relieve users of liability for any expense, loss or damage of the sewer system, treatment plant or treatment process, or for any fines imposed on the Village under applicable State and Federal regulations.

Section 198-53 – Posting required – A notice shall be furnished and permanently posted on the Significant Industrial User's bulletin board advising employees whom to call in case of an accidental discharge in violation of this Chapter. Copies of this Local Law are to be made available to user's employees.

Section 198-54 – No dilution of discharge – No user shall ever increase the use of process water or, in any way, attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve compliance with the limitations contained in the Federal Categorical Pretreatment Standards, or in any other pollutant specific limitation developed by the County or State unless authorized by State or Federal regulations.

Article III – Penalties

Section 198-55 – Violations – Penalty

(a) Notice of violation. Any person found to be violating any provision of the Chapter including any person who knowingly makes any false statement, representation, record, report, plan or documentation filed with the municipality shall be served by the Village with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violations. The Village maintains the right herein to take appropriate remedial or preventative action in the event of a threatened violation.

(b) Continuing violations. Any person who shall continue any violation beyond the time limit established by the notice provided in paragraph (a), shall be guilty of a misdemeanor, and on conviction thereof shall be fined in an amount not exceeding fifty dollars ($50.00) for each violation. Each day in which any such violation shall continue shall be deemed a separate offense.

(c) Protection from damage. No person(s) shall maliciously, willfully, or negligently break, damage, destroy, uncover, deface, or tamper with any structure, appurtenance or equipment, which is a part of the wastewater facilities. Any person(s) violating this provision shall be subject to immediate arrest and charge of disorderly conduct, or other applicable provision of the law.

(d) The Village may revoke any wastewater discharge permit or terminate or cause to e terminated wastewater service to any premises if a violation of any provision of this Chapter is found to exist or if a discharge of wastewater causes or threatens to cause a condition of contamination or pollution as defined in this Chapter.

(e) Liability. Any person violating any of the provisions of this Chapter shall become liable to the Village for any expense, loss or damage occasioned the Village by reason of such violation (L.L. 2 of 1982).

Sections 198-56 – 198-61 – Reserved

Article IV – Sewer Rent

Section 198-62 – Definitions – For the purposes of this article the following words, terms and phrases shall have the meanings herein ascribed to them:

Penalty: An additional charge for nonpayment of the sewer rent within a specified period of time as determined by the Board of Trustees of the Village.

Sewer Rent: The rate of charge as determined by the Board of Trustees of the Village for the use of the sewer system facilities.

Sewer system and disposal unit: All the public sewer system in the Village, including pipes, lateral connections, disposal units, pumps and all other equipment and materials incidental to a sewer system.

Unit and Premises:

(a) A building under one roof or leased by one customer and occupied as one residence or one place of business; or

(b) A combination of buildings owned or leased by one customer, in one common enclosure, occupied by one family, or one corporation or firm, as a residence or place of business; or

(c) Each unit of a multiple house or building separated by solid vertical partition wall occupied by one family, or one firm, as a residence, or place of business; or

(d) A building owned or leased by one customer having a number of apartments, offices or lots which are rented to tenants and using in common one hall and one or means of entrance; or

(e) A building two (2) or more stories high under one roof owned or leased by one customer having an individual entrance for the ground floor occupants and one for the occupants of the upper floors (L.L. 2 of 1982).

*State law reference – Authority of the Village to establish sewer rents; to change rent rates; delinquent payment of rents to constitute lien upon the property served by sewers; disposition of rents, etc., Vill. Law, 279.

Section 198-63 – Purpose of Sewer Rents – The purpose of the sewer rents is to generate sufficient revenues for retiring debt service, capital expenditures, and operating and maintenance of the Village owned sewage works.

Section 198-64 – Method used to establish rent – The basis or method used to establish the sewer rent shall be based on the actual reading of the water meter by the Onondaga County Water Authority, which reading will be supplied to the Village each quarter, indicating the amount of water per gallon consumed by consumers (L.L. 2 of 1982). The rate will be established by the Village Board. A minimum quarterly rate may be established.

Section 198-65 – When rent due and payable; penalty of nonpayment – The sewer rent shall be due and payable on July first, October first, January first and April first. Each statement will list separately debt service and operation and maintenance costs. A penalty of ten percent (10%) per quarter, compounded, shall be imposed for nonpayment of the quarterly charge within thirty (30) days of the mailing date of the statement of bill (L.L. 2 of 1982).

Section 198-66 – Schedule of rates and biennial review – A schedule of sewer rent rates shall be maintained on file in the office of the Village Clerk. Sewer rent rates will be determined by the Village Board on a year-to-year basis. In addition, a biennial review of the wastewater contribution of users and user classes, the total costs of operation and maintenance of the treatment works, and its sewer rent rates will be made by the Village Board. Biennial revisions made to the sewer rent rates will accomplish the following:

1) Maintain the proportionate distribution of operation and maintenance costs among users and user classes.

2) Generate sufficient revenue to pay the total operation and maintenance costs necessary to the proper operation and maintenance of the system.

