

2015-16 Wastewater Study

In 2012, The Village of Lawrence received a \$143,000 grant for a full review of the Village wastewater system, with a \$16,000 local match. The system audit involved videotaping the sanitary lines (wastewater) throughout the Village, conducting a smoke test of the lines checking for air gaps, then a full review of the 4 sanitary lift stations and The Lagoon Treatment Facility. The resulted study and report (shown below) recommended the cleanout and rebuild of the 3 lagoons, adding flow controls, and to have 3 of 4 sanitary lift stations rebuilt. On 6/18/13, The Village conducted a Public hearing to introduce the results of the study and its recommendations. Cost estimate in the study for the project is approximately \$2.6 million. Although sewer rates to residents and businesses had been increased in recent years to “keep the sewer fund in the black”, this project would still require a 40 year loan to pay for this project.

Sealed bids for Project A (Sewage Pump Stations Improvements & Upgrades) and Project B (Lagoon Treatment Improvements) were issued August 3 with a 9/10/15 Bid Opening. On 10/13/15, The Village Council rejected all bids on the basis that bids came in much higher than estimated, and due to the small number of contractors that actually submitted bids. The bids were resubmitted in December 2015 with the bid package designed to allow bid items to be left out by Councils discretion. On 03/08/16, The Village Council rejected the second round of bids due to higher than expected bids. A decision was made to re-evaluate the project and to determine a time table for recommended items in the waste water projects on a most to least needed basis.

The following are excerpts from the Village of Lawrence Wastewater System Project Plan Report completed in May 2013:

Pump Stations Adequacies to Maintain Sewer System Integrity – The collection sewer system includes four sewage pump stations. The original and current pumping capacity of each of the three primary pump stations is shown in Table 8.

Table 8: Pump Delivery Rates

Pump Station Name	Original Pump Delivery (GPM)	Current Pump Delivery (GPM)
James Street	300	202
School/St. Joseph Street	100	71

** GPM = Gallons per minute

A review of the condition and adequacy of each station is as follows:

James Street Pump Station (located at the northwest corner of Paw Paw Street and James Street)

This pump station is a wet well/dry well flooded suction type pump station. It was constructed in 1980. The station has been well maintained by the Village over the last 15 years, but the fact that most of the components in the station have an expected life far short of the 30 plus years that the station has been functioning. Accordingly, to maintain this station in reliable operation, more than routine maintenance is required, including weekly to monthly jetting to remove grease and accumulating solids. Additionally, due to the hydraulic arrangement of the local sewers and levels in the adjacent structure, the sewer in the area of this pump station has little, if any, effective storage capacity prior to causing basements to experience backup. This station services the entire district located south of St. Joseph Street, including the Business Park adjacent to I-94 located approximately 1-½ miles to the south of the pump station. A report completed in 2005 regarding the sanitary sewer system recommended that this pump station be upgraded or replaced. This remains true today. For these reasons, it is recommended that this pump station be replaced with a structure that meets today's codes and regulations allowing sufficient pump cycle time and is reliable and cost effective to operate.

An additional reason that this pump station is recommended for replacement is due to the events that occurred in the fall of 2012. In October of 2012, the Village experienced an emergency situation at this pump station. A small pressure line ruptured within the dry well that began to fill the structure with raw sewage. The alarm indicating water in the station called the Operator during off hours. The Operator responded quickly, but the pump motors were already partially submerged at the time of arrival. Both motors eventually burned out, and the Village responded by using a portable bypass pump around the station for several days while the station was repaired. Although this situation could occur at any time and location, it is primarily attributable to the age of the station.

The original Basis of Design for these pumps included a pump delivery of 300 gallons per minute (gpm) at 80 feet of head. Both pumps are equipped with 20 horsepower motors. It can be seen from the data in the table above that the actual pump delivery has been substantially decreased due to over 30 years of wear on the pumps. The replacement station requirements remain at 300 gpm. Additional right-of-way or easements will need to be obtained adjacent to the existing station to facilitate the construction of a new pump station.

School Pump Station

This pump station was constructed in 1980 and serves the Lawrence Public High School and surrounding neighborhood, as well as businesses on Michigan Street and along the north side of St. Joseph Street. The existing station is a small grinder pump station that is in relatively poor condition as of October 2012. This station is in need of replacement with a conventional station that has solids handling pumps, flow meter, valves, emergency connection, etc. The replacement station would be designed to meet the Ten State Standards and would have a pump capacity of 120 gallons per minute.