Section 198-67 – Toxic Pollutants – Surcharge – Any user which discharges any toxic pollutants, which cause an increase in cost of managing the effluent of the system shall pay for such increased cost as may be determined by the Village Board.

Section 198-68 – Inconsistent Agreements – The sewer rent system shall take precedence over any terms or conditions of agreements or contracts between the Village and users.

Note: The former provisions of Ch. 10, derived from an ordinance adopted May 23, 1966, arts I-VII, have been deleted as superseded by LL 5 of 1977, now superseded by L. L. 2 of 1982, from which the present chapter is now derived.

This Local Law No. 2 of 1982 shall be effective the first day of July 1982.

INTERMUNICIPAL AGREEMENT
BETWEEN
The Town of Marcellus on behalf of
the Marcellus Sewer Districts # 1 and 2
and
The Village of Marcellus

Agreement made as of this 9th day of July, 2012, by and between the Town of Marcellus, a municipal corporation, with its offices at 24 E. Main Street (OK) Marcellus, New York (hereinafter referred to as the "Town") on behalf of the Marcellus Consolidated Sewer Districts # 1 and 2, and the Village of Marcellus, a municipal corporation of the State of New York, with its offices at 6 Slocombe, Marcellus, New York (hereinafter referred to as the "Village").

WITNESSETH:

WHEREAS, the Town has formed, operates and maintains the Marcellus Sewer Districts # 1 and 2 within the Town, to include sewer lines and one or more pumping stations, for the purpose of providing public sanitary sewer services to Town residents ("Town Sewer System"),

WHEREAS, the Marcellus Central School District has formed the Marcellus Central School District System (the "School District") and operates and maintains such system for the purpose of providing public sanitary sewer services within the School District and contracts with the Village to transport and treat sewage from the School District;

WHEREAS, the Village operates and maintains a sewer system within its corporate boundaries, which includes sewer lines, pumping stations and a wastewater treatment plant ("Village Sewer System"),

WHEREAS, the Town contracts with the Village to use the Village Sewer System to transport and treat sewerage from the Town; and

WHEREAS, the Village Wastewater Treatment Plant's average flow for the 2011 calendar year was .39 million gallons per day, representing one hundred-three percent (103%) of the plant's design flow, which exceeds the permitted flow by the New York State Department of Environmental Conservation ("DEC"), and

WHEREAS, the DEC has ordered the Village to reduce wastewater flow by creating and executing a Flow Management Plan to address inflow and infiltration ("I & I") that is occurring in the Village, Town and School District Sewer Systems, and

WHEREAS, the Town and Village wish to consolidate the operation, maintenance, repair and billing of their sewer systems ("Consolidated Sewer System") in order to optimize operational efficiency, reduce flow within the system by addressing I & I issues and reduce taxpayer expense.

NOW, THEREFORE, in consideration of the terms, covenants and conditions contained herein, the Town and Village do hereby agree as follows:

1. VILLAGE ACTIONS

The Village agrees to

a. Enter into agreements to have a flow management plan developed for the sewer systems in the Village, Town and School District which will detail the methods to be used to investigate I & I problems in the systems ("Flow Management Plan") and a follow-up I & I field investigation (to include videotaping, flow management, smoke testing, etc.) and report which will set forth specific actions to be taken to address I & I problems in the systems ("I & I Investigation and Report"); and

b. Pay for its proportional share of the cost to develop the Flow Management Plan based upon the percentage of sewer units in the Village compared to the total number of sewer units in the Village, Town and Marcellus Central School District combined; and

c. Pay for the full cost to conduct the I & I Investigation and Report as it relates to the Village Sewer System; and

d. Oversee implementation and completion of the Flow Management Plan and I & I Investigation and Report; and

e. Lease from the Town the Town Sewer System and when repairs to the Town Sewer System identified in the I & I Investigation and Report are made by the Town and approved by the Village, which approval shall not be unreasonable withheld ("Town System Upgrade"), the Village will enter into negotiations with the Town to assume ownership of the Town Sewer System; and

f. Operate, maintain and repair the Consolidated Sewer System in accordance with all applicable laws and regulations; and

g. Eliminate the "outside user fee" currently paid by Town sewer users to the Village in favor of collecting a Transmission and Maintenance Fee which is currently paid by Town sewer users to the Town; and

h. Maintain accurate records detailing the costs incurred to monitor and oversee the operation, maintenance and repair the Town Sewer System prior to completion of the Town System Upgrade, as well as the costs incurred in overseeing implementation and completion of the I & I Investigation and Report as it relates to the Town Sewer System.

2. TOWN ACTIONS

The Town agrees to

a. Lease to the Village the Town Sewer System and when the Town System Upgrade is complete, enter into negotiations with the Village to transfer ownership of the Town Sewer System to the Village; and

b. Pay for its proportional share of the cost to develop the Flow Management Plan based upon the percentage of sewer units in the Town compared to the total number of sewer units in the Village, Town and School District combined; and

c. Pay for the full cost to conduct the I & I Investigation and Report as it relates to the Town Sewer System; and

d. Make repairs to the Town Sewer System identified in the I & I Investigation and Report to the satisfaction of the Village, which approval shall not be unreasonably withheld, with the cost of such repairs being the sole responsibility of the Town. "Repairs" shall be defined in the I & I Investigation and Report as the high priority recommended repair areas, which would include sections of sewer or manholes that have evidence of structural cracks, spalling, offset joints and other physical deterioration that result in inflow or infiltration entering the system. "Repairs" shall also include the disconnection of any known illegal cross connections into the Town Sewer System; and

e. Continue to pay any existing debt associated with the Town Sewer System that was in existence prior to full consolidation of the sewer systems; and

f. Obtain the approval of the Board of Trustees of the Village before making any additional connections to or extensions of the Town Sewer System; and

g. Turn over to the Village any remaining balance in the Town's sewer maintenance/repair fund if the fund is not completely depleted by the Town to pay for the Town Sewer Upgrade; and

h. Have Town sewer users in the Town Sewer Districts (#1 and #2) continue to pay (but payment now will be made to the Village rather than the Town pursuant to the schedule listed in section 4 below) an annual Transmission and Maintenance Fee equivalent to the fee currently charged by the Town to maintain the Town Sewer System (25% of the Basic Service Cost referenced below); and

i. Reimburse the Village for any costs incurred by the Village to monitor and oversee the operation, maintenance and repair the Town Sewer System prior to completion of the Town Sewer Upgrades, as well any costs incurred in overseeing implementation of the I & I Investigation and Report as it relates to the Town Sewer System, which collectively exceed 10% of the Basic Service Cost referenced below in any given year (June 1 through May 31). Such reimbursement shall be made to the Village within 30 days of the Village providing an accounting of its costs to the Town. In the event a line breaks or other significant repairs are needed to the Town Sewer System prior to completion of the Town Sewer Upgrade, the Town shall pay for such repairs directly to the respective vendor(s).

3. COST OF SERVICES

a. The Town agrees to pay the Village a fee for operating and maintaining the Village Sewer System which transmits and treats sewage from the Town ("Basic Service

Fee"), plus the Transmission and Maintenance Fee referenced in section 2(f) above, in accordance with the following formula:

FORMULA

Total Village Sewer System Revenue divided by Village sewer units equals Basic Service Fee

Basic Service Fee plus Transmission and Maintenance Fee (25% of Basic Service Fee) equals Consolidated Service Fee

Consolidated Service Fee multiplied by number of Town sewer units equals Total Town Cost

b. The Village agrees to lease the Town Sewer System from the Town for one dollar ($1.00) and other good and valuable consideration, the receipt and adequacy of such are hereby acknowledged.

4. SCHEDULE OF PAYMENTS

The Town agrees to make payments to the Village on the first business day of each of the months of April, July, October and February, each in the amount of one-fourth (1/4) the estimated Total Town Cost provided by the Village as calculated from Section 3 herein. Said payment shall be based upon an annual estimate amount to be prepared by the Village and submitted to the Town on or before June 1st of each year. The annual estimate shall first be used in calculating and making the July payment and subsequent payments in the following three quarters.

a. The Village shall by August 1st of each year prepare an audit of all eligible costs incurred, which shall be transmitted, to the Town.

b. Said costs will be subject to an audit to be conducted and certified to by a Consulting Engineer as mutually agreed upon by both the Town and Village.

c. Any and all necessary adjustments to the Total Town Cost resulting from the audit shall be incorporated into the October 1st payment each year.

5. CLASSIFICATION OF UNITS

The following classification of units will be used in both the Village and Town to determine the applicable annual sewer use payments to be made by the Town to the Village:

	CLASSIFICATION	FACTOR
1.	Single Family House	1 Unit
2.	Mobile Home or Private Lot	1 Unit
3.	Mobile Home in Park	1 Unit each
4.	Apartment Houses	1 Unit for 1st Apt. and

		1 Unit for each add'l Apt.
5.	Church	1 Unit
6.	Parsonage – Separate Structure	1 Unit
7.	Parsonage – Attached to Church	1 Unit
8.	Firehouse or Municipal Building	1 Unit
9.	Campsite or RV Rental Unit w/Sanitary Facilities	1/8 Unit
10.	Industrial & Commercial (Stores, Restaurants, Motels, Hotels, Gas Stations, Laundromat, etc)	1 Unit and 1 Unit per 80,000 gals. of sewage per year or part thereof over 80,000 gals.

The number of units to be used in calculating the applicable annual sewer use payments as per Sections 2(f) and 3 herein shall be determined annually.

(a) The Village shall determine and submit its actual unit count along with the annual budget on June 1st of each year.

(b) The Town shall determine and submit its count of actual units connected to the sewer and submit said count to the Village along with the April 1st payment. Any new units within the Town which are connected to the sewer prior to October 1st of any given year shall be used in making final audit and in making the final payment adjustments the following October.

6. OTHER AGREEMENTS

a. This Agreement supersedes all prior negotiations and written or oral understandings, if any, and may not be amended or supplemented except by an instrument in writing signed by both parties hereto.

b. This Agreement shall replace all prior agreements both written and oral between Village and Town for the Town Sewer System.