The increased flow is not due to anticipated flow increases, however, it is recommended to for improved maintenance as it will increase the self-cleaning velocity within the force main that the pumps discharge in to. This will increase the velocity from 2.2 feet per second (ft/sec) to 3.0 ft/sec. Since the force main length is only approximately 30 feet long, this will have negligible impact on the power cost over the life of the station. Additional right-of-way or easements will need to be obtained adjacent to the existing station to facilitate the construction of a new pump station.

Main/River Pump Station

This pump station is an above grade suction lift type of station and was constructed in 1980. It is the primary station that pumps all sewage flow from the sanitary system to the wastewater treatment facility. Although the Village has continued keeping this station operational with diligent maintenance, this station is approaching 35 years old and is in need of replacement. In addition to mechanical and structural issues, the station is located within the 100-year floodplain of the Paw Paw River. Due to this situation, the integrity of the station and the entire collection system is in jeopardy when the river overflow's its banks for a 100-year storm. This situation has occurred on more than one occasion just in the last five years. The Operators responded by placing sand bags around the station to prevent the floodwaters from the river entering the wet well and, thus inundate and compromise the stations reliability.

The original Basis of Design for these pumps included a pump delivery of 500 gallons per minute (gpm) at 82 feet of head. Both pumps are equipped with 30 horsepower motors. It can be seen from the data in the table above that the actual pump delivery has been substantially decreased due to over 30 years of wear on the pumps. The replacement station requirements remain at 500 gpm.

A new replacement pump station needs to be constructed out of the floodplain and out of the adjacent wetland. This new station would include solids handling pumps, flow meter, valves, emergency connection, etc. The replacement station would be designed to meet the Ten State Standards and would have a pumping capacity equal to the existing capacity of 500 gallons per minute. Additional right-of-way or an easement will need to be obtained adjacent to the existing station to facilitate the construction of a new pump station while keeping the existing station in operation.

Lagoon Treatment Facility

The daily operation, maintenance, and (minor) repair has been ongoing, but more major items now exist and need to be addressed to obtain the optimum use of the facility. These items include the following:

1. Replacement of 10 of the existing 20 isolation valves at the lagoon site is needed. These valves no longer seat and allow flow to leak through them when they are in the closed position. This problem, therefore, requires additional Operator time to plug the various pipes by other means. This is an ineffective and non-approved method of operation.
2. The Village currently needs to manually read flow that discharges over the outfall weir in an effort to quantify the volume and flow rate that is discharged from the lagoons each year. To improve the operations and increase accuracy, it is recommended that a flow meter be installed

to accurately measure discharges from the lagoons. This will require bringing 120 volt, single phase power service to the site at the location of the current weir. It would also require a small building to house the flow meter controls. The sampling equipment used during discharge, as well as storage for weed control at the lagoons, could also be stored in this building. This is being proposed as a cold storage structure.

3. An additional operational problem occurs due to the fact that the current piping and valve configuration prevents the wastewater flow from Cell #1 to Cell #3 (and vice versa), while the Operator discharges from Cell #2. Therefore, to give the Operator more flexibility, and thus increase the potential for a higher quality discharge, it is recommended that additional piping and valves be installed that will separately allow the discharge of treated effluent from either Cell #2 or Cell #3, while allowing the wastewater to flow between the other cells.
4. When the interior side slopes of each of the three lagoon cells were constructed, small diameter stone (approximately two to four-inch dimensions) were installed along the side-slopes from one foot above high water level down to the low water level. However, over time, some areas of this stone have moved to the toe of the slope. In almost all areas, plant growth has occurred through the stone. To repair the side slopes to a condition to its original state, the weed growth needs to be removed, the stone that has been displaced to the bottom of the slope needs to be reinstalled along the side slopes, and an additional layer of riprap placed from the high water level to the toe of slope. This new layer of riprap needs to be anchored at the bottom. This will aid in better protecting the side slopes against wave action and reduce the potential for future weed growth through the riprap, thus reducing the threat of future erosion.
5. Other items are being proposed to improve the operation and maintenance of this facility. This includes the purchase of a mower designed to be used on slopes. This is recommended to improve the safety of the operator / maintenance staff when mowing the exterior slopes of the lagoon dikes. The second item includes the erection of a cold storage building at the site. It is typical for this type of building to be placed at or near a treatment site, but one was not included with the project in 1980. The building would be used for housing the mower and for storage of 1) chemicals used to combat weeds, and 2) flow meter parts, effluent sampler, and valve wrenches.