7. INTERPRETATION

a. The paragraph captions are for convenience only and shall not affect the interpretation of this Agreement.

b. This Agreement shall be construed and enforced in accordance with the laws of the State of New York.

8. ASSIGNMENT

This Agreement will be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns to which this Agreement relates.

9. NOTICES

Notices will be deemed properly given when in writing sent by certified mail postage prepaid and addressed:

If to the Town: Supervisor, Town off Marcellus
24 E. Main Street
Marcellus, New York 13108

If to the Village: Mayor, Village of Marcellus
6 Slocombe Avenue
Marcellus, New York 13108

10. HOLD HARMLESS

The Village shall indemnify, defend, keep and hold the Town, including its officers, agents and employees, harmless from and against any and all damages, costs, expenses and liability arising from any negligence by the Village or Village's failure to comply with any of the terms, covenants and conditions herein contained. The Town shall indemnify, defend, keep and hold the Village harmless from and against any and all damages, costs, expenses and liability arising from any negligence by the Town or Town's failure to comply with any of the terms, covenants and conditions herein contained. The obligation to indemnify shall also include the duty to pay any judgments or settlements, and all reasonable costs, fees and expenses, including attorney fees, incurred in connection therewith.

11. LENGTH OF AGREEMENT

The term of this Agreement shall be from June 1, 2012 until December 31, 2022, unless superseded by an agreement to transfer ownership of the Town Sewer System to the Village. This Agreement may be cancelled by the Village upon ninety (90) days prior written notice if the Town fails to timely make repairs to the Town Sewer System identified in the I & I Report to the satisfaction of the Village, which approval shall not be unreasonably withheld. "Timely" shall be defined as completing the repairs referenced in paragraph 2(d) infra within one year of issuance of the I & I Report.

IN WITHNESS WHEREOF, the parties hereto have caused this Agreement to be signed and their respective seals to be hereunto affixed by their duly authorized officers the day and year first above written.

TOWN OF MARCELLUS

By _____
Town Supervisor

VILLAGE OF MARCELLUS

By _____
Mayor

STATE OF NEW YORK)
COUNTY OF ONONDAGA) ss.
TOWN OF MARCELLUS)

On this 10th day of July, 2012, before me personally appeared Daniel G. Ross, to me personally known, who, acknowledged that he resides at 2467 Cardiewick, in Marcellus, New York that he is the Supervisor of the Town of Marcellus, the corporation described in and which executed the within instrument, and that the instrument was sealed and executed pursuant to the authority in he vested.

Karen R Pollard

Notary Public

KAREN R. POLLARD
Notary Public, State of New York
Qualified in Onon. Co. No. 01PO6027141
Commission Expires June 28, 2015

PAY TO THE ORDER OF
KEYBANK
MARCELLUS, NY 13108
021300077
FOR DEPOSIT ONLY
TOWN OF MARCELLUS
TOWN CLERK
320120042264

STATE OF NEW YORK)
COUNTY OF ONONDAGA) ss.
VILLAGE OF MARCELLUS)

On this 26th day of June, 2012, before me personally appeared John P. Curtin, to me personally known, who, acknowledged that he resides at 6 Slocombe Ave., in Marcellus, New York, that he is the mayor of the Village of Marcellus, the corporation described in and which executed the within instrument, and that the instrument was sealed and executed pursuant to the authority in he vested.

Dawn M. O'Hara

Notary Public

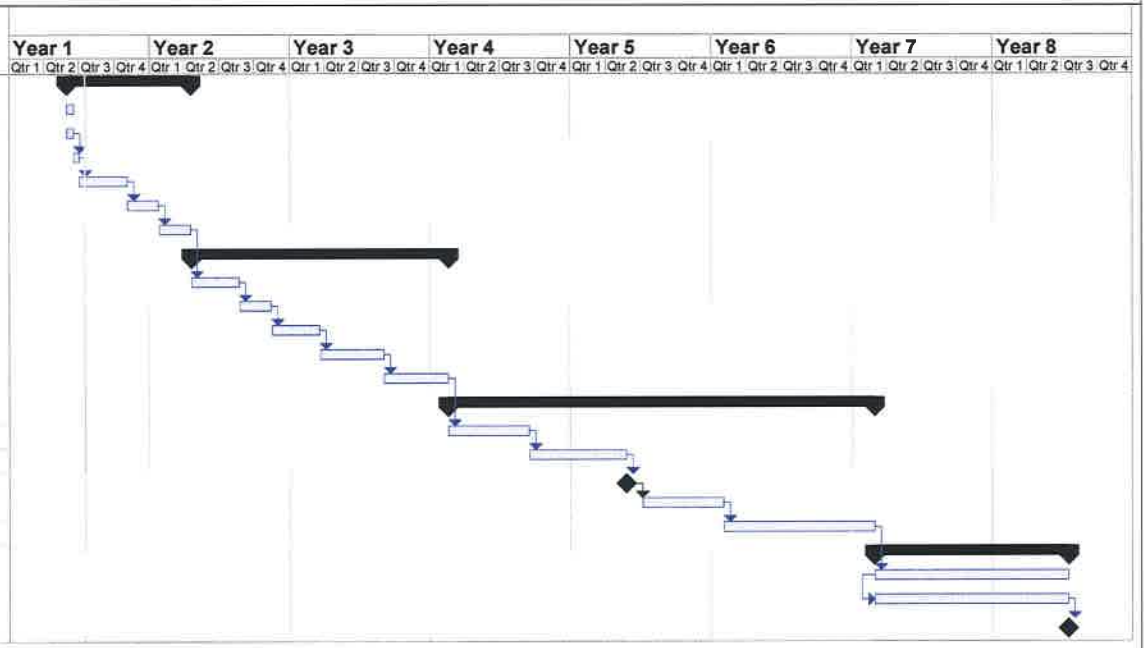
DAWN M. O'HARA
Notary Public, State of New York
No. 01OH6213160
Qualified in Onondaga County
Commission Expires Nov. 2, 2013

APPENDIX E

FLOW MANAGEMENT PLAN – IMPLEMENTATION SCHEDULE

Village of Marcellus
Flow Management Plan - Implementation Timeline

ID	Task Name
1	**Year 1**
2	Review and evaluate previous I/I Investigation Work
3	Evaluate Corrective Actions that have been performed
4	Prepare Flow Management Plan
5	Conduct Manhole Flow Metering to Identify Problem Areas within the Village
6	Prepare an Action Plan for additional I/I Investigation Work within the Village
7	Prepare an Action Plan for Out-of-District contributors (Town of Marcellus)
8	**Year 2-3**
9	Perform Sewer Relining of Deteriorated Areas with Highest Priority
10	Perform Spot Repairs of High Problem Areas
11	Conduct Additional Flow Metering to Identify New Problem Areas
12	Conduct Televising of Sanitary Sewers and Manhole Conditions Survey
13	Perform Flow Metering with Town
14	**Year 4-6**
15	Perform Sewer Relining of Deteriorated Areas with High Priority
16	Perform Spot Repairs of High Problem Areas
17	Evaluate Flow Management Plan and Revise Accordingly
18	Conduct Televising of Sanitary Sewers and Manhole Conditions Survey
19	Continue sewer repair and/or I&I elimination projects
20	**Year 7 and Beyond**
21	Continue I/I Investigations
22	Continue sewer repair & I&I improvements to remove significant I&I
23	Evaluate Flow Management Plan and Revise Accordingly



Mon 7/16/12

APPENDIX F

PHOSPHORUS REMOVAL QUANTITIES ESTIMATES

Completed By:	A. Cummings	**Job No:**	1375.12001.000
Checked By:		**Page:**	1 of 2
Project Name:	Village of Marcellus	**Date:**	Apr-12

MRB group
Engineering, Architecture, Surveying, P.C.

Subject: Determine the daily Alum feed required, based on various WWTP flows

References: 1. USEPA, Process Design Manual for Phosphorus Removal, EPA 625/1-76-001a

Givens:
1. Formula for liquid alum: $Al_2(SO_4)_3\ 14H_2O$
2. Alum strength is 48%
3. Density of alum solution: 80 lb/ft3, 10.7 lb/gal
4. Secondary Effluent P = 4.5 mg/L
5. Molecular weight of alum is 594, molecular weight of Al is 27, and the molecular weight of P is 31
6. Alum Solution Storage Capacity: 30 days

Step 1: Determine weight of alum

a. The weight of alum/gallon is:

Alum/gal = Alum strength x density of alum solution

Alum/gal = 48% x 10.7 lb/gal
Alum/gal = 5.13 lb/gal

$$Al_2(SO_4)_3 \cdot 14H_2O + 2PO_4^{3-} \rightarrow 2AlPO_4 + 3SO_4^{2-} + 14H_2O$$

P Removal Required	Alum:P Wt. Ratio
75%	13 :1
85%	16 :1
95%	22 :1

Step 4: Determine the amount of alum solution per day

cost per gallon $1.10

	Flow (mgd)	P Removed (mg/L)	P % Removal	Alum Dose (mg/L)	Alum (gpd)	(Gal.)	$/day	$/year
Interim P Limit Effluent P (mg/L) 1.0	0.280	3.5	78	59	27	799	$29.29	$10,691.64
	0.330	3.5	78	59	31	942	$34.52	$12,600.86
	0.380	3.5	78	59	36	1,084	$39.75	$14,510.08

Completed By:	A. Cummings	**Job No:**	1375.12001.000
Checked By:		**Page:**	2 of 2
Project Name:	Village of Marcellus	**Date:**	Apr-12

MRB group
Engineering, Architecture, Surveying, P.C.

Subject: Determine the increase in sludge production from addition of Alum

References: 1. USEPA, Nutrient Control Design Manual, EPA 600/R-10-100

Givens:
1. Formula for liquid alum: $Al_2(SO_4)_3\ 14H_2O$
2. Alum strength is 48%
3. Density of alum solution: 80 lb/ft3, 10.7 lb/gal
4. 1.5 mole of Al is required per mole of P
5. Secondary Effluent P = 4.5 mg/L
6. Molecular weight of alum is 594, molecular weight of Al is 26.98, and the molecular weight of P is 31
7. Alum Solution Storage Capacity: 30 days
8. Influent Al^{3+} = 10 mg/L
9. Precipitated products include: $AlPO_4$, $Al(OH)_3$

	Flow (mgd)	P Removed (mg/L)	P % Removal	P Removed (mmole/L)	Al^{3+} Added (mmole/L)	$AlPO_4$ Formed (mmole/L)	$Al(OH)_3$ Formed (mmole/L)	Mass Precip. Solids (lb/day)	Mass Precip. Solids (lb/year)
Interim P Limit	0.280	3.5	78	0.113	0.290	0.113	0.177	87	31,773
Effluent P (mg/L)	0.330	3.5	78	0.113	0.290	0.113	0.177	103	37,447
1.0	0.380	3.5	78	0.113	0.290	0.113	0.177	118	43,121

APPENDIX G

CLARIFIER EVALUATION CALCULATIONS

Clarifier Evaluations

Existing clarifier dimensions

No. of units	2
Diameter	20 ft
Area	314 ft^2
Depth	8 ft
MLSS	2000 mg/L (Assumed)
RAS	150 gpm (Assumed)

The scenarios below evaluate the clarifiers operating individually

Scenario Description	Peak Hourly Flow (MGD)	Surface Overflow Rate (gpf/ft^2) [Per 10 States Standards]	Surface Area (ft^2)	Calculated Diameter (ft)	Recommended Diameter (ft)
Existing	1.3	1,200	1,083	19	20
P Removal	1.3	900	1,444	21	25
P Removal	1.3	600	2,167	26	30

The scenarios below evaluate the clarifiers operating in parallel

Scenario Description	Peak Hourly Flow (MGD)	Surface Overflow Rate (gpf/ft^2) [Per 10 States Standards]	Surface Area (ft^2)	Calculated Diameter (ft)	Recommended Diameter (ft)
Existing	1.3	1,200	542	13	15
P Removal	1.3	900	722	15	20
P Removal	1.3	600	1,083	19	20
P Removal	1.3	400	1,625	23	25

APPENDIX H

AEROBIC DIGESTER EVALUATION CALCULATIONS

MRB|*group*

Project Title: Village of Marcellus WWTP Capacity Study
Project No.: 1375.12001.000
Date: 5/1/2012
Engineer: Adam Cummings, P.E.

Objective: To evaluate the Aerobic Digester capacity.

Calculations:

1) Calculate the degree-days for Winter and Summer seasons.

SRT =	60 days
Winter Temp =	15 °C
	59 °F
Winter Degree-days =	900 degree-days
Winter VSS Reduction =	**45 %**

Winter VSS Requirement is achieved.

Summer Temp =	20 °C
	68 °F
Summer Degree-days =	1,200 degree-days
Summer VSS Reduction =	**48 %**

2) Calculate the mass of VSS reduced.

Volatile fraction of digester TSS = 0.8 (from Ref. (1) below)

Total Solids to be Digested = 244 lb/day

Total Mass of VSS = Vol Fraction of digester TSS x Total Solids to be Digested

Total Mass of VSS = 194.9 lb VSS/day

Seasonal VSS reduced = Season VSS Reduction Rate x Total Mass of VSS

Winter VSS reduced =	109	lb VSS reduced/day
Summer VSS reduced =	117	lb VSS reduced/day

3) Determine the oxygen requirements for each season.

Oxygen required for oxidation of cell tissue = 2.3 lb O_2/lb VSS (from Ref. 1 below)

Winter O_2 Required =	252	lb O_2/day
Summer O_2 Required =	269	lb O_2/day

4) Calculate the volume of air required.

$$\rho_{air} = \frac{P\left(144 in^2/ft^2\right)}{RT}$$

R = 53.3 ft*lb/lb-air*°R
P = 14.7 lb/in^2

Avg. Winter Air Temp = 34 °F
493.67 °R

Winter ρ_{air} = 0.0804 lb/ft^3

Avg. Summer Air Temp = 75 °F
534.67 °R

Summer ρ_{air} = 0.0743 lb/ft^3

$$VolofAir = \frac{O_2 required}{(\rho_{air})(0.232)}$$

Winter: V_{air} = 13,489 ft^3/day

Summer: V_{air} = 15,604 ft^3/day

5) Calculate the air flowrates for the different seasons.

Oxygen Transfer Efficiency = 10% (Assumed)

Winter: q_{air} = 93.7 ft^3/min

Summer: q_{air} = 108.4 ft^3/min

6) Calculate the volume of sludge to be disposed per day.

$$VolofSludge = \frac{M_s}{\rho_w S_s P_s}$$

Density of Water (ρ_w) = 62.4 lb/ft^3 (Assumed)
Sludge Spec. Grav. (S_s) = 1.03 (Assumed)
Sludge Conc. (P_s) = 2.5% (Assumed)

Volume of Sludge = 152 ft^3/day

7) Calculate the required volume of the aerobic digester (winter conditions govern).

$$V = \frac{Q_i(X_i + YS_i)}{X\left(k_d P_v + \frac{1}{SRT}\right)}$$

X_i =	10,000	mg/L	(Assumed)
X =	7,000		(Assumed to be 70% of incoming flow)
Y =	0.0	No Primary Solids included in this design.	
S_i =	200	mg/L	(From BOD Data)
k_d =	0.06	day^{-1}	
P_v =	0.8	(Assumed)	
Required V =	3,350	ft^3	
Available V =	6,144	ft^3	

Adequate volume is present for this design.

8) Compute the air requirement per unit volume for the aerobic digester.

q = 32.4 $ft^3/10^3\ ft^3$*min

Adequate mixing is achieved with the diffused air system.

References:

1) Tchobanoglous, George, Burton, Franklin L., and H. David Stensel. *Wastewater Engineering Treatment and Reuse, 4th Edition.* McGraw-Hill. New York: 2004.

APPENDIX I

CHLORINATION/DECHLORINATION VS. UV DISINFECTION CALCULATIONS

MRB|*group*

Project Title Village of Marcellus WWTP Capacity Study
Project No.: 1375.12001.000
Date: April 27, 2012
Engineer: Adam Cummings

Objective: To calculate the costs associated with the construction of a Chlorine Contact Tank Expansion at the WWTP.

Calculations:

Capital cost =	**$229,500**	
Interest rate =	**4.50%**	
Operation cost =	**$800**	per year
Service life =	**10**	years
Salvage value at end of service life =	**$0**	

Assume straight-line depreciation of the system.

$$Depreciation = \frac{(initial - salvage)}{servicelife}$$

Depreciation =	$22,950	per year
Total annual cost =	$23,750	per year

References:

1) Reynolds, Joseph P., Jeris, John S. and Louis Theodore, Handbook of Chemical and Environmental Engineering. John Wiley & Sons, Inc., New York: 2002, p. 628-630.

MRB|*group*

Project Title Village of Marcellus WWTP Capacity Study
Project No.: 1375.12001.000
Date: April 27, 2012
Engineer: Adam Cummings

Objective: To calculate the costs associated with the installation and operation of the UV Radiation disinfection system at the WWTP.

Calculations:

Capital cost =	$330,500	
Interest rate =	4.50%	
Operation cost =	$8,000	per year
Service life =	30	years
Salvage value at end of service life =	$0	

Assume straight-line depreciation of the system.

$$Depreciation = \frac{(initial - salvage)}{servicelife}$$

Depreciation =	$11,017	per year
Total annual cost =	$19,017	per year

References:

1) Reynolds, Joseph P., Jeris, John S. and Louis Theodore, Handbook of Chemical and Environmental Engineering. John Wiley & Sons, Inc., New York: 2002, p. 628-630.

MRB|*group*

Project Title Village of Marcellus WWTP Capacity Study
Project No.: 1375.12001.000
Date: April 27, 2012
Engineer: Adam Cummings

Objective: To calculate the costs associated with the installation and operation of the UV Radiation disinfection system at the WWTP.

Calculations:

Capital cost =	$12,000	
Interest rate =	0.00%	
Operation cost =	$800	per year
Service life =	10	years
Salvage value at end of service life =	$0	

Assume straight-line depreciation of the system.

$$Depreciation = \frac{(initial - salvage)}{servicelife}$$

Depreciation =	$1,200	per year
Total annual cost =	$2,000	per year

References:

1) Reynolds, Joseph P., Jeris, John S. and Louis Theodore, Handbook of Chemical and Environmental Engineering. John Wiley & Sons, Inc., New York: 2002, p. 628-630.

MRB|*group*

Project Title Village of Marcellus WWTP Capacity Study
Project No.: 1375.12001.000
Date: April 27, 2012
Engineer: Adam Cummings

Objective: To calculate the costs associated with the operation of the dechlorination system at the WWTP.

Calculations:

Dosage Calculations

Average flowrate =	0.38	MGD
Average SO_2 dosage =	**2.5**	mg/L
Daily SO_2 dosage rate =	8	lb/day
Annual SO_2 dosage rate =	2,892	lb/year

Cost Calculations

SO_2 costs =	**$0.90**	per lb
Annual SO_2 cost =	$2,610	per year

References:

1) Reynolds, Joseph P., Jeris, John S. and Louis Theodore, Handbook of Chemical and Environmental Engineering. John Wiley & Sons, Inc., New York: 2002, p. 628-630.

MRB|*group*

Project Title Village of Marcellus WWTP Capacity Study
Project No.: 1375.12001.000
Date: April 27, 2012
Engineer: Adam Cummings

Objective: To compare and evaluate the use of UV radiation for disinfection of wastewater effluent to the existing chlorine disinfection system.

Calculations:

Total Cost to upgrade and operate Chlorine/Dechlor disinfection system

Annual TOC = $30,060 per year

Total Cost to operate UV radiation disinfection system

Annual TOC = $19,017 per year

Note: TOC stands for Total Operating Cost

Next, determine any cost savings for switching disinfection systems.

Annual cost savings = TOC for existing chlorine gas system - TOC for UV system

Annual cost savings = $11,043 per year

Then, you can determine the expect Return of Investment (ROI) on the investment of the UV system.

ROI = 100*(Annual cost savings)/(investment)

ROI = 3.3%

The ROI is less than the interest rate available for this system.

References:

1) Reynolds, Joseph P., Jeris, John S. and Louis Theodore, Handbook of Chemical and Environmental Engineering. John Wiley & Sons, Inc., New York: 2002, p. 628-630.

APPENDIX J

OPINION OF PROBABLE COSTS TABLES

MRB Project No. 1375.12001.000
Author: A. Cummings

Village of Marcellus WWTP Influent Structure
5/3/2012

Description	Quantity	Unit	Unit Cost	Estimated Total Cost	Comments
Mobilization/Demobilization	1	LS	$30,000.00	$30,000.00	
Geotechnical and Materials Testing	1	LS	$10,000.00	$10,000.00	
New Building (24' x 30')	1	LS	$108,000.00	$108,000.00	
New Concrete Channel	1	LS	$90,000.00	$90,000.00	
Sitework, Site Piping, etc.	1	LS	$75,000.00	$75,000.00	
New Screening Unit w/ Compactor	1	LS	$120,000.00	$120,000.00	
New Grit Removal System	1	LS	$160,000.00	$160,000.00	
Parshall Flume/Flow Monitoring	1	LS	$20,000.00	$20,000.00	
Mechanical, Electrical, Plumbing	1	LS	$50,000.00	$50,000.00	
			Construction Subtotal	$663,000.00	
			Construction Contingency (10%)	$66,300.00	
			Engineering, Legal, Administrative (20%)	$132,600.00	
			TOTAL PROJECT BUDGET ESTIMATE		$862,000.00

MRB Project No. 1375.12001.000
Author: A. Cummings

Village of Marcellus WWTP New Clarifiers
5/3/2012

Description	Quantity	Unit	Unit Cost	Estimated Total Cost	Comments
Mobilization/Demobilization	1	LS	$30,000.00	$30,000.00	
Geotechnical and Materials Testing	1	LS	$10,000.00	$10,000.00	
Rock Blasting/Disposal	1	LS	$300,000.00	$300,000.00	
Excavation	1	LS	$125,000.00	$125,000.00	
Concrete Tankage	1	LS	$175,000.00	$175,000.00	
Chemical Building	1	LS	$150,000.00	$150,000.00	
Pump/Chem Feed for P Removal	1	LS	$45,000.00	$45,000.00	
New Clarifier Equipment	1	LS	$185,000.00	$185,000.00	
Tank Coatings	1	LS	$15,000.00	$15,000.00	
Process Piping and Valves	1	LS	$85,000.00	$85,000.00	
Mechanical, Electrical, Plumbing	1	LS	$25,000.00	$25,000.00	
			Construction Subtotal	$1,145,000.00	
			Construction Contingency (10%)	$114,500.00	
			Engineering, Legal, Administrative (20%)	$229,000.00	
			TOTAL PROJECT BUDGET ESTIMATE		$1,489,000.00

MRB Project No. 1375.12001.000
Author: A. Cummings

Village of Marcellus WWTP UV Disinfection
5/3/2012

Description	Quantity	Unit	Unit Cost	Estimated Total Cost	Comments
Mobilization/Demobilization	1	LS	$10,000.00	$10,000.00	
Concrete Channel Modifications	1	LS	$45,000.00	$45,000.00	
Demo Ex. Chlorine Equipment	1	LS	$15,000.00	$15,000.00	
UV Equipment	1	LS	$158,000.00	$158,000.00	
Electrical	1	LS	$40,000.00	$40,000.00	
			Construction Subtotal	$268,000.00	
			Construction Contingency (10%)	$26,800.00	
			Engineering, Legal, Administrative (20%)	$53,600.00	
				TOTAL PROJECT BUDGET ESTIMATE	$349,000.00

MRB Project No. 1375.12001.000
Author: A. Cummings

Village of Marcellus WWTP Chemical Disinfection
5/3/2012

Description	Quantity	Unit	Unit Cost	Estimated Total Cost	Comments
Chlorination Replacement Pumps	2	LS	$6,000.00	$12,000.00	
Dechlorination Replacement Pumps	2	LS	$6,000.00	$12,000.00	
Excavation/Backfill	1	LS	$35,000.00	$35,000.00	
Piping	1	LS	$20,000.00	$20,000.00	
New Chlorine Contact Tank Walls	1	LS	$93,000.00	$93,000.00	
Chlorine Contact Tank Demo/Disposal	1	LS	$10,000.00	$10,000.00	
New Baffles in Chlorine Contact Tank	1	LS	$1,000.00	$1,000.00	
Restoration	1	LS	$5,000.00	$5,000.00	
			Construction Subtotal	$188,000.00	
			Construction Contingency (10%)	$18,800.00	
			Engineering, Legal, Administrative (20%)	$37,600.00	
				TOTAL PROJECT BUDGET ESTIMATE	$245,000.00